Badger Industries

Seismic Bracing Manual

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

2019 Edition
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GENERAL NOTES
(GN1). Neither NUSIG nor Badger Industries is responsible for engineering or detailing the use of NUSIG, Badger Industries and/or other products and components for a specific project and/or application. All such engineering is to be performed by an engineer, retained by others, who is licensed to perform the necessary engineering, and who is insured to provide these “Responsible Engineer” engineering services. All design submittals specifying NUSIG / Badger Industries products and components must be sealed and signed by the Responsible Engineer, and submitted for review and approval to the project S.E.O.R. (Structural Engineer Of Record) and when required, the A.H.J. (Authority Having Jurisdiction).

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

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

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(GN1). Continued:
ANVIL PRODUCTS
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.

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

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

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 overtighten 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.

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

\[(F_{p}) = \text{Seismic Horizontal}, \quad (ASD) = \text{Gravity Vertical Tension}.\]
(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
BADGER INDUSTRIES
SEISMIC HARDWARE
CAPACITY DETAILS
BADGER INDUSTRIES


Seismic Hardware Kits

BADGER (SSC) Can Be Welded To
Building Structure

(TYP.) (2 Of 2)
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

(TYP.) (2 Of 2)
Badger Industries
Provided Screws For
Conn., Of Pivot Arm
To Brace Member

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

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

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

RRK-X/X Kits

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES</th>
<th>Seismic Hardware Kit Numbers</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>76° to 90° 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>
<td></td>
</tr>
</tbody>
</table>

~ BADGER INDUSTRIES ~

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. 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.

Seismic Hardware Kit

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

SRK Kit
SRK 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. 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.
- Each Individual Badger (SSC) Seismic Bracket Has (1) (1/2") Conn., Hole And (1) (5/8") Conn., Hole.

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

SRK-MD 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. 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:

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

Badger Industries (SBEMT)
Double Screw Type Seismic Hardware End Conn., (No Substitution)

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 ~

Detail (SBEMT)

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Seismic Hardware Part Number</th>
<th>EMT Conduit Member Size</th>
<th>0° Offset (LRFD)</th>
<th>90° Offset (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SBEMT) Double Screw End Connection</td>
<td>3/4&quot; EMT Conduit</td>
<td>1,875 lbs.</td>
<td>1,295 lbs.</td>
</tr>
<tr>
<td></td>
<td>1&quot; EMT Conduit</td>
<td>2,265 lbs.</td>
<td>2,040 lbs.</td>
</tr>
<tr>
<td></td>
<td>1-1/4&quot; EMT Conduit</td>
<td>3,370 lbs.</td>
<td>2,740 lbs.</td>
</tr>
<tr>
<td></td>
<td>1-1/2&quot; EMT Conduit</td>
<td>3,370 lbs.</td>
<td>2,470 lbs.</td>
</tr>
<tr>
<td></td>
<td>2&quot; EMT Conduit</td>
<td>3,370 lbs.</td>
<td>2,345 lbs.</td>
</tr>
<tr>
<td></td>
<td>2-1/2&quot; EMT Conduit</td>
<td>3,370 lbs.</td>
<td>2,345 lbs.</td>
</tr>
</tbody>
</table>

Compress Capacity For A Given EMT Conduit Size And Length Varies, And Shall Be Determined By S.E.B.O.

Notice: "SEBO"™ Seismic Engineering By Others

~ BADGER INDUSTRIES ~

SBEMT Seismic Hardware - Design Demand Capacity Limits

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Badger Industries (SWB) Patent Pending Seismic Hardware

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

Min. (3"

One Hook End Of Badger Industries (SWB) Fits (3/8") Diameter Connections And The Other Hook End Of The Same (SWB) Fits (1/2") Diameter Connections

Badger Industries (SWB) Patent Pending Seismic Hardware With Badger Stake-Eye End Conn., Cable Brace Member (No Substitution), (TYP.)

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

Plan View

(1, 2, 3 Or More) Badger Industries (SWB) Patent Pending Seismic Hardware Brackets Can Be Stacked Together, Provided A Washer Is Located Between Hex Nut And The (SWB) Nearest The Hex Nut

(BADGER INDUSTRIES)

Seismic Hardware

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Sales@NUSIG.com
2019 Edition

<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) Installation Torque</th>
<th>(SCC-x) Maximum Live Length</th>
<th>Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)</th>
<th>Brace Angle From Vertical 45° to 60° 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 10 ft.- lbs. 1-1/2&quot; Inch</td>
<td>10 Feet</td>
<td>112 lbs.</td>
<td>159 lbs.</td>
</tr>
<tr>
<td>SWBx118 - 10</td>
<td>Min. (1/8&quot;) Inch Dia. (7x7) Galvanized Steel</td>
<td>SCC-2 20 ft.- lbs. 1-1/2&quot; Inch</td>
<td>10 Feet</td>
<td>219 lbs.</td>
<td>310 lbs.</td>
</tr>
<tr>
<td>SWBx118 - 20</td>
<td>Min. (1/8&quot;) Inch Dia. (7x7) Galvanized Steel</td>
<td>SCC-2 20 ft.- lbs. 1-1/2&quot; Inch</td>
<td>20 Feet</td>
<td>219 lbs.</td>
<td>310 lbs.</td>
</tr>
<tr>
<td>SWBx316 - 10</td>
<td>Min. (3/16&quot;) Inch Dia. (7x19) Galvanized Steel</td>
<td>SCC-2 30 ft.- lbs. 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.
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.

SHVT-SPCA
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.
### SHVT-COPA

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

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

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

Anvil International LLC referred to as ANVIL

**FOR BRACING OF COPPER PIPING:**

ANVIL Fig. 212 And FIG. 212FP

<table>
<thead>
<tr>
<th>Size &amp; Clamp Part Number</th>
<th>SBEMT</th>
<th>Nut 1</th>
<th>Nut 2</th>
<th>Vertical Fp (LRFD)</th>
<th>Brace Angle From Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; Fig. 212</td>
<td>SBEMT</td>
<td></td>
<td></td>
<td>1&quot; in.</td>
<td>125 lbs.</td>
</tr>
<tr>
<td>1-1/4&quot; Fig. 212</td>
<td>SBEMT</td>
<td></td>
<td></td>
<td>1-1/4&quot; in.</td>
<td>1,155 lbs.</td>
</tr>
<tr>
<td>1-1/2&quot; Fig. 212</td>
<td>SBEMT</td>
<td></td>
<td></td>
<td>1-1/2&quot; in.</td>
<td>1,215 lbs.</td>
</tr>
<tr>
<td>2&quot; Fig. 212</td>
<td>SBEMT</td>
<td></td>
<td></td>
<td>2&quot; in.</td>
<td>1,945 lbs.</td>
</tr>
<tr>
<td>2-1/2&quot; Fig. 212</td>
<td>SBEMT</td>
<td></td>
<td></td>
<td>2-1/2&quot; in.</td>
<td>1,195 lbs.</td>
</tr>
<tr>
<td>3&quot; Fig. 212</td>
<td>SBEMT</td>
<td></td>
<td></td>
<td>3&quot; in.</td>
<td>1,580 lbs.</td>
</tr>
<tr>
<td>5&quot; Fig. 212</td>
<td>SBEMT</td>
<td></td>
<td></td>
<td>5&quot; in.</td>
<td>1,225 lbs.</td>
</tr>
<tr>
<td>6&quot; Fig. 212</td>
<td>SBEMT</td>
<td></td>
<td></td>
<td>6&quot; in.</td>
<td>1,100 lbs.</td>
</tr>
</tbody>
</table>

---

#### BADGER INDUSTRIES

**Seismic Hardware**

- **Part Number:** SBEMT
- **Nominal Size:**
  - 1" Fig. 212: 925 lbs.
  - 1-1/4" Fig. 212: 1,155 lbs.
  - 1-1/2" Fig. 212: 1,215 lbs.
  - 2" Fig. 212: 1,945 lbs.
  - 2-1/2" Fig. 212: 1,195 lbs.
  - 3" Fig. 212: 1,580 lbs.
  - 5" Fig. 212: 1,225 lbs.
  - 6" Fig. 212: 1,100 lbs.

---

#### Notes:

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

---

#### Diagrams:

- **ANVIL (AS 3792):**
  - 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")

- **BADGER INDUSTRIES (SBEMT):**
  - Cushion Strip Joint Example. Offset Can Be Orientated Clockwise Or Counter Clockwise From (SBEMT)

---

**Contact:**

- [www.NUSIG.com](http://www.NUSIG.com)
- Sales@NUSIG.com

---

**2019 Edition**
For Bracing of EMT Conduit and Sch. 5 Steel Piping:

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

For Pipe Sizes (1" thru 2"):
1.) Tighten Hex Nut 1, Until Clamp Ears Contact Badger SBEMT.
2.) Tighten Hex Nut 2, Until Clamp Ears Contact Each Other.

For Pipe Sizes (2-1/2" thru 4"):
1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
2.) Tighten (Alternately) Hex Nuts 1 And 2 An Additional (2) Turns. Alternate Tightening Hex Nut 1 And Hex Nut 2, Every (1) Turn.

~ BADGER INDUSTRIES ~
Single Hanger Vertical & Transverse - Design Demand Capacity Limits
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Part Number</th>
<th>Steel Schedule</th>
<th>Maximum Fp (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 in.</td>
<td>SBEMT</td>
<td>(7 thru 80) Pipe</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>1-1/4 in.</td>
<td>SBEMT</td>
<td>Use Limited To Sch., 40 Or Thicker Steel Pipe Or RMC Conduit</td>
<td>577 lbs.</td>
<td>549 lbs.</td>
<td>396 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>1-1/2 in.</td>
<td>SBEMT</td>
<td>1-1/2 in.</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>2 in.</td>
<td>SBEMT</td>
<td>2 in.</td>
<td>840 lbs.</td>
<td>957 lbs.</td>
<td>908 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>2-1/2 in.</td>
<td>SBEMT</td>
<td>2-1/2 in.</td>
<td>1,795 lbs.</td>
<td>1,795 lbs.</td>
<td>1,844 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>3 in.</td>
<td>SBEMT</td>
<td>3 in.</td>
<td>2,202 lbs.</td>
<td>3,220 lbs.</td>
<td>3,970 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>3-1/2 in.</td>
<td>SBEMT</td>
<td>3-1/2 in.</td>
<td>2,202 lbs.</td>
<td>3,110 lbs.</td>
<td>3,320 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>4 in.</td>
<td>SBEMT</td>
<td>4 in.</td>
<td>1,815 lbs.</td>
<td>1,655 lbs.</td>
<td>1,655 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>5 in.</td>
<td>SBEMT</td>
<td>5 in.</td>
<td>1,917 lbs.</td>
<td>1,910 lbs.</td>
<td>1,510 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>6 in.</td>
<td>SBEMT</td>
<td>6 in.</td>
<td>2,202 lbs.</td>
<td>2,995 lbs.</td>
<td>2,995 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>8 in.</td>
<td>SBEMT</td>
<td>8 in.</td>
<td>2,202 lbs.</td>
<td>3,220 lbs.</td>
<td>3,815 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>10 in.</td>
<td>SBEMT</td>
<td>10 in.</td>
<td>2,315 lbs.</td>
<td>2,120 lbs.</td>
<td>2,120 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>12 in.</td>
<td>SBEMT</td>
<td>12 in.</td>
<td>1,465 lbs.</td>
<td>1,780 lbs.</td>
<td>1,780 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
</tbody>
</table>

[1] No Substitution
[3] Use Of (1") Anvil Fig 212 Limited To (1") Schedule 40 Or Thicker Wall Pipe Conforming To ASTM A-53 Grade A, Or B With A Minimum (30,000 psi) Yield Strength Or Equivalent.
[4] (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.
[5] (1" and 1-1/2" thru 6") RIGID Conduit Conforming To UL-6 Or ANSI C-80.3 With A Minimum (30,000 psi) Yield Strength Or Equivalent.

FOR BRACING OF STEEL PIPING AND RMC CONDUIT:

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

For Sizes (1", 1-1/4" and 1-1/2"):
1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
2.) Tighten (Alternately) Hex Nuts 1 And 2 To (12 ft. lbs.), Using (6 ft. 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.
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.-lb.), 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.

[1] ANVIL Fig. 212 Or ANVIL Fig. 212FP Per Chart
[1] BADGER INDUSTRIES (SBEMT)

Brace Angle Per Chart

Horizontal Fp Per Chart
### Table: Brace Angle From Vertical (Not to Scale)

<table>
<thead>
<tr>
<th>ANVIL Fig. 212</th>
<th>ANVIL Fig. 212FP</th>
<th>Copper Pipe Type L Or Type K, Annealed Or Drawn</th>
<th>Nominal Size</th>
<th>30° to 44° Fp (LRFD)</th>
<th>45° to 60° Fp (LRFD)</th>
<th>61° to 75° Fp (LRFD)</th>
<th>90° Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; Fig. 212</td>
<td>SBEMT</td>
<td>1 in.</td>
<td>1-1/2&quot; Fig. 212FP</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>1-1/4&quot; Fig. 212</td>
<td>SBEMT</td>
<td>1-1/4 in.</td>
<td>2&quot; Fig. 212</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>1-1/2&quot; Fig. 212</td>
<td>SBEMT</td>
<td>1-1/2 in.</td>
<td>2-1/2&quot; Fig. 212FP</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>2&quot; Fig. 212</td>
<td>SBEMT</td>
<td>2 in.</td>
<td>3&quot; Fig. 212</td>
<td>222 lbs.</td>
<td>90 lbs.</td>
<td>90 lbs.</td>
<td>Not Rated</td>
</tr>
<tr>
<td>2-1/2&quot; Fig. 212</td>
<td>SBEMT</td>
<td>2-1/2 in.</td>
<td>4&quot; Fig. 212</td>
<td>515 lbs.</td>
<td>650 lbs.</td>
<td>697 lbs.</td>
<td>Not Rated</td>
</tr>
<tr>
<td>3&quot; Fig. 212</td>
<td>SBEMT</td>
<td>3 in.</td>
<td>5&quot; Fig. 212FP</td>
<td>844 lbs.</td>
<td>775 lbs.</td>
<td>700 lbs.</td>
<td>Not Rated</td>
</tr>
<tr>
<td>3-1/2&quot; Fig. 212</td>
<td>SBEMT</td>
<td>3-1/2 in.</td>
<td>6&quot; Fig. 212FP</td>
<td>353 lbs.</td>
<td>281 lbs.</td>
<td>231 lbs.</td>
<td>Not Rated</td>
</tr>
<tr>
<td>4&quot; Fig. 212</td>
<td>SBEMT</td>
<td>4 in.</td>
<td>5&quot; Fig. 212</td>
<td>1,258 lbs.</td>
<td>982 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>5&quot; Fig. 212FP</td>
<td>SBEMT</td>
<td>5 in.</td>
<td>6&quot; Fig. 212FP</td>
<td>1,134 lbs.</td>
<td>1,134 lbs.</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
</tbody>
</table>

**Notes:**
1. ANVIL (AS 3792) Cushion Strip Shall Be Installed Between The Copper Pipe And The Anvil Clamp. Cushion Strip Shall Not Overlap. Cushion Strip Shall Maintain A Gap (≤ 1/4") from (SBEMT).
2. Per FM, (ASD) = (LRFD / 1.5).
3. Cushion Strip Joint Offset Can Be Orientated Clockwise or Counter Clockwise.
4. (1" thru 3") and (4" thru 6") Type L Or Type K, Annealed Or Drawn Copper Piping Conforming To ASTM B88.
### Badger Industries

**Seismic Hardware**

**ANVIL**

**Fig. 212**

**Detail (SHL-EMT5A) Anvil**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Steel EMT Conduit Nominal Size</th>
<th>Schedule 5 Pipe Nominal Size</th>
<th>30° to 44° Fp (LRFD)</th>
<th>45° to 60° Fp (LRFD)</th>
<th>61° to 75° Fp (LRFD)</th>
<th>90° Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; Fig. 212</td>
<td>SBEMT</td>
<td>N / A</td>
<td>N / A</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>1-1/4&quot; Fig. 212</td>
<td>SBEMT</td>
<td>1-1/2 in.</td>
<td>1,227 lbs.</td>
<td>1,332 lbs.</td>
<td>1,376 lbs.</td>
<td>Not Rated</td>
</tr>
<tr>
<td>2&quot; Fig. 212</td>
<td>SBEMT</td>
<td>2 in.</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
<td>Not Rated</td>
</tr>
<tr>
<td>2-1/2&quot; Fig. 212</td>
<td>SBEMT</td>
<td>2-1/2 in.</td>
<td>1,467 lbs.</td>
<td>1,493 lbs.</td>
<td>1,493 lbs.</td>
<td>Not Rated</td>
</tr>
<tr>
<td>3&quot; Fig. 212</td>
<td>SBEMT</td>
<td>3 in.</td>
<td>1,882 lbs.</td>
<td>2,230 lbs.</td>
<td>2,361 lbs.</td>
<td>Not Rated</td>
</tr>
<tr>
<td>3-1/2&quot; Fig. 212</td>
<td>SBEMT</td>
<td>3-1/2 in.</td>
<td>1,817 lbs.</td>
<td>1,654 lbs.</td>
<td>1,654 lbs.</td>
<td>Not Rated</td>
</tr>
<tr>
<td>4&quot; Fig. 212</td>
<td>SBEMT</td>
<td>4 in.</td>
<td>1,112 lbs.</td>
<td>1,269 lbs.</td>
<td>1,303 lbs.</td>
<td>Not Rated</td>
</tr>
</tbody>
</table>

**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.), Using (6 ft.-lb.) Torque Increases.

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

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

---

**SHL-EMT5A**

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 FpT Tension Capacity Per "SEBO".

Notice: "SEBO"™ Seismic Engineering By Others

<table>
<thead>
<tr>
<th>Vertical Member No.</th>
<th>Stiffener 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>18 in.</td>
<td>23 in.</td>
<td>1,500 lbs.</td>
<td></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 FpT Tension Capacity Per "SEBO".

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

EMT-RSC - Rod Stiffener Clamp

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

**[RS-1]**

**Rod Stiffener Bolt**

---

### Vertical Rod Size Per "SEBO"

<table>
<thead>
<tr>
<th>Vertical Member No.</th>
<th>Vertical Rod Size</th>
<th>(X) Maximum</th>
<th>With Stiffener Maximum Compression Fpc (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[V-3]</td>
<td>3/8 in.</td>
<td>13 in.</td>
<td>1,100 lbs.</td>
</tr>
<tr>
<td>[V-5]</td>
<td>1/2 in.</td>
<td>18 in.</td>
<td>1,900 lbs.</td>
</tr>
<tr>
<td>[V-6]</td>
<td>5/8 in.</td>
<td>23 in.</td>
<td>2,600 lbs.</td>
</tr>
<tr>
<td>[V-6]</td>
<td>3/4 in.</td>
<td>28 in.</td>
<td>2,600 lbs.</td>
</tr>
<tr>
<td>[V-6]</td>
<td>7/8 in.</td>
<td>33 in.</td>
<td>2,600 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. Vertical Member Shall Be Installed As A Straight, (1) Piece Continuous Member. A Minimum Of (2) Badger Industries (RS-1) Rod Stiffener Bolts Required Per Assembly. Seismic Bracing Not Shown For Clarity. Application Specific Seismic Vertical Support Rod Length (Without) Rod Stiffener Per "SEBO".

The FpT Tension Capacity Per "SEBO".

---

**Various Seismic Vertical Hanger**

To Building Structure Connections Per "SEBO"

---

**Badger Industries (RS-1)**

Rod Stiffener

---

**One Size (RS-1) Bolt**

Fits (3/8"), (1/2"), (5/8"), (3/4") And (7/8") Vertical Rod Diameter

---

**~ BADGER INDUSTRIES ~**

**RS-1**

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

---

**~ BADGER INDUSTRIES ~**

**Detail (RVM-7)**

---

**Item Being Supported By**

Threaded Rod, Strut Trapeze, HVAC Duct, Equipment, Piping Or Other Per "SEBO"

---

**Maximum Length**

With Stiffener Member (9' - 8"), See Chart

---

**Maximum Length**

(Without) Stiffener Member Per "SEBO", See Notice

---

**Tighten Until**

Bolt Head Breaks Off

---

**Badger Industries (RS-1)**

Rod Stiffener Bolt

---

**FpC Per Chart**

---

**Strut Stiffener Member Sits On Top Of Hex Nut**

---

**Various Seismic Vertical Hanger**

To Building Structure Connections Per "SEBO"
**Badger Industries**

**[SHCA] Kit Clamp Assembly**

Patent #10,281,062

---

**NOTE:**

Badger (SHCA) is packaged as a "KIT". Each single SHCA kit contains:

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

---

**Installation Detail**

**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 FPC Tension Capacity Per "SEBO".

---

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

---

**To Resist Vertical Uplift Movement**

Strut Vertical Member with inserted Badger (SVSS) bracket sits on top of the pipe or conduit.

---

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

---

**To Secure Vertical Assemblies**

Strut Vertical Member with inserted Badger (SVSS) bracket sits on top of the pipe or conduit.

---

**Notice:**

Badger (SHCA) is packaged as a "KIT". Each single SHCA kit contains:

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

---

**SHCA - Single Hanger Compression Assembly**

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
RIGID BRACING
INSTALLATION DETAILS
Brace Member Length Per Chart (TYP.) Each End Connection

<table>
<thead>
<tr>
<th>Brace Member No.</th>
<th>Brace Member Steel Conduit Nominal Sizes</th>
<th>Brace Member Maximum Length</th>
<th>Brace Angle From Vertical 30° to 44° Brace Member Maximum Fp (LRFD)</th>
<th>Brace Angle From Vertical 45° to 60° Brace Member Maximum Fp (LRFD)</th>
<th>Brace Angle From Vertical 61° to 75° Brace Member Maximum Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[B-0]</td>
<td>(3/4&quot;) EMT (1&quot;) EMT (1-1/4&quot;) EMT (1-1/2&quot;) EMT</td>
<td>7 ft. - 5 in. 9 ft. - 9 in. 12 ft. - 9 in. 14 ft. - 9 in.</td>
<td>152 lbs. 216 lbs. 264 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[B-1]</td>
<td>(3/4&quot;) EMT (1&quot;) EMT (1-1/4&quot;) EMT (1-1/2&quot;) EMT (2&quot;) EMT</td>
<td>6 ft. - 0 in. 9 ft. - 7 in. 12 ft. - 9 in. 14 ft. - 9 in. 18 ft. - 10 in.</td>
<td>220 lbs. 311 lbs. 381 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[B-2]</td>
<td>(3/4&quot;) EMT (1&quot;) EMT (1-1/4&quot;) EMT (1-1/2&quot;) EMT (2&quot;) EMT</td>
<td>4 ft. - 4 in. 7 ft. - 3 in. 12 ft. - 0 in. 14 ft. - 9 in. 18 ft. - 10 in.</td>
<td>350 lbs. 494 lbs. 606 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[B-3]</td>
<td>(3/4&quot;) EMT (1&quot;) EMT (1-1/4&quot;) EMT (1-1/2&quot;) EMT (2&quot;) EMT</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>550 lbs. 777 lbs. 952 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[B-4]</td>
<td>(1&quot;) EMT (1-1/4&quot;) EMT (1-1/2&quot;) EMT (2&quot;) EMT</td>
<td>3 ft. - 11 in. 7 ft. - 5 in. 9 ft. - 6 in. 14 ft. - 2 in. 20 ft. - 0 in.</td>
<td>750 lbs. 1,060 lbs. 1,299 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[B-5]</td>
<td>(1-1/4&quot;) EMT (1-1/2&quot;) EMT (2&quot;) EMT (2-1/2&quot;) EMT</td>
<td>6 ft. - 2 in. 8 ft. - 1 in. 12 ft. - 2 in. 20 ft. - 0 in.</td>
<td>950 lbs. 1,343 lbs. 1,645 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[B-6]</td>
<td>(1-1/4&quot;) EMT (1-1/2&quot;) EMT (2&quot;) EMT (2-1/2&quot;) EMT</td>
<td>3 ft. - 9 in. 6 ft. - 0 in. 9 ft. - 9 in. 16 ft. - 8 in.</td>
<td>1,300 lbs. 1,838 lbs. 2,251 lbs.</td>
<td></td>
<td></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 Length Per Chart (TYP.) Each End Connection

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

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

<table>
<thead>
<tr>
<th>Brace Member No.</th>
<th>Brace Member Steel Conduit Nominal Size</th>
<th>Brace Member Maximum Length</th>
<th>Brace Angle From Vertical 30° to 44° Brace Member Maximum Fp (LRFD)</th>
<th>Brace Angle From Vertical 45° to 60° Brace Member Maximum Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[B-4]</td>
<td>(2&quot;) EMT</td>
<td>15 ft. - 7 in.</td>
<td>750 lbs.</td>
<td>1,060 lbs.</td>
</tr>
<tr>
<td>[B-5]</td>
<td>(2&quot;) EMT</td>
<td>13 ft. - 10 in.</td>
<td>950 lbs.</td>
<td>1,343 lbs.</td>
</tr>
<tr>
<td>[B-6]</td>
<td>(2&quot;) EMT</td>
<td>11 ft. - 10 in.</td>
<td>1,300 lbs.</td>
<td>1,838 lbs.</td>
</tr>
<tr>
<td>[B-7]</td>
<td>(2&quot;) EMT</td>
<td>11 ft. - 3 in.</td>
<td>1,450 lbs.</td>
<td>2,050 lbs.</td>
</tr>
<tr>
<td>[B-8]</td>
<td>(2&quot;) EMT</td>
<td>10 ft. - 8 in.</td>
<td>1,600 lbs.</td>
<td>2,262 lbs.</td>
</tr>
<tr>
<td>[B-9]</td>
<td>(2&quot;) EMT</td>
<td>10 ft. - 0 in.</td>
<td>1,800 lbs.</td>
<td>2,545 lbs.</td>
</tr>
<tr>
<td>[B-10]</td>
<td>(2&quot;) EMT</td>
<td>8 ft. - 8 in.</td>
<td>2,400 lbs.</td>
<td>3,393 lbs.</td>
</tr>
<tr>
<td>[B-11]</td>
<td>(2&quot;) EMT</td>
<td>7 ft. - 9 in.</td>
<td>3,050 lbs.</td>
<td>4,312 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 (SBEML) Seismic Hardware With One Of The Arm Of Each (SBEML) Inside The EMT Conduit Member And The Other Arm Of Each (SBEML) Outside Of The EMT Conduit Member. Depth Of EMT Conduit Member Installation Into The (SBEML) Seismic Hardware Shall Be Per This Detail. Screws Connecting Brace Member To The (SBEML) Seismic Hardware Shall Be Installed Through Pilot Holes And Tightened Until Screw Washer Head Is Flat-To-Flat With (SBEML) Seismic Hardware. Do Not Install Screws Into Conduit Weld Seam. Brace Seismic Hardware Depicted In-Line, Can Be Installed With Any End-To-End, Upper Seismic Hardware To Lower Seismic Hardware Off-Set.

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**~ BADGER INDUSTRIES ~**

**Detail (RBM-HD)**

- **Rigid Brace Member - Heavy Duty** (Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
### BADGER INDUSTRIES

**RVM-HD**

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

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

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Listed (LRFD) Capacities Based On Seismic Independent Lab Testing 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.
Various Seismic Vertical Hanger To Building Structure Connections Per “SEBO”

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

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

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

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

Badger Industries (RRK-X/X) Kit Sized To Fit Vertical Support Rod Diameter (No Substitution)

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

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

INSTALLATION DETAIL

BADGER INDUSTRIES www.NUSIG.com Sales@NUSIG.com 2019 Edition
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 For Pipe And Conduit Sizes (2-1/2" thru 4").

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

BOX:"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 For Pipe And Conduit Sizes (2-1/2" thru 4").

Use ANVIL Fig. 212FP 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.
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.

Single Hanger Transverse Bracing - Heavy Duty
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Notice: "SEBO"™ Seismic Engineering By Others
Specified Weld Is TYP., For All Badger Seismic Hardware Connections To Piping. Welding Shall Be In Compliance With Project Specifications And Latest AWS Standards.

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

Badger SSC-HD Kit
Seismic Hardware
(No Substitution)
(TYP.) For Vertical

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

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

Steel Pipe

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

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

Various Seismic Brace To Building Structure Connections Per "SEBO"

~ BADGER INDUSTRIES ~

SHT-HD2
Single Hanger Transverse Bracing - Heavy Duty

(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 Longitudinal Bracing

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
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:
Anvil International LLC referred to as ANVIL

For Pipe Sizes (2” thru 12”):
1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft. • lbs.), Using (10 - 15 ft. • lb.) Torque Increases.

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).

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

Various Seismic Brace To Building Structure Connections Per “SEBO”

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 (SBEMT). Offset Can Be Orientated Clockwise Or Counter Clockwise From (SBEMT). Cushion Strip Shall Not Overlap. Cushion Strip Shall Maintain A Gap (< 1/4”).
Various Seismic Vertical Hanger To Building Structure Connections 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 Industries (SSC-HD) Kit
Seismic Hardware (No Substitution) (TYP.) Both Vertical End Connections

(TYP.) Fill
Flush

1/4" 1/4"

(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)

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

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

(TYP.) Fill
Flush

1/4" 1/4"

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

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

1/4" 1/4"

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

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

Badger SSC
Seismic Longitudinal Brace (2 Of 2)

Longitudinal Brace

Vertical

Steel Pipe

Badger SSC
Seismic Longitudinal Brace (1 Of 2)

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

(2") EMT Conduit

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

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

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

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

(2") EMT Conduit

(1 Of 2)

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

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

(TYP.) Fill
Flush

1/4" 1/4"

(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)

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.

Badger SSC
Seismic Longitudinal Brace (2 Of 2)

Longitudinal Brace

Vertical

Steel Pipe

Badger SSC
Seismic Longitudinal Brace (1 Of 2)

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

(2") EMT Conduit

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

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

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

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

(2") EMT Conduit

(1 Of 2)

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

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

(TYP.) Fill
Flush

1/4" 1/4"

(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)

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.

Badger SSC
Seismic Longitudinal Brace (2 Of 2)

Longitudinal Brace

Vertical

Steel Pipe

Badger SSC
Seismic Longitudinal Brace (1 Of 2)

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

(2") EMT Conduit

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

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

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

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

(2") EMT Conduit

(1 Of 2)

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 SSC
Seismic Vertical Hanger To Building Structure Connections Per “SEBO”
Minimum (2") Inches

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

Various Seismic Brace To Building Structure Connections Per “SEBO”

Notice: “SEBO”™ Seismic Engineering By Others

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.

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

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

(BADGER INDUSTRIES)

Trapeze - Transverse Brace

(T-T1) (Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Various Seismic Vertical Hanger To Building Structure Connections Per “SEBO”

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

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

(1 And 2 Of 2) EMT Conduit Rigid Longitudinal Brace Members Per “SEBO”. See Detail (RBM-1)

(TYP.) Securement Of Items To Trapeze Per “SEBO”

Minimum (2”) Inches

Maximum Trapeze Span Length Per “SEBO”

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

Minimum (2”) Inches

Various Seismic 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

Badger SSC

Badger SSC-RF

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.

T-TL3

Trapeze - 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 2) Seismic Vertical Supports Per "SEBO"

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

(12 ga. 1-5/8"x1-5/8") Single Strut Member Per "SEBO"

HVAC Duct Construction Per SMACNA Standards

SMACNA Type Bottom Support Member Sized Per SMACNA Standards

#10 ITW Buildex Tek Screws (1" O.C.).

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

Plan View
Bracing Not Shown For Clarity

Various Seismic 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

Badger SSC-RRK

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

Minimum (2") Inches (TYP.)
Upper And Lower Square Strut Washer And Hex Nut

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

(1 Of 2) Seismic Vertical Supports Per “SEBO”
(2 Of 2) Seismic Vertical Supports Per “SEBO”
(1 And 2 Of 2) EMT Conduit Rigid Longitudinal Brace Members Per “SEBO”. See Detail (RBM-1)
(6 And 6 Of 12) #10 ITW Buildex Teks Screws (1" O.C.). (Ref. ICC-ESR-1976)

Max. (3”) From Edge Of Duct To Center Support Rod (TYP.) Both Rods
Screw Nearest Side Of Duct Shall Be Installed Within (1”) Inch Of Side Of Duct (TYP.)

HVAC Duct Construction Per SMACNA Standards

SMACNA Type Bottom Support Member Sized Per SMACNA Standards

#10 ITW Buildex Teks 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

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 Seismic Vertical Supports Per “SEBO”

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

(D-TL3) Elev. View - (Not To Scale) - (Read General Notes Prior To Use)
Seismic Vertical Supports Per "SEBO"

Min., (3/4") Inch (TYP.)
Max., (1") Inch (TYP.)

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

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

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

(1 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

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

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”

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

(3 Of 4) Or (3 Of 8) EMT Conduit Rigid Brace Members Per “SEBO”. See Detail (RBM-1)

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

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

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

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

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

(TYP.) All Brace Arms

(TYP.) (1 Of 4 Or More) Equipment Supports With Threaded Vertical Support Rod Diameter 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.

Equipment Construction And Seismic Certification By Others

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

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Notice: **SEBO™** Seismic Engineering By Others

One Or More Individual Rigid Brace Arms Depicted As Can Be Rotated In Plan 180 Degrees About Its Depicted Point Of Connection To Equipment.

At Least (3) Of The (4) Outer Most Vertical Support Rods Shall Be Used As Seismic Brace Connections To Equipment Unit.

~ BADGER INDUSTRIES ~

**ERBLP**

Equipment Rigid Bracing Layout Pattern

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
CABLE BRACING
INSTALLATION DETAILS
**Badger Industries**

Patent Pending Seismic Hardware

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

- **Min. (3")**

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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 Per Chart

---

**Cable Brace Member**

- **Size, Construction Strands / Arrangement, And Material**
- **Brace Angle From Vertical**

<table>
<thead>
<tr>
<th><strong>Badger Industries</strong> Seismic Hardware Part Number</th>
<th><strong>Cable Brace Member Size, Construction</strong></th>
<th><strong>(SCC-x)</strong> Cable Clamp Size</th>
<th><strong>(SCC-x) Installation Torque</strong></th>
<th><strong>(X) Maximum</strong></th>
<th><strong>Cable Brace Member Maximum Live Length</strong></th>
<th><strong>Brace Angle From Vertical</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SWBx116 - 10</strong></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° Max Fp (LRFD)</td>
</tr>
<tr>
<td><strong>SWBx116 - 10</strong></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>45° to 60° Max Fp (LRFD)</td>
</tr>
<tr>
<td><strong>SWBx118 - 20</strong></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>45° to 60° Max Fp (LRFD)</td>
</tr>
</tbody>
</table>

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**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.

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**Badger Industries**

(CSC-1) Inspection Head Stamp

(CSC-2) Inspection Head Stamp

Washer Faced Slotted Hex Bolt

Washer Face Hex Nut

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**Badger Industries**

(CSC-x) Field Assembly Cable End Connection Per Chart (No Substitution), (Typ.)

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**Badger Industries**

End Conn., To Item Being Braced Fits (3/8") & (1/2")

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**Badger Industries**

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 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 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").

For Pipe Sizes (2-1/2" thru 12"):  
1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).  
2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft• lbs.), Using (10 - 15 ft• lb.) Torque Increases.

For 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.

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

Cushion Strip Joint Shall Be Installed Between The Copper Pipe And The Anvil Clamp. Cushion Strip Joint Shall Be Offset (20° to 160°) From Cable. Cushion Strip Shall Not Overlap. Cushion Strip Shall Maintain A Gap (< 1/4") (TYP.) Each Clamp
For Anvil Clamp Sizes (2") And Larger, Bushing In Hole Of Badger Industries (SBEMT) Seismic Hardware Shall Be Removed And Discarded To Allow For Seismic Hardware Fitment To (1/2") Clamp Bolt Size.

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

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

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

For Pipe Sizes (2-1/2" thru 12"):  
1.) Tighten Hex Nut 1 And Hex Nut 2 Until Clamp Ears Are Equally Spaced (Visually).
2.) Tighten (Alternately) Hex Nuts 1 And 2 To (35 ft.-lbs.), Using (10 - 15 ft.-lb.) Torque Increases.

Notice: "SEBO™ Seismic Engineering By Others Seismic Capacity And Load Path Integrity Of Depicted Clevis, Or Other Type Of Vertical Hanger Shall Be Determined By SEBO. Depicted Badger Industries (SWB) Seismic Hardware Can Be Substituted With Other Badger Cable Bracing Seismic Hardware. For Applicable Anvil Clamp Sizes (2-1/2" thru 12") Use A McMaster Carr Spacer Part #92415A144 Or Equal. For Applicable Design Capacities Per Brace Angle And Pipe Or Conduit Size, See The Following Details. For Sch 7 And Thicker Steel Pipe And RMC Conduit See Detail (SHL-SPCA). For Cast-Iron Pipe See Detail (SHL-CIPA). For Type L And Type K Annealed And Drawn Copper Pipe See Detail (SHL-COPA). For Sch 5 Steel Pipe And EMT Conduit See Detail (SHL-EMT5A). This Detail Is For Use With Cable Bracing Installed Taught To Remove Slack.
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 (TCLBP) 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
Application Specific Orientation Of Braces Shall Be Per “SEBO”.

Trapeze 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.

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 Within (1") Inch Of Side Of Duct (TYP.)

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

(TYP) Strut Washer Required To Provide Base For Badger (SWB) Seismic Hardware Bracket

Various Seismic Brace To Building Structure Connections Per “SEBO”

Badger Industries (SWB) Kit Patent Pending With Badger Stake Eye Cable Brace Per “SEBO”, (TYP.) All Braces

Min. (2”) Inches

HVAC Duct Construction Per SMACNA Standards

Screw Nearest Side Of Duct Shall Be Installed Within (1") Inch Of Side Of Duct (TYP.)

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

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.

Various Seismic Vertical Supports Per “SEBO”

(TYP) Rod Stiffener Assembly

(TYP) Badger Industries (EMT-RSC) Cable Clamp Per “SEBO” (TYP) All Braces

Badger Industries (SCC-X) Cable Clamp Per “SEBO” (TYP) All Braces

Badger Industries (SWB) Kit Patent Pending Per “SEBO” (TYP) All Braces

Plan View Bracing Not Shown For Clarity

~ BADGER INDUSTRIES ~

HVAC Duct - Cable Bracing

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

RD-C2  RD-C4  RD-C6

~ BADGER INDUSTRIES ~

Round HVAC Duct - Cable Bracing

(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.

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.
VIBRATION ISOLATION BRACING
INSTALLATION DETAILS
**BADGER INDUSTRIES**

**Patent Pending Seismic Hardware**

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

- Min. (3")

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(CSC-x) Inspection Head Stamp

- Washer Faced Slotted Hex Bolt

- Washer Face Hex Nut

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**BADGER INDUSTRIES**

**Installation Detail**

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### BADGER INDUSTRIES (SWB) Patent Pending

**Seismic Hardware**

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

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**BADGER INDUSTRIES**

**SWB Cable Kits**

**Seismic Hardware - Design Demand Capacity Limits**

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**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.

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

Badger Industries (SWB) Kit
Patent Pending
With Badger Stake
Eye Cable Brace
Per “SEBO”. (TYP.)
All Braces

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 #90415A144 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.

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

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

Various Seismic Brace To Building Structure Connections Per “SEBO”

Badger Industries
(SHC) Vertical Uplift Resistance Assembly

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

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

Nut 1

(1 Of 2) 
ANVIL Fig. 212 Or ANVIL Fig. 212FP (No Substitution) (TYP.)

Steel Pipe To Be Installed On (Nut 1) Clamp Bolts Prior To Tightening Of (Nut 1) Clamp Bolt, See Notice

(2 Of 2) Cable Brace Members Per “SEBO”. See Detail (SWB Kits) (TYP.)

(2 Of 2) Cable Brace Members Per “SEBO”. See Detail (SWB Kits) (TYP.)

(2 Of 2)

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

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

Nut 1

Nut 2

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

(1 And 2 Of 2)
ANVIL Fig. 212 Or ANVIL Fig. 212FP (No Substitution) (TYP.)

(1 Of 2) Cable Brace Members Per “SEBO”. See Detail (SWB Kits) (TYP.)

(1 Of 2) Cable Brace Members Per “SEBO”. See Detail (SWB Kits) (TYP.)

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

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

(1 Of 2) Cable Brace Members Per “SEBO”. See Detail (SWB Kits) (TYP.)

Nut 1

Nut 2

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

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 #90415A144 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.

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

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 #90415A144 Or Equal.
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For Cast-Iron Pipe See Detail (SHL-CIPA).
For Type L And Type K Annealed And Drawn Copper Pipe See Detail (SHL-COPA).
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Cusion Strip Joint Example. Offset Can Be Orientated Clockwise Or Counter Clockwise From Cable, (TYP.)

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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 #90415A144 Or Equal.
For Applicable Design Capacities Per Brace Angle And Pipe Or Conduit Size, See The Following Details.
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For Cast-Iron Pipe See Detail (SHL-CIPA).
For Type L And Type K Annealed And Drawn Copper Pipe See Detail (SHL-COPA).
For Sch 5 Steel Pipe And EMT Conduit See Detail (SHL-EMT5A).
This Detail Is For Use With Slack Cable Bracing To Allow For Operational Movement Of Spring Hanger Type Vertical Support. Proper Amount Of Cable Slack Shall Be Determined By Vibration Isolation Design Engineering By Others.
For Anvil Clamp Sizes (2") And Larger, Bushing In Hole Of Badger Industries (SBEMT) Seismic Hardware Shall Be Removed And Discarded To Allow For Seismic Hardware Fitment To (1/2") Clamp Bolt Size.

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

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 Structure Conn., All Required Brace End To Item Being Braced Conn., And All Required Vertical Supports With Vibration Isolation Spring Hangers Not Shown For Clarity.
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.
Seismic Vertical Conn., To Structure
Installation Details
Anchor Length Notice:

SVC13H
Seismic Vertical Connection - 1 Anchor
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

<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. ( h_{\text{nom}} ) Embed.</td>
<td>2-5/16 in.</td>
<td>2-5/16 in.</td>
</tr>
<tr>
<td>Min. ( h_{\text{hole}} ) Depth</td>
<td>2-5/8 in.</td>
<td>2-5/8 in.</td>
</tr>
<tr>
<td>Min. ( h_{\text{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>
</tbody>
</table>

Installation Torque: 25 ft.-lbs. Includes (2.0) Omega Per ASCE 7-16

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

Notice: See 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>~ BADGER INDUSTRIES ~</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detail (SVC14H)</td>
</tr>
<tr>
<td>Hilti Kwik Bolt - TZ</td>
</tr>
<tr>
<td>Carbon Steel Anchor</td>
</tr>
<tr>
<td>(IC-ES (ESR-1917))</td>
</tr>
</tbody>
</table>

<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. ( \text{h}_{\text{nom}} ) Embed.</td>
<td>3-5/8 in.</td>
<td>3-5/8 in.</td>
</tr>
<tr>
<td>Min. ( \text{h}_{\text{hole}} ) Depth</td>
<td>4 in.</td>
<td>4 in.</td>
</tr>
<tr>
<td>Min. ( \text{h}_{[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 ( F_{pT} ) (LRFD)</td>
<td>637 lbs.</td>
<td>732 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, \( F_{pT} \) Values Accounted For Seismic And Cracked Concrete. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

- Do Not Use Badger Industries (SVCxx) To Provide Torque Setting Of Concrete Anchor.
- Anchor Can Be Installed Between Metal Decking Flutes, Into \( \text{h}_{\text{UCT}} \) Upper Concrete Topping Provided \( \text{h}_{\text{UCT}} \) Is Equal To, Or Greater Than Chart Listed Minimum \( \text{h}_{[TC]} \).

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

- Do Not Use Badger Industries (SVCxx) To Provide Torque Setting Of Concrete Anchor.
- Anchor Can Be Installed Between Metal Decking Flutes, Into \( \text{h}_{\text{UCT}} \) Upper Concrete Topping Provided \( \text{h}_{\text{UCT}} \) Is Equal To, Or Greater Than Chart Listed Minimum \( \text{h}_{[TC]} \).

~ BADGER INDUSTRIES ~
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.)

**Type "W2" Or "W3" Decking Per Applicable Detail (SVC14H)**

- (TYP.) Min. (2") Can Be Located Anywhere Between Anchors

**Anchor Length Notice:**

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

**SVC-FSA**

Seismic Vertical Connection - Flute Span Assembly Double Anchors

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

---

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

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

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

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

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

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


Fp Values Account For Seismic And Cracked Concrete. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control.

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

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

---

**~ BADGER INDUSTRIES ~**

**Detail (SVC15H)**

<table>
<thead>
<tr>
<th>Hilti Kwik Bolt - TZ Carbon Steel Anchor</th>
<th>Concrete Over Metal “W” Decking</th>
<th>Concrete Over Metal “B” Decking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
<td>5/8 in.</td>
<td></td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>4-7/16 in.</td>
<td></td>
</tr>
<tr>
<td>Min. hhole Depth</td>
<td>4-3/16 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>Not Applicable</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>Seismic Vertical Maximum</td>
<td>1,131 lbs.</td>
<td></td>
</tr>
<tr>
<td>Fpₚ (LRFD)</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td></td>
</tr>
</tbody>
</table>

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

---

**Seismic Vertical Connection - 1 Anchor**

(SVC15H)  
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Notice: "SEBO"™ Seismic Engineering By Others
Do Not Use Badger Industries (SVCxx) To Provide Torque Setting Of Concrete Anchor.

~ BADGER INDUSTRIES ~
Detail (SVC13HCS)

<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>3/8 in.</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
<td>2-5/16 in.</td>
</tr>
<tr>
<td>Min. h hole 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>Seismic Vertical Maximum</td>
<td>600 lbs.</td>
</tr>
<tr>
<td>Fpt (LRFD)</td>
<td></td>
</tr>
</tbody>
</table>

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

Normal Weight Concrete
(f'c Min = 3,000 psi)

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

SVC13HCS
Seismic Vertical Connection - 1 Anchor
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
### SVC14HCS

**Normal Weight Concrete**  
(f'c Min = 3,000 psi)

**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 And Cracked Concrete. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Do Not Use Badger Industries (SVCxx) To Provide Torque Setting Of Concrete Anchor.**

---

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor Length Notice:</td>
<td>After Proper Installation And Tightening Of Anchor, A Minimum (3/4&quot;) 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.</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. 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>
<tr>
<td>Seismic Vertical Maximum Fpt (LRFD)</td>
<td>1,295 lbs.</td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td></td>
</tr>
</tbody>
</table>

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

---

**SVC14HCS**

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

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

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

Fpt / Fpc Per Chart

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

**Badger Industries**

Seismic Vertical Connection - Single Beam Clamp Attachment

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

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.

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

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

**BADGER INDUSTRIES**

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Seismic Hardware Part Number</th>
<th>Maximum Beam Flange Width</th>
<th>ANSI / SP-58 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**

(18") Maximum

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

(TYP.) (2 Of 2) Badger Industries (SBC158L)
Patent Pending Beam Clamp
(No Substitution)
Min. (0.1875")
Max. (1.260")
Beam Flange Thickness

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

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

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

ASTM A36 Or Better Vertical Support Rod

FpT / Fpc Per Chart

Gravity Per Chart

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

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

SVC52L

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.

---

### Table: Cantilever End Load

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Seismic Hardware Part Number</th>
<th>X</th>
<th>Maximum</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>SBC158</td>
<td>6&quot;</td>
<td>337 lbs.</td>
<td>703 lbs.</td>
<td>195 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>9&quot;</td>
<td>254 lbs.</td>
<td>468 lbs.</td>
<td>155 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>12&quot;</td>
<td>195 lbs.</td>
<td>350 lbs.</td>
<td>128 lbs.</td>
</tr>
<tr>
<td>SBC158</td>
<td>15&quot;</td>
<td>155 lbs.</td>
<td>279 lbs.</td>
<td>109 lbs.</td>
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<tr>
<td>SBC158</td>
<td>18&quot;</td>
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<td>221 lbs.</td>
<td>94 lbs.</td>
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<td>166 lbs.</td>
<td>83 lbs.</td>
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<td>94 lbs.</td>
<td>130 lbs.</td>
<td>103 lbs.</td>
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<td>SBC158</td>
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<td>103 lbs.</td>
<td>74 lbs.</td>
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<tr>
<td>SBC158</td>
<td>30&quot;</td>
<td>74 lbs.</td>
<td>84 lbs.</td>
<td>67 lbs.</td>
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</table>
End Of Strut Without Vertical Support Rod Shall Be Flush With Or Extend Beyond Beam Clamp

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.

~ BADGER INDUSTRIES ~
Detail (SVC52L-C4)

BADGER INDUSTRIES Seismic Hardware Part Number

SBC158L 6" 372 lbs. 1,169 lbs.
SBC158L 9" 281 lbs. 884 lbs.
SBC158L 12" 226 lbs. 710 lbs.
SBC158L 15" 189 lbs. 594 lbs.
SBC158L 18" 162 lbs. 510 lbs.
SBC158L 21" 142 lbs. 447 lbs.
SBC158L 24" 126 lbs. 398 lbs.
SBC158L 27" 114 lbs. 358 lbs.
SBC158L 30" 104 lbs. 326 lbs.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>[X] Maximum</th>
<th>Gravity Allowable</th>
<th>SEISMIC</th>
<th>[X] Maximum</th>
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<td>SBC158L</td>
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<td>372 lbs.</td>
<td>1,169 lbs.</td>
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<td>281 lbs.</td>
<td>884 lbs.</td>
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<td>SBC158L</td>
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<td>226 lbs.</td>
<td>710 lbs.</td>
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<tr>
<td>SBC158L</td>
<td>15&quot;</td>
<td>189 lbs.</td>
<td>594 lbs.</td>
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<tr>
<td>SBC158L</td>
<td>18&quot;</td>
<td>162 lbs.</td>
<td>510 lbs.</td>
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<td>398 lbs.</td>
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<td>SBC158L</td>
<td>27&quot;</td>
<td>114 lbs.</td>
<td>358 lbs.</td>
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<tr>
<td>SBC158L</td>
<td>30&quot;</td>
<td>104 lbs.</td>
<td>326 lbs.</td>
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~ BADGER INDUSTRIES ~
Seismic Vertical Connection - Double Beam Clamp Attachment

(TYP.) (2 Of 2)
Badger Industries
Patent Pending
Beam Clamp
(No Substitution)

(TYP.) (1 Of 2)
Badger Industries
Patent Pending
Beam Clamp
(No Substitution)

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.)

End Of Strut Without Vertical Support Rod Shall Be Flush With Or Extend Beyond Beam Clamp

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

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

(1-5/8")

(3-1/4")

ASTM A36
Or Better Vertical Support Rod

Fpt / Fpc Per Chart

Gravity Per Chart

[2"] Min.

[2"] Min.

[2"] Min.
SVC52-EF1T

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 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.

**INSTALLATION DETAIL**

**Badger Industries Seismic Hardware Part Number**

<table>
<thead>
<tr>
<th>[X] Maximum</th>
<th>Uniform Load Fp / Fpc (LRFD)</th>
<th>Uniform Load Fp / Fpc (LRFD)</th>
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<tbody>
<tr>
<td>SBC158</td>
<td>1&quot;-0&quot;</td>
<td>1,572 lbs.</td>
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<tr>
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<td>785 lbs.</td>
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<td>2,817 lbs.</td>
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<td>1,407 lbs.</td>
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<td>SBC158</td>
<td>2&quot;-0&quot;</td>
<td>783 lbs.</td>
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<td>390 lbs.</td>
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<td>1,405 lbs.</td>
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<td>701 lbs.</td>
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<td>SBC158</td>
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<td>519 lbs.</td>
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<td>257 lbs.</td>
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<td>934 lbs.</td>
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<td>464 lbs.</td>
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<td>SBC158</td>
<td>4&quot;-0&quot;</td>
<td>386 lbs.</td>
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<td>189 lbs.</td>
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<td>697 lbs.</td>
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<td>345 lbs.</td>
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<td>306 lbs.</td>
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<td>148 lbs.</td>
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<td>555 lbs.</td>
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<td>273 lbs.</td>
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<td>252 lbs.</td>
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<td>120 lbs.</td>
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<td>459 lbs.</td>
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<td>224 lbs.</td>
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<td>SBC158</td>
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<td>100 lbs.</td>
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<td>390 lbs.</td>
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<td></td>
<td>189 lbs.</td>
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<td>SBC158</td>
<td>8&quot;-0&quot;</td>
<td>183 lbs.</td>
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<td>84 lbs.</td>
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<td>338 lbs.</td>
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<td></td>
<td>162 lbs.</td>
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<td>SBC158</td>
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<td>159 lbs.</td>
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<td>72 lbs.</td>
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<td>297 lbs.</td>
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<td></td>
<td>141 lbs.</td>
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<td>SBC158</td>
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<td>61 lbs.</td>
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<td>235 lbs.</td>
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<td>123 lbs.</td>
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<tr>
<td>SBC158</td>
<td>11&quot;-0&quot;</td>
<td>124 lbs.</td>
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<td>52 lbs.</td>
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<td>178 lbs.</td>
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<td></td>
<td>109 lbs.</td>
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<tr>
<td>SBC158</td>
<td>12&quot;-0&quot;</td>
<td>110 lbs.</td>
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<tr>
<td></td>
<td></td>
<td>45 lbs.</td>
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<td></td>
<td></td>
<td>137 lbs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>86 lbs.</td>
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</table>

**Notice:**
Upper And Lower Strut Nuts Sized To Fit Vertical Support Rod. Installed Hand Tight Plus (1/4) Turn. Lower Strut Nut Is Not Required For Gravity Vertical Supports Not Required To Resist Uplift (Compression) Forces, (TYP.)

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

**Badger Industries**

www.NUSIG.com
Sales@NUSIG.com
2019 Edition
Anvil (AS 200 BTB), Or (AS 200H BTB) Or (AS 200EH BTB)

12 ga. 1-5/8"x1-5/8"

Double Back-To-Back Manufacturer Spot Welded Strut Member

Badger Industries

Seismic Vertical Connection - Double Beam Clamp Attachment

(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.)

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.

(Typ.) (2 Of 2)
Badger Industries (SBC158)
Patent Pending Beam Clamp. See Thick Flange Notice (No Substitution)

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

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

Uniform Load Concentrated Center Load
Maximum Tension Gravity Maximum Tension Gravity

- Fpt / Fpc (LRFD)
- Fpc (LRFD)


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.

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

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.

Upper And Lower Strut Nuts Sized To Fit Vertical Support Rod. Installed Hand Tight Plus (1/4) Turn, Lower Strut Nut Is Not Required For Gravity Vertical Supports Not Required To Resist Uplift (Compression) Forces, (TYP.)

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

Depicted Individual Beam Clamps Can Be Installed On Upper Or Lower Flange And/OR On Individual Steel Beams Or Joists.

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

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

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

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

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Depicted Individual Beam Clamps Can Be Installed On Upper Or Lower Flange. (TYP.) (1 Of 2)

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

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

Installation Detail

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

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.

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

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

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

INSTALLATION DETAIL

BADGER INDUSTRIES ~
Seismic Vertical Connection - Double Beam Clamp Attachment

(SVC52-LF1T) ~ (Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
### ANSI/SP-58

<table>
<thead>
<tr>
<th>Badger Industries Seismic Hardware Part Number</th>
<th>Uniform Load Maximum Allowable Tension GRAVITY</th>
<th>Concentrated Center Load Maximum Allowable Tension GRAVITY</th>
<th>ANSI / FM 1950-2016 Uniform Load Fpt / Fpc (LRFD)</th>
<th>Concentrated Center Load Maximum SEISMIC Fpt / Fpc (LRFD)</th>
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</thead>
<tbody>
<tr>
<td>SBC158 5&quot;-0&quot;</td>
<td>865 lbs.</td>
<td>424 lbs.</td>
<td>1,563 lbs.</td>
<td>773 lbs.</td>
</tr>
<tr>
<td>SBC158 6'-0&quot;</td>
<td>714 lbs.</td>
<td>347 lbs.</td>
<td>1,296 lbs.</td>
<td>637 lbs.</td>
</tr>
<tr>
<td>SBC158 7'-0&quot;</td>
<td>606 lbs.</td>
<td>291 lbs.</td>
<td>1,104 lbs.</td>
<td>540 lbs.</td>
</tr>
<tr>
<td>SBC158 8'-0&quot;</td>
<td>524 lbs.</td>
<td>248 lbs.</td>
<td>960 lbs.</td>
<td>466 lbs.</td>
</tr>
<tr>
<td>SBC158 9'-0&quot;</td>
<td>459 lbs.</td>
<td>214 lbs.</td>
<td>847 lbs.</td>
<td>408 lbs.</td>
</tr>
<tr>
<td>SBC158 10'-0&quot;</td>
<td>407 lbs.</td>
<td>186 lbs.</td>
<td>755 lbs.</td>
<td>360 lbs.</td>
</tr>
<tr>
<td>SBC158 11'-0&quot;</td>
<td>363 lbs.</td>
<td>162 lbs.</td>
<td>680 lbs.</td>
<td>321 lbs.</td>
</tr>
<tr>
<td>SBC158 12'-0&quot;</td>
<td>326 lbs.</td>
<td>142 lbs.</td>
<td>617 lbs.</td>
<td>288 lbs.</td>
</tr>
</tbody>
</table>

- Beam Clamp Bolt Shall Be In Full Contact With Beam Flange Steel, (TYP.)
- Upper And Lower Strut Nuts Sized To Fit Vertical Support Rod. Installed Hand Tight Plus (1/4) Turn. Lower Strut Nut Is Not Required For Gravity Vertical Supports Not Required To Resist Uplift Forces, (TYP.)
- Vertical Support Rod Placement Off-Set At Edge Of Beam Flange Allows For Full Beam Depth Vertical Adjustment, (TYP.)
- (TYP.) (1 Of 2) Badger Industries Badger Clamp Bolt Head, (TYP.)
- (TYP.) (2 Of 2) Badger Industries Badger Clamp Bolt Head, (TYP.)
- (TYP.) ASTM A36 Or Better Vertical Support Rod, Engineered By Others
- Threaded Rod With Hex Nuts And Square Strut Washers, (TYP.)

**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.

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

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**INSTALLATION DETAIL**

Seismic Vertical Connection - Double Beam Clamp Attachment

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Anvil (AS 200), (AS 200H) Or (AS 200EH) (12 ga. 1-5/8"x1-5/8")

Single Strut Member, Installed Tight To Underside Of Beam Flange Steel, (TYP.)

**Badger Industries**

**Patent Pending**

**Beam Clamp. See Thick Flange Notice (No Substitution)**

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**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.
- Across Span [X], Provided The Accumulated Loads Do Not Exceed Applicable Center Concentrated Load Listing Within Chart.
- Min. (0.1875") Max. (1.260") Beam Flange Thickness. See Thick Flange Notice

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

**Min. (0.1875") Max. (1.260")**

**Beam Flange Thickness. See Thick Flange Notice**

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**SVC52-LF**

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

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

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**Badger Industries**

**Seismic Hardware**

**Part Number**

**www.NUSIG.com**

**Sales@NUSIG.com**

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**~ BADGER INDUSTRIES ~**

**Detail (SVC52-LF)**

**ANSI/MSS SP-58**

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Seismic Hardware Part Number</th>
<th>Uniform Load Maximum Allowable Tension GRAVITY</th>
<th>Concentrated Center Load Maximum Allowable Tension GRAVITY</th>
<th>ANSI / FM 1950-2016 Uniform Load Maximum SEISMIC FpT / Fpc (LRFD)</th>
<th>Concentrated Center Load Maximum SEISMIC FpT / Fpc (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158 5'-0&quot;</td>
<td>463 lbs.</td>
<td>306 lbs.</td>
<td>837 lbs.</td>
<td>555 lbs.</td>
</tr>
<tr>
<td>SBC158 6'-0&quot;</td>
<td>383 lbs.</td>
<td>252 lbs.</td>
<td>694 lbs.</td>
<td>459 lbs.</td>
</tr>
<tr>
<td>SBC158 7'-0&quot;</td>
<td>325 lbs.</td>
<td>212 lbs.</td>
<td>592 lbs.</td>
<td>390 lbs.</td>
</tr>
<tr>
<td>SBC158 8'-0&quot;</td>
<td>281 lbs.</td>
<td>183 lbs.</td>
<td>514 lbs.</td>
<td>338 lbs.</td>
</tr>
<tr>
<td>SBC158 9'-0&quot;</td>
<td>246 lbs.</td>
<td>159 lbs.</td>
<td>454 lbs.</td>
<td>297 lbs.</td>
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<tr>
<td>SBC158 10'-0&quot;</td>
<td>219 lbs.</td>
<td>140 lbs.</td>
<td>405 lbs.</td>
<td>264 lbs.</td>
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<tr>
<td>SBC158 11'-0&quot;</td>
<td>195 lbs.</td>
<td>124 lbs.</td>
<td>365 lbs.</td>
<td>237 lbs.</td>
</tr>
<tr>
<td>SBC158 12'-0&quot;</td>
<td>176 lbs.</td>
<td>110 lbs.</td>
<td>331 lbs.</td>
<td>214 lbs.</td>
</tr>
</tbody>
</table>

---

**INSTALLATION DETAIL**

**Beam Clamp Bolt**

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

---

**Torque-Off**

Badger Industries Beam Clamp Bolt Head, (TYP.)

---

**(2") Min.**

(TYP.)

---

**Anvil (AS 200), Single Strut Member, Installed Tight To Underside Of Beam Flange Steel, (TYP.)**

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**~ BADGER INDUSTRIES ~**

**SVC52-LF**

**Concentrated Center Loading Per Chart**

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**Uniform Loading Per Chart**

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---
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.

**INSTALLATION DETAIL**

<table>
<thead>
<tr>
<th>BADGER INDUSTRIES Hardware Part Number</th>
<th>Uniform Load Maximum Allowable Tension GRAVITY</th>
<th>Concentrated Center Load Maximum Allowable Tension GRAVITY</th>
<th>ANSI / FM 1950-2016 Uniform Load Maximum SEISMIC FpT / Fpc (LRFD)</th>
<th>Concentrated Center Load Maximum SEISMIC FpT / Fpc (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158L 5'- 0&quot;</td>
<td>1,306 lbs.</td>
<td>865 lbs.</td>
<td>2,152 lbs.</td>
<td>1,563 lbs.</td>
</tr>
<tr>
<td>SBC158L 6'- 0&quot;</td>
<td>1,082 lbs.</td>
<td>714 lbs.</td>
<td>1,954 lbs.</td>
<td>1,296 lbs.</td>
</tr>
<tr>
<td>SBC158L 7'- 0&quot;</td>
<td>921 lbs.</td>
<td>606 lbs.</td>
<td>1,669 lbs.</td>
<td>1,104 lbs.</td>
</tr>
<tr>
<td>SBC158L 8'- 0&quot;</td>
<td>799 lbs.</td>
<td>524 lbs.</td>
<td>1,454 lbs.</td>
<td>960 lbs.</td>
</tr>
<tr>
<td>SBC158L 9'- 0&quot;</td>
<td>704 lbs.</td>
<td>459 lbs.</td>
<td>1,286 lbs.</td>
<td>847 lbs.</td>
</tr>
<tr>
<td>SBC158L 10'- 0&quot;</td>
<td>627 lbs.</td>
<td>407 lbs.</td>
<td>1,150 lbs.</td>
<td>755 lbs.</td>
</tr>
<tr>
<td>SBC158L 11'- 0&quot;</td>
<td>564 lbs.</td>
<td>363 lbs.</td>
<td>1,039 lbs.</td>
<td>680 lbs.</td>
</tr>
<tr>
<td>SBC158L 12'- 0&quot;</td>
<td>510 lbs.</td>
<td>326 lbs.</td>
<td>946 lbs.</td>
<td>617 lbs.</td>
</tr>
</tbody>
</table>

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

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

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

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

Badger Industries Patent Pending Beam Clamps (No Substitution)

[SVC52L-LF] Badger Industries Seismic Hardware Part Number

Uniform Loading Per Chart

Concentrated Center Loading Per Chart

Uniform Loading Per Chart

Concentrated Center Loading Per Chart

(Strut Orientation To Underside Of Beam Flange, (TYP.)

Min. (0.1875") Max. (1.260") Beam Flange Thickness

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

[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.)

< Diagram of Seismic Vertical Connection - Double Beam Clamp Attachment >

~ BADGER INDUSTRIES ~

- Seismic Vertical Connection - Double Beam Clamp Attachment

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

**Detail (SVC52-LFa)**

**BADGER INDUSTRIES Seismic Hardware Part Number**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>[X] Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC158</td>
<td>5'- 0&quot;</td>
</tr>
<tr>
<td>SBC158</td>
<td>6'- 0&quot;</td>
</tr>
<tr>
<td>SBC158</td>
<td>7'- 0&quot;</td>
</tr>
<tr>
<td>SBC158</td>
<td>8'- 0&quot;</td>
</tr>
<tr>
<td>SBC158</td>
<td>9'- 0&quot;</td>
</tr>
<tr>
<td>SBC158</td>
<td>10'-0&quot;</td>
</tr>
<tr>
<td>SBC158</td>
<td>11'-0&quot;</td>
</tr>
<tr>
<td>SBC158</td>
<td>12'-0&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Uniform Load</th>
<th>Concentrated Center Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Tension Gravity</td>
<td>Maximum Allowable Tension Gravity</td>
</tr>
<tr>
<td>463 lbs.</td>
<td>306 lbs.</td>
</tr>
<tr>
<td>383 lbs.</td>
<td>252 lbs.</td>
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<tr>
<td>325 lbs.</td>
<td>212 lbs.</td>
</tr>
<tr>
<td>281 lbs.</td>
<td>183 lbs.</td>
</tr>
<tr>
<td>246 lbs.</td>
<td>159 lbs.</td>
</tr>
<tr>
<td>219 lbs.</td>
<td>140 lbs.</td>
</tr>
<tr>
<td>195 lbs.</td>
<td>124 lbs.</td>
</tr>
<tr>
<td>176 lbs.</td>
<td>110 lbs.</td>
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</table>

<table>
<thead>
<tr>
<th>Uniform Load</th>
<th>Concentrated Center Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fp / Fpc (LRFD)</td>
<td>Fp / Fpc (LRFD)</td>
</tr>
<tr>
<td>837 lbs.</td>
<td>555 lbs.</td>
</tr>
<tr>
<td>694 lbs.</td>
<td>459 lbs.</td>
</tr>
<tr>
<td>592 lbs.</td>
<td>390 lbs.</td>
</tr>
<tr>
<td>514 lbs.</td>
<td>338 lbs.</td>
</tr>
<tr>
<td>454 lbs.</td>
<td>297 lbs.</td>
</tr>
<tr>
<td>405 lbs.</td>
<td>264 lbs.</td>
</tr>
<tr>
<td>365 lbs.</td>
<td>237 lbs.</td>
</tr>
<tr>
<td>331 lbs.</td>
<td>214 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.
- (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.

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

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

**BADGER INDUSTRIES**

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

**SVC52L-LFa**

**Part Number:**

- **SBC158L**
- **SBC158L**
- **SBC158L**
- **SBC158L**
- **SBC158L**

**Maximum:**

- 5'- 0" 1,306 lbs.
- 6'- 0" 1,082 lbs.
- 7'- 0" 921 lbs.
- 8'- 0" 799 lbs.
- 9'- 0" 704 lbs.
- 10'- 0" 627 lbs.
- 11'- 0" 564 lbs.
- 12'- 0" 510 lbs.

**Minimum: (0.1875")**

- 5'- 0" 865 lbs.
- 6'- 0" 714 lbs.
- 7'- 0" 606 lbs.
- 8'- 0" 524 lbs.
- 9'- 0" 459 lbs.
- 10'- 0" 407 lbs.
- 11'- 0" 363 lbs.
- 12'- 0" 326 lbs.

**Maximum: (1.260")**

- 5'- 0" 2,152 lbs.
- 6'- 0" 1,954 lbs.
- 7'- 0" 1,669 lbs.
- 8'- 0" 1,454 lbs.
- 9'- 0" 1,286 lbs.
- 10'- 0" 1,150 lbs.
- 11'- 0" 1,039 lbs.
- 12'- 0" 946 lbs.

**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.

---

**ANSI/MSS SP-58**

<table>
<thead>
<tr>
<th>[X] Maximum</th>
<th>Uniform Load</th>
<th>Concentrated Center Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum Allowable Tension GRAVITY</td>
<td>Maximum Allowable Tension GRAVITY</td>
</tr>
<tr>
<td>SBC158L</td>
<td>5'- 0&quot;</td>
<td>1,306 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>6'- 0&quot;</td>
<td>1,082 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>7'- 0&quot;</td>
<td>921 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>8'- 0&quot;</td>
<td>799 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>9'- 0&quot;</td>
<td>704 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>10'- 0&quot;</td>
<td>627 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>11'- 0&quot;</td>
<td>564 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>12'- 0&quot;</td>
<td>510 lbs.</td>
</tr>
</tbody>
</table>

**ANSI / FM 1950-2016**

<table>
<thead>
<tr>
<th>[X] Maximum</th>
<th>Uniform Load</th>
<th>Concentrated Center Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum SEISMIC FpT / Fpc (LRFD)</td>
<td>Maximum SEISMIC FpT / Fpc (LRFD)</td>
</tr>
<tr>
<td>SBC158L</td>
<td>5'- 0&quot;</td>
<td>1,954 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>6'- 0&quot;</td>
<td>1,669 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>7'- 0&quot;</td>
<td>1,454 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>8'- 0&quot;</td>
<td>1,286 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>9'- 0&quot;</td>
<td>1,150 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>10'- 0&quot;</td>
<td>1,039 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>11'- 0&quot;</td>
<td>946 lbs.</td>
</tr>
<tr>
<td>SBC158L</td>
<td>12'- 0&quot;</td>
<td>946 lbs.</td>
</tr>
</tbody>
</table>

---

Badger Industries

Seismic Hardware

www.NUSIG.com
Sales@NUSIG.com

2019 Edition
### Badger Industries

**Seismic Vertical Connection - Welded Beam Attachment**

**SVC50-HD**

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

---

#### BADGER INDUSTRIES

**Detail (SVC50-HD)**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Maximum Gravity Load (ASD)</th>
<th>Maximum Combined Gravity + Seismic Load $F_{pt}/F_{pc}$ (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSC-HD</td>
<td>3,000 lbs.</td>
<td>5,250 lbs.</td>
</tr>
</tbody>
</table>

---

**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”). $F_{pc}$ Capacity May Be Controlled By Size And Length Of Rigid Vertical Member “SEBO”.

---

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

---

**Steel Beam By Others**

(2") EMT Conduit RIGID Vertical Member Per “SEBO” And Badger Detail (RVM-HD)

(2") EMT Conduit RIGID Vertical Member Shall Extend A Minimum (3/8") Inch Beyond End Screw. (TYP.) All End Conn.

---

**(SSC-HD)**

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

---

**Badger SSC**

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

---

**Badger Industries**

Seismic Hardware


---

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

---

**BADGER INDUSTRIES**

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Sales@NUSIG.com

---

2019 Edition
Seismic Brace Conn.,
To Structure
Installation Details
**Anchor Length Notice:**
A Minimum (1") Inch Of Exposed Threads Is Required To Allow For Attachment Of Badger Seismic Hardware. Recommend Use Of (3/8x3-3/4) Hilti KB-TZ Anchor.

### ~ BADGER INDUSTRIES ~

**Detail (SWB13H)**

<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>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. Hole 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>
</tbody>
</table>

**Installation Torque**

- 25 ft. lbs.
- 25 ft. lbs.

**Brace Angle From Vertical**

- **30° to 44°** Maximum Fp (LRFD) 57 lbs. Includes (2.0) Omega Per ASCE 7-16
- **45° to 60°** Maximum Fp (LRFD) 133 lbs. Includes (2.0) Omega Per ASCE 7-16

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

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].

**Notice:** "SEBO™ Seismic Engineering By Others Installation, Testing And Inspection: Per Current Hilti, ICC-ES Evaluation Report (ESR-1917), Project Structural Engineer Of Record And Jurisdictional Requirements. Fp Values Account For Seismic, Cracked Concrete, And Seismic Hardware Prying. Weaker Components / Conditions Within Overall Design And Application Including, But Not Limited To The Building Structure Capacity Shall Control. Prior To Proper Tightening Of Anchor Hex Nut The Badger Industries Seismic Hardware Can Be Rotated 360° Degrees About Its Connection To The Anchor. Anchor Can Be Installed Between Metal Decking Flutes, Into [UCT] Upper Concrete Topping Provided [UCT] Is Equal To, Or Greater Than Chart Listed Minimum [TC].

---

**Installaton Detail**

**Badger Industries (SWB)**
Seismic Hardware With Badger CABLE Bracing Per “SEBO” (No Substitution)
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.

<table>
<thead>
<tr>
<th>~ BADGER INDUSTRIES ~</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detail (SWB14H)</td>
</tr>
<tr>
<td>Hilti Kwik Bolt - TZ</td>
</tr>
<tr>
<td>Carbon Steel Anchor</td>
</tr>
<tr>
<td>ICC-ES (ESR-1917)</td>
</tr>
<tr>
<td>Concrete</td>
</tr>
<tr>
<td>Over Metal</td>
</tr>
<tr>
<td>&quot;W&quot; Decking</td>
</tr>
<tr>
<td>Concrete</td>
</tr>
<tr>
<td>Over Metal</td>
</tr>
<tr>
<td>&quot;B&quot; Decking</td>
</tr>
<tr>
<td>Anchor O.D. da</td>
</tr>
<tr>
<td>Min. hnom Embed.</td>
</tr>
<tr>
<td>Min. Flute Depth</td>
</tr>
<tr>
<td>Min. [TC] Thickness</td>
</tr>
<tr>
<td>Min. Edge Distance</td>
</tr>
<tr>
<td>Min. Between Anchor Spacing Across Lower Flutes</td>
</tr>
<tr>
<td>Installation Torque</td>
</tr>
<tr>
<td>Brace Angle From Vertical</td>
</tr>
<tr>
<td>30° to 44° Maximum</td>
</tr>
<tr>
<td>Fp (LRFD)</td>
</tr>
<tr>
<td>Brace Angle From Vertical</td>
</tr>
<tr>
<td>45° to 60° Maximum</td>
</tr>
<tr>
<td>Fp (LRFD)</td>
</tr>
</tbody>
</table>

For ASC7-10, Fp (LRFD) Values, Multiply Listed Values By (0.80).

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].

Notice: "SEBO™ Seismic Engineering By Others

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

Type "W" Decking

Type "B" Decking

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

Type "W" Seismic Brace Connection - 1 Anchor

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

Installation Detail

2019 Edition
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>Parameter</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>
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</table>

<table>
<thead>
<tr>
<th>Brace Angle</th>
<th>Minimum Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Vertical 30º to 44º</td>
<td>190 lbs.</td>
</tr>
<tr>
<td>Maximum</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Brace Angle</th>
<th>Minimum Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Vertical 45º to 75º</td>
<td>218 lbs.</td>
</tr>
<tr>
<td>Maximum</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brace Angle</th>
<th>Minimum Fp (LRFD)</th>
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</thead>
<tbody>
<tr>
<td>From Vertical 50º to 80º</td>
<td>547 lbs.</td>
</tr>
<tr>
<td>Maximum</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brace Angle</th>
<th>Minimum Fp (LRFD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Vertical 60º to 100º</td>
<td>558 lbs.</td>
</tr>
<tr>
<td>Maximum</td>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
</tbody>
</table>

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

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)
SBA24H

Seismic Brace Anchorage - 2 Anchors (Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

Notice: “SEBO”™ Seismic Engineering By Others

Prior To Proper Tightening Or Welding The Badger Industries Seismic Hardware Can Be Rotated 360º 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)

<table>
<thead>
<tr>
<th>Brace Angle From Vertical</th>
<th>Brace Angle From Vertical 45° to 75°</th>
<th>Installation Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° to 44° Maximum Fp (LRFD)</td>
<td>561 lbs.</td>
<td>40 ft.- lbs.</td>
</tr>
<tr>
<td>561 lbs. Includes (2.0) Omega Per ASC 7-16</td>
<td>858 lbs.</td>
<td>40 ft.- lbs.</td>
</tr>
<tr>
<td>858 lbs. Includes (2.0) Omega Per ASC 7-16</td>
<td>607 lbs.</td>
<td>561 lbs.</td>
</tr>
<tr>
<td>561 lbs. Includes (2.0) Omega Per ASC 7-16</td>
<td>728 lbs.</td>
<td>607 lbs.</td>
</tr>
<tr>
<td>728 lbs. Includes (2.0) Omega Per ASC 7-16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

INCLUDES (2.0) OMEGA PER ASCE 7-16

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

Anchor O.D. da
Min. Hn embedd.
Min. Hole Embedd.
Min. [TC] Thickness
Min. Edge Distance
Min. Between Anchor Spacing
Min. Between Anchor Spacing Across Lower Flutes
Installation Torque

1/2 in. 1/2 in.
3-5/8 in. 3-5/8 in.
4 in. 4 in.
4-5/8 in. 4-5/8 in.
7-1/2 in. 7-1/2 in.
9-3/4 in. 9-3/4 in.
4-1/2 in. 4-1/2 in.
40 ft.- lbs. 40 ft.- lbs.

Rigidity - (No Substitution)

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

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

Notice: “SEBO”™ Seismic Engineering By Others

Prior To Proper Tightening Or Welding The Badger Industries Seismic Hardware Can Be Rotated 360º 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 ~

Seismic Brace Anchorage - 2 Anchors (Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
### Installation Detail

**Anchor Length Notice:**
A minimum (1") inch of exposed threads is required to allow for attachment of Badger seismic hardware. Recommend use of (5/8x6) Hilti KB-TZ anchor.

---

**~ BADGER INDUSTRIES ~**

**Detail (SBA15H)**

<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. hnom Embed.</td>
<td>4-7/16 in.</td>
<td></td>
</tr>
<tr>
<td>Min. hnom Depth</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 30° to 44° Maximum Fp (LRFD)</td>
<td>337 lbs.</td>
<td></td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brace Angle From Vertical 45° to 75° Maximum Fp (LRFD)</td>
<td>841 lbs.</td>
<td></td>
</tr>
<tr>
<td>Includes (2.0) Omega Per ASCE 7-16</td>
<td></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 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].

---

**SBA15H**

Seismic Brace Anchorage - 1 Anchor

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
DOUBLE ANCHORS IN THE SAME LOWER FLUTE SPACING

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

Minimum 20 GA. Steel Decking

Min. (5/8") (TYP.) [TC]

Hole

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.

~ BADGER INDUSTRIES ~ Detail (SBA25H)

(1") For "W" Decking. Not Usable For "B" Decking

Max. (4-1/2") For "W" Decking. Not Usable For "B" Decking


Hilti Kwik Bolt TZ Anchors

Lower Flute - To - Lower Flute Spacing

For Type "W" Decking: For Type "B" Decking:

Maximum (14") Not Usable

Minimum (10")

INSTALLATION DETAIL

BADGER INDUSTRIES

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2019 Edition

Seismic Brace Anchorage - 2 Anchors

SBA25H

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

~ BADGER INDUSTRIES ~

Seismic Brace Anchorage - 2 Anchors

SBA25H

Concrete Over Metal "W" Decking

Concrete Over Metal "B" Decking

Anchor O.D. da 5/8 in.

Min. hnom Embed. 4-7/16 in.

Min. Hole Depth 4-3/4 in.

Min. [TC] Thickness 5-3/8 in.

Min. Edge Distance 8-3/4 in.

Min. Between Anchor Spacing 12 in.

Min. Between Anchor Spacing Across Lower Flutes 10 in.

Installation Torque 60 ft.- lbs.

Brace Angle From Vertical 30º to 44º Maximum Fp (LRFD) 933 lbs. Includes (2.0) Omega Per ASCĚ 7-16

Brace Angle From Vertical 45º to 75º Maximum Fp (LRFD) 1,357 lbs. Includes (2.0) Omega Per ASCĚ 7-16

For ASCĚ 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 360º 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 ~

Seismic Brace Anchorage - 2 Anchors

SBA25H

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

Min. (5/8")

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

~ BADGER INDUSTRIES ~
Detail (SWB13HCS)

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor O.D. da</td>
<td>3/8 in.</td>
</tr>
<tr>
<td>Min. fnom Embed.</td>
<td>2-5/16 in.</td>
</tr>
<tr>
<td>Min. fhole 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 30º to 44º Maximum Fp (LRFD)</td>
<td>88 lbs. Includes (2.0) Omega Per ASCÉ 7-16</td>
</tr>
<tr>
<td>Brace Angle From Vertical 45º to 60º Maximum Fp (LRFD)</td>
<td>160 lbs. Includes (2.0) Omega Per ASCÉ 7-16</td>
</tr>
</tbody>
</table>

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


SWB13HCS
Seismic Brace Connection - 1 Anchor
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
~ 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. fnom Embed.</td>
<td>3-5/8 in.</td>
</tr>
<tr>
<td>Min. fhole 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 ASCE 7-16 |
| Brace Angle From Vertical 45° to 60° Maximum Fp (LRFD)       | 345 lbs.      |
|                                                            | 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

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.

Normal Weight Concrete 
(f’c Min = 3,000 psi)

Min. (5/8")
Min. (6")

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

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

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

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

Horizontal Fp Per Chart

Do Not Install With Brace Arm Crossing Over Bolted / Threaded Connection

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

**Detail (SBA14HCS)**

| Anchor O.D. dia | 1/2 in. |
| Min. \(f_{\text{nom}}\) Embed. | 3-5/8 in. |
| Min. \(f_{\text{hole}}\) Depth | 4 in. |
| Min. [TC] Thickness | 6 in. |
| Min. Edge Distance | 7-1/2 in. |
| Min. Between Anchor Spacing | 9-3/4 in. |
| Installation Torque | 40 ft.-lbs. |

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

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

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

---

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


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

---

**Seismic Brace Anchorage - 1 Anchor**

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

**Hilti Kwik Bolt TZ Anchor**

- **Material:** Carbon Steel Anchor
- **ICC-ES (ESR-1917)**
- **Anchor O.D. da:** 1/2 in.
- **Min. \( h_{\text{nom}} \) Embed.:** 3-5/8 in.
- **Min. \( h_{\text{hole}} \) Depth:** 4 in.
- **Min. \( [T]C \) Thickness:** 6 in.
- **Min. Edge Distance:** 7-1/2 in.
- **Min. Between Anchor Spacing:** 9-3/4 in.
- **Installation Torque:** 40 ft.-lbs.

#### Brace Angles and Fp Values

- **Fp (LRFD) Values**
  - **Brace Angle From Vertical:** 30° to 44°
    - Maximum Fp per Chart
    - \( 916 \text{ lbs.} \)
  - **Brace Angle From Vertical:** 45° to 75°
    - Maximum Fp per Chart
    - \( 1,170 \text{ lbs.} \)

**Notice:** For ASCE 7-10, Fp (LRFD) Values. Multiply Chart Listed Values by (0.8).

---

**Seismic Brace Anchorage - 2 Anchors**

**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.**

**Recommended Use:** (1/2x5-1/2) Hilti KB-TZ Anchor.

---

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

---

**Badger Industries**

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

---

**Seismic Brace Anchorage - 2 Anchors**

- (Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
Notice: “SEBO”™ Seismic Engineering By Others


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

Brace Angle From Vertical 30º to 44º Maximum Fp (LRFD) 458 lbs. Includes (2.0) Omega Per ASCE 7-16
Brace Angle From Vertical 45º to 75º Maximum Fp (LRFD) 916 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

**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. hhole 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).

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

---

**Normal Weight Concrete**

- Minimum (5/8") / Maximum (14")

**ASTM A36 Steel Plate**

- (1/2") Inch Thick By Min. (6") Inch Wide
- With Drilled Round Holes No Greater Than (1/16") Of And Inch Larger Than The Diameter Of The Anchor.

**Badger SSC Or NUSIG (SB1258) Seismic Hardware With Badger RIGID Or CABLE Bracing Per "SEBO" (No Substitution)**

**Seismic Brace Anchorage - 2 Anchors**

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

---

- **Hilti Kwik Bolt - TZ Anchor**: ICC-ES (ESR-1917)
- **Min. (5/8") hole**: 4-3/4 in.
- **Min. hnom Embed.**: 8-3/4 in.
- **Min. Between Anchor Spacing**: 12 in.
- **Installation Torque**: 60 ft.-lbs.
- **Bracket 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.

---

<table>
<thead>
<tr>
<th>Anchor O.D. da</th>
<th>5/8 in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. hnom Embed.</td>
<td>4-7/16 in.</td>
</tr>
<tr>
<td>Min. hhole 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>
<tr>
<td>Brace Angle From Vertical 30° to 44° Maximum Fp (LRFD)</td>
<td>1,241 lbs. Includes (2.0) Omega Per ASCE 7-16</td>
</tr>
<tr>
<td>Brace Angle From Vertical 45° to 75° Maximum Fp (LRFD)</td>
<td>1,575 lbs. 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).
**INSTALLATION DETAIL**

### Badger Industries

**Badger Industries**

**Beam Clamp**

Part Number: SBC158-C

<table>
<thead>
<tr>
<th>Brace Splayed Between Perpendicular And Parallel.</th>
<th>Perpendicular To Beam Length</th>
<th>Perpendicular To Beam Length</th>
<th>Parallel To Beam Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. (0.1875&quot;) - Max. (1.260&quot;)</td>
<td>30° to 44° Maximum Fp (LRFD)</td>
<td>45° to 60° Maximum Fp (LRFD)</td>
<td>61° to 75° Maximum Fp (LRFD)</td>
</tr>
<tr>
<td>493 lbs.</td>
<td>493 lbs.</td>
<td>493 lbs.</td>
<td>493 lbs.</td>
</tr>
<tr>
<td>440 lbs.</td>
<td>435 lbs.</td>
<td>435 lbs.</td>
<td>435 lbs.</td>
</tr>
</tbody>
</table>

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

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


**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.

**Brace Splayed Between Perpendicular And Parallel.**

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

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


**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.

**Brace Splayed Between Perpendicular And Parallel.**

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

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

Notice: “SEBO™ Seismic Engineering By Others

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

Install Beam Clamp Throat
Steel-To-Steel Tight To Flange
Of Joist. Tighten Beam Clamp
Bolt Until Cup Point End Of
Spacer Is Tight Against Joist
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.

Do Not Install
With Brace Arm
Crossing Over
Beam Clamp
Torque-Off Bolt

Secure
Badger Industries
Seismic Hardware
To Beam Clamp
Using (5/8") ASTM A307
Or Stronger Bolt With
Lock Washer And Hex
Nut Tightened Until Lock
 WASHER Is Flat, Plus
(1/4) Turn, (TYP.)

~ BADGER INDUSTRIES ~

Seismic Brace Connection - Single Beam Clamp Attachment

(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
WARNING: No Attachments In Protected Zones As Defined In AISC 341 Without Project S.E.O.R. Approval

Max., (1/3) Beam Depth

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

Badger SSC Or NUSIG (SB1258)
Seismic Hardware With Badger RIGID Or CABLE Bracing Per “SEBO” (No Substitution)

Seismic Brace Connection - Welded
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

~ BADGER INDUSTRIES ~
Seismic Brace Connection - Welded

SSC50

~ BADGER INDUSTRIES ~
Detail (SSC50)

<table>
<thead>
<tr>
<th>Brace Angle From Vertical</th>
<th>BADGER INDUSTRIES Seismic Hardware Part Number</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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NUSIG SB1258</td>
<td>1,174 lbs.</td>
<td>1,145 lbs.</td>
<td>1,102 lbs.</td>
</tr>
<tr>
<td></td>
<td>SSC</td>
<td>1,574 lbs.</td>
<td>2,380 lbs.</td>
<td>2,436 lbs.</td>
</tr>
</tbody>
</table>

Notice: “SEBO”™ Seismic Engineering By Others

Installation, Testing And Inspection: Per Project Structural Engineer Of
Record And Jurisdictional Requirements. Listed Capacities Based On Capacity Of Badger Seismic Hardware.

Badger Seismic Hardware Can Be Rotated Other Than That Depicted. See Warning Note For Conn., To Bottom Flange.
WARNING: No Rotation From That Depicted Without Project S.E.O.R. Approval.

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

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

BADGER INDUSTRIES

Steel Beam By Others

INSTALLATION DETAIL

SSC50HD

Seismic Brace Connection - Welded
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)

BADGER INDUSTRIES

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Sales@NUSIG.com
2019 Edition

BADGER INDUSTRIES

Seismic Brace Connection - Welded
(Elev. View) - (Not To Scale) - (Read General Notes Prior To Use)
BADGER INDUSTRIES
Integrated Lean Construction Through Innovation