### Manufacturer Information

**Manufacturer:** Mason West  
**Manufacturer’s Technical Representative:** Todd Noce  
**Mailing Address:** 1601 East Miraloma, Placentia, CA 92870  
**Telephone:** (714) 630-0701  
**Email:** tnoce@masonwest.com

### Product Information

**Product Name:** SEISMIC RESTRAINT COMPONENTS FOR SUSPENDED UTILITIES  
**Product Type:** Seismic Restraint Components for Suspended Utilities  
**Product Model Number:** SHB, UCC, SRC, SSBS, SCB, SCBH, SAS(E), SSB, Z-1011, CHS,, MW-PAL-A, WPL, SAP, KY, SSN, BON, UCC-BON, SCBBON, WBB, SPC, SSC, SSCE, SCC, SCCI  
**General Description:** Seismic Restraint Guidelines for Suspended Distribution Systems

### Applicant Information

**Applicant Company Name:** Mason West  
**Contact Person:** Todd Noce  
**Mailing Address:** 1601 East Miraloma, Placentia, CA 92870  
**Telephone:** (714) 630-0701  
**Email:** tnoce@masonwest.com  
**Title:** Vice President
Certification Method

Testing in accordance with: ☑ ICC-ES AC156 ☑ FM 1950-16
X Other(s) (Please Specify): ASTM E 488-18 - AISI S100-12

*Use of criteria other than those adopted by the California Building Standards Code, 2013 (CBSC 2013) for component supports and attachments are not permitted. For distribution system, interior partition wall, and suspended ceiling seismic bracings, test criteria other than those adopted in the CBSC 2013 may be used when approved by OSHPD prior to testing.

Analysis
Experience Data
Combination of Testing, Analysis, and/or Experience Data (Please Specify):

OSHPD Approval

Date: 10/9/2020
Name: Jeffrey Kikumoto Title: Senior Structural Engineer
Condition of Approval (if applicable):
# TABLE OF CONTENTS

## MECHANICAL, PLUMBING, AND FIRE PROTECTION PIPE

<table>
<thead>
<tr>
<th>Design General Notes</th>
<th>A0.1 - A0.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Notes</td>
<td>A10.0 - A10.8</td>
</tr>
<tr>
<td>Design Procedure</td>
<td>A11.0 - A11.12</td>
</tr>
<tr>
<td>Layout of Seismic Bracing</td>
<td>A12.0 - A12.9</td>
</tr>
<tr>
<td>12&quot; Rule for Suspended Piping</td>
<td>A13.0</td>
</tr>
<tr>
<td>Transverse Brace Allowable Brace Angle Variation in Plan</td>
<td>A14.0 - A14.1</td>
</tr>
<tr>
<td>Alternate Arrangement of Seismic Braces</td>
<td>A15.0 - A15.5</td>
</tr>
<tr>
<td>Attachment Options for Piping to Trapeze</td>
<td>A16.0 - A16.4</td>
</tr>
<tr>
<td>Installation Option - Off Strut Hanger</td>
<td>A18.0 - A18.7</td>
</tr>
<tr>
<td>Installation Option - Pipe Clamp</td>
<td>A19.0 - A19.1</td>
</tr>
<tr>
<td>Installation Option - Individually Suspended Piping</td>
<td>A19.2 - A19.7</td>
</tr>
<tr>
<td>Seismic Brace Tables</td>
<td>B1.0 - B1.20</td>
</tr>
<tr>
<td>Individually Hung Pipe - Kit Installation Details - Solid (Rigid) Bracing</td>
<td>C1.10 - C1.75</td>
</tr>
<tr>
<td>Individually Hung Pipe - Kit Installation Details - Cable Bracing (Standard)</td>
<td>C2.10 - C2.52</td>
</tr>
<tr>
<td>Individually Hung Pipe - Kit Installation Details - Wall Attachment</td>
<td>C3.10 - C3.30</td>
</tr>
<tr>
<td>Trapeze Supported Pipe - Kit Installation Details - Solid (Rigid) Bracing</td>
<td>F1.10 - F1.75</td>
</tr>
<tr>
<td>Trapeze Supported Pipe - Kit Installation Details - Cable Bracing (Standard)</td>
<td>F2.10 - F2.42</td>
</tr>
<tr>
<td>Trapeze Supported Pipe - Kit Installation Details - Cable Bracing (X - Pattern)</td>
<td>F3.10 - F3.13</td>
</tr>
<tr>
<td>Trapeze Supported Pipe - Kit Installation Details - Wall Attachment</td>
<td>F4.10 - F4.32</td>
</tr>
<tr>
<td>Hanger - Structure Attachment Details</td>
<td>M0.00 - M9.10</td>
</tr>
<tr>
<td>Hanger Installation Details with Rod Stiffener</td>
<td>M10.10 - M10.12</td>
</tr>
<tr>
<td>Brace - Structure Attachment Details</td>
<td>N0.00 - N7.10</td>
</tr>
<tr>
<td>Supplemental Steel Details</td>
<td>P1.10 - P1.12</td>
</tr>
<tr>
<td>Pipe Brace Spacing Tables</td>
<td>S1.0 - S1.5</td>
</tr>
<tr>
<td>Pipe Clamp Spacing Tables</td>
<td>S3.0 - S3.2.1</td>
</tr>
<tr>
<td>Trapeze Selection Tables</td>
<td>T2.0 - T2.7</td>
</tr>
<tr>
<td>Components</td>
<td>X1.0 - X9.0.9</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS
## DUCTWORK

<table>
<thead>
<tr>
<th>Section</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGN GENERAL NOTES</td>
<td>A0.1 - A0.7</td>
</tr>
<tr>
<td>GENERAL NOTES</td>
<td>A1.0 - A1.6</td>
</tr>
<tr>
<td>DESIGN PROCEDURE</td>
<td>A2.0 - A2.3</td>
</tr>
<tr>
<td>LAYOUT OF SEISMIC BRACING</td>
<td>A3.0 - A3.2</td>
</tr>
<tr>
<td>12&quot; RULE FOR SUSPENDED DUCTWORK</td>
<td>A4.0</td>
</tr>
<tr>
<td>TRANSVERSE BRACE ALLOWABLE BRACE ANGLE VARIATION IN PLAN</td>
<td>A5.0</td>
</tr>
<tr>
<td>ALTERNATE ARRANGEMENT OF SEISMIC BRACES</td>
<td>A6.0 - 6.2</td>
</tr>
<tr>
<td>INSTALLATION OPTION - OFF STRUT HANGER</td>
<td>A7.0 - A7.3</td>
</tr>
<tr>
<td>SEISMIC BRACE TABLES</td>
<td>B2.0 - B4.5</td>
</tr>
<tr>
<td>RECTANGULAR DUCT - KIT INSTALLATION DETAILS - SOLID (RIGID) BRACING</td>
<td>D1.10 - D1.35</td>
</tr>
<tr>
<td>ROUND DUCT - KIT INSTALLATION DETAILS - SOLID (RIGID) BRACING</td>
<td>D2.10 - D2.32</td>
</tr>
<tr>
<td>FACTORY BUILT VENT DUCT - KIT INSTALLATION DETAILS - SOLID (RIGID) BRACING</td>
<td>D3.10 - D3.22</td>
</tr>
<tr>
<td>RECTANGULAR DUCT - KIT INSTALLATION DETAILS - CABLE BRACING (STANDARD)</td>
<td>D4.10 - D4.32</td>
</tr>
<tr>
<td>RECTANGULAR DUCT - KIT INSTALLATION DETAILS - CABLE BRACING (X - PATTERN)</td>
<td>D5.10 - D5.12</td>
</tr>
<tr>
<td>ROUND DUCT - KIT INSTALLATION DETAILS - CABLE BRACING (STANDARD)</td>
<td>D6.10 - D6.22</td>
</tr>
<tr>
<td>ROUND DUCT - KIT INSTALLATION DETAILS - CABLE BRACING (X - PATTERN)</td>
<td>D7.10 - D7.12</td>
</tr>
<tr>
<td>FACTORY BUILT VENT DUCT - KIT INSTALLATION DETAILS - CABLE BRACING</td>
<td>D8.10 - D8.22</td>
</tr>
<tr>
<td>IN LINE DUCT DEVICE - KIT INSTALLATION DETAILS - SOLID (RIGID) BRACING</td>
<td>D9.10 - D9.13</td>
</tr>
<tr>
<td>IN LINE DUCT DEVICE - KIT INSTALLATION DETAILS - CABLE BRACING</td>
<td>D10.10 - D10.13</td>
</tr>
<tr>
<td>SUSPENDED EQUIPMENT - KIT INSTALLATION DETAILS - SOLID (RIGID) BRACING</td>
<td>D11.10 - D11.13</td>
</tr>
<tr>
<td>SUSPENDED EQUIPMENT - KIT INSTALLATION DETAILS - CABLE BRACING (STANDARD)</td>
<td>D12.10 - D12.13</td>
</tr>
<tr>
<td>SUSPENDED EQUIPMENT - KIT INSTALLATION DETAILS - CABLE BRACING (X - PATTERN)</td>
<td>D13.10 - D13.13</td>
</tr>
<tr>
<td>RECTANGULAR DUCT - KIT INSTALLATION DETAILS - WALL ATTACHMENT</td>
<td>D14.10 - D14.32</td>
</tr>
<tr>
<td>HANGER - STRUCTURE ATTACHMENT DETAILS</td>
<td>M0.00 - M9.10</td>
</tr>
<tr>
<td>HANGER INSTALLATION DETAILS WITH ROD STIFFENER</td>
<td>M10.10 - M10.12</td>
</tr>
<tr>
<td>BRACE - STRUCTURE ATTACHMENT DETAILS</td>
<td>N0.00 - N7.10</td>
</tr>
<tr>
<td>SUPPLEMENTAL STEEL DETAILS</td>
<td>P1.10 - P1.12</td>
</tr>
<tr>
<td>TRAPEZE SELECTION TABLES</td>
<td>T1.0 - T1.7</td>
</tr>
<tr>
<td>COMPONENTS</td>
<td>X1.0 - X9.0.9</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

## ELECTRICAL RACEWAYS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGN GENERAL NOTES</td>
<td>A0.1 - A0.7</td>
</tr>
<tr>
<td>GENERAL NOTES</td>
<td>A20.0 - A20.6</td>
</tr>
<tr>
<td>DESIGN PROCEDURE</td>
<td>A21.0 - A21.6</td>
</tr>
<tr>
<td>LAYOUT OF SEISMIC BRACING</td>
<td>A22.0 - A22.7</td>
</tr>
<tr>
<td>12&quot; RULE FOR SUSPENDED RACEWAYS</td>
<td>A23.0</td>
</tr>
<tr>
<td>TRANSVERSE BRACE ALLOWABLE BRACE ANGLE VARIATION IN PLAN</td>
<td>A24.0 - A24.2</td>
</tr>
<tr>
<td>ALTERNATE ARRANGEMENT OF SEISMIC BRACES</td>
<td>A25.0 - A25.2</td>
</tr>
<tr>
<td>ATTACHMENT OPTIONS FOR CONDUITS TO TRAPEZE</td>
<td>A26.0</td>
</tr>
<tr>
<td>INSTALLATION OPTION - OFF STRUT HANGER</td>
<td>A27.0 - A27.11</td>
</tr>
<tr>
<td>INSTALLATION OPTION - PIPE CLAMP</td>
<td>A28.0 - A28.1</td>
</tr>
<tr>
<td>SEISMIC BRACE TABLES</td>
<td>B1.12 - B1.20, B5.0 - B5.8</td>
</tr>
<tr>
<td>INDIVIDUALLY HUNG CONDUIT - KIT INSTALLATION DETAILS - SOLID (RIGID) BRACING</td>
<td>C1.10 - C1.35</td>
</tr>
<tr>
<td>INDIVIDUALLY HUNG CONDUIT - KIT INSTALLATION DETAILS - CABLE BRACING</td>
<td>C2.10 - C2.32</td>
</tr>
<tr>
<td>INDIVIDUALLY HUNG CONDUIT - KIT INSTALLATION DETAILS - WALL ATTACHMENT</td>
<td>C3.10 - C3.30</td>
</tr>
<tr>
<td>CONDUITS ON TRAPEZE - KIT INSTALLATION DETAILS - SOLID (RIGID) BRACING</td>
<td>F1.10 - F1.75</td>
</tr>
<tr>
<td>CONDUITS ON TRAPEZE - KIT INSTALLATION DETAILS - CABLE BRACING (STANDARD)</td>
<td>F2.10 - F2.42</td>
</tr>
<tr>
<td>CONDUITS ON TRAPEZE - KIT INSTALLATION DETAILS - CABLE BRACING (X - PATTERN)</td>
<td>F3.10 - F3.13</td>
</tr>
<tr>
<td>CONDUITS ON TRAPEZE - KIT INSTALLATION DETAILS - WALL ATTACHMENT</td>
<td>F4.10 - F4.32</td>
</tr>
<tr>
<td>CABLE TRAYS ON TRAPEZE - KIT INSTALLATION DETAILS - SOLID (RIGID) BRACING</td>
<td>E1.10 - E1.32</td>
</tr>
<tr>
<td>CABLE TRAYS ON TRAPEZE - KIT INSTALLATION DETAILS - CABLE BRACING (STANDARD)</td>
<td>E2.10 - E2.32</td>
</tr>
<tr>
<td>CABLE TRAYS ON TRAPEZE - KIT INSTALLATION DETAILS - CABLE BRACING (X - PATTERN)</td>
<td>E3.10 - E3.12</td>
</tr>
<tr>
<td>CABLE TRAYS ON TRAPEZE - KIT INSTALLATION DETAILS - WALL ATTACHMENT</td>
<td>E4.10 - E4.32</td>
</tr>
<tr>
<td>HANGER - STRUCTURE ATTACHMENT DETAILS</td>
<td>M0.00 - M9.10</td>
</tr>
<tr>
<td>HANGER INSTALLATION DETAILS WITH ROD STIFFENER</td>
<td>M10.10 - M10.12</td>
</tr>
<tr>
<td>BRACE - STRUCTURE ATTACHMENT DETAILS</td>
<td>N0.00 - N7.10</td>
</tr>
<tr>
<td>SUPPLEMENTAL STEEL DETAILS</td>
<td>P1.10 - P1.12</td>
</tr>
<tr>
<td>CONDUIT BRACE SPACING TABLES</td>
<td>S2.1 - S2.2</td>
</tr>
<tr>
<td>PIPE CLAMP SPACING TABLES</td>
<td>S4.0 - S4.2</td>
</tr>
<tr>
<td>TRAPEZE SELECTION TABLES</td>
<td>T2.0 - T3.7</td>
</tr>
<tr>
<td>COMPONENTS</td>
<td>X1.0 - X9.0.9</td>
</tr>
</tbody>
</table>
DESIGN GENERAL NOTES

Conditions of Use:
This OSHPD Pre-approval of Manufacturer's Certification (OPM) is based on the 2013 CBC. The Demand (design forces) for use with the OPM shall be based on the 2013 CBC.

This OPM is also applicable to the 2016 CBC without modification and the 2019 CBC with modifications indicated on pages A1.5a, A1.6a, A10.5a, A10.6a, A20.5a and A20.6a in lieu of pages A1.5, A1.6, A10.5, A10.6, A20.5 and A20.6, respectively. Note to be added to note 1 on sheets A1.0, A10.0, A20.0, and X9.0.

Maximum allowable $S_D$ for this OPM is limited to 2.5g.

These drawings are prepared for Mason West Inc.

This pre-approval is for the seismic bracing of interior pipes, ducts, conduits and cable trays. It does not address other loads such as, but not limited to, those generated by thermal growth, pressure, fluid dynamics, pipe rupture, or movements of equipment to which brace components are attached. It does not address components that cross seismic separations of buildings. Nor does it address components (other than pipe risers) attached to portions of the structure or equipment that will experience relative seismic displacement. The range of component sizes and material included in the pre-approval are as follows:

a) Pipes:
   i. Steel; Sch. 10 and larger - Sizes up to 30"
   ii. Copper; Type L and K - Sizes up to 6"
   iii. Cast Iron Pipe - Sizes 2" - 12"

b) Ducts:
   i. Galvanized Rectangular Duct; all sizes up to 120" wide
   ii. Galvanized Round Duct; 3" to 84"

c) Conduits/Cable Trays:
   i. RMC Conduit - Sizes up to 6"
   ii. IMC Conduit - Sizes up to 4"
   iii. EMT Conduit - Sizes up to 4"
   iv. Cable trays -- ladder type, all sizes

d) Fire Protection (or Sprinkler) Pipes:
   i. Steel; Sch. 10 (Sizes up to 8"), Sch. 40 (Sizes up to 12")

The substrates included in this pre-approval are as follows:

a) Concrete
b) Metal Decking
c) Steel
d) Wood

Registered Design Professional Responsibility:
The Registered Design Professional (RDP) is the engineer executing the design of the seismic bracing system. The RDP delivers the complete seismic bracing design to the Structural Engineer of Record (SEOR) for the OSHPD project. It is the responsibility of the Registered Design Professional in responsible charge to:

1) Verify that the nonstructural components or system is seismically qualified in accordance with the 2013 CBC.

2) Verify that the proper Mason West Inc. brace system is selected to meet the seismic requirements of this OPM.
3) Verify that the structure to which the Mason West Inc. seismic brace is anchored meets the requirements of the applicable anchorage ICC ESR Report.

4) Verify that anchor edge distance and spacing meets the requirements of the applicable ICC ESR.

5) Verify that the installation is in conformance with the 2013 CBC and with details shown in this OPM. Testing of post installed anchors shall also be performed in accordance with 2013 CBC Section 1913A.7.

Layout Drawings:

A) Layout drawings of the supports, attachments, and bracing systems in accordance with the pre-approval shall be submitted to the Structural Engineer Of Record (SEOR)/Registered Design Professional (RDP) in responsible charge of the project for review to verify that the details are in conformance with the code requirements. The layout drawings shall, as a minimum, satisfy the requirements of ASCE 7 Section 13.6 (including Supplements # 1 & # 2) as modified by CBC 2013 Section 1616A.

1. The SEOR shall verify that the supporting structure is adequate for the forces imposed on it by the supports, attachments and braces installed in accordance with the pre-approval in addition to all other loads.

2. The SEOR shall forward the supports, attachments, and bracing drawings (including construction documents for supplementary framing, where required) to the RDP in responsible charge with a notation indicating that the drawings have been reviewed and are in general conformance with the pre-approval and the design of the project.

3. A review stamp shall be permitted to be used, by the SEOR, to indicate compliance with this requirement.

4. The Registered Design Professional (RDP), other than SEOR, may provide the review stamp for small projects at the discretion of OSHPD.

B) The SEOR shall design any supplementary framing that is needed to resist the loads, maintain stability and/or is required for installation of pre-approved system.
   - The supplementary framing shall be submitted to OSHPD as part of original Construction Documents or as a Deferred Submittal Item; Deferred Submittal Items shall be listed on the cover page of the original Construction Documents.

C) The layout drawings, with the review stamp, shall be submitted to OSHPD, as part of original CDs or as Deferred Submittal Items in accordance with 2013 CAC Section 7-126 and 2013 CBC Section 107.3.4.1 for verification that:

1) Structure supporting the distribution system has adequate capacity;
2) Seismic design forces (F_P) are in accordance with the 2013 CBC; and
3) Verify that submittal is within the scope of OSHPD Preapproval of Manufacturer's Certification (OPM):
   a. Size of distribution system components
   b. Spacing of bracing and flex. joints, and
   c. Substrate for attachments
DESIGN GENERAL NOTES

D. The layout drawings, with the review stamp, shall be kept on the jobsite to be used for installation of the support and bracing.
   - The approved agency/inspector of record shall provide inspection in accordance with CBC Sections 1704 or 1704A/CAC Section 7-145.
   - OSHPD field staff will review/inspect the installation in accordance with CAC Section 7-147.

E. A copy of the bracing system(s) installation guide/OPM manual shall be on the jobsite prior to starting the installation of hangers and/or braces.
   - The approved agency/inspector shall maintain an approved copy of the OPM (obtained from the OSHPD website) in accordance with CAC Section 7-145 Item #4.

F. Components of two or more pre-approved bracing systems shall not be mixed.
   - Only one pre-approved bracing system may be used for a run of pipe, duct, or raceway.
   - Any substitution of a component of an OPM system shall require OSHPD review and approval.

Expansion Anchors:

1) All post installed concrete anchors shall meet requirements of 2013 CBC 1616A.1.19, and be installed per their ICC ESR report.
2) The special inspector shall be on the jobsite continuously during anchor installation, unless otherwise noted in the ICC ESR.
3) Expansion anchors to be tested per the requirements specified in 2013 CBC Section 1913A.7.

Definitions:

1) Snug tight - Tightness required to bring the connected plies into firm contact, and that the nuts could not be removed without the use of a wrench.
# EXPANSION ANCHOR TEST VALUES

## Concrete Slab Test Values

<table>
<thead>
<tr>
<th>Anchor Size</th>
<th>Concrete Slab Test Values (lbs)</th>
<th>Torque Test Values (ft-lbs)</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
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<tr>
<td>POWERS POWER-STUD+ SD2</td>
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</tr>
<tr>
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</tr>
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</tr>
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<td>60</td>
</tr>
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<td>2800</td>
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</tr>
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<td>5150</td>
<td>90</td>
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<td>5/8&quot; Ø x 5&quot; MIN. EFF. EMBED.</td>
<td>6350</td>
<td>150</td>
</tr>
<tr>
<td>HILTI KB-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/8&quot; Ø x 3 3/8&quot; MIN. EFF. EMBED.</td>
<td>1450</td>
<td>25</td>
</tr>
</tbody>
</table>

## Notes:

1. Anchor diameter refers to the thread size.
2. Apply proof test loads to anchors without removing the nut if possible. If not, remove nut and install a threaded coupler to the same tightness of the original nut using a torque wrench and apply load.
3. Reaction loads from test fixtures may be applied close to the anchor being tested, provided the anchor is not restrained from withdrawing by the fixture(s).
4. Test equipment is to be calibrated by an approved testing laboratory in accordance with standard recognized procedures.
5. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency.
6. The following criteria apply for the acceptance of installed anchors:
   - **HYDRAULIC RAM METHOD:** The anchor should have no observable movement at the applicable test load. A practical way to determine observable movement is that the washer under the nut becomes loose.
   - **TORQUE WRENCH METHOD:** The applicable test torque must be reached within 1/4 turn of the nut for 3/8" diameter anchors and 1/2" turn of the nut for all others.
7. Testing shall occur 24 hours minimum after installation of the subject anchors.
8. Refer to appropriate M1 and N1 pages for appropriate slab installation parameters.
# EXPANSION ANCHOR TEST VALUES

<table>
<thead>
<tr>
<th>Anchor Size</th>
<th>Soffit of Concrete over Deck Test Values</th>
<th>Torque Test Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(lbs)</td>
<td>(ft-lbs)</td>
</tr>
<tr>
<td>HILTI KB-TZ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8&quot; Ø x 2&quot; MIN. EFF. EMBED.</td>
<td>1140</td>
<td>25</td>
</tr>
<tr>
<td>1/2&quot; Ø x 2&quot; MIN. EFF. EMBED.</td>
<td>970</td>
<td>40</td>
</tr>
<tr>
<td>5/8&quot; Ø x 3 1/4&quot; MIN. EFF. EMBED.</td>
<td>2050</td>
<td>40</td>
</tr>
<tr>
<td>5/8&quot; Ø x 3 1/4&quot; MIN. EFF. EMBED.</td>
<td>1970</td>
<td>60</td>
</tr>
<tr>
<td>7/8&quot; Ø x 4&quot; MIN. EFF. EMBED.</td>
<td>2650</td>
<td>60</td>
</tr>
<tr>
<td>5/8&quot; Ø x 3 1/4&quot; MIN. EFF. EMBED.</td>
<td>2170</td>
<td>110</td>
</tr>
<tr>
<td>POWERS POWER-STUD+ SD1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8&quot; Ø x 2&quot; MIN. EFF. EMBED.</td>
<td>1640</td>
<td>40</td>
</tr>
<tr>
<td>5/8&quot; Ø x 2 1/4&quot; MIN. EFF. EMBED.</td>
<td>1350</td>
<td>80</td>
</tr>
<tr>
<td>5/8&quot; Ø x 3 1/4&quot; MIN. EFF. EMBED.</td>
<td>1940</td>
<td>110</td>
</tr>
<tr>
<td>POWERS POWER-STUD+ SD2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8&quot; Ø x 2&quot; MIN. EFF. EMBED.</td>
<td>1770</td>
<td>40</td>
</tr>
<tr>
<td>5/8&quot; Ø x 3 1/4&quot; MIN. EFF. EMBED.</td>
<td>2250</td>
<td>60</td>
</tr>
<tr>
<td>5/8&quot; Ø x 4&quot; MIN. EFF. EMBED.</td>
<td>3570</td>
<td>60</td>
</tr>
<tr>
<td>5/8&quot; Ø x 3 1/4&quot; MIN. EFF. EMBED.</td>
<td>2370</td>
<td>110</td>
</tr>
<tr>
<td>MASON IND. N.Y. SAS(E)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8&quot; Ø x 1 1/8&quot; MIN. EFF. EMBED.</td>
<td>720</td>
<td>30</td>
</tr>
<tr>
<td>5/8&quot; Ø x 3 1/4&quot; MIN. EFF. EMBED.</td>
<td>1790</td>
<td>30</td>
</tr>
<tr>
<td>5/8&quot; Ø x 2 1/4&quot; MIN. EFF. EMBED.</td>
<td>1400</td>
<td>60</td>
</tr>
<tr>
<td>5/8&quot; Ø x 4&quot; MIN. EFF. EMBED.</td>
<td>1870</td>
<td>60</td>
</tr>
<tr>
<td>5/8&quot; Ø x 2 1/4&quot; MIN. EFF. EMBED.</td>
<td>1790</td>
<td>90</td>
</tr>
<tr>
<td>5/8&quot; Ø x 5&quot; MIN. EFF. EMBED.</td>
<td>3400</td>
<td>90</td>
</tr>
<tr>
<td>5/8&quot; Ø x 3 1/4&quot; MIN. EFF. EMBED.</td>
<td>1920</td>
<td>150</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Anchor diameter refers to the thread size.
2. Apply proof test loads to anchors without removing the nut if possible. If not, remove nut and install a threaded coupler to the same tightness of the original nut using a torque wrench and apply load.
3. Reaction loads from test fixtures may be applied close to the anchor being tested, provided the anchor is not restrained from withdrawing by the fixture(s).
4. Test equipment is to be calibrated by an approved testing laboratory in accordance with standard recognized procedures.
5. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency.
6. The following criteria apply for the acceptance of installed anchors:
   - **HYDRAULIC RAM METHOD:** The anchor should have no observable movement at the applicable test load. A practical way to determine observable movement is that the washer under the nut becomes loose.
   - **TORQUE WRENCH METHOD:** The applicable test torque must be reached within 1/4 turn of the nut for 3/8" diameter anchors and 1/2 turn of the nut for all others.
7. Testing shall occur 24 hours minimum after installation of the subject anchors.
8. Refer to appropriate M2 and N2 pages for appropriate soffit of concrete over metal deck installation parameters.
# Screw Anchor Test Values

<table>
<thead>
<tr>
<th>Anchor Size</th>
<th>Concrete Slab Test Values (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>¼&quot;Ø x 2&quot; MIN. EFF. EMBED.</td>
<td>870</td>
</tr>
<tr>
<td>⅜&quot;Ø x 2⅝&quot; MIN. EFF. EMBED.</td>
<td>2070</td>
</tr>
<tr>
<td>⅜&quot;Ø x 2⅜&quot; MIN. EFF. EMBED.</td>
<td>1890</td>
</tr>
<tr>
<td>½&quot;Ø x 3½&quot; MIN. EFF. EMBED.</td>
<td>3520</td>
</tr>
<tr>
<td>⅝&quot;Ø x 2⅛&quot; MIN. EFF. EMBED.</td>
<td>1840</td>
</tr>
<tr>
<td>⅜&quot;Ø x 3¾&quot; MIN. EFF. EMBED.</td>
<td>2520</td>
</tr>
<tr>
<td>½&quot;Ø x 3¾&quot; MIN. EFF. EMBED.</td>
<td>3050</td>
</tr>
<tr>
<td>⅝&quot;Ø x 1¾&quot; MIN. EFF. EMBED.</td>
<td>920</td>
</tr>
<tr>
<td>⅜&quot;Ø x 2⅝&quot; MIN. EFF. EMBED.</td>
<td>2290</td>
</tr>
<tr>
<td>⅜&quot;Ø x 3¾&quot; MIN. EFF. EMBED.</td>
<td>3290</td>
</tr>
<tr>
<td>⅝&quot;Ø x 4½&quot; MIN. EFF. EMBED.</td>
<td>4170</td>
</tr>
<tr>
<td>½&quot;Ø x 4¼&quot; MIN. EFF. EMBED.</td>
<td>4540</td>
</tr>
<tr>
<td>¼&quot;Ø x 2&quot; MIN. EFF. EMBED.</td>
<td>870</td>
</tr>
<tr>
<td>⅜&quot;Ø x 1½&quot; MIN. EFF. EMBED.</td>
<td>550</td>
</tr>
<tr>
<td>⅜&quot;Ø x 1¾&quot; MIN. EFF. EMBED.</td>
<td>1620</td>
</tr>
<tr>
<td>⅝&quot;Ø x 2½&quot; MIN. EFF. EMBED.</td>
<td>2020</td>
</tr>
<tr>
<td>⅝&quot;Ø x 2⅓&quot; MIN. EFF. EMBED.</td>
<td>2350</td>
</tr>
<tr>
<td>½&quot;Ø x 3¾&quot; MIN. EFF. EMBED.</td>
<td>4850</td>
</tr>
<tr>
<td>½&quot;Ø x 3½&quot; MIN. EFF. EMBED.</td>
<td>3170</td>
</tr>
</tbody>
</table>

## Notes:
1. Anchor diameter refers to the thread size.
2. Reaction loads from test fixtures may be applied close to the anchor being tested, provided the anchor is not restrained from withdrawing by the fixture(s).
3. Test equipment is to be calibrated by an approved testing laboratory in accordance with standard recognized procedures.
4. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency.
5. The following criteria apply for the acceptance of installed anchors:
   - **Hydraulic Ram Method**: The anchor should have no observable movement at the applicable test load. A practical way to determine observable movement is that the washer under the nut becomes loose.
6. Testing shall occur 24 hours minimum after installation of the subject anchors.
7. Refer to appropriate M1 and N1 pages for appropriate slab installation parameters.
### SCREW ANCHOR TEST VALUES

<table>
<thead>
<tr>
<th>Anchor Size</th>
<th>Soffit of Concrete over Deck Test Values (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POWERS HANGERMATE+ SCREW-BOLT+</strong></td>
<td></td>
</tr>
<tr>
<td>3/4&quot;Ø x 2&quot; MIN. EFF. EMBED.</td>
<td>640</td>
</tr>
<tr>
<td>3/4&quot;Ø x 2-1/2&quot; MIN. EFF. EMBED.</td>
<td>1390</td>
</tr>
<tr>
<td>3/4&quot;Ø x 3-1/4&quot; MIN. EFF. EMBED.</td>
<td>870</td>
</tr>
<tr>
<td>5/8&quot;Ø x 2-1/4&quot; MIN. EFF. EMBED.</td>
<td>1590</td>
</tr>
<tr>
<td>5/8&quot;Ø x 3-3/4&quot; MIN. EFF. EMBED.</td>
<td>2750</td>
</tr>
<tr>
<td>5/8&quot;Ø x 2-3/4&quot; MIN. EFF. EMBED.</td>
<td>1190</td>
</tr>
<tr>
<td>5/8&quot;Ø x 3-7/8&quot; MIN. EFF. EMBED.</td>
<td>1650</td>
</tr>
<tr>
<td><strong>MASON IND. N.Y. SAST</strong></td>
<td></td>
</tr>
<tr>
<td>3/8&quot;Ø x 1-1/4&quot; MIN. EFF. EMBED.</td>
<td>340</td>
</tr>
<tr>
<td>3/8&quot;Ø x 1-3/4&quot; MIN. EFF. EMBED.</td>
<td>600</td>
</tr>
<tr>
<td>5/16&quot;Ø x 1-1/8&quot; MIN. EFF. EMBED.</td>
<td>1170</td>
</tr>
<tr>
<td>5/16&quot;Ø x 1-3/16&quot; MIN. EFF. EMBED.</td>
<td>600</td>
</tr>
<tr>
<td>5/16&quot;Ø x 2-5/8&quot; MIN. EFF. EMBED.</td>
<td>1400</td>
</tr>
<tr>
<td><strong>HILTI</strong></td>
<td></td>
</tr>
<tr>
<td>3/8&quot;Ø x 1-1/4&quot; MIN. EFF. EMBED.</td>
<td>500</td>
</tr>
<tr>
<td>3/8&quot;Ø x 2&quot; MIN. EFF. EMBED.</td>
<td>670</td>
</tr>
<tr>
<td>5/16&quot;Ø x 1-1/4&quot; MIN. EFF. EMBED.</td>
<td>820</td>
</tr>
<tr>
<td>3/8&quot;Ø x 1-3/4&quot; MIN. EFF. EMBED.</td>
<td>1420</td>
</tr>
<tr>
<td>3/8&quot;Ø x 2-1/4&quot; MIN. EFF. EMBED.</td>
<td>1900</td>
</tr>
<tr>
<td>5/16&quot;Ø x 2-1/4&quot; MIN. EFF. EMBED.</td>
<td>1320</td>
</tr>
<tr>
<td>5/16&quot;Ø x 3-3/4&quot; MIN. EFF. EMBED.</td>
<td>2300</td>
</tr>
<tr>
<td>5/16&quot;Ø x 2-3/4&quot; MIN. EFF. EMBED.</td>
<td>1800</td>
</tr>
<tr>
<td>5/16&quot;Ø x 3-7/8&quot; MIN. EFF. EMBED.</td>
<td>4090</td>
</tr>
<tr>
<td>3/8&quot;Ø x 3&quot; MIN. EFF. EMBED.</td>
<td>1800</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Anchor diameter refers to the thread size.
2. Reaction loads from test fixtures may be applied close to the anchor being tested, provided the anchor is not restrained from withdrawing by the fixture(s).
3. Test equipment is to be calibrated by an approved testing laboratory in accordance with standard recognized procedures.
4. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency.
5. The following criteria apply for the acceptance of installed anchors:
   - **HYDRAULIC RAM METHOD:** The anchor should have no observable movement at the applicable test load. A practical way to determine observable movement is that the washer under the nut becomes loose.
6. Testing shall occur 24 hours minimum after installation of the subject anchors.
7. Refer to appropriate M2 and N2 pages for appropriate soffit of concrete over metal deck installation parameters.
1) This OSHPD Preapproval of Manufacturer's Certification (OPM) is based on the 2013 CBC. The demand (design forces) for use with this OPM shall be based on the 2013 CBC.

2) Per ASCE 7-10, Section 13.3.1, restraints and their anchorages must be capable of restraining horizontal, \( F_P \), and vertical, \( F_{PV} \), seismic accelerations as follows.

\[
F_P = (0.7) \frac{0.4a_p S_{DS} W_P}{R_p I_p} (1+2 \frac{z}{h}) \quad \text{(ASD)} \quad \text{(ASCE 7-10 EQ 13.3-1)}
\]

is not required to be taken greater than \((0.7)1.6 S_{DS} I_p W_P\) \quad \text{(ASD)} \quad \text{(ASCE 7-10 EQ 13.3-2)}

shall not be taken less than \((0.7)0.3 S_{DS} I_p W_P\) \quad \text{(ASD)} \quad \text{(ASCE 7-10 EQ 13.3-3)}

\[
F_{PV} = (0.7)0.2 S_{DS} W_P \quad \text{(ASD)}
\]

Where:
- \( S_{DS} \) = short period spectral acceleration - up to 2.5g. Values of \( S_{DS} \) indicated in the general notes of the structural drawing take precedence over those calculated per ASCE 7-10, 11.4.4.
- \( W_P \) = component (or tributary length of duct) operating weight (lbs/ft).
- \( I_p \) = component importance factor
  - 1.5 for OSHPD 1 & 4 in accordance with the 2013 CBC, Section 1616A.1.17 and for OSHPD 2 & 3, where required by ASCE 7, Section 13.1.3.
  - 1.0 for OSHPD 2 & 3, when permitted by ASCE 7, Section 13.1.3.
- \( a_p \) = component amplification factor (Ref. ASCE 7-10, Table 13.6-1)
  - 2.5 for airside HVAC equipment and ductwork.
- \( R_p \) = component response modification factor (Ref. ASCE 7-10, Table 13.6-1)
  - 3.0 for ductwork, including in-line devices, constructed of low-deformability materials, such as cast iron, glass and non-ductile plastics.
  - 6.0 for airside HVAC equipment and ductwork, including in-line duct devices, constructed of high- or limited deformability materials, with joints made by means other than welding or brazing.
  - 9.0 for ductwork, including in-line duct devices, constructed of high-deformability materials, with joints made by welding or brazing.

Note: Per ASCE 7-10, Section 13.4.1, do not use an \( R_p \) factor greater than 6.0 when calculating \( F_P \) and \( F_{PV} \) for design of the attachment.

\[
z = \text{height in structure of point of connection of component with respect to base (ft).}
\]
\[
h = \text{average roof height of structure with respect to base (ft).}
\]

3) For systems anchored to concrete only, the anchorage to concrete overstrength factor, \( \Omega_0 \), must be applied. Sections M & N provide alternate allowable load tables with and without \( \Omega_0 \) applied. For cases where \( \Omega_0 \) is applicable, use the appropriate tables in Sections M & N so it is not necessary to apply this factor when calculating \( F_P \) and \( F_{PV} \). \( \Omega_0 \) is not applicable if a yielding steel element is considered in the load path. Refer to ACI 318-11 Appendix D, Section D.3.3.4.3 or ACI 318-14 Chapter 17, Section 17.2.3.4.3 for a list of qualifying conditions. The Registered Design Professional (RDP) shall use the allowable vertical loads under overstrength factor \( \Omega_0 = 2.0 \) unless the vertical support complies with one of the qualifying conditions.

4) A complete description on how to use these guidelines is provided in Section A2. It includes specific examples for both using the enclosed details/charts and a layout procedure for bracing of suspended duct systems.
Notes on Seismic Bracing:

1) These guidelines list installations which may be exempt from seismic bracing under the 2013 CBC. The RDP shall be responsible for determining whether to allow these exceptions, subject to approval by the SEOR and OSHPD.

2) Each straight run of a duct system requires a minimum of two transverse braces (perpendicular to the run). (Option: A longitudinal brace located at any point of the straight run on the opposite side of an elbow or tee may act as a transverse brace. Refer to the layout examples detailed in Section A3.)

3) Each straight run of a duct system requires a minimum of one longitudinal brace (parallel to the run). (Option: A transverse brace on the opposite side of an elbow or tee can act as a longitudinal brace provided it is located within 2 feet of the elbow or tee. Refer to the layout examples detailed in Section A3.)

   Note: For items 2) and 3) above, a short run of ductwork may not require seismic bracing if its tributary seismic load transfers to an adjacent run of ductwork that is sufficiently seismically braced that can accept the additional seismic loads, when approved by OSHPD for a specific project.

4) Transverse and longitudinal braces that project to the overhead structure shall be installed between 30 and 60 degrees from horizontal. Braces that project to an adjacent wall may be installed directly horizontal (zero degrees) or between 30 and 60 degrees from the horizontal. However, this is limited depending on the capacity of the brace and method of connection to structure.

5) Seismic bracing may consist of solid bracing designed to accept loads in tension and compression or cable bracing designed to accept tension loads only. Each brace method requires a vertical hanger within close proximity of their connection to the distribution system. (Refer to the specific detail for limitations). The vertical hanger may or may not require stiffening or additional anchorage to the structure (Refer to Notes on Supports, Page A1.2).

6) Avoid mixing solid bracing with cable bracing in the same direction on any run of a distribution system unless specifically engineered and approved by the enforcement agency.

7) Avoid bracing a system to two different parts of a building which may act differently in response to an earthquake (i.e. separated by a seismic joint). In cases where this may occur, the duct run must be designed to accept the seismic relative displacement.

8) Systems with significant thermal motion shall be designed on a case by case basis by a professional engineer familiar with both seismic loading and thermal expansion.

9) Seismic brace details for suspended duct systems include maximum allowable horizontal seismic load, \( F_p \), at different brace angles. The details include Mason Industries N.Y. seismic brace component size, aircraft cable or solid brace member size, acceptable hanger rod diameter(s) and hanger rod stiffening requirements. Trapeze member sizes and connection to structure for both hanger rods and seismic braces are tabulated and/or detailed in Sections B, T, M, and N, respectively.

10) Seismic brace requirements for seismic accelerations ranging from 0.25 to 1.0g (ASD) are tabulated in Sections B2, B3 and B4. Each schedule is designed to a specific seismic acceleration and provides maximum transverse, longitudinal and all-directional brace spacings based on operating weight per linear foot of the duct system. In addition, the schedules provide hanger rod and seismic brace connection options that meet the same criteria.
11) Multi-layer duct systems that share support rods must be braced independently from one another or as specifically engineered by the RDP. Layers supporting loads ≤ 10 lbs/ft need not be braced, provided that the load is accounted for in the nearest braced layer. Each section of threaded rod between trapezes and/or the building structure is subject to vertical stiffening requirements.

12) Vertical drops from suspended duct systems to equipment (or flexible connectors where applicable) may be braced using the transverse and longitudinal braces in this manual. Note: Do not exceed $\frac{1}{2}$ of the maximum brace spacing as measured from the seismic brace to the equipment or flexible connector when bracing vertical drops. (Refer to Layout of Seismic Braces, Section A3). If the transverse or longitudinal brace cannot accept the full vertical drop, a seismic floor support designed for the applicable loads is required. Design of this support shall account for seismic relative displacement between floors and may require a flexible connection between the floor support and the first seismic brace location above.

13) Any system which crosses a building separation or seismic joint must be designed to accommodate the seismic relative displacement per ASCE 7-10 13.3.2, 13.3.2.1, and 13.3.2.2, or as specified by the engineer of record for approval by the enforcement agency.

Notes on Supports:

1) Where the seismic brace system incorporates the use of a threaded vertical hanger rod designed to carry gravity loads only, additional anchorage and/or stiffening may be required as detailed. General support of suspended duct systems and equipment to carry gravity loads shall be determined by the engineer of record and/or mechanical code requirements. However, hanger rod connection details in this manual may be used as a guide for these supports. ASTM A307 threaded rods may be used in lieu of ASTM A36 threaded rods as called out in this manual. The use of "C-Clamps" designed to attach threaded rod to one side of a steel beam flange shall not be used unless they are provided with a restraining strap or hook to the opposite beam flange equivalent to those specified in NFPA 13, Section 9.3.7 and approved by OSHPD.

2) Support rod capacity and its anchorage to the structure is an important part of a solid bracing system. Solid braces shall not be attached to existing systems or support rods designed for gravity loads unless they are checked for increased loads.

3) Threaded vertical hanger rods where seismic sway bracing is attached may require stiffening if the length of the rod exceeds the maximum unbraced rod length indicated on the kit installation detail in Section D. However, if the calculated compression on the rod due to combined gravity, the vertical brace component of the bracing system as a result of Fp, and Fpv loads is less than or equal to zero, no rod stiffening is required, regardless of rod length. A vertical rod stiffener using a $\frac{15}{8}''$x$\frac{15}{8}''$x12ga strut channel or angle cut to the appropriate length and attached to the threaded rod with a minimum of two Mason Ind. N.Y. Type UCC or SRC clamps is required, as detailed in Section D. The contractor may substitute a break-off bolt set to a minimum of 10 ft-lbs (Ref. X3.0). Rod stiffening strut may be solid, slotted or punched. Ref. X7.0 and X7.1 for strut member data.

4) Trapeze supports shall consist of 12 gauge single or double channel strut, steel angles or tube steel as tabulated in Sections B and T. For gravity-only trapeze supports and trapeze supports where transverse seismic braces are installed, the acceptable size of the trapeze member is provided in the same sections. For trapeze supports where longitudinal seismic braces are to be installed, the acceptable size of the trapeze member is also provided. Trapeze members may be provided with round holes sized for hanger rods. Ref. X7.0 and X7.1 for strut member data. In all cases, for analysis purposes, the following information is required: a) seismic 'g' coefficient, b) duct weight per foot and c) maximum span between threaded rod supports. The trapezes shall be supported by threaded rods, with nuts and washers as detailed in Section D, with rod stiffeners as required per Note 3.
5) Concrete overstrength factor, $\Omega_0$, is not required for hanger supports designed for gravity only or hanger supports at seismic cable brace locations where seismic forces do not exceed 20% of the total forces.

Notes on Seismic Cable Bracing:

1) Cables shall be prestretched galvanized 7x19 strand core aircraft cable, with no limit to their installed length. Cables meet the following specifications: MIL-DTL-83420M with Amendment 2, Type 1 non-jacketed cable.

2) Cables shall be installed slightly slack, so as not to support gravity loads.

3) Cable shall connect the braced item to a building structural element. Cable shall have a bracket at each end to make the connections. The cable assembly, with connection brackets, shall be Mason Ind. N.Y. SCB or SCBH, refer to pages X1.0 & X1.1. Cable is held to end brackets with one or two bolts. Cable bolts shall be tightened to the torque values stated in the details or, in the case where break off nuts are provided, until the nut breaks off. Break off nuts are as manufactured by Mason West, Inc. (Refer to Page X4.0).

4) The Mason Ind. N.Y. SCBH component can be used for connection directly to the threaded vertical hanger rod used for supporting system gravity loads as detailed in Section D.

5) The SCB bracket and cable (Ref. X1.0), SCBH bracket and cable (Ref. X1.1), and UCC rod stiffener clamp (Ref. X3.0) are manufactured by Mason Ind. N.Y. and are included (with accompanying hardware) in the kit options provided in Section D.

Notes on Seismic Solid (Rigid) Bracing:

1) Solid bracing members shall be 12 gauge channel strut or steel angle. Strut members may be solid, slotted or punched. The details in Section D indicate the minimum solid brace size based on a maximum solid brace length. The charts on pages X2.0 and X2.1 tabulate different solid brace member sizes for maximum installed lengths of 5'-0", 9'-6" or 14'-6". Ref. X7.0 and X7.1 for strut member data.

2) Solid brace members shall be connected to both the distribution system and the structure using the seismic solid brace components (Mason Ind. N.Y. Type SSBS or SHB. Refer to pages X2.0 or X2.1, respectively).

3) The attachment between the solid brace component and the 12 gauge channel strut shall consist of (1) or (2) 1/2" bolt and strut nut connections torqued to 50 ft-lbs or, in the case where break off nuts are provided, until the nut breaks off. Refer to Section D to determine the quantity of bolt/strut nut connections required. Break off nuts are as manufactured by Mason West, Inc. (Refer to Page X4.0).

4) The SSBS bracket (Ref. X2.0), SHB bracket (Ref. X2.1), and UCC rod stiffener clamp (Ref. X3.0) are manufactured by Mason Ind. N.Y. and are included in the kit options (with accompanying hardware) provided in Section D.
Notes on Seismic Brace Attachment to Building Structure:

1) Attachment methods and hardware (connectors) used for seismic bracing attachment to the building structural element is the critical factor in the design of seismic sway-bracing. Lightweight structures may limit the maximum spacing between seismic braces. The structural engineer of record shall determine the maximum allowable seismic loads that may be imposed on the building structure.

2) Attachment to different types of structures are addressed in these guidelines. Attachment types include reinforced normal or sand lightweight concrete (flat slabs, slabs poured in steel decking, walls or columns), fully grouted reinforced concrete masonry, hollow steel decking, steel framing, timber framing, and metal stud wall framing. Attachments may be made with pre- or post-installed concrete anchors, machine bolts, self-drilling and self-tapping screws, lag bolts, nails or in cases of steel on steel attachments, by arc-welding. Use of attachment methods not detailed in these guidelines must be engineered on an individual job basis subject to approval by the enforcement agency. Note: The structural engineer of record shall verify that attachment details specified by the RDP are in accordance with the design concept for the primary structure.

3) Expansion anchors shall be Hilti Kwik Bolt TZ, Powers Power-Stud+ SD1, Mason Ind. N.Y. SAS(E) or Powers Power-Stud+ SD2 for minimum 3000 psi concrete slabs, beams, or walls and concrete filled decks (sand light or normal weight) installed in accordance with ICC Reports ICC ESR 1917, 2818, 3037 or 2502, respectively. Hilti Kwik Bolt 3 expansion anchors shall be used to resist static and transient seismic tension and shear loads in uncracked, grout-filled concrete masonry. Expansion anchors designed to ICC-ES AC01 are limited to allowable stress design only in accordance with AC01 1.2. SEOR shall verify that: (1) masonry is not cracked as defined in ICC-ES AC01 Section 2.3; calculation required to show masonry wall would not crack under the design earthquake loads under all service load conditions; wall has to remain elastic; (2) masonry wall shall be fully grouted in accordance with ESR-1385 Section 3.2; (3) condition of use requirements in accordance with ESR-1385 Section 5.0 is satisfied. When expansion anchors are used, 50 percent of alternate bolts in a group shall be tension tested or torque tested per 2013 CBC Section 1913A.7. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency. If any anchors fail, test all previously untested anchors installed by the same trade until 20 consecutive anchors pass. Then resume the original test frequency. Refer to page A0.4 for test loads.

4) Concrete inserts shall be Mason West Type MW-PAL-A for installation in normal or sand lightweight concrete slabs or MW-CDI for installation in normal or sand lightweight concrete filled metal decks.

5) All welded attachments shall be minimum 70xx electrode welds. Minimum 60xx electrode welds may be used for steel thicknesses that are 12 gauge or less.

6) Metal decks for expansion anchor attachments and MW-CDI inserts shall be minimum 20 gauge with either a maximum 3 inch flute and minimum 1-1/2 inch cover or a maximum 1-1/2 inch flute and minimum 2-1/4 inch cover. Metal decks for MW-PAL-A insert shall be minimum 20 gauge with 3" flute and 3-1/4" cover. Refer to appropriate M2 and N2 pages for allowable deck anchor attachments. Concrete fill shall be minimum 3000 psi sand lightweight concrete. Note: Metal decks with minimum 3000 psi stone aggregate concrete fill may use the sand lightweight concrete deck charts.

7) Concrete attachments are based on specified anchor bolts or inserts. Substitution of alternate anchors must be approved by Mason West and the enforcement agency on a job by job basis.

8) When installing drilled-in anchors in existing non-prestressed reinforced concrete, use care and caution to avoid cutting or damaging reinforcing bars. When installing them in existing prestressed concrete, locate the prestressed tendons by using a non-destructive method and do not cut or damage the tendons during installation.
9) Attachments are provided for wide flange structural steel members, open web steel trusses as well as wood trusses, joists, and beams in Section N3.11-3.13, N4.10-4.13.

10) Screw anchors shall be Powers Screw-Bolt+/Hangermate+, Mason Ind. N.Y. SAST, or Hilti Kwik HUS-EZ/HUS-EZ I for minimum 3000 psi concrete slabs, beams, or walls and concrete filled decks (sand light or normal weight) installed in accordance with ICC Reports ICC ESR 3889, 2713 or 3027, respectively. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency. If any anchors fail, test all previously untested anchors installed by the same trade until 20 consecutive anchors pass. Then resume the original test frequency. Screw anchors shall not be tested using a torque wrench. Screw anchors may be loosened a maximum of one full turn to facilitate the positioning of a tension test collar. Following the tension test, the anchor shall be re-torqued in accordance with the manufacturer's installation instructions. Refer to page A0.5 for test loads.

Notes on Suspended HVAC Ducts and Factory Built Vent Duct:

Note: Ductwork designed to carry toxic, highly toxic or flammable gases, or used for smoke control shall be designed and braced without considering the exceptions noted below.

1) Per 2013 CBC Sections 1616A.1.18 & 1616A.1.24, ASCE 7-10 Sections 13.1.4 and 13.6.7, design for the seismic forces are not required for HVAC Ductwork and Factory Built Vent Duct where any of the following are satisfied:
   a) The component is positively attached to the structure; and the project is designated as Seismic Design Categories D, E or F; flexible connections are provided between the duct and the component/equipment; and the duct weighs 5 lbs/ft or less; or
   b) Trapeze assemblies are used to support ductwork and the total weight of the ductwork supported by trapeze assemblies is less than 10 lbs/ft; or
   c) The ductwork is supported by hangers and each hanger in the duct run is 12” or less in length from the duct support point to the supporting structure (refer to Note 2 below for 12” Inch Rule). Where rod hangers are used with a diameter greater than 3/8”, they shall be equipped with swivels, eye bolts or other devices to prevent inelastic bending of the rod; or
   d) Provisions are made to avoid impact with larger ducts or mechanical components or to protect the ducts in the event of such impact and the HVAC ducts or Factory Built Vent Ducts have a cross-sectional area of 6 ft² or less or weigh 10 lbs/ft or less.

   Note: Seismic Design Category and I² can be found in the general notes of the structural drawings for a specific project under Design Criteria.

2) Section A4 of these guidelines details the "12 Inch Rule" exception described in Note 1c for Suspended HVAC Ducts and Factory Built Vent Duct.

3) Ductwork conforming to SMACNA standards, including but not limited to duct construction and joint connections, shall be braced at a maximum transverse and longitudinal brace spacing of 30 feet and 60 feet, respectively.

4) Rectangular and oval ductwork shall be supported at seismic brace locations with a trapeze support member sized to carry the gravity load of the ductwork; a minimum of (2) threaded vertical hanger rods. An upper support member over top of the duct is required when seismic bracing is attached to the top. The trapeze and upper support members must be fastened to the ductwork with sheet metal screws as detailed in Section D. Refer to Sections B and T for sizing of the trapeze and upper support members. Refer to installation pages for connection details from the ductwork to the trapeze members.
9) Attachments are provided for wide flange structural steel members, open web steel trusses as well as wood trusses, joists, and beams in Section N3.11-3.13, N4.10-4.13.

10) Screw anchors shall be Powers Screw-Bolt+/Hangermate+, Mason Ind. N.Y. SAST, or Hilti Kwik HUS-EZ/HUS-EZ I for minimum 3000 psi concrete slabs, beams, or walls and concrete filled decks (sand light or normal weight) installed in accordance with ICC Reports ICC ESR 3889, 2713 or 3027, respectively. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency. If any anchors fail, test all previously untested anchors installed by the same trade until 20 consecutive anchors pass. Then resume the original test frequency. Screw anchors shall not be tested using a torque wrench. Screw anchors may be loosened a maximum of one full turn to facilitate the positioning of a tension test collar. Following the tension test, the anchor shall be re-torqued in accordance with the manufacturer's installation instructions. Refer to page A0.5 for test loads.

Notes on Suspended HVAC Ducts and Factory Built Vent Duct:

Note: Ductwork designed to carry toxic, highly toxic or flammable gases, or used for smoke control shall be designed and braced without considering the exceptions noted below.

1) Per 2019 CBC Sections 1601.1.4 & 1617A.1.18 applicable only to OSHPD-1,2,4,5 and 1R designated projects, distributed HVAC Ductwork and Factory Built Vent Duct weighing 5 lbs/ft or less are exempt from design for the seismic forces of ASCE 7-16 Section 13.3. For remaining duct systems, per 2019 CBC Section 1617A.1.25, design for the seismic forces and relative displacements shall not be required for HVAC Ductwork and Factory Built Vent Duct where flexible connections or other assemblies are provided to accommodate the relative displacement between the duct system and associated components, the duct system is positively attached to the structure, and where one of the following apply:
   a) Trapezoid assemblies with \( \frac{3}{8} '' \) or \( \frac{1}{2} '' \) diameter rod hangers not exceeding 12'' in length from the duct support point to the connection at the supporting structure are used to support duct, and the total weight supported by any single trapeze is less than 10 lb/ft and 100 lbs or less; or
   b) The duct is supported by individual rod hangers \( \frac{3}{8} '' \) or \( \frac{1}{2} '' \) in diameter, and each hanger in the duct run is 12'' or less in length from the duct support point to the connection at the supporting structure, and the total weight supported by any single rod is 50 lbs or less.

2) Design for the seismic forces and relative displacements shall not be required where provisions are made to avoid impact with other ducts or mechanical components or to protect the ducts in the event of such impact, the distribution system is positively attached to the structure, and HVAC Ductwork or Factory Built Vent Duct have a cross-sectional area of less than 6 square feet and weigh 20 lbs/ft or less.

3) Ductwork conforming to SMACNA standards, including but not limited to duct construction and joint connections, shall be braced at a maximum transverse and longitudinal brace spacing of 30 feet and 60 feet, respectively.

4) Rectangular and oval ductwork shall be supported at seismic brace locations with a trapeze support member sized to carry the gravity load of the ductwork; a minimum of (2) threaded vertical hanger rods. An upper support member over top of the duct is required when seismic bracing is attached to the top. The trapeze and upper support members must be fastened to the ductwork with sheet metal screws as detailed in Section D. Refer to Sections B and T for sizing of the trapeze and upper support members. Refer to installation pages for connection details from the ductwork to the trapeze members.
5) Multiple ducts may be combined in a single frame and braced based on the combined duct weight.

6) Wall penetrations may be considered transverse brace locations where duct is tightly blocked, subject to approval by the SEOR. If a breakaway smoke damper is present, its ability to accept the transverse seismic load shall be evaluated on a case by case basis. The Engineer of Record or the Project Architect must verify the ability of the wall to accommodate the transverse seismic load.

7) Floor penetrations of vertical duct may be considered transverse and longitudinal brace locations where duct is tightly blocked, no smoke dampers are installed, and the distance from the floor penetration to the inside of the 90 degree turn horizontal is less than 2 feet.

8) Components or equipment that are installed in-line with the duct system and have an operating weight greater than 75 lbs such as fans, heat exchangers, humidifiers and VAV/CAV/ATU boxes, etc. shall be supported and laterally braced independent of the duct system. Unbraced piping attached to in-line components or equipment shall be provided with adequate flexibility (e.g. flexible connections or (3) 90 degree offsets) to accommodate the seismic relative displacements.

9) Components or equipment that are installed in-line with the duct system and have an operating weight of 75 lbs or less such as fans, heat exchangers, humidifiers and VAV/CAV/ATU boxes, etc. and are otherwise not independently braced shall be positively attached with mechanical fasteners to the rigid duct on both sides. Unbraced piping attached to in-line components or equipment shall be provided with adequate flexibility (e.g. flexible connections or (3) 90 degree offsets) to accommodate the seismic relative displacements.

Note: If the in-line duct device requires special seismic certification or an OSHPD OSP, support and lateral bracing shall be provided as specified in the certification or OSP document, regardless of in-line duct device operating weight.

10) The appendix of this manual tabulates the duct weight per foot for rectangular and round ductwork of different sizes and gages.

11) If a 2 piece rod is used to support ductwork, minimum engagement of the rod in the coupling nut shall be equal to the rod diameter. Rods shall be run up tight in the coupling nut.

Notes on Vertical Risers:

1) Vertical ductwork systems supported at each floor shall be considered seismically braced if the penetration through each floor is tightly packed and the floor-to-floor spacing is not in excess of 30 feet. Tops of risers exceeding 3 feet shall be provided with a 4-way brace. Where the 4-way brace is attached on the horizontal ductwork, it shall be installed within 2 feet of the centerline of the riser.

2) Vertical duct risers in an open shaft must be attached to steel supports with both steel supports and connections sized to accept the combined gravity and seismic loads. Thermal loads shall be considered, where applicable. Lateral seismic restraint spacing shall not exceed 30 feet. Supports and connections must be engineered on a job by job basis subject to approval by the enforcement agency. Seismic relative displacement between floors shall be considered in the design.
DUCTWORK DESIGN PROCEDURE

Follow the five steps below to determine the seismic kit installation, hanger and brace connection details that pertain to a specific suspended duct system. An example is provided on the following pages.

Step 1. **Determine 'g' Forces:**
Calculate the lateral acceleration, \( F_p \), and vertical acceleration, \( F_{PV} \), in terms of 'g' using the equations outlined on page A1.0 for each level of the building.

Step 2. **Determine Operating Weight (lbs/ft or lbs):**
Determine the operating weight, \( W_p \), of the distribution system (lbs/ft) or component (lbs) to be seismically braced. Refer to the appendix for rectangular and round duct weights.

Step 3. **Determine Seismic Forces (lbs):**
Determine the maximum allowable brace spacings from page A1.5, note 3. If you choose to use the pre-designed schedules in Section B, skip the remainder of this step.

If you choose to use the pre-designed schedules in Section B, skip the remainder of this step. Calculate the maximum lateral and vertical forces applied to the seismic brace system. Resolve the maximum lateral force to the brace, \( F_p \), and maximum load on the hanger rod, \( T_{Rod} \).

The resultant compression load on the hanger rod at seismic brace locations may be calculated to determine if rod stiffening is required.

Step 4. **Select Seismic Kit Installation, Hanger and Brace connection Details:** Select the appropriate details from the schedules in Section B for rectangular, round or factory built vent duct based on maximum 'g' force, system weight per foot and maximum transverse, longitudinal and all directional brace spacing.

If you calculated the seismic forces in step 3, verify the details selected are correct by comparing the calculated lateral force, \( F_p \), and load on the hanger rod, \( T_{Rod} \), with the rated loads tabulated on the detail sheets. If \( F_p \) and \( T_{Rod} \) are less than or equal to the tabulated rated loads, the details are acceptable.

Step 5. **Select Trapeze Upper and Lower Members:**
Select the upper and lower trapeze members from the tables in Section B or T for transverse, longitudinal and all-directional seismic braces based on 'g' force and maximum span of trapeze member.
DUCTWORK DESIGN PROCEDURE (continued)

Example:

70" x 48" x 18 gauge rectangular ductwork, constructed per SMACNA standards, is suspended within a 3 story poured-in place concrete building with basement. The ductwork is supported at every 8 feet. The elevation of each floor, including the basement, is 15 feet. The short period spectral acceleration, $S_{DS}$, listed on the contract structural drawings, is 1.02. The component importance factor, $I_P = 1.5$.

Note: When anchoring to concrete, allowable loads have been reduced by the concrete overstrength factor, $\Omega_0$, where applicable, in Sections M & N. Therefore, $\Omega_0$ is not used when calculating applied seismic forces in this example.

Step 1. **Determine 'g' Forces**

Component amplification and response modification factors for suspended ductwork, constructed by means other than welding or brazing are as follows:

$a_P = 2.5$; $R_P = 6.0$

Therefore,

$$F_P = (0.7) \frac{0.4(2.5)(1.02)W_P}{(6.0)/(1.5)}(1+2z_h) = 0.18(1+2z_h)g$$

$$F_{P(min)} = (0.7)(0.3)(1.02)(1.5)W_P = 0.32g$$

$$F_{P(max)} = (0.7)(1.6)(1.02)(1.5)W_P = 1.71g$$

$$F_{PV} = (0.7)(0.2)(1.02)W_P = 0.14g$$

Tabulated below are the 'g' forces for each level of the building.

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>$F_P$</th>
<th>$F_{PV}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>0.14g</td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>0.14g</td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>0.14g</td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>0.14g</td>
</tr>
</tbody>
</table>

Step 2. **Determine Operating Weight (lbs/ft):**

From page APP1.3, the operating weight of an 70" x 48" x 18 gauge rectangular ductwork is 45.4 lbs/ft.
Step 3. **Determine Seismic Forces (lbs):**

From page A1.5 Note 3, the maximum transverse and longitudinal brace spacing for suspended ductwork (constructed of ductile materials with ductile connections) is 30 feet and 60 feet, respectively, for all levels.

Note: At this point, you have the option to calculate the seismic forces and loads on the hanger rods and complete this step or move on to step 4.

For Basement Level and Level 1,

\[
F_p \text{ (Transverse)} = 0.32 \times 45.4 \text{ lbs/ft} \times 30 \text{ ft brace spacing} = 436 \text{ lbs}
\]

\[
F_p \text{ (Longitudinal)} = 0.32 \times 45.4 \text{ lbs/ft} \times 60 \text{ ft brace spacing} = 872 \text{ lbs}
\]

\[
F_{PV} = 0.14 \times 45.4 \text{ lbs/ft} \times 8 \text{ ft support spacing} = 51 \text{ lbs}
\]

Note: \( F_p \) does not need to be increased due to installation tolerances indicated in assembly details.

For seismic solid brace installations:

\[
T_{Rod} = F_p \tan(\text{brace angle}) + (45.4 \text{ lbs/ft} \times 8 \text{ ft} + F_{PV})/2 = 643 \text{ lbs.}
\]

Note: Brace angle = 45 degrees for this example. Longitudinal loads considered split evenly to each rod.

For seismic cable brace installations:

\[
T_{Rod} = (45.4 \text{ lbs/ft} \times 8 \text{ ft} + F_{PV})/2 = 207 \text{ lbs.}
\]

Note: In both seismic solid and cable brace \( T_{Rod} \) calculations, the gravity loads are assumed to be evenly distributed to each hanger. If this is not the case, make the necessary adjustment.

Similarly for Levels 2 and 3, \( F_p, F_{PV} \) and \( T_{Rod} \) are as tabulated below.

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>( F_p )</th>
<th>( F_{PV} )</th>
<th>( T_{Rod(\text{Solid})} )</th>
<th>( T_{Rod(\text{Cable})} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>436 lbs</td>
<td>51 lbs</td>
<td>643 lbs</td>
<td>207 lbs</td>
</tr>
<tr>
<td>1</td>
<td>436 lbs</td>
<td>51 lbs</td>
<td>643 lbs</td>
<td>207 lbs</td>
</tr>
<tr>
<td>2</td>
<td>572 lbs</td>
<td>51 lbs</td>
<td>779 lbs</td>
<td>207 lbs</td>
</tr>
<tr>
<td>3</td>
<td>735 lbs</td>
<td>51 lbs</td>
<td>942 lbs</td>
<td>207 lbs</td>
</tr>
</tbody>
</table>

\[
C_{Rod} = F_p \tan(\text{brace angle}) + F_{PV} - 0.9W_p = 436 \text{ lbs} \times \tan(45 \text{ degrees}) + 51 \text{ lbs}/2 - 0.9 \times (45.4 \text{ lbs/ft} \times 8 \text{ ft})/2 = 298 \text{ lbs.}
\]

Note: If \( C_{Rod} \leq 0 \), rod stiffeners are not required.
**Step 4. Select Seismic Kit Installation, Hanger and Brace connection Details:**

For rectangular duct with operating weight of 45.4 lbs/ft, acceptable seismic kit installation, hanger and connection details from the charts in Section B for each level of the building are as tabulated below.

### Seismic Solid (Rigid) Brace, Hanger and Brace connection Details

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>B2.1</td>
<td>30’/60’</td>
<td>D1.33 D1.34 N/A</td>
<td>63L N/A</td>
<td>63J</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>B2.1</td>
<td>30’/60’</td>
<td>D1.33 D1.34 N/A</td>
<td>63L N/A</td>
<td>63J</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>B2.1</td>
<td>30’/60’</td>
<td>D1.33 D1.34 N/A</td>
<td>63L N/A</td>
<td>63J</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>B2.2</td>
<td>20’/40’</td>
<td>D1.33 D1.34 D1.32</td>
<td>63M 63P 63L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Seismic Cable (Standard) Brace, Hanger and Brace connection Details

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>Fp</th>
<th>Section B Page</th>
<th>Tran/Long Spacing</th>
<th>Kit Installation Details</th>
<th>Hanger Conn. Desig.</th>
<th>Brace Conn. Desig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>B2.4</td>
<td>20’/40’</td>
<td>D4.20 D4.21 D4.22</td>
<td>50E 50G</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>B2.4</td>
<td>20’/40’</td>
<td>D4.20 D4.21 D4.22</td>
<td>50E 50G</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>B2.4</td>
<td>20’/40’</td>
<td>D4.20 D4.21 D4.22</td>
<td>50E 50G</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>B2.5</td>
<td>8’/16’</td>
<td>D4.20 D4.21 D4.22</td>
<td>50E 50F</td>
<td></td>
</tr>
</tbody>
</table>

For calculated $F_p$ and $T_{Rod}$ select the appropriate details in Sections D, M and N by comparing the calculated values with the tabulated values indicated on each detail.

**Step 5. Select Trapeze Upper and Lower Members:**

For a rectangular duct weighing 45.4 lbs/ft supported by a trapeze member with a maximum span between hanger rods of 78 in. and the seismic accelerations calculated in step 2, go to the tables in Section T1 to find the allowable trapeze members for transverse, longitudinal and all-directional seismic braces for each level of the building. For transverse brace spacing of 30 feet and longitudinal/all-directional brace spacing of 60 feet:

### Trapeze Upper Member at Longitudinal and All-Directional Brace Locations

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>Fp</th>
<th>Section T Page</th>
<th>Longitudinal</th>
<th>All-Directional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>T1.2</td>
<td>3-1/4&quot; Single Strut</td>
<td>3-1/4&quot; Single Strut</td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>T1.2</td>
<td>3-1/4&quot; Single Strut</td>
<td>3-1/4&quot; Single Strut</td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>T1.3</td>
<td>3-1/4&quot; Single Strut</td>
<td>3-1/4&quot; Single Strut</td>
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<td>T1.4</td>
<td>3-1/4&quot; Single Strut</td>
<td>3-1/4&quot; Single Strut</td>
</tr>
</tbody>
</table>

Refer to page T1.0 for trapeze upper member at transverse brace locations and trapeze lower member at all brace locations; for these cases, trapeze member to be 1-5/8" Single Strut.
LAYOUT OF SEISMIC BRACES FOR DUCTWORK

Step 1. Separate the layout of the system into individual straight runs. A straight run is defined as a section of the utility between changes in direction. If an offset(s) occurs between changes of direction it may be neglected if the distance perpendicular to the run is less than 2 feet.

- Maximum Offset Length (2 feet)
- Angular Offset
- Multiple Offsets
- Transverse brace at final support point of each end of straight run

Step 2. Each straight run must be braced in the transverse direction (perpendicular to the run) at each end.

Plan View

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California SE No. S5270

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020
26 of 846
Step 3. Add transverse braces, if required, to limit the spacing(s) to the maximum spacing indicated in Section A.

Step 4. Each straight run must be braced in the longitudinal direction (parallel to the run) with at least one brace. Transverse braces within the maximum offset length discussed in Step 1 may be used in addition to or in lieu of independent longitudinal braces. The length of duct around a 90 degree turn (indicated as 'P' below) longitudinally braced from a transverse brace = S-0.5T-A, where:

\[ S = \text{Maximum Allowable Transverse Brace Spacing (30 feet per note 3, Page A1.5)} \]
\[ T = \text{The distance between Transverse Braces} \]
\[ A = \text{Offset Length} \leq 2 \text{ feet} \]
Step 5. Multiple changes in direction may be treated as one complete system. Straight runs greater than the maximum offset length require 2 transverse braces. Straight runs less than the maximum offset length may require as few as one or no braces. (See layout below)

Step 6. Vertical drops to equipment must be restrained with a transverse brace at the final support point before the vertical drop. The distance from the transverse brace to the drop must be within the maximum offset length of the system. The maximum allowable length of the system braced from the transverse brace to the flexible connector is equal to $\frac{1}{2}$ of the maximum transverse brace spacing indicated in Section A. If this distance is greater than $\frac{1}{2}$ of the maximum transverse brace spacing, an additional brace is required at the end of the vertical drop by attaching to the floor. Consideration must be given to seismic relative displacements (SRD) imposed on duct when braced to the floor.
12" RULE FOR SUSPENDED DUCTWORK

*NOTE: CONNECTIONS COMPLYING INCLUDE SWIVEL JOINTS, EYE BOLTS, ETC.

- SWIVEL CONNECTIONS* FOR ROD SIZE > 3/8"
- SHEET METAL STRAPS
- (2) #10 SHEET METAL SCREWS
- SHEET METAL SCREWS AS REQUIRED

SUPPORT STRUCTURE

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A4.0

10/09/2020
SEISMIC BRACE REQUIREMENTS
FOR DUCTWORK ON MULTI-LAYER TRAPEZES

CASE 1
IF $w_{\text{total}} < 10 \text{ LB/FT}$, NO BRACING REQ'D

CASE 2
IF $w_1 \geq 10 \text{ LB/FT}$ AND $w_2 \geq 10 \text{ LB/FT}$, BRACE EACH LAYER INDEPENDENTLY

CASE 3
IF $w_{\text{total}} \geq 10 \text{ LB/FT}$ AND $w_2 < 10 \text{ LB/FT}$,
BRACE TOP TRAPEZE FOR $w_{\text{total}}$
(BOTTOM TRAPEZE NEED NOT BE BRACED PROVIDED THE LOAD IS ACCOUNTED FOR IN THE NEAREST BRACED LAYER)

NOTES:
1) REGISTERED DESIGN PROFESSIONAL (RDP) SHALL VERIFY BRACE REQUIREMENTS LISTED ON PAGE A1.5.
2) HANGER REACTIONS SHALL BE DETERMINED FROM TOTAL DUCT WEIGHT FROM ALL LAYERS.
NOTE: ANY OR ALL BRACE LOCATIONS ARE PERMITTED TO USE THE ANGLE VARIATION TO MEET FIELD CONDITIONS.

THE ANGLE VARIATION MAY INCREASE BEYOND 2.5 DEGREES UP TO 15 DEGREES PROVIDED THE TRANSVERSE BRACES ARE SKEWED IN THE SAME DIRECTION AND A LONGITUDINAL BRACE OCCURS OPPOSITE THE SKEWED ANGLE DIRECTION AS SHOWN BELOW.

SKEW ANGLE DIRECTION

TRANSVERSE BRACE WITH SKEW

LONGITUDINAL OR ALL-DIRECTIONAL BRACE

MAX OFFSET LENGTH OF 2 FEET

SKEW ANGLE DIRECTION

TRANSVERSE BRACE WITH SKEW

TRANSVERSE BRACE (OR WALL WHERE APPLICABLE)

TIGHTLY PACKED FLOOR PENETRATION WITHIN MAX OFFSET LENGTH OF 2 FEET

CABLE BRACE

SKEW ANGLE DIRECTION

TRANSVERSE BRACE WITH SKEW

LONGITUDINAL OR ALL-DIRECTIONAL BRACE

MAX OFFSET LENGTH OF 2 FEET

SKEW ANGLE DIRECTION

TRANSVERSE BRACE WITH SKEW

TRANSVERSE BRACE

TIGHTLY PACKED FLOOR PENETRATION WITHIN MAX OFFSET LENGTH OF 2 FEET

SKEW ANGLE DIRECTION

TRANSVERSE BRACE WITH SKEW

TRANSVERSE BRACE

TIGHTLY PACKED FLOOR PENETRATION WITHIN MAX OFFSET LENGTH OF 2 FEET
ALTERNATE ARRANGEMENT OF SEISMIC BRACES FOR DUCTWORK, IN-LINE DEVICES, AND SUSPENDED EQUIPMENT

ELEVATION VIEW
SOLID BRACE INSTALLED IN-BETWEEN HANGERS
(TRANSVERSE OR ALL-DIRECTIONAL BRACE)

ELEVATION VIEW
SOLID BRACE INSTALLED AT BOTTOM TRAPEZE
(TRANSVERSE BRACE ONLY)

PLAN VIEW
CABLE X-PATTERN BRACE INSTALLED IN-BETWEEN HANGERS

ELEVATION VIEW
CABLE BRACE INSTALLED IN-BETWEEN HANGERS

ELEVATION VIEW
CABLE BRACE INSTALLED AT SINGLE HANGER
(TRANSVERSE BRACE ONLY)

SEISMIC BRACE BRACKET OFFSET FROM HANGER RODS

NOTES:
1) REFER TO APPROPRIATE DETAIL D PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
2) WHEN INSTALLING SHB TO BOTTOM OF TRAPEZE, MW-KY SHB KEY IS REQ'D (REF. X2.4).
ALTERNATE ARRANGEMENT OF SEISMIC BRACES FOR DUCTWORK, IN-LINE DEVICES, AND SUSPENDED EQUIPMENT

PLAN VIEW
LONGITUDINAL SOLID BRACES INSTALLED IN ALTERNATING DIRECTIONS

PLAN VIEW
ALL-DIRECTIONAL SOLID BRACES INSTALLED IN ALTERNATING DIRECTIONS

ELEVATION VIEW
DUCT ATTACHMENT TO HSS TRAPEZE

SEISMIC BRACE BRACKET OFFSET FROM HANGER ROD FOR HSS TRAPEZE

TRANSVERSE BRACE MAY BE INSTALLED IN BETWEEN HANGERS AS SHOWN ON DETAIL A6.0, TYP.

TRAPEZE MEMBER MAY NOT BE NECESSARY. REFER TO APPROPRIATE D PAGES FOR BALANCE OF INFORMATION, TYP.

BRACKET MAY BE OFFSET 3" MAX FROM HANGER ROD

HSS TRAPEZE, TYP

SEE DETAIL A, TYP.

SEE NOTE 2

HSS

1” TYP.

5/8” MIN.
TYP.

(1) L1/2x1/2x1/2 AT EACH DUCT CORNER

#12-24 ITW BUILDEX TEKS SCREWS CENTERED ON ANGLE LEGS. REFER TO THE APPROPRIATE DETAIL D PAGES FOR THE MIN. NUMBER OF SCREWS REQ'D TO DUCT AND MATCH QUANTITY OF SCREWS TO HSS.

NOTES:
1) REFER TO APPROPRIATE DETAIL D PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
2) WHEN INSTALLING SHB TO BOTTOM OF TRAPEZE, MW-KY SHB KEY IS REQ'D (REF. X2.4).
3) ALLOWABLE ANGLE RANGES ARE TYPICAL FOR ALL ARRANGEMENTS OF SEISMIC BRACES.
ALTERNATE ARRANGEMENT OF SEISMIC BRACES FOR DUCTWORK, IN-LINE DEVICES, AND SUSPENDED EQUIPMENT

NOTES:
1) REFER TO APPROPRIATE DETAIL D PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
2) ALLOWABLE ANGLE RANGES ARE TYPICAL FOR ALL ARRANGEMENTS OF SEISMIC BRACES.
3) RESULTANT FORCE SHALL NOT MEET AT A SINGLE POINT TO PREVENT ROTATION AT THE CENTER OF GRAVITY.

PLAN VIEW
SPLIT X-PATTERN CABLE BRACING INSTALLED IN ALTERNATING DIRECTIONS

PLAN VIEW
CABLE BRACING INSTALLED IN ALTERNATING DIRECTIONS

TRAPEZE MEMBERS MAY NOT BE NECESSARY. REFER TO APPROPRIATE D PAGES FOR BALANCE OF INFORMATION, TYP.
SEISMIC SOLID BRACING OFF STRUT HANGER TRANSVERSE OPTION FOR SUSPENDED DUCTWORK

**SINGLE STRUT OPTION**

- REF. M PAGES FOR CONNECTION DETAILS, TYP.
- $1\frac{3}{4}'' 	imes 1\frac{3}{4}'' 	imes 12$ GA SINGLE STRUT, TYP.
- $5'' a$ MIN $102''$ MAX
- $6''$ MAX TYP.

**MAX SPAN**

**DOUBLE STRUT OPTION**

- REF. M PAGES FOR CONNECTION DETAILS, TYP.
- $1\frac{3}{4}'' 	imes 1\frac{3}{4}'' 	imes 12$ GA DOUBLE STRUT, TYP.
- $5'' a$ MIN $96''$ MAX

**MAX SPAN**

NOTES:
1) REFER TO APPROPRIATE D PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.
3) REFER TO T PAGES FOR TRAPEZE SELECTION FOR MAX STRUT SPAN.

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P A G E

A7.0
SEISMIC SOLID BRACING OFF STRUT HANGER
LONGITUDINAL OPTION FOR SUSPENDED DUCTWORK

SINGLE STRUT OPTION

DOUBLE STRUT OPTION

NOTES:
1) REFER TO APPROPRIATE D PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.
3) REFER TO T PAGES FOR TRAPEZE SELECTION FOR MAX STRUT SPAN.
SEISMIC CABLE BRACING OFF STRUT HANGER
TRANSVERSE OPTION FOR SUSPENDED DUCTWORK

MAX SPAN ³

SINGLE STRUT OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
255 LBS

DOUBLE STRUT OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
470 LBS

MAX SPAN ³

NOTES:
1) REFER TO APPROPRIATE D PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.
3) REFER TO T PAGES FOR TRAPEZE SELECTION FOR MAX STRUT SPAN.
SEISMIC CABLE BRACING OFF STRUT HANGER
LONGITUDINAL OPTION FOR SUSPENDED DUCTWORK

SINGLE STRUT OPTION

DOUBLE STRUT OPTION

NOTES:
1) REFER TO APPROPRIATE D PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.
3) REFER TO T PAGES FOR TRAPEZE SELECTION FOR MAX STRUT SPAN.
PIPING GENERAL NOTES

1) This OSHPD Preapproval of Manufacturer's Certification (OPM) is based on the 2013 CBC. The demand (design forces) for use with this OPM shall be based on the 2013 CBC.

2) Per ASCE 7-10, Section 13.3.1, restraints and their anchorages must be capable of restraining horizontal, \( F_p \), and vertical, \( F_{PV} \), seismic accelerations as follows.

\[
F_p = (0.7) \frac{0.4 a_p S_{DS} W_p}{R_p I_p} \left(1 + 2 \frac{z}{h}\right) \text{ (ASD)} \quad (ASCE 7-10 EQ 13.3-1)
\]

is not required to be taken greater than \((0.7) 1.6 S_{DS} I_p W_p\) \text{ (ASD)} \quad (ASCE 7-10 EQ 13.3-2)

shall not be taken less than \((0.7) 0.3 S_{DS} I_p W_p\) \text{ (ASD)} \quad (ASCE 7-10 EQ 13.3-3)

\[
F_{PV} = (0.7) 0.2 S_{DS} W_p \quad \text{(ASD)}
\]

Where:

- \( S_{DS} \) = short period spectral acceleration - up to 2.5g. Values of \( S_{DS} \) indicated in the general notes of the structural drawing take precedence over those calculated per ASCE 7-10, 11.4.4.
- \( W_p \) = component (or tributary length of pipe) operating weight (lbs/ft).
- \( I_p \) = component importance factor
  - 1.5 for OSHPD 1 & 4 in accordance with 2013 CBC, Section 1616A.1.17 and for OSHPD 2 & 3, where required by ASCE 7, Section 13.1.3.
  - 1.0 for OSHPD 2 & 3, when permitted by ASCE 7, Section 13.1.3.
- \( a_p \) = component amplification factor (Ref. ASCE 7-10, Table 13.6-1)
  - 1.0 for gravity waste, vent and drain cast iron plumbing pipe.
  - 2.5 for all other piping and tubing.
- \( R_p \) = component response modification factor (Ref. ASCE 7-10, Table 13.6-1)
  - 2.5 for gravity, waste, vent and drain cast iron plumbing pipe.
  - 3.0 for piping and tubing constructed of low-deformability materials such as cast iron, glass, and nonductile plastics.
  - 4.5 for piping and tubing not in accordance with ASME B31, including in-line components, constructed of high- or limited-deformability materials, with joints made by threading, bonding, compression couplings, or grooved couplings.
  - 6.0 for piping in accordance with ASME B31, including in-line components, constructed of high- or limited-deformability materials, with joints made by threading, bonding, compression couplings, or grooved couplings.
  - 9.0 for piping and tubing not in accordance with ASME B31, including in-line components, constructed of high-deformability materials, with joints made by welding or brazing.
  - 12.0 for piping in accordance with ASME-B31, including in-line components with joints made by welding or brazing.

**NOTE:** Per ASCE 7-10, Section 13.4.1, do not use an \( R_p \) factor greater than 6.0 when calculating \( F_p \) and \( F_{PV} \) for design of the attachment.

- \( z \) = height in structure of point of connection of component with respect to base (ft).
- \( h \) = average roof height of structure with respect to base (ft).

3) For systems anchored to concrete only, the anchorage to concrete overstrength factor, \( \Omega_0 \), must be applied. Sections M & N provide alternate allowable load tables with and without \( \Omega_0 \) applied. For cases where \( \Omega_0 \) is applicable, use the appropriate tables in Sections M & N so it is not necessary to apply this factor when calculating \( F_p \) and \( F_{PV} \). \( \Omega_0 \) is not applicable if a yielding steel element is considered in the load path. Refer to ACI 318-11 Appendix D, Section D.3.3.4.3 or ACI 318-14 Chapter 17, Section 17.2.3.4.3 for a list of qualifying conditions. The Registered Design Professional (RDP) shall use the allowable vertical loads under overstrength factor \( \Omega_0 = 2.0 \) unless the vertical support complies with one of the qualifying conditions.
PIPING GENERAL NOTES (continued)

4) A complete description on how to use these guidelines is provided in Section A11. It includes specific examples for both using the enclosed details/charts and a layout procedure for bracing of suspended pipe systems.

Notes on Seismic Bracing:

1) These guidelines list installations which may be exempt from seismic bracing under the 2013 CBC. The RDP shall be responsible for determining whether to allow these exceptions, subject to approval by the SEOR and OSHPD.

2) Each straight run of a pipe system requires a minimum of two transverse braces (perpendicular to the run). (Option: A longitudinal brace located at any point of the straight run on the opposite side of an elbow or tee may act as a transverse brace. Refer to the layout examples detailed in Section A12.)

3) Each straight run of a pipe system requires a minimum of one longitudinal brace (parallel to the run). (Option: A transverse brace on the opposite side of an elbow or tee can act as a longitudinal brace. Refer to the layout examples detailed in Section A12.)

   Note: For items 2) and 3) above, a short run of piping may not require seismic bracing if its tributary seismic load transfers to an adjacent run of pipe that is sufficiently seismically braced that can accept the additional seismic loads, when approved by OSHPD for a specific project.

4) Transverse and longitudinal braces that project to the overhead structure shall be installed between 30 and 60 degrees from horizontal. Braces that project to an adjacent wall may be installed directly horizontal (zero degrees) or between 30 and 60 degrees from the horizontal. However, this is limited depending on the capacity of the brace and method of connection to structure.

5) Seismic bracing may consist of solid bracing designed to accept loads in tension and compression or cable bracing designed to accept tension loads only. Each brace method requires a vertical hanger within close proximity of their connection to the distribution system. (Refer to the specific detail for limitations). The vertical hanger may or may not require stiffening or additional anchorage to the structure (Refer to Notes on Supports, Page A10.2).

6) Avoid mixing solid bracing with cable bracing in the same direction on any run of a distribution system unless specifically engineered and approved by the enforcement agency.

7) Avoid bracing a system to two different parts of a building which may act differently in response to an earthquake (i.e. separated by a seismic joint). In cases where this may occur, the pipe run must be designed to accept the seismic relative displacement.

8) Systems with significant thermal motion shall be designed on a case by case basis by a professional engineer familiar with both seismic loading and thermal expansion.

9) Seismic brace details for suspended pipe systems include maximum allowable horizontal seismic load, $F_p$, at different brace angle ratios. The details include Mason Industries N.Y. seismic brace component size, aircraft cable or solid brace member size, acceptable hanger rod diameter(s) and hanger rod stiffening requirements. Trapeze member sizes and connection to structure for both hanger rods and seismic braces are tabulated and/or detailed in Sections B, T, M, and N, respectively.
10) Seismic brace requirements for seismic accelerations ranging from 0.25 to 1.0g (ASD) are tabulated in Sections B1. Each schedule is designed to a specific seismic acceleration and provides maximum transverse, longitudinal and all-directional brace spacings based on operating weight per lineal foot of the pipe system. In addition, the schedules provide hanger rod and seismic brace connection options that meet the same criteria. For systems that require design for over 1.0g, the brace spacing is reduced (Refer to Page A10.6, note 3).

11) Multi-layer piping systems that share support rods must be braced independently from one another or as specifically engineered by the RDP. Layers supporting loads ≤ 10 lbs/ft need not be braced, provided that the load is accounted for in the nearest braced layer. Each section of threaded rod between trapezes and/or the building structure is subject to vertical stiffening requirements.

12) Vertical drops from suspended pipe systems to equipment (or flexible connectors where applicable) may be braced using the transverse and longitudinal braces in this manual. Note: Do not exceed ½ of the maximum brace spacing as measured from the seismic brace to the equipment or flexible connector when bracing vertical drops. (Refer to the Figures on Page A12.2.) If the transverse or longitudinal brace cannot accept the full vertical drop, a seismic floor support designed for the applicable loads is required. Design of this support shall account for seismic relative displacement between floors and may require a flexible connection between the floor support and the first seismic brace location above.

13) Any system which crosses a building separation or seismic joint must be designed to accommodate the seismic relative displacement per ASCE 7-10, Section 13.3.2, 13.3.2.1, and 13.3.2.2, or as specified by the engineer of record for approval by the enforcement agency.

Notes on Supports:

1) Where the seismic brace system incorporates the use of a threaded vertical hanger rod designed to carry gravity loads only, additional anchorage and/or stiffening may be required as detailed. General support of suspended pipe systems and equipment to carry gravity loads shall be determined by the engineer of record and/or mechanical code requirements. However, hanger rod connection details in this manual may be used as a guide for these supports. ASTM A307 threaded rods may be used in lieu of ASTM A36 threaded rods as called out in this manual. The use of “C-Clamps” designed to attach threaded rod to one side of a steel beam flange shall not be used unless they are provided with a restraining strap or hook to the opposite beam flange, equivalent to those specified in NFPA 13, Section 9.3.7 and approved by OSHPD.

2) Support rod capacity and its anchorage to the structure is an important part of a solid bracing system. Solid braces shall not be attached to existing systems or support rods designed for gravity loads unless they are checked for increased loads.

3) Threaded vertical hanger rods where seismic sway bracing is attached may require stiffening if the length of the rod exceeds the maximum unbraced rod length indicated on the kit installation detail in Sections C and F. However, if the calculated compression on the rod due to combined gravity, the vertical brace component of the bracing system as a result of $F_p$ and $F_pv$ loads is less than or equal to zero, no rod stiffening is required, regardless of rod length. A vertical rod stiffener using a 1\%"x1\%"x12ga strut channel or steel angle cut to the appropriate length and attached to the threaded rod with a minimum of two Mason Ind. N.Y. Type UCC or SRC clamps is required, as detailed in Sections C and F. The contractor may substitute a break-off bolt set to a minimum of 10 ft-lbs (Ref. X3.0). Rod stiffening strut may be solid, slotted or punched. Ref. X7.0 and X7.1 for strut member data.
4) Trapeze supports shall consist of 12 gauge single or double channel strut, steel angles or tube steel as tabulated in Sections B and T. For gravity only trapeze supports and trapeze supports where transverse seismic braces are installed, the acceptable size of the trapeze member is provided in the same sections. For trapeze supports where longitudinal seismic braces are installed, the acceptable size of the trapeze member is also provided. Trapeze members may be provided with round holes sized for hanger rods. Ref. X7.0 and X7.1 for strut member data. In all cases, for analysis purposes, the following information is required: a) seismic ‘g’ coefficient, b) pipe weight per foot and c) maximum span between threaded rod supports. The trapezes shall be supported by threaded rods, with nuts and washers as detailed in Section F and with rod stiffeners as required per Note 3.

5) Concrete overstrength factor, $\Omega_0$, is not required for hanger supports designed for gravity only or hanger supports at seismic cable brace locations where seismic forces do not exceed 20% of the total forces.

Notes on Seismic Cable Bracing:

1) Cables shall be prestretched galvanized 7x19 strand core aircraft cable, with no limit to their installed length. Cables meet the following specifications: MIL-DTL-83420M with Amendment 2, Type 1 non-jacketed cable.

2) Cables shall be installed slightly slack, so as not to support gravity loads.

3) Cable shall connect the braced item to a building structural element. Cable shall have at each end a bracket to make the connections. The cable assembly, with connection brackets, shall be Mason Ind. N.Y. SCB or SCBH, refer to pages X1.0 & X1.1. Cable is held to end brackets with one or two bolts. Cable bolts shall be tightened to the torque values stated in the details or, in the case where break off nuts are provided, until the nut breaks off. Break off nuts are as manufactured by Mason West, Inc. (Refer to page X4.0).

4) The Mason Ind. N.Y. SCBH component can be used for connection directly to the threaded vertical hanger rod used for supporting system gravity loads as detailed in Sections C and F.

5) The SCB bracket and cable (Ref. X1.0), SCBH bracket and cable (Ref. X1.1), UCC rod stiffener clamp (Ref. X3.0), and SRC rod stiffener clamp (Ref. X3.1) are manufactured by Mason Ind. N.Y. and are included (with accompanying hardware) in the kit options provided in Sections C and F.

Notes on Seismic Solid (Rigid) Bracing:

1) Solid bracing members shall be 12 gauge channel strut or steel angle. Strut members may be solid, slotted or punched. The details in Sections C and F indicate the minimum solid brace size based on a maximum solid brace length. The charts on pages X2.0, X2.1, and X2.2 tabulate different solid brace member sizes for maximum installed lengths of 5'-0", 9'-6" or 14'-6". Ref. X7.0 and X7.1 for strut member data.

2) Solid brace members shall be connected to both the distribution system and the structure using the seismic solid brace components (Mason Ind. N.Y. Type SSBS, SHB, or SSB. Refer to pages X2.0, X2.1, or X2.2, respectively).

3) The attachment between the solid brace component and the 12 gauge channel strut shall consist of (1) or (2) 1/2" bolt and strut nut connections torqued to 50 ft-lbs or, in the case where break off nuts are provided, until the nut breaks off. Refer to Sections C and F to determine the quantity of bolt/strut nut combinations required. Break off nuts are as manufactured by Mason West, Inc. (Refer to page X4.0).

4) The SSBS bracket (Ref. X2.0), SHB bracket (Ref. X2.1), SSB bracket (Ref. X2.2), UCC rod stiffener clamp (Ref. X3.0), and SRC rod stiffener clamp (Ref. X3.1) are manufactured by Mason Ind. N.Y. and are included (with accompanying hardware) in the kit options provided in Sections C and F.
Notes on Seismic Brace Attachment to Building Structure:

1) Attachment methods and hardware (connectors) used for seismic bracing attachment to the building structural element is the critical factor in the design of seismic sway-bracing. Lightweight structures may limit the maximum spacing between seismic braces. The structural engineer of record shall determine the maximum allowable seismic loads that may be imposed on the building structure.

2) Attachment to different types of structures are addressed in these guidelines. Attachment types include reinforced normal or sand lightweight concrete (flat slabs, slabs poured in steel decking, walls or columns), fully grouted reinforced concrete masonry, hollow steel decking, steel framing, timber framing, and metal stud wall framing. Attachments may be made with pre- or post-installed concrete anchors, machine bolts, self-drilling and self-tapping screws, lag bolts, nails or in cases of steel on steel connections, by arc-welding. Use of attachment methods not detailed in these guidelines must be engineered on an individual job basis subject to approval by the enforcement agency. Note: The structural engineer of record shall verify that attachment details specified by the RDP are in accordance with the design concept for the primary structure.

3) Expansion anchors shall be Hilti Kwik Bolt TZ, Powers Power-Stud+ SD1, Mason Ind. N.Y. SAS(E) or Powers Power-Stud+ SD2 for minimum 3000 psi concrete slabs, beams, or walls and concrete filled decks (sand light or normal weight) installed in accordance with ICC Reports ICC ESR 1917, 2818, 3037 or 2502, respectively. Hilti Kwik Bolt 3 expansion anchors shall be used to resist static & transient seismic tension & shear loads in uncracked, grout-filled concrete masonry. Expansion anchors designed to ICC-ES AC01 are limited to allowable stress design only in accordance with AC01 1.2. SEOR shall verify that: (1) masonry is not cracked as defined in ICC-ES AC01 Section 2.3; calculation required to show masonry wall would not crack under the design earthquake loads under all service load conditions; wall has to remain elastic; (2) masonry wall shall be fully grouted in accordance with ESR-1385 Section 3.2; (3) condition of use requirements in accordance with ESR-1385 Section 5.0 is satisfied. When expansion anchors are used, 50 percent of alternate bolts in a group shall be tension tested or torque tested per 2013 CBC, Section 1913A.7. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency. If any anchors fail, test all previously untested anchors installed by the same trade until 20 consecutive anchors pass. Then resume the original test frequency. Refer to page A0.4 for test loads.

4) Concrete inserts shall be Mason West Type MW-PAL-A for installation in normal or sand lightweight concrete slabs or MW-CDI for installation in normal or sand lightweight concrete filled metal decks.

5) All welded attachments shall be minimum 70xx electrode welds. Minimum 60xx electrode welds may be used for steel thicknesses that are 12 gauge or less.

6) Metal decks for expansion anchor attachments and MW-CDI inserts shall be minimum 20 gauge with either a maximum 3 inch flute and minimum 1-1/2 inch cover or a maximum 1-1/2 inch flute and minimum 2-1/4 inch cover. Metal decks for MW-PAL-A insert shall be minimum 20 gauge with 3" flute and 3-1/4" cover. Refer to appropriate M2 and N2 pages for allowable deck anchor attachments. Concrete fill shall be minimum 3000 psi sand lightweight concrete. Note: Metal decks with minimum 3000 psi stone aggregate concrete fill may use the sand lightweight concrete deck charts.

7) Concrete attachments are based on specified anchor bolts or inserts. Substitution of alternate anchors must be approved by Mason West and the enforcement agency on a job by job basis.

8) When installing drilled-in anchors in existing non-prestressed reinforced concrete, use care and caution to avoid cutting or damaging reinforcing bars. When installing them in existing prestressed concrete, locate the prestressed tendons by using a non-destructive method and do not cut or damage the tendons during installation.

9) Attachments are provided for wide flange structural steel members, open web steel trusses as well as wood trusses, joists and beams in Section N3.11-3.13, N4.10-4.13.
10) Screw anchors shall be Powers Screw-Bolt+/Hangermate+, Mason Ind. N.Y. SAST, or Hilti Kwik HUS-EZ/HUS-EZ I for minimum 3000 psi concrete slabs, beams, or walls and concrete filled decks (sand light or normal weight) installed in accordance with ICC Reports ICC ESR 3889, 2713 or 3027, respectively. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency. If any anchors fail, test all previously untested anchors installed by the same trade until 20 consecutive anchors pass. Then resume the original test frequency. Screw anchors shall not be tested using a torque wrench. Screw anchors may be loosened a maximum of one full turn to facilitate the positioning of a tension test collar. Following the tension test, the anchor shall be re-torqued in accordance with the manufacturer's installation instructions. Refer to page A0.5 for test loads.

Notes on Suspended Piping: (Refer to Page A10.7 for Fire Protection Pipe Brace Requirements)

1) Per 2013 CBC Sections 1616A.1.18 and 1616A.1.26, ASCE 7-10 Sections 13.1.4 and 13.6.8 design of piping systems and attachments for the seismic forces are not required for piping where any of the following are satisfied:

a) The component is positively attached to structure; and the project is designated as Seismic Design Categories D, E or F*; flexible connections are provided between the distributed system and the component/equipment*; and the distributed system weighs 5 lbs/ft or less; or

b) Trapeze assemblies are used to support piping whereby no single pipe exceeds the limits set forth in d) below and the total operating weight of the piping supported by trapeze assemblies is less than 10 lbs/ft; or

c) The piping is supported by hangers and each hanger in the piping run is 12" or less in length from the top of the pipe to the supporting structure. Where pipes are supported on a trapeze, the trapeze shall be supported by hangers having a length of 12" or less from the top of the trapeze member to the supporting structure. Where rod hangers are used with a diameter greater than 3/8", they shall be equipped with swivels, eye bolts or other devices to prevent inelastic bending of the rod; or

d) Piping with an $R_p$ of 4.5 or greater is used and provisions are made to avoid impact with other structural or nonstructural components or to protect the piping in the event of such impact and the following size requirements are met.

i. The project is designated a Seismic Design Category of D, E or F*, the value of $I_p$ is greater than 1.0*, and the nominal pipe size is 1" or less; or

ii. The project is designated a Seismic Design Category of D, E or F*, the value of $I_p = 1.0*$, and the nominal pipe size is 3" or less.

### SUMMARY OF INDIVIDUALLY SUPPORTED PIPING SYSTEMS THAT ARE EXEMPT FROM DESIGN FOR SEISMIC FORCES AND SEISMIC RELATIVE DISPLACEMENTS (PER NOTES 1a and 1d ABOVE)

<table>
<thead>
<tr>
<th>SYSTEM (e.g.) - Steel or Copper Material</th>
<th>$I_p$</th>
<th>EXEMPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating Hot and Chilled Water</td>
<td>1.0</td>
<td>1. All pipes ≤ 3&quot; diameter.</td>
</tr>
<tr>
<td>Condenser Water</td>
<td></td>
<td>2. All pipes exempted for the $I_p$=1.5 case below.</td>
</tr>
<tr>
<td>High Temperature Hot Water</td>
<td></td>
<td>1. The following pipes (≤ 5 lbs/ft) where a flexible connection is provided between pipes and components*.</td>
</tr>
<tr>
<td>Steam and Steam Vent</td>
<td></td>
<td>a. ≤ 2&quot; diameter vent, gas or empty SCH 40 steel pipe.</td>
</tr>
<tr>
<td>Condensate Return Water</td>
<td></td>
<td>b. ≤ 1-1/2&quot; diameter SCH 40 steel pipe.</td>
</tr>
<tr>
<td>Boiler Feed Water and Blowdown</td>
<td></td>
<td>c. ≤ 3&quot; diameter vent, gas or empty copper pipe.</td>
</tr>
<tr>
<td>Domestic Hot and Cold Water</td>
<td></td>
<td>d. ≤ 2&quot; diameter copper pipe.</td>
</tr>
<tr>
<td>Fuel Oil, Gas and Compressed Air</td>
<td>1.5</td>
<td>e. Any other piping with an operating weight ≤ 5 lbs/ft.</td>
</tr>
<tr>
<td>Medical Gases and Vacuum</td>
<td></td>
<td>(Note: Refer to system weights in the appendix. Pipes with hazardous contents (e.g. medical gases, fuel oil, natural gas, etc.) shall be braced regardless of weight. Pipe size exemption 2 below still applies. Non-hazardous contents include, but are not limited to, medical vacuum and compressed air.)</td>
</tr>
<tr>
<td>Industrial, Irrigation and Soft Water</td>
<td></td>
<td>2. All other pipes ≤ 1&quot; diameter.</td>
</tr>
<tr>
<td>Emergency Cold Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grease Waste and Vent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanitary Waste and Vent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Refer to A10.6 for continuation of table and notes on Seismic Design Category, $I_p$ and flexible connection.
10) Screw anchors shall be Powers Screw-Bolt+/Hangermate+, Mason Ind. N.Y. SAST, or Hilti Kwik HUS-EZ/HUS-EZ I for minimum 3000 psi concrete slabs, beams, or walls and concrete filled decks (sand light or normal weight) installed in accordance with ICC Reports ICC ESR 3889, 2713 or 3027, respectively. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency. If any anchors fail, test all previously untested anchors installed by the same trade until 20 consecutive anchors pass. Then resume the original test frequency. Screw anchors shall not be tested using a torque wrench. Screw anchors may be loosened a maximum of one full turn to facilitate the positioning of a tension test collar. Following the tension test, the anchor shall be re-torqued in accordance with the manufacturer's installation instructions. Refer to page A0.5 for test loads.

Notes on Suspended Piping: (Refer to Page A10.8 for Fire Protection Pipe Brace Requirements)
1) Per 2019 CBC Sections 1601.1.4 & 1617A.1.18 applicable only to OSHPD-1,2,4,5 and 1R designated projects, distributed piping systems weighing 5 lbs/ft or less are exempt from design for the seismic forces of ASCE 7-16 Section 13.3. For remaining piping systems, per 2019 CBC Section 1617A1.26, design for the seismic forces and relative displacements shall not be required for piping systems where flexible connections or other assemblies are provided to accommodate the relative displacement between component and piping, where the piping system is positively attached to the structure, and where any of the following apply:
   a) Trapeze assemblies are supported by \( \frac{3}{8} \)" or \( \frac{1}{2} \)" diameter rod hangers not exceeding 12" in length from the pipe support point to the connection at the supporting structure, do not support piping with \( I_p \) greater than 1.0, and no single pipe exceeds the diameter limits set forth in item b.ii below or 2" for Seismic Design Category D, E, or F where \( I_p \) is greater than 1.0 and the total weight supported by any single trapeze is 100 lbs or less; or
   b) Piping that has an Rp of 4.5 or greater is either supported by rod hangers and provisions are made to avoid impact with other structural or nonstructural components or to protect the piping in the event of such impact, or pipes with \( I_p = 1.0 \) supported by individual rod hangers \( \frac{3}{8} \)" or \( \frac{1}{2} \)" in diameter, where each hanger in the pipe run is 12" or less in length from the pipe support point to the connection at the supporting structure; and the total weight supported by any single hanger is 50 pounds or less. In addition, the following limitations on the size of piping shall be observed:
      i. In structures assigned to Seismic Design Category D, E, or F where \( I_p \) is greater than 1.0, the nominal pipe size shall be 1" or less.
      ii. In structures assigned to Seismic Design Category D, E, or F where \( I_p = 1.0 \), the nominal pipe size shall be 3" or less.
   c) Pneumatic tube systems supported with trapeze assemblies using \( \frac{3}{8} \)" diameter rod hangers not exceeding 12" in length from the tube support point to the connection at the supporting structure and the total weight supported by any single trapeze is 100 lbs or less.
   d) Pneumatic tube systems supported by individual rod hangers \( \frac{3}{8} \)" or \( \frac{1}{2} \)" in diameter, and each hanger in the run is 12" or less in length from the tube support point to the connection at the supporting structure, and the total weight supported by any single rod is 50 lbs or less.

2) Flexible connections in piping required in Note 1 above are not required where pipe is rigidly attached to the same floor or wall that provides vertical and lateral support for the equipment, or to a fixture. Flexible connections in piping are required at seismic separation joints and shall be detailed to accommodate the seismic relative displacements at connections.
PIPING GENERAL NOTES (continued)

Plumbing Pipe Gravity, Waste, Vent and Similar Systems (Rp < 4.5, Refer to Page A10.0, Note 2)

<table>
<thead>
<tr>
<th>SYSTEM (e.g.) - Non-Ductile Cast Iron Material</th>
<th>Ip*</th>
<th>EXEMPTIONS</th>
</tr>
</thead>
</table>
| Sanitary Waste Vent                           | 1.0 | 1. The following pipes where a flexible connection is provided between the pipes and components*.
| Storm and Overflow Drain                      | or 1.5 | a. No-Hub cast iron vent pipes ≤ 3” diameter.
| Grease Waste Vent                             |     | b. No-Hub cast iron pipes ≤ 2” diameter.
|                                               |     | c. Any other piping with an operating weight ≤ 5 lbs/ft. |

* Notes: 1) Seismic Design Category and Ip can be found in the general notes of the contract structural drawings for a specific project under Design Criteria. Piping not detailed to accommodate the seismic relative displacement at connections to other components shall be provided with connections having sufficient flexibility to avoid failure of the connection between the components.

2) Flexible connections are not required in cases where pipe is rigidly attached to the same floor or wall that provides vertical and lateral support for the equipment as there is no relative motion between pipe and equipment.

3) Flexible connections are required at seismic separation joints.

2) Section A13 of these guidelines details the "12 Inch Rule" exception described in Note 1.c for Suspended Piping.

3) Steel and copper pipe shall be braced at the spacings tabulated in Section S. Brace spacings vary based on the value of Ip, pipe material, service (water filled or vapor) and pipe connection method. Longitudinal brace spacings shall not exceed 3 times the tabulated transverse brace spacings. For cases where multiple pipes with varying brace spacings are supported on a trapeze, the smallest brace spacing shall govern. The seismic design engineer may design brace spacings for trapezed pipe based on combined pipe sections and/or by adding steel strengthening sections on a job by job basis subject to approval by the enforcement agency.

4) Cast iron pipe (no-hub pipe) brace spacings shall not exceed the spacings tabulated in Section S. No-hub couplings shall be manufactured in accordance with ASTM C1540, shall be certified in accordance with FM 1680 Class 1 and gravity hangers shall be spaced per the requirements of Table 313.1 of the 2013 California Plumbing Code (CPC 2013) for no-hub cast iron pipe.

**Exception:** Cast iron (no-hub) pipe joined by couplings not satisfying ASTM C1540 or not certified in accordance with FM 1680 Class 1 shall be designed on a project by project basis, and shall require project specific OSHPD approval.

5) Rigid grooved coupling listed for UL Standard 213 shall be permitted in horizontal run of pipe. Flexible grooved coupling listed for UL Standard 213 shall be permitted in vertical risers (to accommodate drift) and other locations (e.g. seismic separation, equipment nozzle, etc.) to accommodate small movement and/or rotation. Non-UL listed groove couplings shall not be used unless approved on project specific basis.

6) Seismic restraints for individually supported pipes shall be attached directly to the pipe using a Mason West, Inc. Type WPL, welded pipe lug (Refer to page X8.4) for standard schedule or larger steel pipe or a Mason West, Inc. Type SPC seismic pipe clamp (Refer to page X8.3) for steel and cast iron pipe utilizing details in Section C. In addition, a Mason West, Inc. Type SSC strut steel clamp (Refer to page X8.0) for steel pipe or Type SCC strut copper clamp (Refer to page X8.1) or Type SCCI strut copper clamp with insulation (Refer to pages X8.6 - X8.6.3) for copper pipe may be used utilizing detail pages A18.0 - A18.2.
3) Steel and copper pipe shall be braced at the spacings tabulated in Section S. Brace spacings vary based on the value of Ip, pipe material, service (water filled or vapor) and pipe connection method. Longitudinal brace spacings shall not exceed 3 times the tabulated transverse brace spacings. For cases where multiple pipes with varying brace spacings are supported on a trapeze, the smallest brace spacing shall govern. The seismic design engineer may design brace spacings for trapezed pipe based on combined pipe sections and/or by adding steel strengthening sections on a job by job basis subject to approval by the enforcement agency.

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**SUMMARY OF PIPING SYSTEMS THAT ARE EXEMPT FROM DESIGN FOR SEISMIC FORCES AND SEISMIC RELATIVE DISPLACEMENTS (PER PAGE A10.5a, NOTE 1)**

<table>
<thead>
<tr>
<th>The following pipes (≤ 5 lbs/ft) without hazardous contents are exempt from seismic design:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ≤ 2&quot; diameter vent, gas or empty SCH 40 steel pipe.</td>
</tr>
<tr>
<td>b. ≤ 1-1/2&quot; diameter SCH 40 steel pipe.</td>
</tr>
<tr>
<td>c. ≤ 3&quot; diameter vent, gas or empty copper pipe.</td>
</tr>
<tr>
<td>d. ≤ 2&quot; diameter copper pipe.</td>
</tr>
<tr>
<td>e. No-Hub cast iron vent and storm drain pipes ≤ 3&quot; diameter.</td>
</tr>
<tr>
<td>f. No-Hub cast iron waste pipes ≤ 2&quot; diameter.</td>
</tr>
<tr>
<td>g. Any other piping with an operating weight ≤ 5 lbs/ft.</td>
</tr>
<tr>
<td>h. Trapezed piping with combined operating weight ≤ 5 lbs/ft.</td>
</tr>
</tbody>
</table>

Notes:
1. Refer to system weights in the appendix
2. Hazardous - Including, but not limited to, medical gases, fuel oil, natural gas.
3. Non-hazardous - Including, but not limited to, medical vacuum, compressed air, water.
7) Seismic restraints for trapeze supported pipe shall be attached to the trapeze member at the hanger locations as detailed in Section F. Pipes supported by trapezes at seismic brace locations shall utilize Mason West, Inc. Type SSC, strut steel clamp (Refer to page X8.0) for steel pipe or Type SCC, strut copper clamp (Refer to page X8.1) for copper pipe utilizing details in Section F.

8) The pipe weights tabulated in Section B1 are based on schedule 40 steel pipe for up to 12” diameter, schedule 30 steel pipe for 14” to 18” diameter and schedule 20 for 20” and 24” diameters. Total weights include water and insulation. Verify the maximum weight per foot listed in the column next to pipe size when determining seismic brace requirements tabulated in Section B1. The appendix of these guidelines tabulates the weight per foot for steel, copper, PVC, PVDF and cast iron pipe.

9) If a 2 piece rod is used to support piping, minimum engagement of the rod in the coupling nut shall be equal to the rod diameter. Rods shall be run up tight in the coupling nut.

10) For vertical support methods at seismic brace locations other than what are detailed in this manual, the seismic design engineer must provide calculations and/or testing of any additional components or materials (e.g. hangers, clamps, etc.) to comply with the 2013 CBC on a job by job basis subject to review and approval by the enforcement agency.

Notes on Vertical Risers:

1) Vertical piping systems supported at each floor shall be considered seismically braced if the penetration through each floor is tightly packed with approved firestops, satisfying NFPA 13-13 Section 9.3.5.8.5 and the floor to floor spacing does not exceed the maximum brace spacing tabulated in Section S. Tops of risers exceeding 3 feet shall be provided with a 4-way brace. Where the 4-way brace is attached to the horizontal piping, it shall be installed within 2 feet of the centerline of the riser.

2) Vertical pipe risers in an open shaft must be attached to steel supports with both steel supports and connections sized to accept the combined gravity and seismic loads. Thermal loads shall be considered, where applicable. Lateral seismic restraint spacing shall not exceed the spacings tabulated in Section S. Supports and connections must be engineered on a job by job basis subject to approval by the enforcement agency. Seismic relative displacement between floors shall be considered in the design.

3) Vertical pipe risers subject to thermal expansion or contraction may be engineered to allow pipe movement and reduce load transfer between floors. Sliding guides and/or resilient anchors shall be employed to allow or control thermal movement while designed to accept seismic loads at maximum spacings tabulated in Section S. Pipe penetrating cored holes at floor levels that are tightly packed may be considered as pipe guides. Where insulated pipes penetrate cored holes used as guides, a hard insulation insert that exceeds the floor depth at each end is required. Riser clamps or brackets shall be designed to transfer resultant horizontal and vertical loads from the pipe to the supports. Supports and connections must be engineered on a job by job basis subject to approval by the enforcement agency.

4) A pipe penetrating a floor with the annular space packed with firestop may act as an all-directional brace at the end of a horizontal pipe run as described in Note 1 above and depicted on Page A14.0 if the distance from the centerline of the floor to the top of the horizontal pipe is less than 'A', where 'A' is a function of the maximum transverse brace spacing, 'S', as defined on Page A12.1. A pipe connecting to a floor or roof drain poured into or directly connected to the floor or roof may also act as an all-directional brace if the distance from the bottom of the drain to the top of the horizontal pipe is less than 'A'.
Notes on Fire Protection (or Sprinkler) Pipes:

1) Per NFPA 13 Standard for the Installation of Sprinkler Systems, 2016 Edition, seismic bracing is required for the following systems (Note: Ip = 1.5 for all Fire Protection Piping per ASCE7-16 Section 13.1.3, Note 1):
   a) In Seismic Design Categories C, D, E or F:
      i. All mains.
      ii. All cross mains.
      iii. All branch lines 2-1/2” diameter nominal pipe size and larger
      iv. The last length of pipe at the end of a feed or cross main.

   Exception: Transverse seismic bracing shall not be required for pipes supported by individual hangers where each hanger in the pipe run is 6” or less in length from the top of the pipe to the supporting structure.

2) The maximum distance between hangers shall not exceed that specified in NFPA 13 Table 9.2.2.1(a) except where the provisions of NFPA 13 Section 9.2.4 apply.

3) Refer to Page A10.1 notes 2, 3, 4, 5, 6 and 7 for transverse and longitudinal brace discussion.

4) Maximum transverse brace spacings shall not exceed 40 feet for ductile steel pipe 2½” diameter and larger and 30 feet for ductile steel pipe 2” diameter and smaller. The Zone of Influence (ZOI) Method in NFPA 13, Annex E shall be addressed when determining maximum transverse brace spacing. The distance between the last brace and the end of the pipe shall not exceed 6 feet.

5) Maximum longitudinal brace spacings shall not exceed 80 feet for ductile steel pipe 2½” diameter and larger and 60 feet for ductile steel pipe 2” diameter and smaller. The distance between the last brace and the end of the pipe shall not exceed 40 feet.

6) Transverse braces may act as longitudinal braces if they are installed within 24” of the centerline of the piping being braced longitudinally and the lateral brace is on a pipe of equal or greater size than the pipe being braced longitudinally. Similarly, longitudinal braces may act as transverse braces if they are installed within 24” of the centerline of the piping being braced transversely.

7) Each run of pipe between changes in direction shall be provided with both lateral and longitudinal braces. However, it is permissible to brace a straight pipe run of less than 12 feet using the braces on the adjacent runs of pipe.

8) Refer to Page A10.6 (or Page A10.6a for 2019 CBC), note 5 for pipes with grooved couplings. Where flexible couplings are installed on mains other than as required in NFPA 13 Section 9.3.2, a transverse brace shall be provided within 24” of every other coupling, including flexible grooved couplings, but not more than 40 feet on center.

9) Tops of vertical offsets or risers exceeding 3 feet shall be provided with a 4-way brace. Where the 4-way brace is attached to the horizontal piping, it shall be installed within 2 feet of the centerline of the riser. The maximum distance between 4-way braces on a riser shall not exceed 25 feet.

10) Restraint of branch lines is considered a lesser degree of resisting loads than bracing and shall be provided as required in NFPA 13 Section 9.3.6.
PIPING DESIGN PROCEDURE

Follow the five steps below to determine the seismic kit installation, hanger and brace connection details that pertain to a specific suspended piping system. An example is provided on the following pages.

Step 1. **Determine 'g' Forces:**
Calculate the lateral acceleration, $F_p$, and vertical acceleration, $F_{pv}$, in terms of 'g' using the equations outlined on page A10.0 for each level of the building.

Step 2. **Determine Operating Weight (lbs/ft or lbs):**
Determine the operating weight, $W_p$, of the distribution system (lbs/ft) or component (lbs) to be seismically braced. Refer to the appendix for pipe weights.

Step 3. **Determine Seismic Forces (lbs):**
Determine the maximum allowable brace spacings from page A10.6 and Section S. If you choose to use the pre-designed schedules in Section B, skip the remainder of this step.

Calculate the maximum lateral and vertical forces applied to the seismic brace system. Resolve the maximum lateral force to the brace, $F_p$, and maximum load on the hanger rod, $T_{Rod}$.

For trapeze supported piping, determine the maximum allowable brace spacing from page A10.6, Section S and Section X8. If you choose to use the pre-designed schedules in Section B, skip the remainder of this step.

Calculate the maximum lateral and vertical forces applied to the seismic brace system. Resolve the maximum lateral force to the brace, $F_p$, and maximum load on the hanger rod, $T_{Rod}$.

The resultant compression load on the hanger rod at seismic brace locations may be calculated to determine if rod stiffening is required.

Check trapeze seismic attachment to pipe. Use tables in Section S3 to check the capacities of the strut clamps to strut trapezes or details in Section A16 for additional options.

Step 4. **Select Seismic Kit Installation, Hanger and Brace connection Details:** Select the appropriate details from the schedules in Section B for single hung pipe or pipe on trapeze based on maximum 'g' force, system weight per foot or pipe size and maximum transverse, longitudinal and all directional brace spacing.

If you calculated the seismic forces in step 3, verify the details selected are correct by comparing the calculated lateral force, $F_p$, and load on the hanger rod, $T_{Rod}$, with the rated loads tabulated on the detail sheets. If $F_p$ and $T_{Rod}$ are less than or equal to the tabulated rated loads, the details are acceptable.

Step 5. **Select Trapeze Member (where applicable):**
Select the trapeze member from the tables in Section B or T for transverse, longitudinal and all-directional seismic braces based on 'g' force and maximum span of trapeze member.
PIPING DESIGN PROCEDURE (continued)

Example:

4"Ø standard steel pipe is suspended within a 3 story poured-in place concrete building with basement. The pipe is supported at every 10 feet. The elevation of each floor, including the basement, is 15 feet. The short period spectral acceleration, $S_{DS}$, listed on the contract structural drawings, is 1.02. The component importance factor, $I_P = 1.5$. (For trapeze supported pipe example, refer to page A11.4).

Note: When anchoring to concrete, allowable loads have been reduced by the concrete overstrength factor, $\Omega_o$, where applicable, in Sections M & N. Therefore, $\Omega_o$ is not used when calculating applied seismic forces in this example.

Step 1. **Determine 'g' Forces**

Component amplification and response modification factors for steel mechanical pipe are as follows:

\[ a_p = 2.5 ; R_p = 6.0 \]

Therefore,

\[ F_P = (0.7) \frac{0.4(2.5)(1.02)W_p}{(6.0)/(1.5)}(1+2\frac{2}{41}) = 0.18(1+2\frac{2}{41}) \]

\[ F_{P_{(\min)}} = (0.7)(0.3)(1.02)(1.5)W_p = 0.32g \]

\[ F_{P_{(\max)}} = (0.7)(1.6)(1.02)(1.5)W_p = 1.71g \]

\[ F_{PV} = (0.7)(0.2)(1.02)W_p = 0.14g \]

Tabulated below are the 'g' forces for each level of the building:

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>$F_P$</th>
<th>$F_{PV}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>0.14g</td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>0.14g</td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>0.14g</td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>0.14g</td>
</tr>
</tbody>
</table>

Step 2. **Determine Operating Weight (lbs/ft):**

From page APP2.1, the operating weight of a 4"Ø steel pipe with water and insulation is 18.3 lbs/ft.
PIPING DESIGN PROCEDURE (continued)

Step 3.  **Determine Seismic Forces (lbs):**

From page S1.0, the maximum transverse brace spacing for suspended steel pipe is 53 feet for Basement Level and Level 1, 50 feet for Level 2 and 47 feet for Level 3. However, due to seismic brace capacity limits, we will use 30 feet as the maximum brace spacing for this example. Maximum longitudinal brace spacing shall not exceed 3 times the transverse brace spacing. For this example, we will limit the longitudinal brace spacing to 60 feet.

Note: At this point, you have the option to calculate the seismic forces and loads on the hanger rods and complete this step or move on to step 4.

For Basement Level and Level 1,

\[
F_P(\text{Transverse}) = 0.32 \times 18.3 \text{ lbs/ft} \times 30 \text{ ft brace spacing} = 176 \text{ lbs}
\]

\[
F_P(\text{Longitudinal}) = 0.32 \times 18.3 \text{ lbs/ft} \times 60 \text{ ft brace spacing} = 351 \text{ lbs}
\]

\[
F_{PV} = 0.14 \times 18.3 \text{ lbs/ft} \times 10 \text{ ft support spacing} = 26 \text{ lbs}
\]

Note: \(F_p\) does not need to be increased due to installation tolerances indicated in assembly details.

For seismic solid brace installations:

\[
T_{\text{Rod}}(\text{Transverse}) = F_P(\text{Transverse}) \tan (\text{brace angle}) + (18.3 \text{ lbs/ft} \times 10 \text{ ft} + F_{PV}) = 385 \text{ lbs.}
\]

\[
T_{\text{Rod}}(\text{Longitudinal}) = F_P(\text{Longitudinal}) \tan (\text{brace angle}) + (18.3 \text{ lbs/ft} \times 10 \text{ ft} + F_{PV}) = 560 \text{ lbs.}
\]

Note: Brace angle = 45 degrees for this example.

For seismic cable brace installations:

\[
T_{\text{Rod}} = (18.3 \text{ lbs/ft} \times 10 \text{ ft} + F_{PV}) = 209 \text{ lbs.}
\]

Note: In the case of piping on trapeze, for seismic solid and cable brace \(T_{\text{Rod}}\) calculations, 2/3 of the total gravity load is assumed as the worst case on each hanger. If this is not the case, make the necessary adjustment.

Similarly for Levels 2 and 3, \(F_p\), \(F_{PV}\) and \(T_{\text{Rod}}\) are as tabulated below.

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>(F_P(\text{Transverse}))</th>
<th>(F_P(\text{Longitudinal}))</th>
<th>(F_{PV})</th>
<th>(T_{\text{Rod}}(\text{Solid-Tran}))</th>
<th>(T_{\text{Rod}}(\text{Solid-Long}))</th>
<th>(T_{\text{Rod}}(\text{Cable}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>176 lbs</td>
<td>351 lbs</td>
<td>26 lbs</td>
<td>385 lbs</td>
<td>560 lbs</td>
<td>209 lbs</td>
</tr>
<tr>
<td>1</td>
<td>176 lbs</td>
<td>351 lbs</td>
<td>26 lbs</td>
<td>385 lbs</td>
<td>560 lbs</td>
<td>209 lbs</td>
</tr>
<tr>
<td>2</td>
<td>231 lbs</td>
<td>461 lbs</td>
<td>26 lbs</td>
<td>440 lbs</td>
<td>670 lbs</td>
<td>209 lbs</td>
</tr>
<tr>
<td>3</td>
<td>296 lbs</td>
<td>593 lbs</td>
<td>26 lbs</td>
<td>505 lbs</td>
<td>802 lbs</td>
<td>209 lbs</td>
</tr>
</tbody>
</table>

\[
C_{\text{Rod}} = F_P \tan (\text{brace angle}) + F_{PV} - 0.9W_p
\]

\[
= 351 \text{ lbs} \times \tan (45\text{ degrees}) + 26 \text{ lbs} - 0.9 \times (18.3 \text{ lbs/ft} \times 10 \text{ ft}) = 212 \text{ lbs.}
\]

Note: If \(C_{\text{Rod}} \leq 0\), rod stiffeners are not required.
Step 4. **Select Seismic Kit Installation, Hanger and Brace connection Details:**

For 4" standard steel pipe with operating weight of 18.3 lbs/ft, acceptable seismic kit installation, hanger and connection details from the charts in Section B for each level of the building are as tabulated below.

### Seismic Solid (Rigid) Brace, Hanger and Brace connection Details

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>B1.1</td>
<td>30'/60'</td>
<td>C1.30</td>
<td>C1.32</td>
<td>C1.34</td>
<td>63H</td>
<td>63K</td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>B1.1</td>
<td>30'/60'</td>
<td>C1.30</td>
<td>C1.32</td>
<td>C1.34</td>
<td>63H</td>
<td>63K</td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>B1.1</td>
<td>30'/60'</td>
<td>C1.30</td>
<td>C1.32</td>
<td>C1.34</td>
<td>63H</td>
<td>63K</td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>B1.2</td>
<td>30'/30'</td>
<td>C1.30</td>
<td>C1.32</td>
<td>C1.34</td>
<td>63K</td>
<td>63K</td>
</tr>
</tbody>
</table>

### Seismic Cable (Standard) Brace, Hanger and Brace connection Details

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>B1.4</td>
<td>30'/60'</td>
<td>C2.30</td>
<td>C2.41</td>
<td>C2.42</td>
<td>63F</td>
<td>50E</td>
<td>63G</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>B1.4</td>
<td>30'/60'</td>
<td>C2.30</td>
<td>C2.41</td>
<td>C2.42</td>
<td>63F</td>
<td>50E</td>
<td>63G</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>B1.4</td>
<td>30'/60'</td>
<td>C2.30</td>
<td>C2.41</td>
<td>C2.42</td>
<td>63F</td>
<td>50E</td>
<td>63G</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>B1.5</td>
<td>30'/30'</td>
<td>C2.40</td>
<td>C2.41</td>
<td>C2.42</td>
<td>75F</td>
<td>63G</td>
<td>63G</td>
<td></td>
</tr>
</tbody>
</table>

For calculated $F_p$ and $T_{rod}$ select the appropriate details in Sections C, M and N by comparing the calculated values with the tabulated values indicated on each detail.
PIPING DESIGN PROCEDURE (continued)

Example:

(4) $\frac{3}{4}''$ and (4) $1\frac{1}{2}''$ type K drawn copper gas pipes with (4) 2'' type L copper water pipes are suspended within a 3 story poured-in place concrete building with basement. The piping is supported at every 8 feet. The elevation of each floor, including the basement, is 15 feet. The short period spectral acceleration, $S_{DS}$, listed on the contract structural drawings, is 1.02. The component importance factor, $I_p = 1.5$.

Note: When anchoring to concrete, allowable loads have been reduced by the concrete overstrength factor, $\Omega_0$, where applicable, in Sections M & N. Therefore, $\Omega_0$ is not used when calculating applied seismic forces in this example.

Step 1. **Determine 'g' Forces**

Component amplification and response modification factors for suspended copper pipes are as follows:

$t_a = 2.5$; $t_R = 6.0$

Therefore,

$$F_p = (0.7)(0.4)(2.5)(1.02)W_p/(6.0)(1.5) = 0.32g$$

$$F_{P_{(min)}} = (0.7)(0.3)(1.02)(1.5)W_p = 0.32g$$

$$F_{P_{(max)}} = (0.7)(1.6)(1.02)(1.5)W_p = 1.71g$$

$$F_{PV} = (0.7)(0.2)(1.02)W_p = 0.14g$$

Tabulated below are the 'g' forces for each level of the building

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>$F_p$</th>
<th>$F_{PV}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>0.14g</td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>0.14g</td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>0.14g</td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>0.14g</td>
</tr>
</tbody>
</table>

Step 2. **Determine Operating Weight (lbs/ft):**

From page APP2.0, the operating weight of (4) $\frac{3}{4}''$ (1.04 lbs/ft), (4) $1\frac{1}{2}''$ (1.36 lbs/ft) type K copper gas pipes and (4) 2'' type L copper water pipes (4.2 lbs/ft) is about 27 lbs/ft.
PIPING DESIGN PROCEDURE (continued)

Step 3. **Determine Seismic Forces (lbs):**

From page A10.6 Note 3, the maximum transverse and longitudinal brace spacing for suspended type K and type L copper piping is specified in Section S (Page S1.2.1). The maximum transverse brace spacing is governed by the lowest brace spacing, in this case, 2" type L drawn copper pipe with water. For Basement Level and Level 1 $F_P$ of 0.32g, the 0.375g column lists 25 feet, for Level 2 $F_P$ of 0.42g, the 0.5g column lists 22 feet, and for Level 3 $F_P$ of 0.54g, the 0.625g column lists 20 feet. For this example, we will use 20 feet as the maximum transverse brace spacing for all levels. Per note 3 on page S1.2.1, the maximum longitudinal brace spacing may be 3 times the transverse brace spacing, or 60 feet. We will limit it to 40 feet for this example.

*Note: At this point, you have the option to calculate the seismic forces and loads on the hanger rods and complete this step or move on to step 4.*

For Basement Level and Level 1,

- $F_P$ (Transverse) = 0.32 x 27.0 lbs/ft x 20 ft brace spacing = 173 lbs
- $F_P$ (Longitudinal) = 0.32 x 27.0 lbs/ft x 40 ft brace spacing = 346 lbs
- $F_{PV}$ = 0.14 x 27.0 lbs/ft x 8 ft support spacing = 30 lbs

*Note: $F_p$ does not need to be increased due to installation tolerances indicated in assembly details.*

For seismic solid brace installations:

$$T_{Rod} = F_P \tan (brace \ angle) + (27.0 \ lbs/ft \times 8 \ ft + F_{PV})*\left(\frac{2}{3}\right) = 337 \ lbs.$$  

*Note: Brace angle = 45 degrees for this example. Longitudinal loads considered split evenly to each rod.*

For seismic cable brace installations:

$$T_{Rod} = (27.0 \ lbs/ft \times 8 \ ft + F_{PV})*\left(\frac{2}{3}\right) = 164 \ lbs.$$  

*Note: In the case of pipes on trapeze, for seismic solid and cable brace $T_{Rod}$ calculations, 2/3 of the total gravity load is assumed as the worst case on each hanger. If this is not the case, make the necessary adjustment.*

Similarly for Levels 2 and 3, $F_P$, $F_{PV}$ and $T_{Rod}$ are as tabulated below.

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>$F_P$ (lbs)</th>
<th>$F_{PV}$ (lbs)</th>
<th>$T_{ROC}(Solid)$ (lbs)</th>
<th>$T_{ROC}(Cable)$ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>173</td>
<td>30</td>
<td>337</td>
<td>164</td>
</tr>
<tr>
<td>1</td>
<td>173</td>
<td>30</td>
<td>337</td>
<td>164</td>
</tr>
<tr>
<td>2</td>
<td>227</td>
<td>30</td>
<td>391</td>
<td>164</td>
</tr>
<tr>
<td>3</td>
<td>292</td>
<td>30</td>
<td>456</td>
<td>164</td>
</tr>
</tbody>
</table>

$$C_{Rod} = F_P \tan (brace \ angle) + F_{PV} - 0.9W_p$$

$$= 173 \ lbs \times \tan (45 \ degrees) + (\frac{2}{3})^2 \times 30 \ lbs - 0.9 \times (\frac{2}{3})^2 \times 27.0 \ lbs/ft \times 8 \ ft = 63 \ lbs.$$  

*Note: If $C_{Rod} \leq 0$, rod stiffeners are not required.*

Check the seismic clamps, MW-SCC-13 (for 1½" copper), MW-SCC-15 (for 1½" copper) and MW-SCC-20 (for 2" copper) for 20 feet transverse spacing and 40 feet longitudinal brace spacing on sheet S3.1 for Type L drawn and sheet S3.2 for Type K drawn. All brace spacings in charts meet or exceed the necessary brace spacings.
PIPING DESIGN PROCEDURE (continued)

Step 4. Select Seismic Kit Installation, Hanger and Brace connection Details:

For a set of pipes with operating weight of 27.0 lbs/ft, acceptable seismic kit installation, hanger and connection details from the charts in Section B for each level of the building are as tabulated below.

Seismic Solid (Rigid) Brace, Hanger and Brace connection Details

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>B1.13</td>
<td>20'/40'</td>
<td>F1.10 F1.11 F1.12</td>
<td>38G 38L 50E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>B1.13</td>
<td>20'/40'</td>
<td>F1.10 F1.11 F1.12</td>
<td>38G 38L 50E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>B1.13</td>
<td>20'/40'</td>
<td>F1.10 F1.11 F1.12</td>
<td>38G 38L 50E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>B1.14</td>
<td>15'/30'</td>
<td>F1.20 F1.21 F1.22</td>
<td>50J 50M 50G</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Seismic Cable (Standard) Brace, Hanger and Brace connection Details

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>Fp</th>
<th>Section B Page</th>
<th>Tran/Long Spacing</th>
<th>Kit Installation Details</th>
<th>Hanger Conn. Desig.</th>
<th>Brace Conn. Desig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>B1.16</td>
<td>20'/40'</td>
<td>F2.20 F2.21 F2.22</td>
<td>50E 50E</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>B1.16</td>
<td>20'/40'</td>
<td>F2.20 F2.21 F2.22</td>
<td>50E 50E</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>B1.16</td>
<td>20'/40'</td>
<td>F2.20 F2.21 F2.22</td>
<td>50E 50E</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>B1.17</td>
<td>15'/30'</td>
<td>F2.20 F2.21 F2.22</td>
<td>50E 50E</td>
<td></td>
</tr>
</tbody>
</table>

For calculated $F_p$ and $T_{ROD}$ select the appropriate details in Section F, M and N by comparing the calculated values with the tabulated values indicated on each detail.

Step 5. Select Trapeze Member (where applicable):

For a set of pipes on trapeze weighing 27.0 lbs/ft supported by a trapeze member with a maximum span between hanger rods of 48 in. and the seismic accelerations calculated in step 2, go to the tables in Section T2 to find the allowable trapeze members for transverse, longitudinal and all-directional seismic braces for each level of the building. For transverse brace spacing of 20 feet and longitudinal/all-directional brace spacing of 40 feet:

Trapeze Member at Longitudinal and All-Directional Brace Locations

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>Fp</th>
<th>Section T Page</th>
<th>Longitudinal</th>
<th>All-Directional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>T2.2</td>
<td>(2) 13/16&quot; Double Strut</td>
<td>(2) 13/16&quot; Double Strut</td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>T2.2</td>
<td>(2) 13/16&quot; Double Strut</td>
<td>(2) 13/16&quot; Double Strut</td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>T2.3</td>
<td>3-1/4&quot; Single Strut</td>
<td>3-1/4&quot; Single Strut</td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>T2.4</td>
<td>3-1/4&quot; Single Strut</td>
<td>3-1/4&quot; Single Strut</td>
</tr>
</tbody>
</table>

Refer to page T2.0 for trapeze member at transverse brace locations; for these cases, member to be 1-5/8" Single Strut.
FIRE PROTECTION PIPING DESIGN PROCEDURE

Follow the five steps below to determine the seismic kit installation, hanger and brace connection details that pertain to a specific suspended piping system. An example is provided on the following pages.

Step 1. **Determine 'g' Forces:**
Calculate the lateral acceleration, \( F_P \), and vertical acceleration, \( F_{PV} \), in terms of 'g' using the equations outlined on page A10.0 for each level of the building.

Step 2. **Determine Operating Weight (lbs/ft or lbs):**
Determine the operating weight, \( W_P \), of the distribution system (lbs/ft) to be seismically braced. Consider Zone of Influence (ZOI) effects from branch lines per NFPA 13, Annex 13. Refer to the tables on pages A11.11 and A11.12 for pipe weights. Per NFPA 13, \( W_P \) shall be taken as 1.15 times the weight of the water filled pipe.

Step 3. **Determine the Maximum Brace Spacing, \( S \):**
Using the seismic 'g' force from Step 1 and the weight from Step 2, determine the maximum transverse brace spacing from the appropriate table on pages A11.11 and A11.12.

Step 4. **Determine Seismic Forces (lbs):**
Calculate the maximum lateral and vertical forces applied to the seismic brace system. Resolve the maximum lateral force to the brace, \( F_P \), and maximum load on the hanger rod, \( T_{Rod} \).

The resultant compression load on the hanger rod at seismic brace locations may be calculated to determine if rod stiffening is required.

Step 5. **Select Seismic Kit Installation, Hanger and Brace connection Details:**
Verify the details selected are correct by comparing the calculated lateral force, \( F_P \), and load on the hanger rod, \( T_{Rod} \), with the rated loads tabulated on the detail sheets. If \( F_P \) and \( T_{Rod} \) are less than or equal to the tabulated rated loads, the details are acceptable.
Example:

4"Ø schedule 40 steel pipe is suspended within a 3 story poured-in place concrete building with basement. The pipe is supported at every 15 feet. The elevation of each floor, including the basement, is 15 feet. The short period spectral acceleration, $S_{DS}$, listed on the contract structural drawings, is 1.02. The component importance factor, $I_p = 1.5$.

Note: When anchoring to concrete, allowable loads have been reduced by the concrete overstrength factor, $\Omega_o$, where applicable, in Sections M & N. Therefore, $\Omega_o$ is not used when calculating applied seismic forces in this example.

Step 1. **Determine 'g' Forces**

Component amplification and response modification factors for steel pipe with grooved couplings are as follows:

\[ a_p = 2.5 \; \text{;} \; R_p = 4.5 \]

Therefore,

\[
F_p = (0.7) \frac{0.4(2.5)(1.02)W_p}{(4.5)(1.5)} (1+2z^h) = 0.24(1+2z^h)g
\]

\[
F_{P_{(\text{min})}} = (0.7)(0.3)(1.02)(1.5)W_p = 0.32g
\]

\[
F_{P_{(\text{max})}} = (0.7)(1.6)(1.02)(1.5)W_p = 1.71g
\]

\[
F_{PV} = (0.7)(0.2)(1.02)W_p = 0.14g
\]

Tabulated below are the 'g' forces for each level of the building.

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>$F_p$</th>
<th>$F_{PV}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>0.14g</td>
</tr>
<tr>
<td>1</td>
<td>0.40g</td>
<td>0.14g</td>
</tr>
<tr>
<td>2</td>
<td>0.56g</td>
<td>0.14g</td>
</tr>
<tr>
<td>3</td>
<td>0.72g</td>
<td>0.14g</td>
</tr>
</tbody>
</table>

Note: We are expressing the seismic coefficient in terms of 'g' which is defined as $C_p$ in NFPA 13.

Step 2. **Determine Operating Weight (lbs/ft):**

For this example, assume the combined weight of the main pipe and branch pipes within the Zone of Influence (ZOI) is 600 lbs.
Step 3. **Determine the Maximum Brace Spacings**

The maximum transverse brace spacing for 4"Ø steel pipe is 40 feet. However, we must check the pipe for the combined load of the main pipe and branch lines of 600 lbs using the appropriate seismic coefficient 'g' table on page A11.12.

From Step 2, the maximum 'g' force of 0.72 occurs on level 3. Go to Table 1 on page A11.12 for maximum 'g' of 0.75. For 4"Ø pipe at 40 foot spacing, the maximum weight, W_P, is 1526 lbs. Since this is greater than 600 lbs, the pipe can be braced in the transverse direction at 40 feet maximum spacing.

The maximum longitudinal brace spacing of 4"Ø pipe is 80 feet. However, we will limit the brace spacing to 60 feet for this example.

Step 4. **Determine Seismic Forces (lbs):**

For Basement Level,

\[
\begin{align*}
F_P(\text{Transverse}) &= 0.32 \times 600 \text{ lbs} \times 1.15 = 221 \text{ lbs} \\
F_P(\text{Longitudinal}) &= 0.32 \times 16.5 \text{ lbs/ft} \times 1.15 \times 60 \text{ ft brace spacing} = 317 \text{ lbs} \\
F_{PV} &= 0.14 \times 16.5 \text{ lbs/ft} \times 1.15 \times 15 \text{ ft support spacing} = 40 \text{ lbs}
\end{align*}
\]

*Note: F_p does not need to be increased due to installation tolerances indicated in assembly details.*

For seismic solid brace installations:

\[
\begin{align*}
T_{Rod}(\text{Transverse}) &= F_P(\text{Transverse}) \tan(\text{brace angle}) + (16.5 \text{ lbs/ft} \times 1.15 \times 15 \text{ ft} + F_{PV}) = 546 \text{ lbs}
\end{align*}
\]

\[
\begin{align*}
T_{Rod}(\text{Longitudinal}) &= F_P(\text{Longitudinal}) \tan(\text{brace angle}) + (16.5 \text{ lbs/ft} \times 1.15 \times 15 \text{ ft} + F_{PV}) = 642 \text{ lbs}
\end{align*}
\]

*Note: Brace angle = 45 degrees for this example.*

For seismic cable brace installations:

\[
T_{Rod} = (16.5 \text{ lbs/ft} \times 1.15 \times 15 \text{ ft} + F_{PV}) = 325 \text{ lbs}
\]

Similarly for Levels 1, 2 and 3, F_P, F_{PV} and T_{Rod} are as tabulated below.

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>F_P (Transverse)</th>
<th>F_P (Longitudinal)</th>
<th>F_{PV}</th>
<th>T_{Rod}(Solid - Tran)</th>
<th>T_{Rod}(Solid-Long)</th>
<th>T_{Rod}(Cable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>221 lbs</td>
<td>317 lbs</td>
<td>40 lbs</td>
<td>546 lbs</td>
<td>642 lbs</td>
<td>325 lbs</td>
</tr>
<tr>
<td>1</td>
<td>276 lbs</td>
<td>455 lbs</td>
<td>40 lbs</td>
<td>601 lbs</td>
<td>780 lbs</td>
<td>325 lbs</td>
</tr>
<tr>
<td>2</td>
<td>386 lbs</td>
<td>638 lbs</td>
<td>40 lbs</td>
<td>711 lbs</td>
<td>963 lbs</td>
<td>325 lbs</td>
</tr>
<tr>
<td>3</td>
<td>497 lbs</td>
<td>820 lbs</td>
<td>40 lbs</td>
<td>822 lbs</td>
<td>1145 lbs</td>
<td>325 lbs</td>
</tr>
</tbody>
</table>

\[C_{Rod} = F_P \tan(\text{brace angle}) + F_{PV} - 0.9W_P = 317 \text{ lbs} \times \tan(45 \text{ degrees}) + 40 \text{ lbs} - 0.9 \times (16.5 \text{ lbs/ft} \times 1.15 \times 15 \text{ ft}) = 101 \text{ lbs} \]

*Note: Brace Note: If C_{Rod} ≤ 0, rod stiffeners are not required.*
Step 5. **Select Seismic Kit Installation, Hanger, and Brace connection Details:**

Compare $F_p$ values when using pipe brace details from Section C and brace connection details from Section N.

Compare $T_{rod}$ values with $Ta$ when using hanger connection details from Section M. The table below summarizes details that are applicable for each floor.

### Seismic Solid (Rigid) Brace, Hanger and Brace connection Details

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>40'/60'</td>
<td>C1.30</td>
<td>63F</td>
<td>63G</td>
<td>63H</td>
<td>63C</td>
<td>63D</td>
</tr>
<tr>
<td>1</td>
<td>0.40g</td>
<td>40'/60'</td>
<td>C1.30</td>
<td>63G</td>
<td>63H</td>
<td>63J</td>
<td>63D</td>
<td>63E</td>
</tr>
<tr>
<td>2</td>
<td>0.56g</td>
<td>40'/60'</td>
<td>C1.33</td>
<td>63H</td>
<td>63J</td>
<td>63K</td>
<td>63E</td>
<td>63G</td>
</tr>
<tr>
<td>3</td>
<td>0.72g</td>
<td>40'/60'</td>
<td>N/A</td>
<td>63H</td>
<td>63L</td>
<td>63L</td>
<td>63F</td>
<td>63H</td>
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### Seismic Cable (Standard) Brace, Hanger and Brace connection Details

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<td>50D</td>
<td>50E</td>
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<td>C2.41</td>
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<td>75F</td>
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# MAXIMUM TRANSVERSE BRACE SPACING FOR FIRE PROTECTION PIPING

## Schedule 10 Steel Pipe

### Table 1

<table>
<thead>
<tr>
<th>Pipe Size (in)</th>
<th>Weight/ft (lbs/ft)</th>
<th>Max Gravity Support Spacing (ft)</th>
<th>Maximum Weight Using ZOI Method, ( W_p ) (lbs)</th>
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<tbody>
<tr>
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<td>Max 'g' force 0.75</td>
</tr>
<tr>
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<td>Max. Transverse Brace Spacing (ft)</td>
</tr>
<tr>
<td>1</td>
<td>1.84</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>1( \frac{1}{4} )</td>
<td>2.55</td>
<td>12</td>
<td>115</td>
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<tr>
<td>1( \frac{1}{2} )</td>
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<td>15</td>
<td>193</td>
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<tr>
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<td>4.28</td>
<td>15</td>
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<td>15</td>
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<td>3</td>
<td>8.0</td>
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<td>682</td>
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<td>4</td>
<td>11.9</td>
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<tr>
<td>5</td>
<td>17.5</td>
<td>15</td>
<td>1756</td>
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<tr>
<td>6</td>
<td>23.2</td>
<td>15</td>
<td>3027</td>
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<tr>
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<td>40.4</td>
<td>15</td>
<td>10314</td>
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### Table 2

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<th>Pipe Size (in)</th>
<th>Weight/ft (lbs/ft)</th>
<th>Max Gravity Support Spacing (ft)</th>
<th>Maximum Weight Using ZOI Method, ( W_p ) (lbs)</th>
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<tbody>
<tr>
<td></td>
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<td></td>
<td>Max 'g' force 1.25</td>
</tr>
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<td>Max. Transverse Brace Spacing (ft)</td>
</tr>
<tr>
<td>1</td>
<td>1.84</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
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<td>2.55</td>
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REFER TO EXAMPLE ON PAGE A11.9 BEFORE USING THESE TABLES.
# MAXIMUM TRANSVERSE BRACE SPACING FOR FIRE PROTECTION PIPING

Schedule 40 Steel Pipe

Table 1

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<td>2.1</td>
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<tr>
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<td>12</td>
<td>236  189  155  N/A  N/A</td>
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<tr>
<td>1½</td>
<td>3.6</td>
<td>12</td>
<td>324  260  213  N/A  N/A</td>
</tr>
<tr>
<td>2</td>
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<td>15</td>
<td>558  447  366  N/A  N/A</td>
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<tr>
<td>2½</td>
<td>7.9</td>
<td>15</td>
<td>1075 860  705  N/A  N/A</td>
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<tr>
<td>3</td>
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<td>50</td>
<td>15</td>
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<td>75</td>
<td>15</td>
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Table 2

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<tr>
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<tr>
<td>2</td>
<td>5.2</td>
<td>15</td>
<td>335 268 220  N/A  N/A</td>
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<tr>
<td>2½</td>
<td>7.9</td>
<td>15</td>
<td>645 516 423  N/A  N/A</td>
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<td>1045 836 685 587 491</td>
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<td>18128 14502 11882 10184 8528</td>
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<td>103</td>
<td>15</td>
<td>26454 21163 17339 14862 12445</td>
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</table>

Refer to example on page A11.9 before using these tables.
LAYOUT OF SEISMIC BRACES FOR INDIVIDUALLY SUSPENDED PIPING

Step 1. Separate the layout of the system into individual straight runs. A straight run is defined as a section of the utility between changes in direction. If an offset(s) occurs between changes of direction it may be neglected if the distance perpendicular to the run is less than the offset length, $S_{10}$, where $S$ is the maximum transverse brace spacing tabulated in Section S.

![Diagram showing maximum offset length and brace placement](image)

Step 2. Each straight run must be braced in the transverse direction (perpendicular to the run) at each end.

![Diagram showing transverse brace placement](image)
LAYOUT OF SEISMIC BRACES FOR
INDIVIDUALLY SUSPENDED PIPING (continued)

Step 3. Add transverse braces, if required, to limit the spacing(s) to the maximum spacing indicated in Section S.

Step 4. Each straight run must be braced in the longitudinal direction (parallel to the run) with at least one brace. Transverse braces within offset distance 'A' may be used in addition to or in lieu of independent longitudinal braces. The maximum length of pipe around a 90 degree turn (indicated as 'P' below) longitudinally braced from a transverse brace at offset distance 'A' is as follows:

When $A \leq 0.30*S$, $P = 0.5*S$,
When $A \leq 0.25*S$, $P = 0.75*S$,
When $A \leq 0.20*S$, $P = S$,
When $A \leq 0.15*S$, $P = 1.5*S$,

where:
- $S =$ Maximum Allowable Transverse Brace Spacing (From Section S)
- $T =$ The distance between Transverse Braces
- $A =$ Offset Distance
**Step 5.** Multiple changes in direction may be treated as one complete system. Straight runs greater than the maximum offset length require 2 transverse braces. Straight runs less than the maximum offset length may require as few as one or no braces. (See layout below)

**Step 6.** Vertical drops to equipment must be restrained with a transverse brace at the final support point before the vertical drop. The distance from the transverse brace to the drop must be within the maximum offset distance 'A' as defined on Page A12.1. The maximum allowable length of the system braced from the transverse brace to the flexible connector is equal to 'P' as defined on Page A12.1. If this distance is greater than 'P', an additional brace is required at the end of the vertical drop by attaching to the floor. Consideration must be given to seismic relative displacements (SRD) imposed on pipe when braced to the floor.

---

**PLAN VIEW**

Pipe Run

A = Runs greater than the Maximum Offset Length \( \left( \frac{S}{10} \right) \)

B = Runs less than the Maximum Offset Length \( \left( \frac{S}{10} \right) \)

---

**PLAN VIEW**

Pipe Run

Transverse Brace at final support point before vertical drop

A (Refer to Page A12.1)

If additional brace is required as stated above.

A flex connector may be required before connecting system to equipment to account for SRD.

P - B (If applicable) \( \leq \) (Refer to Page A12.1 for P)

It may be necessary to move or add a flex connector if a brace is installed at the floor to account for SRD. For this case the amount of pipe braced by the transverse brace terminates at the top of the flex connector.
LAYOUT OF SEISMIC BRACES FOR TRAPEZE SUSPENDED PIPING (continued)

Step 1a. Separate the layout of the system into individual straight runs. A straight run is defined as a section of the utility between changes in direction. If an offset(s) occurs between changes of direction it may be neglected if the distance perpendicular to each pipe run is less than the offset length, \( \frac{S}{10} \), where \( S \) is the maximum transverse brace spacing tabulated in Section S.

Step 2a. Each straight run must be braced in the transverse direction (perpendicular to the run) at each end.
Step 3a. Add transverse braces, if required, to limit the spacing(s) to the maximum spacing indicated in Section S.

Step 4a. Each straight run must be braced in the longitudinal direction (parallel to the run) with at least one brace. Transverse braces within offset distance 'A' may be used in addition to or in lieu of independent longitudinal braces. The maximum length of pipe around a 90 degree turn (indicated as 'P' below) longitudinally braced from a transverse brace at offset distance 'A' is as follows:

When \( A \leq 0.30*S \), \( P = 0.5*S \),
When \( A \leq 0.25*S \), \( P = 0.75*S \),
When \( A \leq 0.20*S \), \( P = S \),
When \( A \leq 0.15*S \), \( P = 1.5*S \), where:

\( S \) = Maximum Allowable Transverse Brace Spacing (From Section S)
\( T \) = The distance between Transverse Braces
\( A \) = Offset Distance
Step 5a. Multiple changes in direction may be treated as one complete system. Straight runs greater than the maximum offset length require 2 transverse braces. Straight runs less than the maximum offset length may require as few as one or no braces. (See layout below)

Step 6a. Vertical drops to equipment must be restrained with a transverse brace at the final support point before the vertical drop. The distance from the transverse brace to the drop must be within the maximum offset distance 'A' as defined on Page A12.4. The maximum allowable length of the system braced from the transverse brace to the flexible connector is equal to 'P' as defined on Page A12.4. If this distance is greater than 'P', an additional brace is required at the end of the vertical drop by attaching to the floor. Consideration must be given to seismic relative displacements (SRD) imposed on the pipe when braced to the floor.
LAYOUT OF SEISMIC BRACES FOR
FIRE PROTECTION PIPING

Step 1. Separate the layout of the system into individual straight runs. A straight run is defined as a section of the utility between changes in direction. If an offset(s) occurs between changes of direction it may be neglected if the distance perpendicular to the run is less than 24".

Step 2. Each straight run must be braced in the transverse direction (perpendicular to the run) at each end.
LAYOUT OF SEISMIC BRACES FOR FIRE PROTECTION PIPING (continued)

Step 3. Add transverse braces, if required, to limit the spacing(s) to the maximum spacing indicated in Section S.

Spacing ≤ Maximum transverse brace spacing

Step 4. Each straight run must be braced in the longitudinal direction (parallel to the run) with at least one brace. Transverse braces within the maximum offset length discussed in Step 1 may be used in addition to or in lieu of independent longitudinal braces. The max length of pipe around a 90 degree turn (indicated as ‘P’ below) longitudinally braced from a transverse brace = L-0.5T-A (not to exceed S), where:

\[ L = \text{Maximum Allowable Longitudinal Brace Spacing (From Section S)} \]
\[ S = \text{Maximum Allowable Transverse Brace Spacing (From Section S)} \]
\[ T = \text{The distance between Transverse Braces} \]
\[ A = \text{Offset Length} \leq \text{Maximum Offset Length} \left(\frac{S}{10}\right) \]
Step 5. Multiple changes in direction may be treated as one complete system. Straight runs greater than the maximum offset length require 2 transverse braces. Straight runs less than the maximum offset length may require as few as one or no braces. (See layout below)

Step 6. Vertical drops to equipment must be restrained with a transverse brace at the final support point before the vertical drop. The distance from the transverse brace to the drop must be within the maximum offset length of the system. The maximum allowable length of the system braced from the transverse brace to the flexible connector is equal to \( \frac{1}{2} \) of the maximum transverse brace spacing. If this distance is greater than \( \frac{1}{2} \) of the maximum transverse brace spacing, an additional brace is required at the end of the vertical drop by attaching to the floor. Consideration must be given to seismic relative displacements (SRD) imposed on pipe when braced to the floor.

MASON WEST, INC.
1601 E. Miraloma Ave, Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com
**12" RULE FOR SUSPENDED PIPING**

*SUPPORT STRUCTURE*

**SWIVEL CONNECTIONS**
*FOR ROD SIZE > 3/8"*

**CLEVIS HUNG PIPE**

**PIECE ATTACHMENT TO TRAPEZE**
*CONFORMING TO MSS SP-58 TYPE 53, 56, OR 59, TYP*

*NOTE: CONNECTIONS COMPLYING INCLUDE SWIVEL JOINTS, EYE BOLTS, ETC.*
SEISMIC BRACE REQUIREMENTS
FOR PIPING ON MULTI-LAYER TRAPEZES

CASE 1
IF \( w_{\text{total}} < 10 \text{ LB/FT}, \)
NO BRACING REQ'D

CASE 2
IF \( w_1 \geq 10 \text{ LB/FT AND } w_2 \geq 10 \text{ LB/FT}, \)
BRACE EACH LAYER INDEPENDENTLY

CASE 3
IF \( w_{\text{total}} \geq 10 \text{ LB/FT AND } w_2 < 10 \text{ LB/FT}, \)
BRACE TOP TRAPEZE FOR \( w_{\text{total}} \)
(BOTTOM TRAPEZE NEED NOT BE BRACED PROVIDED THE LOAD IS ACCOUNTED FOR IN THE NEAREST BRACED LAYER)

NOTES:
1) REGISTERED DESIGN PROFESSIONAL (RDP) SHALL VERIFY BRACE REQUIREMENTS LISTED ON PAGE A10.5.
2) HANGER REACTIONS SHALL BE DETERMINED FROM TOTAL PIPING WEIGHT FROM ALL LAYERS.
The angle variation may increase beyond 2.5 degrees up to 15 degrees provided the transverse braces are skewed in the same direction and a longitudinal brace occurs opposite the skewed angle direction as shown below.

**NOTE:** Any or all brace locations are permitted to use the angle variation to meet field conditions.
TRANSVERSE BRACE ALLOWABLE ANGLE VARIATIONS
IN PLAN FOR PIPE ON TRAPEZE

THE ANGLE VARIATION MAY INCREASE BEYOND 2.5 DEGREE UP TO 15 DEGREE PROVIDED THE TRANSVERSE BRACES ARE SKEWED IN THE SAME DIRECTION AND A LONGITUDINAL BRACE OCCURS OPPOSITE THE SKEWED ANGLE DIRECTION AS SHOWN BELOW.

NOTE: ANY OR ALL BRACE LOCATIONS ARE PERMITTED TO USE THE ANGLE VARIATION TO MEET FIELD CONDITIONS.
ALTERNATE ARRANGEMENT OF SEISMIC BRACES FOR PIPING ON TRAPEZE

NOTES:
1) REFER TO APPROPRIATE DETAIL F PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
ALTERNATE ARRANGEMENT OF SEISMIC BRACES FOR PIPING ON TRAPEZE

MIN 3/4" x 1-5/8" x 1-1/2" ASTM A36 STRUT WASHER REQ'D WHERE SCBH-0 IS USED

SEE NOTE 2

3" MAX OFFSET

STRUT TRAPEZE

1" OFFSET

(TRANSVERSE BRACE ONLY)

BRACKET MAY BE OFFSET 3" MAX FROM HANGER ROD

MIN 3/4" x 1-5/8" x 1-1/2" ASTM A36 STRUT WASHER REQ'D WHERE SCBH-0 IS USED

SEE NOTE 2

3" MAX OFFSET

STRUT TRAPEZE

(TRANSVERSE, LONGITUDINAL OR ALL-DIRECTIONAL BRACE)

STRUT TRAPEZE

SEE NOTE 2

3" MAX OFFSET

HSS TRAPEZE

BRACKET MAY BE OFFSET 3" MAX FROM HANGER ROD

ANGLE TRAPEZE

MIN 3/4" x 1-5/8" x 1-1/2" ASTM A36 STRUT WASHER REQ'D WHERE SCBH-0 IS USED

SEE NOTE 2

3" MAX OFFSET

STRUT TRAPEZE

1"

(TRANSVERSE, LONGITUDINAL OR ALL-DIRECTIONAL BRACE)

SEISMIC BRACE BRACKET OFFSET FROM HANGER RODS

NOTES:
1) REFER TO APPROPRIATE DETAIL F PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
2) WHEN INSTALLING SHB TO BOTTOM OF TRAPEZE, MW-KY SHB KEY IS REQ'D (REF. X2.4).
ALTERNATE ARRANGEMENT OF SEISMIC BRACES FOR INDIVIDUALLY SUSPENDED STEEL PIPING

NOTES:
1) REFER TO APPROPRIATE DETAIL C PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
2) MAX OFFSETS ARE BASED ON STEEL PIPE CONFORMING TO ASTM SPECIFICATION A53, TYPE E, GRADE B WITH MINIMUM $F_y = 35$ ksi AND $S_a = 14.6$ ksi AT MAXIMUM OPERATING PRESSURE AND TEMPERATURE OF 400 psi and 650°F, RESPECTIVELY.

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<th>MAX OFFSET</th>
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<td>24&quot;</td>
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ALTERNATE ARRANGEMENT OF SEISMIC BRACES FOR INDIVIDUALLY SUSPENDED STEEL PIPING

NOTES:
1) REFER TO APPROPRIATE DETAIL C PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
2) MAX OFFSETS ARE BASED ON STEEL PIPE CONFORMING TO ASTM SPECIFICATION A53, TYPE E, GRADE B WITH MINIMUM Fy = 35 ksi AND SA = 14.6 ksi AT MAXIMUM OPERATING PRESSURE AND TEMPERATURE OF 400 psi and 650°F, RESPECTIVELY.

<table>
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<tr>
<th>PIPE DIA.</th>
<th>MAX OFFSET</th>
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<tr>
<td>24&quot;</td>
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</tr>
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MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jiefu “Jeff” Zhang, SE
California SE No. S5270

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
80 of 846
ALT ENTERATE ARRANGEMENT OF SEISMIC BRACES
FOR INDIVIDUALLY SUSPENDED CAST IRON PIPING

NOTES:
1) REFER TO APPROPRIATE DETAIL C PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
2) MAX OFFSETS ARE BASED ON CAST IRON PIPE CONSTRUCTED TO ASTM A 888 OR CISPI 301 STANDARDS WITH A MINIMUM TENSILE
STRENGTH OF 21,000 PSI.

<table>
<thead>
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<tbody>
<tr>
<td>2&quot; - 3&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>4&quot; - 12&quot;</td>
<td>12&quot;</td>
</tr>
</tbody>
</table>

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TEL (714) 630 - 0701, www.masonwest.com
ALTERNATE ARRANGEMENT OF SEISMIC BRACES FOR INDIVIDUALLY SUSPENDED CAST IRON PIPING

NOTES:
1) REFER TO APPROPRIATE DETAIL C PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
2) MAX OFFSETS ARE BASED ON CAST IRON PIPE CONSTRUCTED TO ASTM A 888 OR CISPI 301 STANDARDS WITH A MINIMUM TENSILE STRENGTH OF 21,000 PSI.

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>MAX OFFSET</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot; - 3&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>4&quot; - 12&quot;</td>
<td>12&quot;</td>
</tr>
</tbody>
</table>

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Jiefu "Jeff" Zhang, SE
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PAGE A15.5

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
82 of 846
ATTACHMENT OPTIONS FOR PIPING ON TRAPEZE MEMBERS FOR TRANSVERSE, LONGITUDINAL, AND ALL-DIRECTIONAL BRACING SYSTEMS

**ELEVATION VIEW**

**SECTION VIEW**

**WELDED ANGLE CLIPS (STANDARD SCHEDULE)**

<table>
<thead>
<tr>
<th>PIPE SIZE (IN.)</th>
<th>MAX TRANSVERSE Fp (lbs)</th>
<th>MAX LONGITUDINAL Fp (lbs)</th>
<th>PIPE TRUNNION OPTION</th>
<th>PIPE WELD SIZE</th>
<th>HSS TRUNNION</th>
<th>HSS WELD LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot; - 3&quot;Ø</td>
<td>240</td>
<td>870</td>
<td>3/16 STD. HSS2x2x1/2</td>
<td>3/16&quot;</td>
<td>HSS3x3x1/2</td>
<td>2&quot;</td>
</tr>
<tr>
<td>3&quot; - 4&quot;Ø</td>
<td>380</td>
<td>1600</td>
<td>3/16 STD. HSS3x3x1/2</td>
<td>3/16&quot;</td>
<td>HSS4x4x1/2</td>
<td>3&quot;</td>
</tr>
<tr>
<td>5&quot;</td>
<td>870</td>
<td>4410</td>
<td>3/16 STD. HSS3x3x1/2</td>
<td>3/16&quot;</td>
<td>HSS4x4x1/2</td>
<td>3&quot;</td>
</tr>
<tr>
<td>6&quot; - 8&quot;Ø</td>
<td>1600</td>
<td>9670</td>
<td>4&quot; STD. HSS4x4x1/2</td>
<td>3/16&quot;</td>
<td>HSS4x4x1/2</td>
<td>4&quot;</td>
</tr>
<tr>
<td>10&quot; - 12&quot;Ø</td>
<td>4630</td>
<td>14630</td>
<td>5&quot; STD. HSS4x4x3/8</td>
<td>3/16&quot;</td>
<td>HSS4x4x3/8</td>
<td></td>
</tr>
<tr>
<td>14&quot;Ø</td>
<td>3770</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16&quot; - 18&quot;Ø</td>
<td>4350</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20&quot;Ø</td>
<td>5460</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24&quot;Ø</td>
<td>6350</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30&quot;Ø</td>
<td>7440</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. MAX Fp FORCES ARE BASED ON STEEL PIPE CONFORMING TO ASTM SPECIFICATION A53, TYPE E, GRADE B WITH MINIMUM Fy = 33 ksi. FOR ASTM A53, TYPE E, GRADE A WITH MINIMUM Fy=30 ksi, REDUCE TRANSVERSE Fp FORCE ONLY BY A FACTOR OF 1.20 UP TO 14"Ø PIPE, 1.33 UP TO 30"Ø PIPE.
2. THE MAX Fp FORCES SHOWN ABOVE MAY BE USED FOR SCH. 80 STEEL PIPE.
3. FOR SCH. 10 STEEL PIPE, THE REGISTERED DESIGN PROFESSIONAL (RDP) SHALL DETERMINE THE MAX ALLOWABLE Fp FORCES.
4. FOR PIPE TRUNNION OPTION, THE BRACE SPACING SHALL NOT EXCEED 40'-0" MAX FOR TRANSVERSE BRACING SYSTEMS.
5. ASTM A53, GRADE B, Fy = 35 KSI (PIPE TRUNNION) OR ASTM A500, GRADE B, Fy = 46 KSI (HSS TRUNNION)

**PIECE TRUNNION**

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ATTACHMENT OPTIONS FOR PIPING ON TRAPEZE MEMBERS FOR TRANSVERSE, LONGITUDINAL, AND ALL-DIRECTIONAL BRACING SYSTEMS

PIPE CLAMP, TYP (REF. PAGES X8.0, X8.0.1, X8.1, X8.1.1, X8.6 - X8.6.3)\(^1,3\)

SIDE ELEVATION VIEW

STRUT SPACER, TYP (REF. PAGE X8.2)

MIN. (1) WELD @ \(\frac{1}{2}''\) FROM EACH END, TYP

FRONT ELEVATION VIEW

MASON WEST MW-SSC, MW-SCC, AND MW-SCCI PIPE CLAMPS

MW-SPC, TYP (REF. PAGES X8.3-X8.3.1)\(^1\)

SIDE ELEVATION VIEW

ASTM A307 "D" BOLT & NUT \(^2\)

FRONT ELEVATION VIEW

MASON WEST MW-SPC PIPE CLAMPS

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>D. BOLT DIAMETER</th>
<th>w, MIN WELD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1(\frac{1}{4})-2&quot;Ø</td>
<td>(\frac{3}{16})&quot;</td>
<td>(\frac{1}{2})&quot;</td>
</tr>
<tr>
<td>2(\frac{1}{2})-3&quot;Ø</td>
<td>(\frac{1}{2})&quot;</td>
<td>(\frac{3}{16})&quot;</td>
</tr>
<tr>
<td>4&quot;-5&quot;Ø</td>
<td>(\frac{3}{16})&quot;</td>
<td>(\frac{3}{4})&quot;</td>
</tr>
<tr>
<td>6&quot;-12&quot;Ø</td>
<td>(\frac{1}{4})&quot;</td>
<td>(\frac{1}{2})&quot;</td>
</tr>
</tbody>
</table>

NOTES:
1) PIPE CLAMPS MAY BE USED FOR TRANSVERSE, LONGITUDINAL, OR ALL-DIRECTIONAL BRACING SYSTEMS. REF. APPROPRIATE X8 PAGES FOR MAX \(F_p\) FORCES.
2) RDP SHALL VERIFY THE SUPPORTING TRAPEZE HAS SUFFICIENT STRENGTH AND STEEL WIDTH FOR WELD AND BOLT ATTACHMENT OPTIONS.
3) MASON WEST TYPE MW-SCCI PIPE CLAMPS MAY ONLY BE USED AT TRANSVERSE LOCATIONS.

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PAGE

A16.1

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
84 of 846
ATTACHMENT OPTIONS FOR PIPING ON TRAPEZE MEMBERS FOR LONGITUDINAL BRACING SYSTEMS

TEE MEMBER STANCHION OR STOPPER OPTION

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>WT SIZE</th>
<th>MIN WELD SIZE</th>
<th>L WELD LENGTH</th>
<th>MAX Fp FORCE (lbs) a = 12&quot; MAX a = 6&quot; MAX a = 4&quot; MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>2½&quot;-3&quot;Ø</td>
<td>MT3x2.2</td>
<td>3/16&quot;</td>
<td>2&quot;</td>
<td>320</td>
</tr>
<tr>
<td>4&quot;-5&quot;Ø</td>
<td>WT3x6</td>
<td>3/8&quot;</td>
<td>2&quot;</td>
<td>810</td>
</tr>
<tr>
<td>6&quot;-8&quot;Ø</td>
<td>WT4x7.5</td>
<td>1/2&quot;</td>
<td>3&quot;</td>
<td>1530</td>
</tr>
<tr>
<td>10&quot;-18&quot;Ø</td>
<td>WT6x13</td>
<td>3/4&quot;</td>
<td>4&quot;</td>
<td>2840</td>
</tr>
<tr>
<td>20&quot;-30&quot;Ø</td>
<td>WT8x20</td>
<td>1½&quot;</td>
<td>4&quot;</td>
<td>6490</td>
</tr>
</tbody>
</table>

NOTES:
1) THE MAX Fp FORCES SHOWN ABOVE MAY BE USED FOR SCH. 80 STEEL PIPE. FOR SCH. 10 STEEL PIPE, THE REGISTERED DESIGN PROFESSIONAL (RDP) SHALL DETERMINE THE MAX ALLOWABLE Fp FORCES.
2) GAP MAY INCREASE FOR JOB SPECIFIC THERMAL DESIGN.
3) ASTM A36, Fy = 36 KSI (WT SHAPES)
ATTACHMENT OPTIONS FOR PIPING ON TRAPEZE MEMBERS FOR TRANSVERSE BRACING SYSTEMS

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>U-BOLT DIA</th>
<th>U-BOLT ANGLE CLIP SIZE</th>
<th>E, WELD SIZE</th>
<th>MAX Fp FORCE (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2½&quot;-5&quot;Ø</td>
<td>½&quot;</td>
<td>L3x3x⅛, 3&quot; LG</td>
<td>⅛&quot;</td>
<td>1200</td>
</tr>
<tr>
<td>6&quot;-8&quot;Ø</td>
<td>⅜&quot;</td>
<td>L4x4x⅜, 4&quot; LG</td>
<td>⅛&quot;</td>
<td>3960</td>
</tr>
<tr>
<td>10&quot;Ø</td>
<td>⅝&quot;</td>
<td>L4x4x⅜, 4&quot; LG</td>
<td>⅛&quot;</td>
<td>4970</td>
</tr>
<tr>
<td>12&quot;-16&quot;Ø</td>
<td>⅛&quot;</td>
<td>L5x5x⅜, 5&quot; LG</td>
<td>⅛&quot;</td>
<td>6060</td>
</tr>
</tbody>
</table>

NOTES:
1) U-BOLT W/ ANGLE CLIPS OPTION MAY ONLY BE INSTALLED TO TOP OF TRAPEZE.
2) ASTM A36, Fy = 36 KSI (STEEL ANGLES, PLATES, AND U-BOLTS)
ATTACHMENT OPTIONS FOR PIPING ON TRAPEZE MEMBERS FOR TRANSVERSE BRACING SYSTEMS

Pipe Size | Max Fp Force (lbs) | Angle Member | H | Weld Size | Plate Size |
---|---|---|---|---|---|
2½"-5"Ø | 720 | L2x2x½ | 9" | ⅛" | 2" | 4" | ½" |
6"-8"Ø | 1420 | L3x3x½ | 12" | ⅛" | 3" | 5" |
10"-18"Ø | 1620 | L4x4x½ | 16" | ⅛" | 4" | 6" | ½" |
20"-30"Ø | 2840 | L6x6x½ | 24" | ⅛" | 4" | 8" |

1. MAX Fp FORCES ARE BASED ON STEEL PIPE CONFORMING TO ASTM SPECIFICATION A53, TYPE E, GRADE B WITH MINIMUM Fy = 35 ksi.
2. FOR ASTM A53, TYPE E, GRADE A WITH MINIMUM Fy=30 ksi, REDUCE TRANSVERSE Fp FORCE ONLY BY A FACTOR OF 1.20 UP TO 14"Ø PIPE, 1.33 UP TO 30"Ø PIPE.
3. FOR SCH. 10 STEEL PIPE, THE REGISTERED DESIGN PROFESSIONAL (RDP) SHALL DETERMINE THE MAX ALLOWABLE Fp FORCES.
4. THE BRACE SPACING SHALL NOT EXCEED 40'-0" MAX FOR TRANSVERSE BRACING SYSTEMS.
5. ASTM A53, GRADE B, Fy = 35 KSI (PIPE POST), ASTM A500, GRADE B, Fy = 46 KSI (HSS POST), OR ASTM A36, Fy = 36 KSI (ANGLE POST)
SEISMIC SOLID BRACING OFF STRUT HANGER
TRANSVERSE OPTION FOR INDIVIDUALLY SUSPENDED PIPING

SINGLE STRUT OPTION

DOUBLE STRUT OPTION

NOTES:
1) REFER TO APPROPRIATE C PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.

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PAGE A18.0

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
88 of 846
SEISMIC SOLID BRACING OFF STRUT HANGER
LONGITUDINAL OPTION FOR INDIVIDUALLY SUSPENDED PIPING

SINGLE STRUT OPTION

1¼"x1½"x12GA SINGLE STRUT @ 10'-0" O.C. MAX

DOUBLE STRUT OPTION

1½"x1¾"x12GA DOUBLE STRUT @ 10'-0" O.C. MAX

NOTES:
1) REFER TO APPROPRIATE C PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
SEISMIC CABLE BRACING OFF STRUT HANGER
TRANSVERSE OPTION FOR INDIVIDUALLY SUSPENDED PIPING

SINGLE STRUT OPTION

- MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. X4.0)
- 1\(\frac{3}{4}\)"x1\(\frac{3}{4}\)"x12GA SINGLE STRUT @ 10'-0" O.C. MAX
- a = 12" MAX

DOUBLE STRUT OPTION

- MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)
- 1\(\frac{3}{4}\)"x1\(\frac{3}{4}\)"x12GA DOUBLE STRUT @ 10'-0" O.C. MAX
- a = 18" MAX

NOTES:
1) REFER TO APPROPRIATE C PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.

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10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020
90 of 846
SEISMIC CABLE BRACING OFF STRUT HANGER
LONGITUDINAL OPTION FOR INDIVIDUALLY SUSPENDED PIPING

A18.3

SINGLE STRUT OPTION

1½"x1½"x12GA SINGLE
STRUT @ 10'-0" O.C. MAX

a = 12" MAX
1" MIN

HOLE SIZE TO BE ⅛" GREATER
 THAN BOLT DIA., TYP

ASTM A307 BOLT. SNUG TIGHTEN INNER
NUT AND LOCK IN PLACE W/ OUTER NUT

PIPE CLAMP (REF. X8.0-X8.1.1)

4"Ø SCH. 40 PIPE MAX

INSULATION WHERE REQ'D

MAX ALLOWABLE
FORCE PER SEISMIC
BRACE ASSEMBLY, Fp

255 LBS

DOUBLE STRUT OPTION

1½"x1½"x12GA DOUBLE
STRUT @ 10'-0" O.C. MAX

a = 18" MAX
1" MIN

HOLE SIZE TO BE ¼" GREATER
 THAN BOLT DIA., TYP

ASTM A307 BOLT. SNUG TIGHTEN INNER
NUT AND LOCK IN PLACE W/ OUTER NUT

PIPE CLAMP (REF. X8.0-X8.1.1)

4"Ø SCH. 40 PIPE MAX

INSULATION WHERE REQ'D

MAX ALLOWABLE
FORCE PER SEISMIC
BRACE ASSEMBLY, Fp

470 LBS

NOTES:
1) REFER TO APPROPRIATE C PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.

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PAGE A18.3

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

91 of 846
SEISMIC SOLID BRACING OFF STRUT HANGER
TRANSVERSE OPTION FOR SUSPENDED PIPING ON TRAPEZE

**SINGLE STRUT OPTION**

- **REF. M PAGES FOR CONNECTION DETAILS**
- **MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)**
- **PIPE CLAMP, TYP (REF. X8.0, X8.0.1, X8.1, X8.1.1, X8.6-X8.6.3)**
- **INSULATION WHERE REQ'D**
- **STRUT SPACER WHERE REQ'D (REF. X8.2)**
- **5*a MIN 102'' MAX**
- **a = 12'' MAX**

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

- **255 LBS**

**DOUBLE STRUT OPTION**

- **REF. M PAGES FOR CONNECTION DETAILS**
- **MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)**
- **PIPE CLAMP, TYP (REF. X8.0, X8.0.1, X8.1, X8.1.1, X8.6-X8.6.3)**
- **INSULATION WHERE REQ'D**
- **STRUT SPACER WHERE REQ'D (REF. X8.2)**
- **5*a MIN 96'' MAX**
- **a = 18'' MAX**

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

- **500 LBS**

**NOTES:**
1. REFER TO APPROPRIATE F PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2. SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.

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---

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SEISMIC SOLID BRACING OFF STRUT HANGER
LONGITUDINAL OPTION FOR SUSPENDED PIPING ON TRAPEZE

NOTES:
1) REFER TO APPROPRIATE F PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.

SINGLE STRUT OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
255 LBS

DOUBLE STRUT OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
500 LBS

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PAGE A18.5

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
93 of 846
SEISMIC CABLE BRACING OFF STRUT HANGER
TRANSVERSE OPTION FOR SUSPENDED PIPING ON TRAPEZE

**SINGLE STRUT OPTION**

- **MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \) 255 LBS

**DOUBLE STRUT OPTION**

- **MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \) 470 LBS

**NOTES:**

1) REFER TO APPROPRIATE F PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.
3) REF. A18.6.1 FOR ALTERNATE INSTALLATION OPTIONS.
SEISMIC CABLE BRACING OFF STRUT HANGER
TRANSVERSE OPTION FOR SUSPENDED PIPING ON TRAPEZE

ALTERNATE INSTALLATION FOR SINGLE STRUT OPTION

ALTERNATE INSTALLATION FOR DOUBLE STRUT OPTION

NOTES:
1) REFER TO A18.6 AND APPROPRIATE F PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
SEISMIC CABLE BRACING OFF STRUT HANGER
LONGITUDINAL OPTION FOR SUSPENDED PIPING ON TRAPEZE

NOTES:
1) REFER TO APPROPRIATE F PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.

SINGLE STRUT OPTION

DOUBLE STRUT OPTION

MAX ALLOWABLE
FORCE PER SEISMIC
BRACE ASSEMBLY, Fp

255 LBS

470 LBS

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P A G E

A18.7

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
96 of 846
SEISMIC SOLID BRACING PIPE CLAMP OPTION FOR INDIVIDUALLY SUSPENDED PIPING

3/8" Ø ATR MAX, TYP

STANDARD NUT (T&B SNUG TIGHT), TYP

HOLE SHALL BE 3/8" GREATER THAN ATR DIA., TYP

BRACE BRACKET PER DETAIL C PAGES 1, TYP

1/2" x 1/2" x 12GA SINGLE STRUT OR 1 1/2" x 3/4" x 12GA SINGLE STRUT, TYP

PIPE CLAMP (REF. PAGES X8.0, X8.0.1, X8.1, X8.1.1, X8.6-X8.6.3 FOR LIMITING CONDITIONS) 2,3, TYP

INSULATION WHERE REQ'D, TYP

NOTES:
1) REFER TO APPROPRIATE DETAIL C PAGES FOR CALL-OUTS, DIMENSIONS AND NOTATIONS NOT SHOWN.
2) CLAMP RATING MAY LOWER MAX ALLOWABLE Fp.
3) MASON WEST TYPE MW-SCCI PIPE CLAMPS MAY ONLY BE USED AT TRANSVERSE LOCATIONS.
SEISMIC CABLE BRACING PIPE CLAMP OPTION FOR INDIVIDUALLY SUSPENDED PIPING

NOTES:
1) REFER TO APPROPRIATE DETAIL C PAGES FOR CALL-OUTS, DIMENSIONS AND NOTATIONS NOT SHOWN.
2) CLAMP RATING MAY LOWER MAX ALLOWABLE Fp.
3) MASON WEST TYPE MW-SCC1 PIPE CLAMPS MAY ONLY BE USED AT TRANSVERSE LOCATIONS.

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10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

98 of 846
TRANSVERSE SEISMIC SOLID BRACING OPTION FOR
INDIVIDUALLY SUSPENDED PIPING

OPTION 1: MW-SPC OR MW-WPL
OPTION 2: WELDED PLATE

PIPE ATTACHMENT DETAIL

SEISMIC SOLID BRACING
NUT (T&B SNUG TIGHT)
GRAVITY SUPPORT W/ VIBRATION ISOLATION WHERE REQ'D
SEE OPTIONS BELOW FOR PIPE ATTACHMENT DETAIL

CENTER HANGER ROD AND BRACE ATTACHMENT ONTO ANGLE.
PROVIDE HOLE SIZE PER BRACE ASSEMBLY TABLE

CENTER HANGER ROD AND BRACE ATTACHMENT ONTO PLATE.
PROVIDE HOLE SIZE PER BRACE ASSEMBLY TABLE

HOLE SIZE

1/8
1/4
3/8
1/2
5/8
3/4
1

OPTION 2: WELDED PLATE

NOTES:
1) REFER TO APPROPRIATE DETAIL C PAGES FOR CALL-OUTS, DIMENSIONS, AND NOTATIONS NOT SHOWN.
2) SEISMIC BRACING DOES NOT NEED TO BE LOCATED AT GRAVITY SUPPORT LOCATIONS, BUT SHALL SATISFY BRACING LAYOUT REQUIREMENTS AS DEFINED IN SECTION A10.
LONGITUDINAL SEISMIC SOLID BRACING OPTION FOR INDIVIDUALLY SUSPENDED PIPING

OPTION 1: MW-SPC OR MW-WPL

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>HANGER ROD</th>
<th>MASON HG</th>
<th>MW-SPC &amp; STL ANGLE</th>
<th>MW-WPL &amp; STL ANGLE</th>
<th>WELD</th>
<th>HOLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1½&quot; - 2&quot;Ø</td>
<td>⅜</td>
<td>HG-38</td>
<td>L3x2½ LLH, 2&quot; LG.</td>
<td>L3x2½ LLH, 3&quot; LG.</td>
<td>⅜</td>
<td>⅜</td>
</tr>
<tr>
<td>2½&quot; - 3&quot;Ø</td>
<td>⅜</td>
<td>HG-50</td>
<td>L4x3¼ LLH, 2&quot; LG.</td>
<td>L4x3¼ LLH, 3&quot; LG.</td>
<td>¾</td>
<td>¾</td>
</tr>
<tr>
<td>4&quot; - 5&quot;Ø</td>
<td>¾</td>
<td>HG-63</td>
<td>L4x3½ LLH, 2&quot; LG.</td>
<td>L4x3½ LLH, 4&quot; LG.</td>
<td>¾</td>
<td>¾</td>
</tr>
<tr>
<td>6&quot; - 8&quot;Ø</td>
<td>¾</td>
<td>HG-75</td>
<td>L4x3½ LLH, 3&quot; LG.</td>
<td>L4x4½, 4&quot; LG.</td>
<td>¼</td>
<td>¼</td>
</tr>
<tr>
<td>10&quot; - 12&quot;Ø</td>
<td>¾</td>
<td>HG-75</td>
<td>L4x4½, 3&quot; LG.</td>
<td>L4x4½, 5&quot; LG.</td>
<td>½</td>
<td>½</td>
</tr>
<tr>
<td>14&quot; - 18&quot;Ø</td>
<td>1</td>
<td>HG-100</td>
<td>N/A</td>
<td>L5x5½, 6&quot; LG.</td>
<td>¾</td>
<td>1⅛</td>
</tr>
<tr>
<td>20&quot; - 24&quot;Ø</td>
<td>1¼</td>
<td>HG-125</td>
<td>N/A</td>
<td>L5x5½, 7&quot; LG.</td>
<td>¾</td>
<td>1⅛</td>
</tr>
</tbody>
</table>

OPTION 2: WELDED PLATE

NOTES:
1) REFER TO APPROPRIATE DETAIL C PAGES FOR CALL-OUTS, DIMENSIONS, AND NOTATIONS NOT SHOWN.
2) SEISMIC BRACING DOES NOT NEED TO BE LOCATED AT GRAVITY SUPPORT LOCATIONS, BUT SHALL SATISFY BRACING LAYOUT REQUIREMENTS AS DEFINED IN SECTION A10.
### Option 1: MW-SPC or MW-WPL

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Hanger Rod</th>
<th>Mason HG</th>
<th>MW-SPC &amp; STL Angle</th>
<th>MW-WPL &amp; STL Angle</th>
<th>Weld</th>
<th>Hole Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; - 2&quot;</td>
<td>1/2</td>
<td>HG-38</td>
<td>L3x2 1/2 LLH, 2&quot; LG.</td>
<td>L3x2 1/2 LLH, 3&quot; LG.</td>
<td>1/8</td>
<td>1/8</td>
</tr>
<tr>
<td>2 1/4&quot; - 3&quot;</td>
<td>1/2</td>
<td>HG-50</td>
<td>L4x3 1/4 LLH, 2&quot; LG.</td>
<td>L4x3 1/4 LLH, 3&quot; LG.</td>
<td>3/16</td>
<td>1/4</td>
</tr>
<tr>
<td>4 1/2&quot; - 5&quot;</td>
<td>1/2</td>
<td>HG-63</td>
<td>L4x3 1/4 LLH, 2&quot; LG.</td>
<td>L4x3 1/4 LLH, 4&quot; LG.</td>
<td>3/16</td>
<td>1/4</td>
</tr>
<tr>
<td>6&quot; - 8&quot;</td>
<td>1/4</td>
<td>HG-75</td>
<td>L4x3 1/4 LLH, 3&quot; LG.</td>
<td>L4x4 1/2, 4&quot; LG.</td>
<td>1/4</td>
<td>1</td>
</tr>
<tr>
<td>10&quot; - 12&quot;</td>
<td>1/4</td>
<td>HG-75</td>
<td>L4x4 1/2, 3&quot; LG.</td>
<td>L4x4 1/2, 5&quot; LG.</td>
<td>3/16</td>
<td>1</td>
</tr>
<tr>
<td>14&quot; - 16&quot;</td>
<td>1</td>
<td>HG-100</td>
<td>N/A</td>
<td>L5x5 1/2, 6&quot; LG.</td>
<td>1/8</td>
<td>1/2</td>
</tr>
<tr>
<td>20&quot; - 24&quot;</td>
<td>1/2</td>
<td>HG-125</td>
<td>N/A</td>
<td>L5x5 1/2, 7&quot; LG.</td>
<td>1/8</td>
<td>1/2</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Refer to appropriate detail C pages for call-outs, dimensions, and notations not shown.
2. Seismic bracing does not need to be located at gravity support locations, but shall satisfy bracing layout requirements as defined in section A10.
TRANSVERSE SEISMIC CABLE BRACING OPTION FOR INDIVIDUALLY SUSPENDED PIPING

SEISMIC CABLE BRACING

NUT (T&B SNUG TIGHT)

GRAVITY SUPPORT W/ VIBRATION ISOLATION WHERE REQ'D

SEE OPTIONS BELOW FOR PIPE ATTACHMENT DETAIL

PIPE

INSULATION WHERE REQ'D

CENTER HANGER ROD AND BRACE ATTACHMENT ONTO ANGLE.

PROVIDE HOLE SIZE PER BRACE ASSEMBLY TABLE

OPTION 1: MW-SPC OR MW-WPL

OPTION 2: WELDED PLATE

HOLE SIZE

PIECE

MASON HG, SEE BRACE ASSEMBLY TABLE

WASHER

DOUBLE NUT

STL ANGLE, SEE BRACE ASSEMBLY TABLE

MW-SPC (REF. X8.3) OR MW-WPL (REF. X8.4)

WASHER HG, SEE BRACE ASSEMBLY TABLE

DOUBLE NUT

STL ANGLE, SEE BRACE ASSEMBLY TABLE

MW-SPC & STL ANGLE

MW-WPL & STL ANGLE

WELD

HOLE SIZE

NOTES:

1) REFER TO APPROPRIATE DETAIL C PAGES FOR CALL-OUTS, DIMENSIONS, AND NOTATIONS NOT SHOWN.

2) SEISMIC BRACING DOES NOT NEED TO BE LOCATED AT GRAVITY SUPPORT LOCATIONS, BUT SHALL SATISFY BRACING LAYOUT REQUIREMENTS AS DEFINED IN SECTION A10.

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Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

102 of 846
LONGITUDINAL SEISMIC CABLE BRACING OPTION FOR INDIVIDUALLY SUSPENDED PIPING

**OPTION 1: MW-SPC OR MW-WPL**

**BRACE ASSEMBLY TABLE**

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>HANGER ROD</th>
<th>MASON HG</th>
<th>MW-SPC &amp; STL ANGLE</th>
<th>MW-WPL &amp; STL ANGLE</th>
<th>WELD</th>
<th>HOLE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/8&quot; - 2&quot; Ø</td>
<td>3/8</td>
<td>HG-38</td>
<td>L3x2xH 2&quot; LG.</td>
<td>L3x2xH 3&quot; LG.</td>
<td>1/8</td>
<td>3/8</td>
</tr>
<tr>
<td>2 1/8&quot; - 3&quot; Ø</td>
<td>3/8</td>
<td>HG-50</td>
<td>L4x3xH 2&quot; LG.</td>
<td>L4x3xH 3&quot; LG.</td>
<td>3/16</td>
<td>1/4</td>
</tr>
<tr>
<td>4&quot; - 5&quot; Ø</td>
<td>3/8</td>
<td>HG-63</td>
<td>L4x4xH 2&quot; LG.</td>
<td>L4x4xH 4&quot; LG.</td>
<td>3/16</td>
<td>1/4</td>
</tr>
<tr>
<td>6&quot; - 8&quot; Ø</td>
<td>1/2</td>
<td>HG-75</td>
<td>L4x4xH 3&quot; LG.</td>
<td>L4x4xH 4&quot; LG.</td>
<td>1/4</td>
<td>1</td>
</tr>
<tr>
<td>10&quot; - 12&quot; Ø</td>
<td>1</td>
<td>HG-75</td>
<td>L5x5xH 3&quot; LG.</td>
<td>L4x4xH 5&quot; LG.</td>
<td>5/16</td>
<td>1</td>
</tr>
<tr>
<td>14&quot; - 18&quot; Ø</td>
<td>1</td>
<td>HG-100</td>
<td>N/A</td>
<td>L5x5xH 6&quot; LG.</td>
<td>5/16</td>
<td>1</td>
</tr>
<tr>
<td>20&quot; - 24&quot; Ø</td>
<td>1/2</td>
<td>HG-125</td>
<td>N/A</td>
<td>L5x5xH 7&quot; LG.</td>
<td>5/16</td>
<td>1/2</td>
</tr>
</tbody>
</table>

**OPTION 2: WELDED PLATE**

**NOTES:**
1) REFER TO APPROPRIATE DETAIL C PAGES FOR CALL-OUTS, DIMENSIONS, AND NOTATIONS NOT SHOWN.
2) SEISMIC BRACING DOES NOT NEED TO BE LOCATED AT GRAVITY SUPPORT LOCATIONS, BUT SHALL SATISFY BRACING LAYOUT REQUIREMENTS AS DEFINED IN SECTION A10.

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

PAGE A19.6
# All-Directional Seismic Cable Bracing Option for Individually Suspended Piping

**Mason West, Inc.**  
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TEL (714) 630 - 0701, www.masonwest.com

## Option 1: MW-SPC or MW-WPL

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Hanger Rod</th>
<th>Mason HG</th>
<th>MW-SPC &amp; STL Angle</th>
<th>MW-WPL &amp; STL Angle</th>
<th>Weld</th>
<th>Hole Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1½&quot;-2&quot; Ø</td>
<td>½</td>
<td>HG-38</td>
<td>L3x2½ LLH, 2&quot; LG.</td>
<td>L3x2½ LLH, 3&quot; LG.</td>
<td>½</td>
<td>½</td>
</tr>
<tr>
<td>2½&quot;-3&quot; Ø</td>
<td>½</td>
<td>HG-50</td>
<td>L4x3½ LLH, 2&quot; LG.</td>
<td>L4x3½ LLH, 3&quot; LG.</td>
<td>¾</td>
<td>¾</td>
</tr>
<tr>
<td>4&quot;-5&quot; Ø</td>
<td>¾</td>
<td>HG-63</td>
<td>L4x3½ LLH, 2&quot; LG.</td>
<td>L4x3½ LLH, 4&quot; LG.</td>
<td>¾</td>
<td>¾</td>
</tr>
<tr>
<td>6&quot;-8&quot; Ø</td>
<td>¾</td>
<td>HG-75</td>
<td>L4x3½ LLH, 3&quot; LG.</td>
<td>L4x4½, 4&quot; LG.</td>
<td>¾</td>
<td>¾</td>
</tr>
<tr>
<td>10&quot;-12&quot; Ø</td>
<td>¾</td>
<td>HG-75</td>
<td>L4x4½, 3&quot; LG.</td>
<td>L4x4½, 5&quot; LG.</td>
<td>¾</td>
<td>¾</td>
</tr>
<tr>
<td>14&quot;-18&quot; Ø</td>
<td>1</td>
<td>HG-100</td>
<td>N/A</td>
<td>L5x6¾, 6&quot; LG.</td>
<td>¾</td>
<td>¾</td>
</tr>
<tr>
<td>20&quot;-24&quot; Ø</td>
<td>1½</td>
<td>HG-125</td>
<td>N/A</td>
<td>L5x5¾, 7&quot; LG.</td>
<td>¾</td>
<td>¾</td>
</tr>
</tbody>
</table>

**Notes:**  
1) Refer to appropriate detail C pages for call-outs, dimensions, and notations not shown.  
2) Seismic bracing does not need to be located at gravity support locations, but shall satisfy bracing layout requirements as defined in Section A10.
ELECTRICAL GENERAL NOTES

1) This OSHPD Preapproval of Manufacturer's Certification (OPM) is based on the 2013 CBC. The demand (design forces) for use with this OPM shall be based on the 2013 CBC.

2) Per ASCE 7-10, Section 13.3.1, restraints and their anchorages must be capable of restraining horizontal, \( F_p \), and vertical, \( F_{PV} \), seismic accelerations as follows.

\[
F_p = (0.7) \frac{0.4a_p S_{DS} W_p}{R_p I_p} \left( 1 + \frac{z}{h} \right) (ASD) \quad (ASCE 7-10 EQ 13.3-1)
\]

is not required to be taken greater than \((0.7)1.6S_{DS} W_p\) (ASD) (ASCE 7-10 EQ 13.3-2)

shall not be taken less than \((0.7)0.3S_{DS} I_p W_p\) (ASD) (ASCE 7-10 EQ 13.3-3)

\[
F_{PV} = (0.7)0.2S_{DS} W_p \quad (ASD)
\]

Where:

- \( S_{DS} \) = short period spectral acceleration - up to 2.5g. Values of \( S_{DS} \) indicated in the general notes of the structural drawing take precedence over those calculated per ASCE 7-10, 11.4.4.
- \( W_p \) = component (or tributary length of raceway) operating weight (lbs/ft).
- \( I_p \) = component importance factor
  - 1.5 for OSHPD 1 & 4 in accordance with 2013 CBC, Section 1616A.1.17 and for OSHPD 2 & 3, where required by ASCE 7, Section 13.1.3.
  - 1.0 for OSHPD 2 & 3, when permitted by ASCE 7, Section 13.1.3.
- \( a_p \) = component amplification factor (Ref. ASCE 7-10, Table 13.6-1)
  - 2.5 for electrical conduits and cable trays.
- \( R_p \) = component response modification factor (Ref. ASCE 7-10, Table 13.6-1)
  - 6.0 for electrical conduits and cable trays.
- \( z \) = height in structure of point of connection of component with respect to base (ft).
- \( h \) = average roof height of structure with respect to base (ft).

3) For systems anchored to concrete only, the anchorage to concrete overstrength factor, \( \Omega_o \), must be applied. Sections M & N provide alternate allowable load tables with and without \( \Omega_o \) applied. For cases where \( \Omega_o \) is applicable, use the appropriate tables in Sections M & N so it is not necessary to apply this factor when calculating \( F_p \) and \( F_{PV} \). \( \Omega_o \) is not applicable if a yielding steel element is considered in the load path. Refer to ACI 318-11 Appendix D, Section D.3.3.4.3 or ACI 318-14 Chapter 17, Section 17.2.3.4.3 for a list of qualifying conditions. The Registered Design Professional (RDP) shall use the allowable vertical loads under overstrength factor \( \Omega_o = 2.0 \) unless the vertical support complies with one of the qualifying conditions.

4) A complete description on how to use these guidelines is provided in Section A21. It includes specific examples for both using the enclosed details/charts and a layout procedure for bracing of suspended raceways.
Notes on Seismic Bracing:

1) These guidelines list installations which may be exempt from bracing under the 2013 CBC. The RDP shall be responsible for determining whether to allow these exceptions, subject to approval by the SEOR and OSHPD.

2) Each straight run of a raceway requires a minimum of two transverse braces (perpendicular to the run). (Option: A longitudinal brace located at any point of the straight run on the opposite side of an elbow or tee may act as a transverse brace. Refer to the layout examples detailed in Section A22.)

3) Each straight run of a raceway requires a minimum of one longitudinal brace (parallel to the run). (Option: A transverse brace on the opposite side of an elbow or tee can act as a longitudinal brace. Refer to the layout examples detailed in Section A22.)

Note: For items 2) and 3) above, a short run of a raceway may not require seismic bracing if its tributary seismic load transfers to an adjacent run of a raceway that is sufficiently seismically braced that can accept the additional seismic loads, when approved by OSHPD for a specific project.

4) Transverse and longitudinal braces that project to the overhead structure shall be installed between 30 and 60 degrees from horizontal. Braces that project to an adjacent wall may be installed directly horizontal (zero degrees) or between 30 and 60 degrees from the horizontal. However, this is limited depending on the capacity of the brace and method of connection to structure.

5) Seismic bracing may consist of solid bracing designed to accept loads in tension and compression or cable bracing designed to accept tension loads only. Each brace method requires a vertical hanger within close proximity of their connection to the distribution system. (Refer to the specific detail for limitations). The vertical hanger may or may not require stiffening or additional anchorage to the structure (Refer to Notes on Supports, Page A20.2).

6) Avoid mixing solid bracing with cable bracing in the same direction on any run of a distribution system unless specifically engineered and approved by the enforcement agency.

7) Avoid bracing a system to two different parts of a building which may act differently in response to an earthquake (i.e separated by a seismic joint). In cases where this may occur, the raceway run must be designed to accept the seismic relative displacement.

8) Systems with significant thermal motion shall be designed on a case by case basis by a professional engineer familiar with both seismic loading and thermal expansion.

9) Seismic brace details for suspended raceways include maximum allowable horizontal seismic load, $F_p$, at different brace angle ratios. The details include Mason Industries N.Y. seismic brace component size, aircraft cable or solid brace member size, acceptable hanger rod diameter(s) and hanger rod stiffening requirements. Trapeze member sizes and connection to structure for both hanger rods and seismic braces are tabulated and/or detailed in Sections B, T, M, and N, respectively.

10) Seismic brace requirements for seismic accelerations ranging from 0.25 to 1.0g (ASD) are tabulated in Sections B5 and B6. Each schedule is designed to a specific seismic acceleration and provides maximum transverse, longitudinal and all-directional brace spacings based on operating weight per lineal foot of the raceway. In addition, the schedules provide hanger rod and seismic brace connection options that meet the same criteria. For systems that require design for over 1.0g, the brace spacing is reduced (Refer to Page A20.5, note 3).
ELECTRICAL GENERAL NOTES (continued)

11) Multi-layer raceways that share support rods must be braced independently from one another or as specifically engineered by the RDP. Layers supporting loads ≤ 10 lbs/ft need not be braced, provided that the load is accounted for in the nearest braced layer. Each section of threaded rod between trapezes and/or the building structure is subject to vertical stiffening requirements.

12) Vertical drops from suspended pipe systems to equipment (or flexible connectors where applicable) may be braced using the transverse and longitudinal braces in this manual. Note: Do not exceed ½ of the maximum brace spacing as measured from the seismic brace to the equipment or flexible connector when bracing vertical drops. (Refer to the Figures on page A22.2) If the transverse or longitudinal brace cannot accept the full vertical drop, a seismic floor support designed for the applicable loads is required. Design of this support shall account for seismic relative displacement between floors and may require a flexible connection between the floor support and the first seismic brace location above.

13) Any system which crosses a building separation or seismic joint must be designed to accommodate the seismic relative displacement per ASCE 7-10 13.3.2, 13.3.2.1, and 13.3.2.2, or as specified by the engineer of record for approval by the enforcement agency.

Notes on Supports:

1) Where the seismic brace system incorporates the use of a threaded vertical hanger rod designed to carry gravity loads only, additional anchorage and/or stiffening may be required as detailed. General support of suspended raceways to carry gravity loads shall be determined by the engineer of record and/or mechanical code requirements. However, hanger rod connection details in this manual may be used as a guide for these supports. ASTM A307 threaded rods may be used in lieu of ASTM A36 threaded rods as called out in this manual. The use of "C-Clamps" designed to attach threaded rod to one side of a steel beam flange shall not be used unless they are provided with a restraining strap or hook to the opposite beam flange, equivalent to those specified in NFPA 13, Section 9.3.7 and approved from OSHPD.

2) Support rod capacity and its anchorage to the structure is an important part of a solid bracing system. Solid braces shall not be attached to existing systems or support rods designed for gravity loads unless they are checked for increased loads.

3) Threaded vertical hanger rods where seismic sway bracing is attached may require stiffening if the length of the rod exceeds the maximum unbraced rod length indicated on the kit installation detail in Sections C, E, and F. However, if the calculated compression on the rod due to combined gravity, the vertical brace component of the bracing system as a result of Fp, and Fpv loads is less than or equal to zero, no rod stiffening is required, regardless of rod length. A vertical rod stiffener using a 1\(\frac{5}{8}\)"x1\(\frac{5}{8}\)"x12ga strut channel or steel angle cut to the appropriate length and attached to the threaded rod with a minimum of two Mason Ind. N.Y. Type UCC or SRC clamps is required, as detailed in Sections C, E, and F. The contractor may substitute a break-off bolt set to a minimum of 10 ft-lbs. Rod stiffening strut may be solid, slotted or punched. Ref. X7.0 and X7.1 for strut member data.

4) Trapeze supports shall consist of 12 gauge single or double channel strut, steel angles or tube steel as tabulated in Sections B5, B6, T2, and T3. For gravity-only trapeze supports and trapeze supports where transverse seismic braces are installed, the acceptable size of the trapeze member is provided in the same section. For trapeze supports where longitudinal seismic braces are to be installed, the acceptable size of the trapeze member is also provided. Trapeze members may be provided with round holes sized for hanger rods. Ref. X7.0 and X7.1 for strut member data. In all cases, for analysis purposes, the following information is required: a) seismic ‘g’ coefficient, b) raceway weight per foot and c) maximum span between threaded rod supports. The trapezes shall be supported by threaded rods, with nuts and washers as detailed in Sections C, E, and F and with rod stiffeners as required per note 3.
5) Concrete overstrength factor, $\Omega_0$, is not required for hanger supports designed for gravity only or hanger supports at seismic cable brace locations where seismic forces do not exceed 20% of the total forces.

Notes on Seismic Cable Bracing:

1) Cables shall be prestretched galvanized 7x19 strand core aircraft cable, with no limit to their installed length. Cables meet the following specifications: MIL-DTL-83420M with Amendment 2, Type 1 non-jacketed cable.

2) Cables shall be installed slightly slack, so as not to support gravity loads.

3) Cable shall connect the braced item to a building structural element. Cable shall have a bracket at each end to make the connections. The cable assembly, with connection brackets, shall be Mason Ind. N.Y. SCB or SCBH, refer to pages X1.0 & X1.1. Cable is held to end brackets with one or two bolts. Cable bolts shall be tightened to the torque values stated in the details or, in the case where break off nuts are provided, until the nut breaks off. Break off nuts are as manufactured by Mason West, Inc. (Refer to page X4.0).

4) The Mason Ind. N.Y. SCBH component can be used for connection directly to the threaded vertical hanger rod used for supporting system gravity loads as detailed in Sections C, E, and F.

5) The SCB bracket and cable (Ref. X1.0), SCBH bracket and cable (Ref. X1.1), UCC rod stiffener clamp (Ref. X3.0), and SRC rod stiffener clamp (Ref. X3.1) are manufactured by Mason Ind. N.Y. and are included (with accompanying hardware) in the kit options provided in Sections C, E, and F.

Notes on Seismic Solid (Rigid) Bracing:

1) Solid bracing members shall be 12 gauge channel strut or steel angle. Strut members shall be solid, slotted or punched. The details in Sections C, E, and F indicate the minimum solid brace size based on a maximum solid brace length. The charts on pages X2.0, X2.1, and X2.2 tabulate different solid brace member sizes for maximum installed lengths of 5'-0", 9'-6" or 14'-6". Ref. X7.0 and X7.1 for strut member data.

2) Solid brace members shall be connected to both the distribution system and the structure using the seismic solid brace components (Mason Ind. N.Y. Type SSBS, SHB, or SSB. Refer to pages X2.0, X2.1, or X2.2, respectively).

3) The attachment between the solid brace component and the 12 gauge channel strut shall consist of (1) or (2) 1/2" bolt and strut nut connections torqued to 50 ft-lbs or, in the case where break off nuts are provided, until the nut breaks off. Refer to Sections C, E, or F to determine the quantity of bolt/strut nut connections required. Break off nuts are as manufactured by Mason West, Inc. (Refer to page X4.0).

4) The SSBS bracket (Ref. X2.0), the SHB bracket (Ref. X2.1), the SSB bracket (Ref. X2.2), the UCC rod stiffener clamp (X3.0), and SRC rod stiffener clamp (Ref. X3.1) are manufactured by Mason Ind. N.Y. and are included (with accompanying hardware) in the kit options provided in Sections C, E, and F.
ELECTRICAL GENERAL NOTES (continued)

Notes on Seismic Brace Attachment to Building Structure:

1) Attachment methods and hardware (connectors) used for seismic bracing attachment to building structural element is the critical factor in the design of seismic sway-bracing. Lightweight structures may limit the maximum spacing between seismic braces. The structural engineer of record shall determine the maximum allowable seismic loads that may be imposed on the building structure.

2) Attachment to different types of structures are addressed in these guidelines. Attachment types include reinforced normal or sand lightweight concrete (flat slabs, slabs poured in steel decking, walls or columns), fully grouted reinforced concrete masonry, hollow steel decking, steel framing, timber framing, and metal stud wall framing. Attachments may be made with pre- or post-installed concrete anchors, machine bolts, self-drilling and self-tapping screws, lag bolts, nails or in cases of steel on steel attachments, by arc-welding. Use of attachment methods not detailed in these guidelines must be engineered on an individual job basis subject to approval by the enforcement agency. Note: The structural engineer of record shall verify that attachment details specified by the RDP are in accordance with the design concept for the primary structure.

3) Expansion anchors shall be Hilti Kwik Bolt TZ, Powers Power-Stud+ SD1, Mason Ind. N.Y. SAS(E), or Powers Power-Stud+ SD2 for minimum 3000 psi concrete slabs, beams, or walls and concrete filled decks (sand light or normal weight) installed in accordance with ICC Reports ICC ESR 1917, 2818, 3037 or 2502, respectively. Hilti Kwik Bolt 3 expansion anchors shall be used to resist static & transient seismic tension & shear loads in uncracked, grout-filled concrete masonry. Expansion anchors designed to ICC-ES AC01 are limited to allowable stress design only in accordance with AC01 1.2. SEOR shall verify that: (1) masonry is not cracked as defined in ICC-ES AC01 Section 2.3; calculation required to show masonry wall would not crack under the design earthquake loads under all service load conditions; wall has to remain elastic; (2) masonry wall shall be fully grouted in accordance with ESR-1385 Section 3.2; (3) condition of use requirements in accordance with ESR-1385 Section 5.0 is satisfied. When expansion anchors are used, 50 percent of alternate bolts in a group shall be tension tested or torque tested per CBC 1913A.7. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency. If any anchors fail, test all previously untested anchors installed by the same trade until 20 consecutive anchors pass. Then resume the original test frequency. Refer to page A0.4 for test loads.

4) Concrete inserts shall be Mason West Type MW-PAL-A for installation in normal or sand lightweight concrete slabs or MW-CDI for installation in normal or sand lightweight concrete filled metal decks.

5) All welded attachments shall be minimum 70xx electrode welds. Minimum 60xx electrode welds may be used for steel thicknesses that are 12 gauge or less.

6) Metal decks for expansion anchor attachments and MW-CDI inserts shall be minimum 20 gauge with either a maximum 3 inch flute and minimum 1-1/2 inch cover or a maximum 1-1/2 inch flute and minimum 2-1/4 inch cover. Metal decks for MW-PAL-A insert shall be minimum 20 gauge with 3" flute and 3-1/4" cover. Refer to appropriate M2 and N2 pages for allowable deck anchor attachments. Concrete fill shall be minimum 3000 psi sand lightweight concrete. Note: Metal decks with minimum 3000 psi stone aggregate concrete fill may use the sand lightweight concrete deck charts.

7) Concrete attachments are based on specified anchor bolts or inserts. Substitution of alternate anchors must be approved by Mason West and the enforcement agency on a job by job basis.

8) When installing drilled-in anchors in existing non-prestressed reinforced concrete, use care and caution to avoid cutting or damaging reinforcing bars. When installing them in existing prestressed concrete, locate the prestressed tendons by using a non-destructive method and do not cut or damage the tendons during installation.

9) Attachments are provided for wide flange structural steel members, open web steel trusses as well as wood trusses, joists and beams in Sections N3.11-3.13, N4.10-4.13.
10) Screw anchors shall be Powers Screw-Bolt+/Hangermate+, Mason Ind. N.Y. SAST, or Hilti Kwik HUS-EZ/HUS-EZ I for minimum 3000 psi concrete slabs, beams, or walls and concrete filled decks (sand light or normal weight) installed in accordance with ICC Reports ICC ESR 3889, 2713 or 3027, respectively. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency. If any anchors fail, test all previously untested anchors installed by the same trade until 20 consecutive anchors pass. Then resume the original test frequency. Screw anchors shall not be tested using a torque wrench. Screw anchors may be loosened a maximum of one full turn to facilitate the positioning of a tension test collar. Following the tension test, the anchor shall be re-torqued in accordance with the manufacturer's installation instructions. Refer to page A0.5 for test loads.

Notes on Suspended Raceways:

1) Per 2013 CBC Sections 1616A.1.18 and 1616A.1.23, ASCE 7-10 Section 13.1.4 and 13.6.5.6, design for the seismic forces are not required for Raceways where any of the following are satisfied:
   a) Component is positively attached to the structure; and the project is designated as Seismic Design Categories D, E or F; flexible connections are provided between the raceway and the component/equipment; and the raceway weighs 5 lbs/ft or less; or
   b) Trapeze assemblies are used to support raceways and the total operating weight of the raceway supported by trapeze assemblies is less than 10 lbs/ft; or
   c) The raceway is supported by hangers and each hanger in the raceway run is 12" or less in length from the raceway support point to the supporting structure. Where rod hangers are used with a diameter greater than 3/8", they shall be equipped with swivels, eye bolts or other devices to prevent inelastic bending of the rod; or
   d) The conduit is 2.5" trade size or smaller.

2) Section A23 of these guidelines details the “12 Inch Rule” exception described in Note 1c for Suspended Raceways.

3) Cable tray transverse and longitudinal brace spacing shall not exceed those specified by the manufacturer. Rigid Metal Conduit (RMC, Schedule 40 pipe), Intermediate Metal Conduit (IMC), and Electrical Metallic Tubing (EMT), shall be braced at spacings tabulated in Section S. Longitudinal brace spacings shall not exceed 3 times the tabulated transverse brace spacings. For cases where multiple conduits with varying brace spacings are supported on a trapeze, the smallest brace spacing shall govern. The seismic design engineer may design brace spacings for trapezed conduits based on combined conduits sections and/or by adding steel strengthening sections on a job by job basis subject to approval by the enforcement agency.

4) Transverse restraints for cable trays shall be installed at general support locations. Cable trays must be positively fastened to the support as detailed in Section E.

5) Seismic restraints for trapeze supported conduit shall be attached to the trapeze member at the hanger locations as detailed in Section F. Conduits supported by trapezes at seismic brace locations shall utilize Mason West, Inc. Type SSC, strut steel clamp (Refer to Page X8.0) for Rigid Metal Conduit (RMC, Schedule 40 pipe) and 2½" to 4" diameter EMT or IMC or Type SSCE, strut steel clamp for up to 2" diameter EMT or IMC (Refer to Page X8.0) utilizing details in Section F.

6) The conduit weights tabulated in the appendix for RMC, IMC, and EMT materials consider the conduit full of conductors to approximate the maximum operating weight. Similarly, the cable tray weight tabulated in the same section consider the cable trays full of cable as allowed by the National Electrical Code (NEC).
ELECTRICAL GENERAL NOTES FOR 2019 CBC (continued)

10) Screw anchors shall be Powers Screw-Bolt+/Hangermate+, Mason Ind. N.Y. SAST, or Hilti Kwik HUS-EZ/HUS-EZ I for minimum 3000 psi concrete slabs, beams, or walls and concrete filled decks (sand light or normal weight) installed in accordance with ICC Reports ICC ESR 3889, 2713 or 3027, respectively. Testing shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency. If any anchors fail, test all previously untested anchors installed by the same trade until 20 consecutive anchors pass. Then resume the original test frequency. Screw anchors shall not be tested using a torque wrench. Screw anchors may be loosened a maximum of one full turn to facilitate the positioning of a tension test collar. Following the tension test, the anchor shall be re-torqued in accordance with the manufacturer's installation instructions. Refer to page A0.5 for test loads.

Notes on Suspended Raceways:

1) Per 2019 CBC Sections 1601.1.4 & 1617A.1.18 applicable only to OSHPD-1, 2, 4, 5 and 1R designated projects, distributed conduit, cable trays and raceways weighing 5 lbs/ft or less are exempt from design for the seismic forces of ASCE 7-16 Section 13.3. For remaining electrical distribution systems, per 2019 CBC Section 1617A1.26, cable trays and raceways shall be designed for seismic forces and seismic relative displacements. In addition, conduit equal to or greater than 2.5" trade size and attached to panels, cabinets, or other equipment subject to seismic relative displacements shall be provided with flexible connections or designed for seismic forces and seismic relative displacements. Design for the seismic forces and relative displacements shall not be required for raceway and associated components to accommodate the relative displacement between component and piping, where the cable tray or raceway is positively attached to the structure, and where one of the following apply:
   a) Trapeze assemblies with 3/8" or 1/2" diameter rod hangers not exceeding 12" in length from the conduit, cable tray, or raceway support point to the connection at the supporting structure are used to support the cable tray or raceway, and the total weight supported by any single trapeze is 100 lbs or less; or
   b) The conduit, cable tray, or raceway is supported by individual rod hangers 3/8" or 1/2" in diameter, and each hanger in the raceway run is 12" or less in length from the conduit, cable tray, or raceway support point connection to the supporting structure, and the total weight supported by any single rod is 50 lbs or less.

2) Design for the seismic forces and relative displacements shall not be required for conduit, regardless of the value of Ip, where the conduit size is less than 2.5" trade size.

3) Cable tray transverse and longitudinal brace spacing shall not exceed those specified by the manufacturer. Rigid Metal Conduit (RMC, Schedule 40 pipe), Intermediate Metal Conduit (IMC), and Electrical Metallic Tubing (EMT), shall be braced at spacings tabulated in Section S. Longitudinal brace spacings shall not exceed 3 times the tabulated transverse brace spacings. For cases where multiple conduits with varying brace spacings are supported on a trapeze, the smallest brace spacing shall govern. The seismic design engineer may design brace spacings for trapezed conduits based on combined conduits sections and/or by adding steel strengthening sections on a job by job basis subject to approval by the enforcement agency.

4) Transverse restraints for cable trays shall be installed at general support locations. Cable trays must be positively fastened to the support as detailed in Section E.
ELECTRICAL GENERAL NOTES (continued)

7) If a 2 piece rod is used to support raceways, minimum engagement of the rod in the coupling nut shall be equal to the rod diameter. Rods shall be run up tight in the coupling nut.

8) For vertical support methods at seismic brace locations other than what are detailed in this manual, the seismic design engineer must provide calculations and/or testing of any additional components or materials (e.g. hangers, clamps, etc.) to comply with the 2013 CBC on a job by job basis subject to review and approval by the enforcement agency.

9) Electrical pull boxes installed directly in-line with the conduit systems (no flexes) may be supported and laterally braced as part of the conduit bracing system. Where necessary, consider the ability of the conduit(s) to transfer gravity and seismic loads to adjacent vertical supports and braces.

Notes on Vertical Risers:

1) Vertical raceways supported at each floor shall be considered seismically braced if the penetration through each floor is tightly packed and the floor to floor spacing does not exceed the maximum brace spacing tabulated in Section S. Tops of risers exceeding 3 feet shall be provided with a 4-way brace. Where the 4-way brace is attached to the horizontal raceway, it shall be installed within 2 feet of the centerline of the riser.

2) Vertical raceways in an open shaft must be attached to steel supports with both steel supports and connections sized to accept the combined gravity and seismic loads. Thermal loads shall be considered, where applicable. Lateral seismic restraint spacings for conduit shall not exceed the spacings tabulated in Section S. Supports and connections must be engineered on a job by job basis subject to approval by the enforcement agency. Seismic relative displacement between floors shall be considered in the design.

3) A conduit penetrating a floor with the annular space packed with firestop may act as an all-directional brace at the end of a horizontal conduit run as described in Note 1 above and depicted on Page A24.0 if the distance from the centerline of the floor to the top of the horizontal conduit is less than 'A', where 'A' is a function of the maximum transverse brace spacing, 'S', as defined on Page A22.1.
ELECTRICAL GENERAL NOTES FOR 2019 CBC (continued)

5) Seismic restraints for trapeze supported conduit shall be attached to the trapeze member at the hanger locations as detailed in Section F. Conduits supported by trapezes at seismic brace locations shall utilize Mason West, Inc. Type SSC, strut steel clamp (Refer to Page X8.0) for Rigid Metal Conduit (RMC, Schedule 40 pipe) and 2½" to 4" diameter EMT or IMC or Type SSCE, strut steel clamp for up to 2" diameter EMT or IMC (Refer to Page X8.0) utilizing details in Section F.

6) The conduit weights tabulated in the appendix for RMC, IMC, and EMT materials consider the conduit full of conductors to approximate the maximum operating weight. Similarly, the cable tray weight tabulated in the same section consider the cable trays full of cable as allowed by the National Electrical Code (NEC).

7) If a 2 piece rod is used to support raceways, minimum engagement of the rod in the coupling nut shall be equal to the rod diameter. Rods shall be run up tight in the coupling nut.

8) For vertical support methods at seismic brace locations other than what are detailed in this manual, the seismic design engineer must provide calculations and/or testing of any additional components or materials (e.g. hangers, clamps, etc.) to comply with the 2013 CBC on a job by job basis subject to review and approval by the enforcement agency.

9) Electrical pull boxes installed directly in-line with the conduit systems (no flexes) may be supported and laterally braced as part of the conduit bracing system. Where necessary, consider the ability of the conduit(s) to transfer gravity and seismic loads to adjacent vertical supports and braces.

Notes on Vertical Risers:

1) Vertical raceways supported at each floor shall be considered seismically braced if the penetration through each floor is tightly packed and the floor to floor spacing does not exceed the maximum brace spacing tabulated in Section S. Tops of risers exceeding 3 feet shall be provided with a 4-way brace. Where the 4-way brace is attached to the horizontal raceway, it shall be installed within 2 feet of the centerline of the riser.

2) Vertical raceways in an open shaft must be attached to steel supports with both steel supports and connections sized to accept the combined gravity and seismic loads. Thermal loads shall be considered, where applicable. Lateral seismic restraint spacings for conduit shall not exceed the spacings tabulated in Section S. Supports and connections must be engineered on a job by job basis subject to approval by the enforcement agency. Seismic relative displacement between floors shall be considered in the design.

3) A conduit penetrating a floor with the annular space packed with firestop may act as an all-directional brace at the end of a horizontal conduit run as described in Note 1 above and depicted on Page A24.0 if the distance from the centerline of the floor to the top of the horizontal conduit is less than 'A', where 'A' is a function of the maximum transverse brace spacing, 'S', as defined on Page A22.1.
ELECTRICAL DESIGN PROCEDURE

Follow the five steps below to determine the seismic kit installation, hanger and brace connection details that pertain to a specific suspended electrical system. An example is provided on the following pages.

**Step 1. Determine 'g' Forces:**
Determine the maximum allowable brace spacings from page A20.5, note 3 and Section S. If you choose to use the pre-designed schedules in Section B, skip the remainder of this step.

Calculate the maximum lateral and vertical forces applied to the seismic brace system. Resolve the maximum lateral force to the brace, $F_P$, and maximum load on the hanger rod, $T_{Rod}$.

For trapeze supported conduit, determine the maximum allowable brace spacing from page A20.5, Section S and Section X8.0. If you choose to use the pre-designed schedules in Section B, skip the remainder of this step.

Calculate the maximum lateral and vertical forces applied to the seismic brace system. Resolve the maximum lateral force to the brace, $F_P$, and maximum load on the hanger rod, $T_{Rod}$.

**Step 2. Determine Operating Weight (lbs/ft or lbs):**
Determine the operating weight, $W_P$, of the distribution system (lbs/ft) or component (lbs) to be seismically braced. Refer to the appendix APP3.0 for raceway weights.

**Step 3. Determine Seismic Forces (lbs):**
Determine the maximum allowable brace spacings from page A20.5, note 3 and Section S. If you choose to use the pre-designed schedules in Section B, skip the remainder of this step.

Calculate the maximum lateral and vertical forces applied to the seismic brace system. Resolve the maximum lateral force to the brace, $F_P$, and maximum load on the hanger rod, $T_{Rod}$.

The resultant compression load on the hanger rod at seismic brace locations may be calculated to determine if rod stiffening is required.

Check trapeze seismic attachment to conduit. Use tables in Section S4 to check the capacities of the strut clamps to strut trapezes.

**Step 4. Select Seismic Kit Installation, Hanger and Brace connection Details:**
Select the appropriate details from the schedules in Section B for individually suspended conduit or raceways on trapeze based on maximum 'g' force, system weight per foot or conduit size and maximum transverse, longitudinal and all directional brace spacing.

If you calculated the seismic forces in step 3, verify the details selected are correct by comparing the calculated lateral force, $F_P$, and load on the hanger rod, $T_{Rod}$, with the rated loads tabulated on the detail sheets. If $F_P$ and $T_{Rod}$ are less than or equal to the tabulated rated loads, the details are acceptable.

**Step 5. Select Trapeze Member (where applicable):**
Select the trapeze member from the tables in Section B or T for transverse, longitudinal and all-directional seismic braces based on 'g' force and maximum span of trapeze member.
ELECTRICAL DESIGN PROCEDURE (continued)

Example:

18" x 4" cable tray is suspended within a 3 story poured-in-place concrete building with basement. The cable tray is supported at every 8 feet. The elevation of each floor, including the basement, is 15 feet. The short period spectral acceleration, $S_{DS}$, listed on the contract structural drawings, is 1.02. The component importance factor, $I_p = 1.5$.

Note: When anchoring to concrete, allowable loads have been reduced by the concrete overstrength factor, $\Omega_o$, where applicable, in Sections M & N. Therefore, $\Omega_o$ is not used when calculating applied seismic forces in this example.

Step 1. **Determine 'g' Forces**

Component amplification and response modification factors for suspended cable trays are as follows:

\[ a_p = 2.5; \quad R_p = 6.0 \]

Therefore,

\[ F_p = (0.7) \frac{0.4(2.5)(1.02)W_p}{(6.0)(1.5)}(1+2\frac{n}{h}) = 0.18(1+2\frac{n}{h})g \]

\[ F_{p(min)} = (0.7)(0.3)(1.02)(1.5)W_p = 0.32g \]

\[ F_{p(max)} = (0.7)(1.6)(1.02)(1.5)W_p = 1.71g \]

\[ F_{PV} = (0.7)(0.2)(1.02)W_p = 0.14g \]

Tabulated below are the 'g' forces for each level of the building

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>$F_p$</th>
<th>$F_{PV}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>0.14g</td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>0.14g</td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>0.14g</td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>0.14g</td>
</tr>
</tbody>
</table>

Step 2. **Determine Operating Weight (lbs/ft):**

From page APP3.0, the operating weight of a 18" x 4" cable tray is 27.0 lbs/ft.
Step 3. **Determine Seismic Forces (lbs):**

From page A20.5 Note 3, the maximum transverse and longitudinal brace spacing for suspended cable tray is specified by the manufacturer. We will assume 40 feet transverse and 80 feet longitudinal brace spacing for this example.

**Note:** At this point, you have the option to calculate the seismic forces and loads on the hanger rods and complete this step or move on to step 4.

For Basement Level and Level 1,

\[
F_P (\text{Transverse}) = 0.32 \times 27.0 \text{ lbs/ft} \times 40 \text{ ft brace spacing} = 346 \text{ lbs} \\
F_P (\text{Longitudinal}) = 0.32 \times 27.0 \text{ lbs/ft} \times 80 \text{ ft brace spacing} = 691 \text{ lbs} \\
F_{PV} = 0.14 \times 27.0 \text{ lbs/ft} \times 8 \text{ ft support spacing} = 30 \text{ lbs} \\
\]

**Note:** \(F_P\) does not need to be increased due to installation tolerances indicated in assembly details.

For seismic solid brace installations:

\[
T_{Rod} = F_P \tan (\text{brace angle}) + (27.0 \text{ lbs/ft} \times 8 \text{ ft} + F_{PV})/2 = 469 \text{ lbs}. \\
\]

**Note:** Brace angle = 45 degrees for this example. Longitudinal loads considered split evenly to each rod.

For seismic cable brace installations:

\[
T_{Rod} = (27.0 \text{ lbs/ft} \times 8 \text{ ft} + F_{PV})/2 = 123 \text{ lbs}. \\
\]

**Note:** In the case of cable trays, for seismic solid and cable brace \(T_{Rod}\) calculations, the gravity loads are assumed to be evenly distributed to each hanger. In the case of conduits on trapeze, for seismic solid and cable brace \(T_{Rod}\) calculations, 2/3 of the total gravity load is assumed as the worst case on each hanger. If this is not the case, make the necessary adjustment.

Similarly for Levels 2 and 3, \(F_P, F_{PV}\) and \(T_{Rod}\) are as tabulated below.

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>(F_P)</th>
<th>(F_{PV})</th>
<th>(T_{Rod}) (Solid)</th>
<th>(T_{Rod}) (Cable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>346 lbs</td>
<td>30 lbs</td>
<td>469 lbs</td>
<td>123 lbs</td>
</tr>
<tr>
<td>1</td>
<td>346 lbs</td>
<td>30 lbs</td>
<td>469 lbs</td>
<td>123 lbs</td>
</tr>
<tr>
<td>2</td>
<td>454 lbs</td>
<td>30 lbs</td>
<td>577 lbs</td>
<td>123 lbs</td>
</tr>
<tr>
<td>3</td>
<td>583 lbs</td>
<td>30 lbs</td>
<td>706 lbs</td>
<td>123 lbs</td>
</tr>
</tbody>
</table>

\[
C_{Rod} = F_P \tan (\text{brace angle}) + F_{PV} - 0.9W_p \\
= 346 \text{ lbs} \times \tan (45 \text{ degrees}) + 30 \text{ lbs}/2 - 0.9 \times (27.0 \text{ lbs/ft} \times 8 \text{ ft})/2 = 264 \text{ lbs}. \\
\]

**Note:** If \(C_{Rod}\) \(\leq 0\), rod stiffeners are not required.
ELECTRICAL DESIGN PROCEDURE (continued)

Step 4. **Select Seismic Kit Installation, Hanger and Brace connection Details:**

For an 18" x 4" cable tray with operating weight of 27.0 lbs/ft, acceptable seismic kit installation, hanger and connection details from the charts in Section B for each level of the building are as tabulated below.

**Seismic Solid (Rigid) Brace, Hanger and Brace connection Details**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>B5.1</td>
<td>30'/60'</td>
<td>E1.20 E1.21 E1.22</td>
<td>50H 50M 50G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>B5.1</td>
<td>30'/60'</td>
<td>E1.20 E1.21 E1.22</td>
<td>50H 50M 50G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>B5.1</td>
<td>30'/60'</td>
<td>E1.20 E1.21 E1.22</td>
<td>50H 50M 50G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>B5.2</td>
<td>15'/30'</td>
<td>E1.20 E1.21 E1.22</td>
<td>50H 50M 50G</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Seismic Cable (Standard) Brace, Hanger and Brace connection Details**

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>Fp</th>
<th>Section B Page</th>
<th>Tran/Long Spacing</th>
<th>Kit Installation Details</th>
<th>Hanger Conn. Desig.</th>
<th>Brace Conn. Desig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>B5.4</td>
<td>30'/60'</td>
<td>E2.20 E2.21 E2.22</td>
<td>50D 50G</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>B5.4</td>
<td>30'/60'</td>
<td>E2.20 E2.21 E2.22</td>
<td>50D 50G</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>B5.4</td>
<td>30'/60'</td>
<td>E2.20 E2.21 E2.22</td>
<td>50D 50G</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>B5.5</td>
<td>15'/30'</td>
<td>E2.20 E2.21 E2.22</td>
<td>50D 50G</td>
<td></td>
</tr>
</tbody>
</table>

For calculated $F_p$ and $T_{ROD}$ select the appropriate details in Section E, M and N by comparing the calculated values with the tabulated values indicated on each detail.

Step 5. **Select Trapeze Member (where applicable):**

For cable tray on trapeze weighing 27.0 lbs/ft supported by a trapeze member with a maximum span between hanger rods of 48 in. and the seismic accelerations calculated in step 2, go to the tables in Section T3 to find the allowable trapeze members for transverse, longitudinal and all-directional seismic braces for each level of the building. For transverse brace spacing of 30 feet and longitudinal/all-directional brace spacing of 60 feet:

**Trapeze Member at Longitudinal and All-Directional Brace Locations**

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>Fp</th>
<th>Section T Page</th>
<th>Longitudinal</th>
<th>All-Directional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>T3.2</td>
<td>1-5/8&quot; Single Strut</td>
<td>1-5/8&quot; Single Strut</td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>T3.2</td>
<td>1-5/8&quot; Single Strut</td>
<td>1-5/8&quot; Single Strut</td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>T3.3</td>
<td>1-5/8&quot; Single Strut</td>
<td>1-5/8&quot; Single Strut</td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>T3.4</td>
<td>1-5/8&quot; Single Strut</td>
<td>1-5/8&quot; Single Strut</td>
</tr>
</tbody>
</table>

Refer to page T3.0 for trapeze member at transverse brace locations; for these cases, member to be 1-5/8" Single Strut.
Example:

(5) 1 1/2" and (6) 2" IMC conduits are suspended on the top of a trapeze support within a 3 story poured-in-place concrete building with basement. The conduits are supported at every 8 feet. The elevation of each floor, including the basement, is 15 feet. The short period spectral acceleration, $S_{D5}$, listed on the contract structural drawings, is 1.02. The component importance factor, $I_P = 1.5$.

Note: When anchoring to concrete, allowable loads have been reduced by the concrete overstrength factor, $\Omega_o$, where applicable, in Sections M & N. Therefore, $\Omega_o$ is not used when calculating applied seismic forces in this example.

Step 1. **Determine 'g' Forces**

Component amplification and response modification factors for suspended conduits are as follows:

$a_P = 2.5; R_P = 6.0$

Therefore,

$$F_P = (0.7) \frac{0.4(2.5)(1.02)W_P}{(6.0)(1.5)} (1+\frac{2z}{h}) = 0.18(1+\frac{2z}{h})g$$

$$F_{P(min)} = (0.7)(0.3)(1.02)(1.5)W_P = 0.32g$$

$$F_{P(max)} = (0.7)(1.6)(1.02)(1.5)W_P = 1.71g$$

$$F_{PV} = (0.7)(0.2)(1.02)W_P = 0.14g$$

Tabulated below are the 'g' forces for each level of the building:

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>$F_P$</th>
<th>$F_{PV}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>0.14g</td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>0.14g</td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>0.14g</td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>0.14g</td>
</tr>
</tbody>
</table>

Step 2. **Determine Operating Weight (lbs/ft):**

From page APP3.0, the operating weight of (5) 1 1/2" (3.42 lbs/ft) and (6) 2" (5.04 lbs/ft) IMC conduits is 47.3 lbs/ft.
ELECTRICAL DESIGN PROCEDURE (continued)

Step 3. Determine Seismic Forces (lbs):

From page A20.5 Note 3, the maximum transverse and longitudinal brace spacing for suspended IMC is specified in Section S (Page S2.1). The maximum transverse brace spacing is governed by the smallest conduit size, in this case, 1½” IMC. For Basement and Level 1 $F_P$ of 0.32g, the 0.375g column lists 36 feet, for Level 2 $F_P$ of 0.4g, the 0.5g column lists 33 feet, and for Level 3 $F_P$ of 0.54g, the 0.625g column lists 31 feet. If we interpolate between the 0.5g and 0.625g columns, the value for the maximum transverse brace spacing is 32 feet. Per note 3 on page S2.1, the maximum longitudinal brace spacing may be 3 times the transverse brace spacing, or 96 feet. For this example, we will limit transverse brace spacing to 30 ft and longitudinal brace spacing to 60 ft.

Note: At this point, you have the option to calculate the seismic forces and loads on the hanger rods and complete this step or move on to step 4.

For Basement Level and Level 1,

$$F_P\text{ (Transverse)} = 0.32 \times 47.3\text{ lbs/ft} \times 30\text{ ft brace spacing} = 454\text{ lbs}$$

$$F_P\text{ (Longitudinal)} = 0.32 \times 47.3\text{ lbs/ft} \times 60\text{ ft brace spacing} = 908\text{ lbs}$$

$$F_{PV} = 0.14 \times 47.3\text{ lbs/ft} \times 8\text{ ft support spacing} = 53\text{ lbs}$$

Note: $F_P$ does not need to be increased due to installation tolerances indicated in assembly details.

For seismic solid brace installations:

$$T_{Rod} = F_P\tan\text{ (brace angle)} + (47.3\text{ lbs/ft} \times 8\text{ ft} + F_{PV})\times(\frac{2}{3}) = 742\text{ lbs}.$$  

Note: Brace angle = 45 degrees for this example. Longitudinal loads considered split evenly to each rod.

For seismic cable brace installations:

$$T_{Rod} = (47.3\text{ lbs/ft} \times 8\text{ ft} + F_{PV})\times(\frac{2}{3}) = 288\text{ lbs}.$$  

Note: In the case of conduits on trapeze, for seismic solid and cable brace $T_{Rod}$ calculations, 2/3 of the total gravity load is assumed as the worst case on each hanger. If this is not the case, make the necessary adjustment.

Similarly for Levels 2 and 3, $F_P$, $F_{PV}$, and $T_{Rod}$ are as tabulated below.

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>$F_P$</th>
<th>$F_{PV}$</th>
<th>$T_{Rod}(Solid)$</th>
<th>$T_{Rod}(Cable)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>454 lbs</td>
<td>53 lbs</td>
<td>742 lbs</td>
<td>288 lbs</td>
</tr>
<tr>
<td>1</td>
<td>454 lbs</td>
<td>53 lbs</td>
<td>742 lbs</td>
<td>288 lbs</td>
</tr>
<tr>
<td>2</td>
<td>596 lbs</td>
<td>53 lbs</td>
<td>884 lbs</td>
<td>288 lbs</td>
</tr>
<tr>
<td>3</td>
<td>766 lbs</td>
<td>53 lbs</td>
<td>1054 lbs</td>
<td>288 lbs</td>
</tr>
</tbody>
</table>

$$C_{Rod} = F_P\tan\text{ (brace angle)} + F_{PV} - 0.9W_p$$

$$= 454\text{ lbs} \times \tan\text{ (45 degrees)} + (\frac{2}{3})\times53\text{ lbs} - 0.9 \times (\frac{2}{3})\times(47.3\text{ lbs/ft} \times 8\text{ ft}) = 262\text{ lbs}.$$  

Note: If $C_{Rod} \leq 0$, rod stiffeners are not required.

Check the seismic clamps, MW-SSCE-15 (for 1½” IMC) and MW-SSCE-20 (for 2” IMC) for 30 feet transverse spacing and 60 feet longitudinal brace spacing on sheet S4.1. All brace spacings in chart meet or exceed the necessary brace spacings.
**ELECTRICAL DESIGN PROCEDURE (continued)**

Step 4. **Select Seismic Kit Installation, Hanger and Brace connection Details:**

For a set of conduits with operating weight of 47.3 lbs/ft, acceptable seismic kit installation, hanger and connection details from the charts in Section B for each level of the building are as tabulated below.

### Seismic Solid (Rigid) Brace, Hanger and Brace connection Details

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>B1.13</td>
<td>30’/60’</td>
<td>F1.33, F1.34, F1.45</td>
<td>63L, 75Q, 63J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>B1.13</td>
<td>30’/60’</td>
<td>F1.33, F1.34, F1.45</td>
<td>63L, 75Q, 63J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>B1.13</td>
<td>30’/60’</td>
<td>F1.33, F1.34, F1.45</td>
<td>63L, 75Q, 63J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>B1.14</td>
<td>15’/30’</td>
<td>F1.33, F1.34, F1.45</td>
<td>63L, 75Q, 63J</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Seismic Cable (Standard) Brace, Hanger and Brace connection Details

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>Fp</th>
<th>Section B Page</th>
<th>Tran/Long Spacing</th>
<th>Kit Installation Details</th>
<th>Hanger Conn. Desig.</th>
<th>Brace Conn. Desig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>B1.16</td>
<td>30’/60’</td>
<td>F2.40, F2.41, F2.42</td>
<td>75G, 63J</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>B1.16</td>
<td>30’/60’</td>
<td>F2.40, F2.41, F2.42</td>
<td>75G, 63J</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>B1.16</td>
<td>30’/60’</td>
<td>F2.40, F2.41, F2.42</td>
<td>75G, 63J</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>B1.17</td>
<td>15’/30’</td>
<td>F2.40, F2.41, F2.42</td>
<td>75G, 63J</td>
<td></td>
</tr>
</tbody>
</table>

For calculated F_P and T_ROD select the appropriate details in Section F, M and N by comparing the calculated values with the tabulated values indicated on each detail.

Step 5. **Select Trapeze Member (where applicable):**

For a set of conduits on trapeze weighing 47.3 lbs/ft supported by a trapeze member with a maximum span between hanger rods of 48 in. and the seismic accelerations calculated in step 2, go to the tables in Section T2 to find the allowable trapeze members for transverse, longitudinal and all-directional seismic braces for each level of the building. For transverse brace spacing of 30 feet and longitudinal/all-directional brace spacing of 60 feet:

### Trapeze Member at Longitudinal and All-Directional Brace Locations

<table>
<thead>
<tr>
<th>Floor Level</th>
<th>Fp</th>
<th>Section T Page</th>
<th>Longitudinal</th>
<th>All-Directional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>0.32g</td>
<td>T2.2</td>
<td>(2) 1-5/8” Double Strut</td>
<td>(2) 1-5/8” Double Strut</td>
</tr>
<tr>
<td>1</td>
<td>0.32g</td>
<td>T2.2</td>
<td>(2) 1-5/8” Double Strut</td>
<td>(2) 1-5/8” Double Strut</td>
</tr>
<tr>
<td>2</td>
<td>0.42g</td>
<td>T2.3</td>
<td>(2) 1-5/8” Double Strut</td>
<td>(2) 1-5/8” Double Strut</td>
</tr>
<tr>
<td>3</td>
<td>0.54g</td>
<td>T2.4</td>
<td>HSS2x2x1/4</td>
<td>HSS2x2x1/4</td>
</tr>
</tbody>
</table>

Refer to page T2.0 for trapeze member at transverse brace locations; for these cases, member to be 3-1/4” Single Strut.
LAYOUT OF SEISMIC BRACES FOR INDIVIDUALLY SUSPENDED CONDUIT

Step 1. Separate the layout of the system into individual straight runs. A straight run is defined as a section of the utility between changes in direction. If an offset(s) occurs between changes of direction it may be neglected if the distance perpendicular to the run is less than the offset length, \( \frac{S}{10} \), where \( S \) is the maximum transverse brace spacing tabulated in Section S.

Step 2. Each straight run must be braced in the transverse direction (perpendicular to the run) at each end.
LAYOUT OF SEISMIC BRACES FOR
INDIVIDUALLY SUSPENDED CONDUIT (continued)

Step 3. Add transverse braces, if required, to limit the spacing(s) to the maximum spacing indicated in Section S.

Spacing ≤ Maximum transverse brace spacing

Step 4. Each straight run must be braced in the longitudinal direction (parallel to the run) with at least one brace. Transverse braces within offset distance 'A' may be used in addition to or in lieu of independent longitudinal braces. The maximum length of conduit around a 90 degree turn (indicated as 'P' below) longitudinally braced from a transverse brace at offset distance 'A' is as follows:

When $A \leq 0.30*S$, $P = 0.5*S$,
When $A \leq 0.25*S$, $P = 0.75*S$,
When $A \leq 0.20*S$, $P = S$,
When $A \leq 0.15*S$, $P = 1.5*S$,

where:

$S$ = Maximum Allowable Transverse Brace Spacing (From Section S)
$T$ = The distance between Transverse Braces
$A$ = Offset Distance

Independent Longitudinal Brace

Transverse Brace used as Longitudinal Brace

Conduit Run

PLAN VIEW
**LAYOUT OF SEISMIC BRACES FOR INDIVIDUALLY SUSPENDED CONDUIT (continued)**

**Step 5.** Multiple changes in direction may be treated as one complete system. Straight runs greater than the maximum offset length require 2 transverse braces. Straight runs less than the maximum offset length may require as few as one or no braces. (See layout below)

**Step 6.** Vertical drops to equipment must be restrained with a transverse brace at the final support point before the vertical drop. The distance from the transverse brace to the drop must be within the maximum offset distance 'A' as defined on Page A22.1. The maximum allowable length of the system braced from the transverse brace to the flexible connector is equal to 'P' as defined on Page A22.1. If this distance is greater than 'P', an additional brace is required at the end of the vertical drop by attaching to the floor. Consideration must be given to seismic relative displacements (SRD) imposed on conduit when braced to the floor.

---

**A =** Runs greater than the Maximum Offset Length \( S_{10} \)

**B =** Runs less than the Maximum Offset Length \( S_{10} \)

**P - B** (If applicable) (Refer to Page A22.1 for P)

It may be necessary to move or add a flex connector if a brace is installed at the floor to account for SRD. For this case the amount of pipe braced by the transverse brace terminates at the top of the flex connector.
LAYOUT OF SEISMIC BRACES FOR TRAPEZE SUSPENDED CABLE TRAYS

Step 1. Each straight run must be braced in the transverse direction (perpendicular to the run) at each end.

Step 2. Add transverse braces, if required, to limit the spacing(s) to the maximum spacing indicated in Section A.
Step 3. Each straight run must be braced in the longitudinal direction (parallel to the run) with at least one brace.
LAYOUT OF SEISMIC BRACES FOR TRAPEZE SUSPENDED CONDUIT

Step 1a. Separate the layout of the system into individual straight runs. A straight run is defined as a section of the utility between changes in direction. If an offset(s) occurs between changes of direction it may be neglected if the distance perpendicular to each pipe run is less than the offset length, $S_{10}$, where $S$ is the maximum transverse brace spacing tabulated in Section S.

Step 2a. Each straight run must be braced in the transverse direction (perpendicular to the run) at each end.
LAYOUT OF SEISMIC BRACES
TRAPEZE SUSPENDED FOR CONDUIT (continued)

Step 3a. Add transverse braces, if required, to limit the spacing(s) to the maximum spacing indicated in Section S.

\[ \begin{align*}
\text{Plan View} & \\
\text{Spacing} & \leq \text{Maximum transverse brace spacing}
\end{align*} \]

Step 4a. Each straight run must be braced in the longitudinal direction (parallel to the run) with at least one brace. Transverse braces within offset distance 'A' may be used in addition to or in lieu of independent longitudinal braces. The maximum length of conduit around a 90 degree turn (indicated as 'P' below) longitudinally braced from a transverse brace at offset distance 'A' is as follows:

- When \( A \leq 0.30*S \), \( P = 0.5*S \)
- When \( A \leq 0.25*S \), \( P = 0.75*S \)
- When \( A \leq 0.20*S \), \( P = S \)
- When \( A \leq 0.15*S \), \( P = 1.5*S \), where:

\[ \begin{align*}
S & = \text{Maximum Allowable Transverse Brace Spacing (From Section S)} \\
T & = \text{The distance between Transverse Braces} \\
A & = \text{Offset Distance}
\end{align*} \]
Step 5a. Multiple changes in direction may be treated as one complete system. Straight runs greater than the maximum offset length require 2 transverse braces. Straight runs less than the maximum offset length may require as few as one or no braces. (See layout below)

LAYOUT OF SEISMIC BRANCES FOR TRAPEZE SUSPENDED CONDUIT (continued)

Step 6a. Vertical drops to equipment must be restrained with a transverse brace at the final support point before the vertical drop. The distance from the transverse brace to the drop must be within the maximum offset distance 'A' as defined on Page A22.6. The maximum allowable length of the system braced from the transverse brace to the flexible connector is equal to 'P' as defined on Page A22.6. If this distance is greater than 'P', an additional brace is required at the end of the vertical drop by attaching to the floor. Consideration must be given to seismic relative displacements (SRD) imposed on the conduit when braced to the floor.

---

A = Runs greater than the Maximum Offset Length \( S \)

B = Runs less than the Maximum Offset Length \( S \)

---

Transverse Brace at final support point before vertical drop

Conduit on Trapeze Run

If additional brace is required as stated above.

A flex connector may be required before connecting system to equipment to account for SRD.

Equipment

---

P - B (If applicable) (Refer to Page A22.6 for P)

It may be necessary to move or add a flex connector if a brace is installed at the floor to account for SRD. For this case the amount of pipe braced by the transverse brace terminates at the top of the flex connector.
12" RULE FOR SUSPENDED RACEWAYS

*SUPPORT STRUCTURE

SWIVEL CONNECTIONS* FOR ROD SIZE > \(\frac{3}{8}\)"

\[\leq 12"\]

CLEVIS HUNG CONDUIT

SWIVEL CONNECTIONS* FOR ROD SIZE > \(\frac{3}{8}\)"

\[\leq 12"\]

CONDUIT OR CABLE TRAY ON TRAPEZE

*NOTE: CONNECTIONS COMPLYING INCLUDE SWIVEL JOINTS, EYE BOLTS, ETC.
SEISMIC BRACE REQUIREMENTS
FOR CONDUITS ON MULTI-LAYER TRAPEZES

CASE 1
IF \(w_{\text{total}} < 10 \text{ LB/FT}\),
NO BRACING REQ'D

CASE 2
IF \(w_1 \geq 10 \text{ LB/FT AND } w_2 \geq 10 \text{ LB/FT}\),
BRACE EACH LAYER INDEPENDENTLY

CASE 3
IF \(w_{\text{total}} \geq 10 \text{ LB/FT AND } w_2 < 10 \text{ LB/FT}\),
BRACE TOP TRAPEZE FOR \(w_{\text{total}}\)
(BOTTOM TRAPEZE NEED NOT BE BRACED PROVIDED THE LOAD IS ACCOUNTED FOR IN THE NEAREST BRACED LAYER)

NOTES:
1) REGISTERED DESIGN PROFESSIONAL (RDP) SHALL VERIFY BRACE REQUIREMENTS LISTED ON PAGE A20.5.
2) HANGER REACTIONS SHALL BE DETERMINED FROM TOTAL CONDUIT WEIGHT FROM ALL LAYERS.
SEISMIC BRACE REQUIREMENTS
FOR CABLE TRAYS ON MULTI-LAYER TRAPEZES

CASE 1
IF \( w_{\text{total}} < 10 \text{ LB/FT} \),
NO BRACING REQ'D

CASE 2
IF \( w_1 \geq 10 \text{ LB/FT} \) AND \( w_2 \geq 10 \text{ LB/FT} \),
BRACE EACH LAYER INDEPENDENTLY

CASE 3
IF \( w_{\text{total}} \geq 10 \text{ LB/FT} \) AND \( w_2 < 10 \text{ LB/FT} \),
BRACE TOP TRAPEZE FOR \( w_{\text{total}} \)
(BOTTOM TRAPEZE NEED NOT BE BRACED PROVIDED THE
LOAD IS ACCOUNTED FOR IN THE NEAREST BRACED LAYER)

NOTES:
1) REGISTERED DESIGN PROFESSIONAL (RDP) SHALL VERIFY BRACE REQUIREMENTS LISTED ON PAGE A20.5.
2) HANGER REACTIONS SHALL BE DETERMINED FROM TOTAL CABLE TRAY WEIGHT FROM ALL LAYERS.
TRANSVERSE BRACE ALLOWABLE ANGLE VARIATIONS
IN PLAN FOR INDIVIDUALLY SUSPENDED CONDUIT

THE ANGLE VARIATION MAY INCREASE BEYOND 2.5 DEGREES UP TO 15 DEGREES PROVIDED THE
TRANSVERSE BRACES ARE SKEWED IN THE SAME DIRECTION AND A LONGITUDINAL BRACE
OCCURS OPPOSITE THE SKEWED ANGLE DIRECTION AS SHOWN BELOW.

NOTE: ANY OR ALL BRACE LOCATIONS ARE PERMITTED TO USE THE ANGLE VARIATION TO MEET FIELD CONDITIONS.
TRANSVERSE BRACE ALLOWABLE ANGLE VARIATIONS IN PLAN FOR TRAPEZE SUSPENDED CABLE TRAY

THE ANGLE VARIATION MAY INCREASE BEYOND 2.5 DEGREES UP TO 15 DEGREES PROVIDED THE TRANSVERSE BRACES ARE SKewed IN THE SAME DIRECTION AND A LONGITUDINAL BRACE OCCURS OPPOSITE THE SKewed ANGLE DIRECTION AS SHOWN BELOW.

NOTE: ANY OR ALL BRACE LOCATIONS ARE PERMITTED TO USE THE ANGLE VARIATION TO MEET FIELD CONDITIONS.
TRANSVERSE BRACE ALLOWABLE ANGLE VARIATIONS IN PLAN FOR CONDUIT ON TRAPEZE

THE ANGLE VARIATION MAY INCREASE BEYOND 2.5 DEGREE UP TO 15 DEGREE PROVIDED THE TRANSVERSE BRACES ARE SKewed IN THE SAME DIRECTION AND A LONGITUDINAL BRACE OCCURS OPPOSITE THE SKewed ANGLE DIRECTION AS SHOWN BELOW.

NOTE: ANY OR ALL BRACE LOCATIONS ARE PERMITTED TO USE THE ANGLE VARIATION TO MEET FIELD CONDITIONS.
ALTERNATE ARRANGEMENT OF SEISMIC BRACES FOR SUSPENDED RACEWAYS

ELEVATION VIEW
SOLID BRACE INSTALLED IN-BETWEEN HANGERS (TRANSVERSE OR ALL-DIRECTIONAL BRACE)

ELEVATION VIEW
CABLE BRACE INSTALLED IN-BETWEEN HANGERS

ELEVATION VIEW
CABLE BRACE INSTALLED AT SINGLE HANGER (TRANSVERSE BRACES ONLY)

PLAN VIEW
LONGITUDINAL SOLID BRACES INSTALLED IN ALTERNATING DIRECTIONS

PLAN VIEW
ALL-DIRECTIONAL SOLID BRACES INSTALLED IN ALTERNATING DIRECTIONS

PLAN VIEW
CABLE X-PATTERN BRACE INSTALLED IN-BETWEEN HANGERS

CONDUIT OR CABLE TRAY ON TRAPEZE, TYP

STRUT TRAPEZE

MIN $\frac{3}{4} \times 1\frac{1}{16} \times 1\frac{1}{16}$ ASTM A36 STRUT WASHER REQ'D WHERE SCBH-0 IS USED

MIN $\frac{3}{4} \times 1\frac{1}{16} \times 1\frac{1}{16}$ ASTM A36 STRUT WASHER REQ'D WHERE SCBH-0 IS USED

SEE NOTE 2

WEIGHT  
1" 

3" MAX OFFSET 

(TRANSVERSE BRACE ONLY)

3" MAX OFFSET 

(LONGITUDINAL OR ALL-DIRECTIONAL BRACE)

SEISMIC BRACE BRACKET OFFSET FROM HANGER RODS

NOTES:
1) REFER TO APPROPRIATE DETAIL PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
2) WHEN INSTALLING SHB TO BOTTOM OF TRAPEZE, MW-KY SHB KEY IS REQ'D (REF. X2.4).
ALTERNATE ARRANGEMENT OF SEISMIC BRACES FOR CONDUITS ON TRAPEZE

ELEVATION VIEW
SOLID BRACE INSTALLED IN-BETWEEN HANGERS (TRANSVERSE OR ALL-DIRECTIONAL BRACE)

ELEVATION VIEW
CABLE BRACE INSTALLED IN-BETWEEN HANGERS

ELEVATION VIEW
CABLE BRACE INSTALLED AT SINGLE HANGER (TRANSVERSE BRACES ONLY)

PLAN VIEW
LONGITUDINAL SOLID BRACES INSTALLED IN ALTERNATING DIRECTIONS

PLAN VIEW
ALL-DIRECTIONAL SOLID BRACES INSTALLED IN ALTERNATING DIRECTIONS

PLAN VIEW
CABLE X-PATTERN BRACE INSTALLED IN-BETWEEN HANGERS

NOTES:
1) REFER TO APPROPRIATE DETAIL F PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
ALTERNATE ARRANGEMENT OF SEISMIC BRACES FOR CONDUITS ON TRAPEZE

MIN 3/8" x 1 1/2" x 1 1/2" ASTM A36 STRUT WASHER REQ'D
WHERE SCBH-0 IS USED

SEE NOTE 2

STRUT TRAPEZE

3" MAX
OFFSET

(TRANSVERSE BRACE ONLY)

3" MAX
OFFSET

BRACKET MAY BE OFFSET 3" MAX FROM HANGER ROD

MIN 3/8" x 1 1/2" x 1 1/2" ASTM A36 STRUT WASHER REQ'D
WHERE SCBH-0 IS USED

SEE NOTE 2

STRUT TRAPEZE

3" MAX
OFFSET

(LONGITUDINAL OR ALL-DIRECTIONAL BRACE)

HSS TRAPEZE

3" MAX
OFFSET

SEISMIC BRACE BRACKET OFFSET FROM HANGER RODS

NOTES:
1) REFER TO APPROPRIATE DETAIL F PAGES FOR DIMENSIONS AND NOTATIONS NOT SHOWN.
2) WHEN INSTALLING SHB TO BOTTOM OF TRAPEZE, MW-KY SHB KEY IS REQ'D (REF. X2.4).
ATTACHMENT OPTIONS FOR CONDUITS ON TRAPEZE MEMBERS FOR TRANSVERSE, LONGITUDINAL, AND ALL-DIRECTIONAL BRACING SYSTEMS

PIPE CLAMP, TYP (REF. PAGES X8.0-X8.0.1)

1" MIN TYP

STRUT SPACER, TYP (REF. PAGE X8.2)

MIN. (1) WELD @ 1/2" FROM EACH END, TYP

PIPE CLAMP AND STRUT SPACER MAY BE INSTALLED TO BOTTOM OF HSS TRAPEZE

ELEVATION VIEW

SECTION VIEW

MASON WEST MW-SSC AND MW-SSCE PIPE CLAMPS

NOTES:
1) PIPE CLAMPS MAY BE USED FOR TRANSVERSE, LONGITUDINAL, OR ALL-DIRECTIONAL BRACING SYSTEMS. REF. APPROPRIATE X8 PAGE FOR MAX Fp FORCES.
SEISMIC SOLID BRACING OFF STRUT HANGER TRANSVERSE OPTION FOR INDIVIDUALLY SUSPENDED CONDUIT

SINGLE STRUT OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
210 LBS

DOUBLE STRUT OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
505 LBS

NOTES:

1) REFER TO APPROPRIATE C PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
SEISMIC SOLID BRACING OFF STRUT HANGER LONGITUDINAL OPTION FOR INDIVIDUALLY SUSPENDED CONDUIT

**SINGLE STRUT OPTION**

- Ref. M pages for connection details
- MW-SSN-1/2 w/ MW-BON-1/2 torqued until nut breaks off, typ (Ref. X4.0)
- 1½"x1½"x12GA single strut @ 10'-0" O.C. max
- 5"a MIN 102" MAX
- 30°-45° MAX
- Hole size to be \( \frac{a}{2} \)" greater than bolt dia, typ
- ASTM A307 bolt. Snug tighten inner nut and lock in place w/ outer nut
- Pipe clamp (Ref. X8.0-X8.0.1)
- 4"Ø conduit max
- Eq

**DOUBLE STRUT OPTION**

- Ref. M pages for connection details
- MW-SSN-1/2 w/ MW-BON-1/2 torqued until nut breaks off, typ (Ref. X4.0)
- 1½"x1½"x12GA double strut @ 10'-0" O.C. max
- 5"a MIN 96" MAX
- 30°-45° MAX
- Hole size to be \( \frac{a}{2} \)" greater than bolt dia, typ
- ASTM A307 bolt. Snug tighten inner nut and lock in place w/ outer nut
- Pipe clamp (Ref. X8.0-X8.0.1)
- 4"Ø conduit max
- Eq

**NOTES:**
1. Refer to appropriate C pages for dimensions and annotations not shown.

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**PAGE**
A27.1

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
140 of 846
SEISMIC CABLE BRACING OFF STRUT HANGER TRANSVERSE OPTION FOR INDIVIDUALLY SUSPENDED CONDUIT

SINGLE STRUT OPTION

1⅛"x⅜"x12GA SINGLE STRUT @ 10'-0" O.C. MAX

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
210 LBS

HOLE SIZE TO BE ⅛" GREATER THAN BOLT DIA, TYP

ATM A307 BOLT, SNUG TIGHTEN INNER NUT AND LOCK IN PLACE W/ OUTER NUT

PIPE CLAMP (REF. X8.0-X8.0.1)

4"Ø CONDUIT MAX

DOUBLE STRUT OPTION

1⅛"x⅜"x12GA DOUBLE STRUT @ 10'-0" O.C. MAX

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
425 LBS

NOTES:
1) REFER TO APPROPRIATE C PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.

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Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
141 of 846
SEISMIC CABLE BRACING OFF STRUT HANGER LONGITUDINAL OPTION FOR INDIVIDUALLY SUSPENDED CONDUIT

SINGLE STRUT OPTION

DOUBLE STRUT OPTION

NOTES:
1) REFER TO APPROPRIATE C PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.

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MASON IND. N.Y.
SCB, TYP
PRESTRETCHED
GALVANIZED
AIRCRAFT CABLE 7x19 STRAND CORE, TYP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

255 LBS

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

470 LBS

PIPE Clamp (REF. X8.0-X8.0.1)
SEISMIC SOLID BRACING OFF STRUT HANGER TRANSVERSE OPTION FOR SUSPENDED CONDUITS ON TRAPEZE

SINGLE STRUT OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, $F_p$

- MAX: 255 LBS

DOUBLE STRUT OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, $F_p$

- MAX: 500 LBS

NOTES:
1) REFER TO APPROPRIATE F PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.

Jiefu "Jeff" Zhang, SE
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PAGE A27.4
SEISMIC SOLID BRACING OFF STRUT HANGER LONGITUDINAL OPTION FOR SUSPENDED CONDUITS ON TRAPEZE

NOTES:
1) REFER TO APPROPRIATE PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.

SINGLE STRUT OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
255 LBS

DOUBLE STRUT OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
500 LBS

REFERENCES:
- MW-SSN-1/2 W/ MW-BON-1/2
- ASTM A307 BOLT. SNUG TIGHTEN INNER NUT AND LOCK IN PLACE W/ OUTER NUT
- HOLE SIZE TO BE \( \frac{3}{16} \)" GREATER THAN BOLT DIA, TYP
- \( L_4 \times 4 \times \frac{3}{4} " \) LG., TYP
- \( \frac{3}{16} " \) Ø HOLE CTR'D ON ANGLE, TYP

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
144 of 846
SEISMIC CABLE BRACING OFF STRUT HANGER TRANSVERSE OPTION FOR SUSPENDED CONDUITS ON TRAPEZE

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

- SINGLE STRUT OPTION
  - MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)
  - PIPE CLAMP, TYP (REF. X8.0-X8.0.1)
  - MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp = 255 LBS
  - REF. M PAGES FOR CONNECTION DETAILS, TYP
  - MASON IND. N.Y. SCB-1, TYP
  - 3/8" PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE, TYP

- DOUBLE STRUT OPTION
  - MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)
  - PIPE CLAMP, TYP (REF. X8.0-X8.0.1)
  - L4x4x3/8", 3" LG., TYP
  - 3/8" Ø HOLE CTR'D ON ANGLE, TYP
  - MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp = 470 LBS

NOTES:
1) REFER TO APPROPRIATE F PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.
3) REF. A27.6.1 FOR ALTERNATE INSTALLATION OPTIONS.
SEISMIC CABLE BRACING OFF STRUT HANGER TRANSVERSE OPTION FOR SUSPENDED CONDUITS ON TRAPEZE

ALTERNATE INSTALLATION FOR SINGLE STRUT OPTION

ALTERNATE INSTALLATION FOR DOUBLE STRUT OPTION

NOTES:
1) REFER TO A27.6 AND APPROPRIATE F PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
SEISMIC CABLE BRACING OFF STRUT HANGER LONGITUDINAL OPTION FOR SUSPENDED CONDUITS ON TRAPEZE

NOTES:
1) REFER TO APPROPRIATE F PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \)

\( 255 \text{ LBS} \)

\( 470 \text{ LBS} \)

SINGLE STRUT OPTION

DOUBLE STRUT OPTION

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SEISMIC SOLID BRACING OFF STRUT HANGER TRANSVERSE OPTION FOR SUSPENDED RACEWAYS ON TRAPEZE

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, $F_p$

- DOUBLE STRUT OPTION
  - $F_p = 500$ LBS
  - $a = 12''$ MAX
  - $5'' \times a \geq 96''$ MAX
  - $1'' \times 1\frac{1}{2}'' \times 12GA$ DOUBLE STRUT
  - $\frac{1}{4}''$ HOLE CTR'D ON ANGLE, TYP

- SINGLE STRUT OPTION
  - $F_p = 255$ LBS
  - $a = 18''$ MAX
  - $5'' \times a \geq 102''$ MAX
  - $1'' \times 1\frac{1}{2}'' \times 12GA$ SINGLE STRUT
  - $\frac{1}{4}''$ HOLE CTR'D ON ANGLE, TYP

NOTES:
1) REFER TO APPROPRIATE E PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.
3) CABLE TRAY SHALL BE APPROVED ON A PROJECT SPECIFIC BASIS OR PREAPPROVED BY OSHPD. SPACING LIMITS SET BY THE MANUFACTURER SHALL NOT BE EXCEEDED. CABLE TRAY BRACE SPACING SHALL BE APPROVED OR PREAPPROVED BY OSHPD.

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OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

PAGE A27.8
SEISMIC SOLID BRACING OFF STRUT HANGER LONGITUDINAL OPTION FOR SUSPENDED RACEWAYS ON TRAPEZE

NOTES:
1) REFER TO APPROPRIATE E PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.
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SINGLE STRUT OPTION

DOUBLE STRUT OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

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Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
149 of 846
SEISMIC CABLE BRACING OFF STRUT HANGER TRANSVERSE OPTION FOR SUSPENDED RACEWAYS ON TRAPEZE

SINGLE STRUT OPTION

DOUBLE STRUT OPTION

NOTES:
1) REFER TO APPROPRIATE E PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.
3) CABLE TRAY SHALL BE APPROVED ON A PROJECT SPECIFIC BASIS OR PREAPPROVED BY OSHPD. SPACING LIMITS SET BY THE MANUFACTURER SHALL NOT BE EXCEEDED. CABLE TRAY BRACE SPACING SHALL BE APPROVED OR PREAPPROVED BY OSHPD.

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PAGE
A27.10
SEISMIC CABLE BRACING OFF STRUT HANGER TRANSVERSE OPTION FOR SUSPENDED RACEWAYS ON TRAPEZE

ALTERNATE INSTALLATION FOR SINGLE STRUT OPTION

ALTERNATE INSTALLATION FOR DOUBLE STRUT OPTION

NOTES:
1) REFER TO A27.10 AND APPROPRIATE E PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
SEISMIC CABLE BRACING OFF STRUT HANGER LONGITUDINAL OPTION FOR SUSPENDED RACEWAYS ON TRAPEZE

**NOTES:**
1) REFER TO APPROPRIATE E PAGES FOR DIMENSIONS AND ANNOTATIONS NOT SHOWN.
2) SINGLE STRUT AND DOUBLE STRUT OPTIONS MAY CARRY UP TO A MAXIMUM OF 30LBS/FT OR 60LBS/FT, RESPECTIVELY.
3) CABLE TRAY SHALL BE APPROVED ON A PROJECT SPECIFIC BASIS OR PREAPPROVED BY OSHPD. SPACING LIMITS SET BY THE MANUFACTURER SHALL NOT BE EXCEEDED. CABLE TRAY BRACE SPACING SHALL BE APPROVED OR PREAPPROVED BY OSHPD.
SEISMIC SOLID BRACING PIPE CLAMP OPTION FOR INDIVIDUALLY SUSPENDED CONDUIT

\[ \frac{3}{4}'' \text{ Ø ATR MAX, TYP} \]

STANDARD NUT (T&B SNUG TIGHT), TYP

HOLE SHALL BE \[ \frac{3}{8}'' \] GREATER THAN ATR DIA., TYP

BRACE BRACKET PER DETAIL C PAGES \(^1\), TYP

\[ 1\frac{1}{4}'' \times 1\frac{1}{2}'' \times 12\text{GA SINGLE STRUT OR} \]

\[ 1\frac{1}{2}'' \times 1\frac{3}{4}'' \times 12\text{GA SINGLE STRUT, TYP} \]

PIPE CLAMP (REF. PAGES X8.0 & X8.0.1 FOR LIMITING CONDITIONS) \(^2\), TYP

TRANSVERSE OPTION

LONGITUDINAL OPTION

ALL-DIRECTIONAL OPTION

NOTES:

1) REFER TO APPROPRIATE DETAIL C PAGES FOR CALL-OUTS, DIMENSIONS AND NOTATIONS NOT SHOWN.

2) CLAMP RATING MAY LOWER MAX ALLOWABLE \( F_p \).
SEISMIC CABLE BRACING PIPE CLAMP OPTION FOR INDIVIDUALLY SUSPENDED CONDUIT

3/4" Ø ATR MAX, TYP
STANDARD NUT (T&B SNUG TIGHT), TYP
HOLE SHALL BE 3/8" GREATER THAN ATR DIA., TYP
BRACE BRACKET PER DETAIL C PAGES 1, TYP
1 1/4 x 1 1/2 x 12 GA SINGLE STRUT OR
1 1/4 x 3/4 x 12 GA SINGLE STRUT, TYP
PIPE CLAMP (REF. PAGES X8.0 & X8.0.1 FOR LIMITING CONDITIONS) 2, TYP

TRANSVERSE OPTION

LONGITUDINAL OPTION

ALL-DIRECTIONAL OPTION

NOTES:
1) REFER TO APPROPRIATE DETAIL C PAGES FOR CALL-OUTS, DIMENSIONS AND NOTATIONS NOT SHOWN.
2) CLAMP RATING MAY LOWER MAX ALLOWABLE Fp.
**INDIVIDUALLY SUSPENDED STEEL PIPE**

**SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS**

**LATERAL FORCE**

Fp = 0.25g (ASD)

**VERTICAL FORCE**

Fpv = 0.375g (ASD)

---

### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

#### MAXIMUM BRACE SPACING - OPTION #1

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<th>PIPE SIZE</th>
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<th>SUPPORT SPACING</th>
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**INSTALLATION DETAILS**

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### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

#### MAXIMUM BRACE SPACING - OPTION #2

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**INSTALLATION DETAILS**

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* - BRACE SPACING SHALL NOT EXCEED THOSE TABULATED IN SECTION S.

**NOTE:** INSTALLATION DETAILS TABULATED ABOVE ARE BASED ON USE OF THE MW-WPL SEISMIC ATTACHMENT TO STEEL PIPE. IF THE DESIGNER PREFERS TO USE THE MW-SPC, CALCULATE THE SEISMIC DEMAND AND COMPARE IT TO THE SEISMIC CAPACITY OF THE MW-SPC AS SHOWN IN SECTION C. IF THE DEMAND IS LESS THAN OR EQUAL TO THE CAPACITY, THE MW-SPC IS ACCEPTABLE.

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PAGE B1.0
**SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS**

**LATERAL FORCE**  
Fp = 0.25g (ASD)  
**VERTICAL FORCE**  
Fpv = 0.375g (ASD)

### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

**INSTALLATION DETAILS**

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* - BRACE SPACING SHALL NOT EXCEED THOSE TABULATED IN SECTION S.

**NOTE:** INSTALLATION DETAILS TABULATED ABOVE ARE BASED ON USE OF THE MW-WPL SEISMIC ATTACHMENT TO STEEL PIPE. IF THE DESIGNER PREFERS TO USE THE MW-SPC, CALCULATE THE SEISMIC DEMAND AND COMPARE IT TO THE SEISMIC CAPACITY OF THE MW-SPC AS SHOWN IN SECTION C. IF THE DEMAND IS LESS THAN OR EQUAL TO THE CAPACITY, THE MW-SPC IS ACCEPTABLE.

---

**INDIVIDUALLY SUSPENDED STEEL PIPE**

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**MASON WEST, INC.**

1601 E. Miraloma Ave. Placentia, CA 92870  
TEL (714) 630 - 0701, www.masonwest.com

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**P A G E**

**B1.0.1**

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**Jiefu "Jeff" Zhang, SE**  
California SE No. S5270

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**OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto**  
10/09/2020  
156 of 846
### LATERAL FORCE

- $F_p = 0.5g$ (ASD)

### VERTICAL FORCE

- $F_{pv} = 0.375g$ (ASD)

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#### SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

**B1.1**

#### Fp = 0.5g

**SOLID (RIGID) BRACING FOR 45° BRACE ANGLE**

**MAXIMUM BRACE SPACING - OPTION #1**

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<tr>
<th>PIPE SIZE</th>
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#### INSTALLATION DETAILS

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#### Fpv = 0.38g

**SOLID (RIGID) BRACING FOR 45° BRACE ANGLE**

**MAXIMUM BRACE SPACING - OPTION #2**

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#### INSTALLATION DETAILS

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* - BRACE SPACING SHALL NOT EXCEED THOSE TABULATED IN SECTION S.

**NOTE:** INSTALLATION DETAILS TABULATED ABOVE ARE BASED ON USE OF THE MW-WPL SEISMIC ATTACHMENT TO STEEL PIPE. IF THE DESIGNER PREFERS TO USE THE MW-SPC, CALCULATE THE SEISMIC DEMAND AND COMPARE IT TO THE SEISMIC CAPACITY OF THE MW-SPC AS SHOWN IN SECTION C. IF THE DEMAND IS LESS THAN OR EQUAL TO THE CAPACITY, THE MW-SPC IS ACCEPTABLE.
### SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

#### LATERAL FORCE
- \( F_p = 0.5g \) (ASD)

#### VERTICAL FORCE
- \( F_{pv} = 0.375g \) (ASD)

### SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

#### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

Maximum Brace Spacing - Option #3

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* - Brace spacing shall not exceed those tabulated in Section S.

**Installation Details Tabulated Above Are Based On Use Of The MW-WPL Seismic Attachment To Steel Pipe. If The Designer Prefers To Use The MW-SPC, Calculate The Seismic Demand And Compare It To The Seismic Capacity Of The MW-SPC As Shown In Section C. If The Demand Is Less Than Or Equal To The Capacity, The MW-SPC Is Acceptable.**

---

**OPM-0043-13**

**By:** Jeffrey Y. Kikumoto

**Date:** 10/09/2020
**INDIVIDUALLY SUSPENDED STEEL PIPE**

**SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS**

**LATERAL FORCE**

Fp = 1.0g (ASD)

**VERTICAL FORCE**

Fpv = 0.375g (ASD)

---

### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

#### MAXIMUM BRACE SPACING - OPTION #1

<table>
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### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

#### MAXIMUM BRACE SPACING - OPTION #2

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* - BRACE SPACING SHALL NOT EXCEED THOSE TABULATED IN SECTION S.

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---

**MASON WEST, INC.**

1601 E. Miraloma Ave. Placentia, CA 92870

TEL (714) 630 - 0701, www.masonwest.com

**Jiefu “Jeff” Zhang, SE**
California SE No. S5270

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**PAGE**

B1.2
### Lateral Force

Fp = 1.0g (ASD)

### Vertical Force

Fpv = 0.375g (ASD)

### Seismic Solid Bracing Installation Requirements

#### B1.2.1

**Solid (Rigid) Bracing for 45° Brace Angle**

**Maximum Brace Spacing - Option #3**

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**Note:** Brace spacing shall not exceed those tabulated in Section S.

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---

**Individually Suspended Steel Pipe**

**Seismic Solid Bracing Installation Requirements**

**Laterale Force**

Fp = 1.0g (ASD)

**Vertical Force**

Fpv = 0.375g (ASD)

**Installation Details**

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Weight</th>
<th>Support Spacing</th>
<th>Installation Details</th>
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**Note:** Brace spacing shall not exceed those tabulated in Section S.

**Installation Details Tabulated Above are Based on Use of the MW-WPL Seismic Attachment to Steel Pipe. If the Designer Prefers to Use the MW-SPC, Calculate the Seismic Demand and Compare it to the Seismic Capacity of the MW-SPC as Shown in Section C. If the Demand is Less Than or Equal to the Capacity, the MW-SPC is Acceptable.
INDIVIDUALLY SUSPENDED STEEL PIPE

SEISMIC CABLE BRACING INSTALLATION REQUIREMENTS

LATERAL FORCE

Fp = 0.25g (ASD)

VERTICAL FORCE

Fpv = 0.375g (ASD)

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>WEIGHT</th>
<th>SUPPORT SPACING</th>
</tr>
</thead>
<tbody>
<tr>
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<td>10</td>
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| STANDARD CABLE BRACING FOR 45° BRACE ANGLE |
| MAXIMUM BRACE SPACING - OPTION #1 |

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<td>50A</td>
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<td>50E</td>
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<td>50G</td>
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<td>63I</td>
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| * - BRACE SPACING SHALL NOT EXCEED THOSE TABULATED IN SECTION S. |
| NOTE: INSTALLATION DETAILS TABULATED ABOVE ARE BASED ON USE OF THE MW-WPL SEISMIC ATTACHMENT TO STEEL PIPE. IF THE DESIGNER PREFERS TO USE THE MW-SPC, CALCULATE THE SEISMIC DEMAND AND COMPARE IT TO THE SEISMIC CAPACITY OF THE MW-SPC AS SHOWN IN SECTION C. IF THE DEMAND IS LESS THAN OR EQUAL TO THE CAPACITY, THE MW-SPC IS ACCEPTABLE. |

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jiefu “Jeff” Zhang, SE
California SE No. S5270

PAGE B1.3
# Lateral Force

**Fp = 0.5g (ASD)**

# Vertical Force

**Fpv = 0.375g (ASD)**

## Seismic Cable Bracing Installation Requirements

### Fp = 0.5g

#### Fpv = 0.38g

### Standard Cable Bracing for 45° Brace Angle

#### Maximum Brace Spacing - Option #1

<table>
<thead>
<tr>
<th>Pipe Size</th>
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### Standard Cable Bracing for 45° Brace Angle

#### Maximum Brace Spacing - Option #2

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### Standard Cable Bracing for 45° Brace Angle

#### Maximum Brace Spacing - Option #3

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* - Brace Spacing Shall Not Exceed Those Tabulated in Section S.

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### SEISMIC CABLE BRACING INSTALLATION REQUIREMENTS

#### LATERAL FORCE

\[ F_p = 1.0g \text{ (ASD)} \]

#### VERTICAL FORCE

\[ F_{pv} = 0.375g \text{ (ASD)} \]

#### BRACING INSTALLATION REQUIREMENTS

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>WEIGHT</th>
<th>SUPPORT SPACING</th>
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**Standard Cable Bracing for 45° Brace Angle**

**Maximum Brace Spacing - Option #1**

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<td>40 FT*</td>
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<td>C2.21</td>
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<tr>
<td>C2.40</td>
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**Standard Cable Bracing for 45° Brace Angle**

**Maximum Brace Spacing - Option #2**

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<td>30 FT*</td>
<td>30 FT*</td>
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<tr>
<td>C2.20</td>
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**Standard Cable Bracing for 45° Brace Angle**

**Maximum Brace Spacing - Option #3**

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* - Brace spacing shall not exceed those tabulated in Section S.

Note: Installation details tabulated above are based on use of the MW-WPL seismic attachment to steel pipe. If the designer prefers to use the MW-SPC, calculate the seismic demand and compare it to the seismic capacity of the MW-SPC as shown in Section C. If the demand is less than or equal to the capacity, the MW-SPC is acceptable.
# Seismic Solid Bracing Installation Requirements

## Lateral Force

F<sub>p</sub> = 0.25g (ASD)

## Vertical Force

F<sub>pv</sub> = 0.375g (ASD)

### Individually Suspended Cast Iron Pipe

<table>
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<tr>
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<td>20 ft</td>
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<td>20 ft</td>
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### Solid (Rigid) Bracing for 45° Brace Angle

#### Maximum Brace Spacing - Option #1

* - Brace spacing shall not exceed those tabulated in Section S.
## Individually Suspended Cast Iron Pipe

### Seismic Solid Bracing Installation Requirements

**Lateral Force**

\[ F_p = 0.5g \text{ (ASD)} \]

**Vertical Force**

\[ F_{pv} = 0.375g \text{ (ASD)} \]

### Installation Details

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Weight (PLF)</th>
<th>Support Spacing</th>
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</thead>
<tbody>
<tr>
<td><strong>Pipe Size</strong></td>
<td><strong>Weight</strong></td>
<td><strong>Support Spacing</strong></td>
</tr>
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<td>(PLF)</td>
<td>(FT)</td>
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<tr>
<td>5</td>
<td>18</td>
<td>8</td>
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</tbody>
</table>

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### Lateral Force

**Fp = 0.5g**

**Solid (Rigid) Bracing for 45° Brace Angle**

**Maximum Brace Spacing - Option #1**

### Installation Details

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<tr>
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### Lateral Force

**Fp = 0.5g**

**Solid (Rigid) Bracing for 45° Brace Angle**

**Maximum Brace Spacing - Option #2**

### Installation Details

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</table>

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### Lateral Force

**Fp = 0.5g**

**Solid (Rigid) Bracing for 45° Brace Angle**

**Maximum Brace Spacing - Option #3**

### Installation Details

<table>
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* - Brace spacing shall not exceed those tabulated in Section S.
### INDIVIDUALLY SUSPENDED CAST IRON PIPE

#### SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

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<td>40 FT*</td>
<td>40 FT*</td>
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<td>ALL-DIR.</td>
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<tr>
<td>3</td>
<td>8.4</td>
<td>8</td>
<td>C1.40</td>
</tr>
</tbody>
</table>

### LATERAL FORCE

**Fp = 1.0g (ASD)**

**VERTICAL FORCE**

**Fpv = 0.375g (ASD)**

### SEISMIC BRACE HANGER CONNECTION

<table>
<thead>
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<th>BRACE CONNECTION</th>
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<tbody>
<tr>
<td>BRACE CONNECTION</td>
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</table>

### TRANS. LONG. ALL-DIR.

### TRANS. LONG. ALL-DIR.

### TRANS. LONG./ALL-DIR.

* - BRACE SPACING SHALL NOT EXCEED THOSE TABULATED IN SECTION S.

---

**MAISON WEST, INC.**

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**Jiefu "Jeff" Zhang, SE**

California SE No. S5270

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**PAGE**

B1.8
**LATERAL FORCE**

\[ F_p = 0.25g \] (ASD)

**VERTICAL FORCE**

\[ F_{pv} = 0.375g \] (ASD)

---

### SEISMIC CABLE BRACING INSTALLATION REQUIREMENTS

**INDIVIDUALLY SUSPENDED CAST IRON PIPE**

**B1.9**

---

#### STANDARD CABLE BRACING FOR 45° BRACE ANGLE

**MAXIMUM BRACE SPACING - OPTION #1**

<table>
<thead>
<tr>
<th>PIPE SIZE (DIA.)</th>
<th>WEIGHT (PLF)</th>
<th>BRACE DIRECTION/SPACING</th>
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<td>50B - 50B - 50C</td>
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<td>4</td>
<td>13</td>
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<td>Type C</td>
<td>50D - 50D - 50E</td>
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<td>5</td>
<td>18</td>
<td>C2.30 - C2.31 - C2.32</td>
<td>Type D</td>
<td>63D - 63D - 63F</td>
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<tr>
<td>6</td>
<td>23.4</td>
<td>C2.40 - C2.41 - C2.42</td>
<td>Type E</td>
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**INSTALLATION DETAILS**

- **TRANS. LONG.**
- **ALL-DIR.**
- **BRACE SUPPORT**
- **SPACING**
- **HANGER CONNECTION TYPE**
- **BRACE CONNECTION TYPE**

---

#### STANDARD CABLE BRACING FOR 45° BRACE ANGLE

**MAXIMUM BRACE SPACING - OPTION #2**

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<th>PIPE SIZE (DIA.)</th>
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<td>63D - 63D - 63F</td>
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<td>6</td>
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**INSTALLATION DETAILS**

- **TRANS. LONG.**
- **ALL-DIR.**
- **BRACE SUPPORT**
- **SPACING**
- **HANGER CONNECTION TYPE**
- **BRACE CONNECTION TYPE**

---

#### STANDARD CABLE BRACING FOR 45° BRACE ANGLE

**MAXIMUM BRACE SPACING - OPTION #3**

<table>
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<th>PIPE SIZE (DIA.)</th>
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<td>C2.20 - C2.21 - C2.22</td>
<td>Type B</td>
<td>50B - 50B - 50C</td>
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<tr>
<td>4</td>
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<td>C2.30 - C2.31 - C2.32</td>
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<td>50D - 50D - 50E</td>
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<td>5</td>
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<td>63D - 63D - 63F</td>
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<tr>
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**INSTALLATION DETAILS**

- **TRANS. LONG.**
- **ALL-DIR.**
- **BRACE SUPPORT**
- **SPACING**
- **HANGER CONNECTION TYPE**
- **BRACE CONNECTION TYPE**

---

* - **BRACE SPACING SHALL NOT EXCEED THOSE TABULATED IN SECTION S.**

---

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OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

10/09/2020  
167 of 846
INDIVIDUALLY SUSPENDED CAST IRON PIPE

SEISMIC CABLE BRACING INSTALLATION REQUIREMENTS

LATERAL FORCE
\[ F_p = 0.5g \] (ASD)

VERTICAL FORCE
\[ F_{pv} = 0.375g \] (ASD)

SEISMIC CABLE BRACING INSTALLATION REQUIREMENTS

- B1.10

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Jeffery Y. Kikumoto
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

* - BRACE SPACING SHALL NOT EXCEED THOSE TABULATED IN SECTION S.
### Lateral Force

\[ F_p = 1.0g \text{ (ASD)} \]

### Vertical Force

\[ F_{pv} = 0.375g \text{ (ASD)} \]

#### Lateral Force Requirements

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>WEIGHT</th>
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<td>8</td>
<td>C2.40 C2.21 C2.22</td>
</tr>
</tbody>
</table>

\[ F_p = 1g \]

#### Standard Cable Bracing for 45° Brace Angle

**Maximum Brace Spacing - Option #1**

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>WEIGHT</th>
<th>SUPPORT SPACING</th>
<th>INSTALLATION DETAILS</th>
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<tbody>
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\[ F_{pv} = 0.38g \]

**Maximum Brace Spacing - Option #2**

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\[ F_p = 1g \]

**Maximum Brace Spacing - Option #3**

<table>
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<td>5</td>
<td>18</td>
<td>8</td>
<td>C2.30 C2.31 C2.32</td>
</tr>
</tbody>
</table>

\[ F_{pv} = 0.38g \]

* - Brace Spacing shall not exceed those tabulated in Section S.
### Piping/Conduit on Trapeze

**Seismic Solid Bracing Installation Requirements**

**Lateral Force**

\[ F_p = 0.25g \text{ (ASD)} \]

**Vertical Force**

\[ F_{pv} = 0.375g \text{ (ASD)} \]

#### Solid (Rigid) Bracing for 45\(^{\circ}\) Brace Angle

**Installation Details**

<table>
<thead>
<tr>
<th>Piping/Conduit Support at 10'-0&quot; Max.</th>
<th>Brace Direction/Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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<td><strong>Trans. Long. All-Dir.</strong></td>
<td><strong>Trans. Long. All-Dir.</strong></td>
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<tr>
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</table>

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**Piping/Conduit Support at 10'-0" Max.**

**SOLID (RIGID) BRACING FOR 45° BRACE ANGLE**

**BRACE SPACING - OPTION #1**

**INSTALLATION DETAILS**

<table>
<thead>
<tr>
<th>BRACE DIRECTION/SPACING</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>BRACE ATTACHMENT TYPE</th>
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**Piping/Conduit Support at 10'-0" Max.**

**SOLID (RIGID) BRACING FOR 45° BRACE ANGLE**

**BRACE SPACING - OPTION #2**

**INSTALLATION DETAILS**

<table>
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</tbody>
</table>

---

**Piping/Conduit Weight (LBS/FT)**

- 10 FT: F1.10, F1.11, F1.12
- 20 FT: F1.10, F1.11, F1.12
- 30 FT: F1.10, F1.11, F1.12
- 40 FT: F1.20, F1.21, F1.22
- 50 FT: F1.20, F1.21, F1.22
- 60 FT: F1.20, F1.21, F1.22
- 70 FT: F1.30, F1.31, F1.32
- 80 FT: F1.30, F1.31, F1.32
- 90 FT: F1.30, F1.31, F1.32
- 100 FT: F1.30, F1.31, F1.32
- 150 FT: F1.50, F1.51, F1.52
- 200 FT: F1.50, F1.51, F1.52
- 300 FT: F1.50, F1.51, F1.52
- 400 FT: F1.60, F1.61, F1.62
- 500 FT: F1.60, F1.61, F1.62

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**Jeffrey Y. Kikumoto**

OPM-0043-13
10/09/2020

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**OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto**

10/09/2020

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**PAGE B1.12**
### PIPING/CONDUIT ON TRAPEZE

### SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

LATERAL FORCE

Fp = 0.25g (ASD)

VERTICAL FORCE

Fpv = 0.375g (ASD)

---

<table>
<thead>
<tr>
<th>PIPING/CONDUIT SUPPORT AT 10'-0&quot; MAX.</th>
<th>SOLID (RIGID) BRACING FOR 45° BRACE ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BRACE SPACING - OPTION #3</td>
</tr>
<tr>
<td></td>
<td>INSTALLATION DETAILS</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>BRACE DIRECTION/SPACING</td>
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<td>TRANS./LONG. ALL-DIR.</td>
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### SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

**LATERAL FORCE**

Fp = 0.5g (ASD)

**VERTICAL FORCE**

Fpv = 0.375g (ASD)

#### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

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#### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

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SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

LATERAL FORCE
\( F_p = 0.5g \) (ASD)

VERTICAL FORCE
\( F_{pv} = 0.375g \) (ASD)

### Installation Details

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<th>Piping/Conduit Weight</th>
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<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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Fp = 0.5g (ASD)
Fpv = 0.375g (ASD)
# Piping/Conduit on Trapeze

## Seismic Solid Bracing Installation Requirements

**Lateral Force**
- $F_p = 1.0g$ (ASD)

**Vertical Force**
- $F_{pv} = 0.375g$ (ASD)

## Seismic Solid Bracing Installation Requirements

### Solid (Rigid) Bracing for 45° Brace Angle

#### Brace Spacing - Option #1

<table>
<thead>
<tr>
<th>Piping/Conduit Support at 10'-0&quot; Max.</th>
<th>Trans. 20'</th>
<th>Long. 40'</th>
<th>All-Dir. 40'</th>
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#### Brace Spacing - Option #2

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<td>Brace Location</td>
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**Mason West, Inc.**
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

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P A G E

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B1.14
### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

#### BRACE SPACING - OPTION #3

<table>
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<tr>
<th>PIPING/CONDUIT WEIGHT (LBS/FT)</th>
<th>PIPING/CONDUIT SUPPORT AT 10'-0&quot; MAX.</th>
<th>BRACE DIRECTION/SPACING</th>
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**LATERAL FORCE**  
Fp = 1.0g (ASD)  
**VERTICAL FORCE**  
Fpv = 0.375g (ASD)
# Piping/Conduit on Trapeze

## Seismic Cable Bracing Installation Requirements

- **Lateral Force** $F_p = 0.25g$ (ASD)
- **Vertical Force** $F_{pv} = 0.375g$ (ASD)

### Standard Cable Bracing for 45° Brace Angle

#### Brace Spacing - Option #1

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### Brace Spacing - Option #3

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### Piping/Conduit Support at 10'-0" Max.

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<td>90</td>
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</tbody>
</table>

**Note:** The above tables provide the required details for the installation of seismic cable bracing, including the appropriate brace direction, spacing, and attachment types. These specifications ensure the stability and safety of the piping/conduit systems in seismic events. For more detailed information, please refer to the MASON WEST, INC. manual, which includes the installation details and guidelines for various scenarios and conditions. The manual can be accessed at www.masonwest.com or by contacting MASON WEST, INC. at 1601 E. Miraloma Ave, Placentia, CA 92870, TEL (714) 630-0701.
## PIPING/CONDUIT ON TRAPEZE

### SEISMIC CABLE BRACING INSTALLATION REQUIREMENTS

#### LATERAL FORCE
- \( F_p = 0.5g \) (ASD)
- \( F_{pv} = 0.375g \) (ASD)

#### Vertical Force
- \( F_{pv} = 0.375g \) (ASD)

## Standard Cable Bracing for 45° Brace Angle

### Brace Spacing - Option #1

<table>
<thead>
<tr>
<th>Piping/Conduit Weight (LBS/FT)</th>
<th>Brace Direction/Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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### Brace Spacing - Option #2

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### Brace Spacing - Option #3

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<th>Brace Direction/Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jiefu "Jeff" Zhang, SE
California SE No. S5270

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

177 of 846
### Seismic Cable Bracing Installation Requirements

#### Lateral Force

\[ F_p = 1.0g \text{ (ASD)} \]

#### Vertical Force

\[ F_{pv} = 0.375g \text{ (ASD)} \]

---

<table>
<thead>
<tr>
<th>Piping/Conduit Support at 10'-0&quot; Max.</th>
<th>Brace Direction/Spacing</th>
<th>Brace Attachment Type</th>
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</thead>
<tbody>
<tr>
<td></td>
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#### Brace Spacing - Option #1

#### Brace Spacing - Option #2

#### Brace Spacing - Option #3
### Installation Requirements for Lateral and Vertical Forces

#### Lateral Force

- **Steel Pipe**: $F_p = 0.25g$ (ASD)
- **Concrete Piping**: $F_p = 0.25g$

#### Vertical Force

- **Concrete Piping**: $F_{pv} = 0.375g$ (ASD)
- **Concrete Piping (under load)**: $F_{pv} = 0.375g$

### Table: Required Brace Spacing and Hanger Attachment Types

#### Option #1

<table>
<thead>
<tr>
<th>Piping/Conduit Support at 10'-0&quot; Max.</th>
<th>Brace Spacing</th>
<th>Hanger Attachment Type</th>
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#### Option #2

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#### Option #3

<table>
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<th>Hanger Attachment Type</th>
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</table>
### Lateral Force

\[ F_p = 0.5g \text{ (ASD)} \]

### Vertical Force

\[ F_{pv} = 0.375g \text{ (ASD)} \]

## Piping/Conduit on Trapeze

### Seismic Cable X-Pattern Bracing

#### Installation Requirements

### Lateral Force

\[ F_p = 0.5g \]

### Vertical Force

\[ F_{pv} = 0.375g \]

#### Piping/Conduit Support at 10'-0" Max.

<table>
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#### Brace Spacing - Option #1

<table>
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<tr>
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<td>63J</td>
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</table>
### Lateral Force

- \( F_p = 1.0g \) (ASD)

### Vertical Force

- \( F_{pv} = 0.375g \) (ASD)

### Piping/Conduit on Trapeze

#### Installation Requirements

- **Lateral Force**
  - \( F_p = 1.0g \) (ASD)
- **Vertical Force**
  - \( F_{pv} = 0.375g \) (ASD)

### X-Pattern Cable Bracing for 45° Brace Angle

#### Brace Spacing

<table>
<thead>
<tr>
<th>Piping/Conduit Support at 10'-0&quot; Max.</th>
<th>Brace Spacing</th>
<th>Hanger Attachment Type</th>
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#### Brace Spacing - Option #1

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#### Brace Spacing - Option #2

<table>
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#### Brace Spacing - Option #3

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</table>
### SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

**LATERAL FORCE**

\[ F_p = 0.25g \text{ (ASD)} \]

**VERTICAL FORCE**

\[ F_{pv} = 0.375g \text{ (ASD)} \]

#### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

**BRACE SPACING - OPTION #1**

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<th>LONG./ 60 FT</th>
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<th>LONG. ALL-DIR. LOCATION</th>
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#### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

**BRACE SPACING - OPTION #2**

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### LATERAL FORCE
\[ F_p = 0.5g \text{ (ASD)} \]

### VERTICAL FORCE
\[ F_{pv} = 0.375g \text{ (ASD)} \]

#### RECTANGULAR DUCT

#### SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

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---

**MASON WEST, INC.**
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

**Jeffrey Y. Kikumoto**
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

183 of 846
### Lateral Force

\[ F_p = 1.0g \text{ (ASD)} \]

### Vertical Force

\[ F_{pv} = 0.375g \text{ (ASD)} \]

---

#### Rectangular Duct

**Seismic Solid Bracing Installation Requirements**

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<th>Duct Weight (Lbs/ft)</th>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>Solid (Rigid) Bracing for 45° Brace Angle</th>
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<td><strong>Installation Details</strong></td>
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<td><strong>Brace Direction/Spacing</strong></td>
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<td><strong>Brace Location</strong></td>
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**INSTALLATION DETAILS**

- **Brace Direction/Spacing**
  - Trans.: 30 FT / Long: 60 FT
  - All-Dir.: D1.12
- **Hanger Attachment Type**
  - Trans./Long. / All-Dir.
- **Brace Attachment Type**
  - 38F
  - 38K
  - 63J
  - 63H
  - 63K

---

**Opinion:**

- **Mason West, Inc.**
  - 1601 E. Miraloma Ave. Placentia, CA 92870
  - TEL (714) 630 - 0701, www.masonwest.com

---

**Reviewed for Code Compliance:**

- Jeffrey Y. Kikumoto
  - OPM-0043-13
  - 10/09/2020

---

**Riy: Jeffrey Y. Kikumoto**

**Date:** 10/09/2020

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**Page:** B2.2
<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>DUCT WEIGHT (LBS/FT)</th>
<th>STANDARD CABLE BRACING FOR 45° BRACE ANGLE</th>
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<th>DUCT WEIGHT (LBS/FT)</th>
<th>STANDARD CABLE BRACING FOR 45° BRACE ANGLE</th>
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</table>
### Lateral Force

Fp = 0.5g (ASD)

### Vertical Force

Fpv = 0.375g (ASD)

#### Rectangular Duct

**Seismic Cable Bracing Installation Requirements**

<table>
<thead>
<tr>
<th>Duct Weight (lbs/ft)</th>
<th>Brace Direction/Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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**Standard Cable Bracing for 45° Brace Angle**

- **Brace Spacing - Option #1**
- **Brace Spacing - Option #2**
- **Brace Spacing - Option #3**

**Installation Details**

- **Brace Direction/Spacing**
- **Hanger Attachment Type**
- **Brace Attachment Type**

**Duct Support at 10'-0" Max.**

- **Duct Weight (lbs/ft)**
- **Brace Location**
- **Brace Location**

**Mason West, Inc.**

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Jeffrey Y. Kikumoto  
OPM-0043-13  
10/09/2020  
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

186 of 846
### Lateral Force

- Lateral Force: $F_p = 1.0g$ (ASD)

### Vertical Force

- Vertical Force: $F_{pv} = 0.375g$ (ASD)

#### Rectangular Duct

### Seismic Cable Bracing Installation Requirements

#### Standard Cable Bracing for 45° Brace Angle

##### Brace Spacing - Option #1

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MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
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Jiefu "Jeff" Zhang, SE
California SE No. S5270

PAGE

B2.5

10/09/2020

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187 of 846
### Rectangular Duct

#### Seismic Cable X-Pattern Bracing Installation Requirements

**Lateral Force**

\[ F_p = 0.25g \text{ (ASD)} \]

**Vertical Force**

\[ F_{pv} = 0.375g \text{ (ASD)} \]

#### X-Pattern Cable Bracing for 45° Brace Angle

**Brace Spacing - Option #1**

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<th>Duct Weight (lbs/ft)</th>
<th>Brace Spacing</th>
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**Brace Spacing - Option #2**

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<td>50E</td>
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<tr>
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<td>63G</td>
<td>50G</td>
</tr>
</tbody>
</table>

---

**MASON WEST, INC.**

1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

**Jiefu "Jeff" Zhang, SE**
California SE No. S5270

**PAGE B2.6**

**OIPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto**

10/09/2020

188 of 846
### Lateral Force

\[ F_p = 0.5g \text{ (ASD)} \]

### Vertical Force

\[ F_{pv} = 0.375g \text{ (ASD)} \]

## Rectangular Duct

### Seismic Cable X-Pattern Bracing

**Installation Requirements**

### Lateral Force

**Fp = 0.5g**

**X-Pattern Cable Bracing for 45° Brace Angle**

**Brace Spacing - Option #1**

<table>
<thead>
<tr>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>Brace Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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<tbody>
<tr>
<td>10</td>
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<td>38A</td>
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<tr>
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<td>50D</td>
<td>50G</td>
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</table>

### Vertical Force

**Fpv = 0.375g**

**Duct Support at 10'-0" Max.**

**Brace Spacing - Option #2**

<table>
<thead>
<tr>
<th>Duct Weight (Lbs/ft)</th>
<th>Brace Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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<tbody>
<tr>
<td>10</td>
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<tr>
<td>50</td>
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<td>50E</td>
<td>50G</td>
</tr>
</tbody>
</table>

### Lateral Force

**Fp = 0.5g**

**X-Pattern Cable Bracing for 45° Brace Angle**

**Brace Spacing - Option #3**

<table>
<thead>
<tr>
<th>Duct Weight (Lbs/ft)</th>
<th>Brace Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
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---

**MASON WEST, INC.**

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**PAGE**

B2.7

10/09/2020

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189 of 846
### LATERAL FORCE
\[ F_p = 1.0g \text{ (ASD)} \]
### VERTICAL FORCE
\[ F_{pv} = 0.375g \text{ (ASD)} \]

#### RECTANGULAR DUCT

### SEISMIC CABLE X-PATTERN BRACING

#### INSTALLATION REQUIREMENTS

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>BRACE SPACING</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>BRACE ATTACHMENT TYPE</th>
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<tr>
<td></td>
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<tr>
<td></td>
<td>10</td>
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<td>50A 50E</td>
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#### INSTALLATION DETAILS

**X-PATTERN CABLE BRACING FOR 45° BRACE ANGLE**

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>BRACE SPACING</th>
<th>HANGER ATTACHMENT TYPE</th>
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<td></td>
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<table>
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<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>BRACE SPACING</th>
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<table>
<thead>
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<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>BRACE SPACING</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>BRACE ATTACHMENT TYPE</th>
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<tbody>
<tr>
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<td>30 FT</td>
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<td>10</td>
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</tbody>
</table>

**MASON WEST, INC.**
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Jeff Kikumoto  
OPM-0043-13  
10/09/2020

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10/09/2020

B2.8
## SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

### LATERAL FORCE
\[ F_p = 0.25g \] (ASD)

### VERTICAL FORCE
\[ F_{pv} = 0.375g \] (ASD)

#### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

**BRACE SPACING - OPTION #1**

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>B3.0</th>
<th>B3.1</th>
<th>B3.2</th>
<th>C3.10</th>
<th>C3.11</th>
<th>C3.12</th>
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<th>D3.11</th>
<th>D3.12</th>
<th>E3.10</th>
<th>E3.11</th>
<th>E3.12</th>
<th>F3.10</th>
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<th>F3.12</th>
<th>G3.10</th>
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</tbody>
</table>

**INSTALLATION DETAILS**

**BRACE ATTACHMENT TYPE**

- TRANS./ LONG./ ALL-DIR.
- TRANS./LONG. BRACE LOCATION
- ALL-DIR. BRACE LOCATION
- TRANS./LONG. ALL-DIR. BRACE ATTACHMENT TYPE

#### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

**BRACE SPACING - OPTION #2**

<table>
<thead>
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<th>D3.12</th>
<th>E3.10</th>
<th>E3.11</th>
<th>E3.12</th>
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<th>F3.12</th>
<th>G3.10</th>
<th>G3.11</th>
<th>G3.12</th>
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<tbody>
<tr>
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</tbody>
</table>

**INSTALLATION DETAILS**

**BRACE ATTACHMENT TYPE**

- TRANS./ LONG./ ALL-DIR.
- TRANS./LONG. BRACE LOCATION
- ALL-DIR. BRACE LOCATION
- TRANS./LONG. ALL-DIR. BRACE ATTACHMENT TYPE

#### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

**BRACE SPACING - OPTION #3**

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>B3.0</th>
<th>B3.1</th>
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<th>C3.10</th>
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</table>

**INSTALLATION DETAILS**

**BRACE ATTACHMENT TYPE**

- TRANS./ LONG./ ALL-DIR.
- TRANS./LONG. BRACE LOCATION
- ALL-DIR. BRACE LOCATION
- TRANS./LONG. ALL-DIR. BRACE ATTACHMENT TYPE

---

**DUCT WEIGHT (LBS/FT)**

- 10: B3.10, B3.11, B3.12, C3.10, C3.11, C3.12
- 60: D3.50, D3.51, D3.52, E3.50, E3.51, E3.52
# ROUND DUCT

## SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

- **LATERAL FORCE**
  - $F_p = 0.5g$ (ASD)

- **VERTICAL FORCE**
  - $F_{pv} = 0.375g$ (ASD)

### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

#### BRACE SPACING - OPTION #1

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>INSTALLATION DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BRACE DIRECTION/SPACING</td>
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<tr>
<td></td>
<td>TRANS./ LONG./ ALL-DIR.</td>
</tr>
<tr>
<td>DUCT WEIGHT (LBS/FT)</td>
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<td>10 D2.10</td>
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<td>20 D2.10</td>
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<tr>
<td>30 D2.20</td>
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<tr>
<td>60 D2.30</td>
<td>D2.31</td>
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</tbody>
</table>

### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

#### BRACE SPACING - OPTION #2

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>INSTALLATION DETAILS</th>
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<td>BRACE DIRECTION/SPACING</td>
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<td>TRANS./ LONG./ ALL-DIR.</td>
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### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

#### BRACE SPACING - OPTION #3

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>INSTALLATION DETAILS</th>
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<tr>
<td></td>
<td>BRACE DIRECTION/SPACING</td>
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<tr>
<td></td>
<td>TRANS./ LONG./ ALL-DIR.</td>
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<tr>
<td>DUCT WEIGHT (LBS/FT)</td>
<td>10</td>
</tr>
<tr>
<td>10 D2.10</td>
<td>D2.11</td>
</tr>
<tr>
<td>20 D2.10</td>
<td>D2.11</td>
</tr>
<tr>
<td>30 D2.20</td>
<td>D2.21</td>
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<tr>
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<td>D2.21</td>
</tr>
<tr>
<td>60 D2.20</td>
<td>D2.21</td>
</tr>
</tbody>
</table>
### Lateral Force

- **Lateral Force (Fp)**: 1.0g (ASD)
- **Vertical Force (Fpv)**: 0.375g (ASD)

### Round Duct Seismic Solid Bracing Installation Requirements

#### Option #1
- **Fp = 1g**
- **Fpv = 0.375g**

<table>
<thead>
<tr>
<th>Duct Weight (lbs/ft)</th>
<th>Brace Direction/Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trans./ Long./ All-Dir.</td>
<td>Trans./ Long. Brace Location</td>
<td>All-Dir. Brace Location</td>
</tr>
<tr>
<td>10</td>
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<td>38F</td>
<td>50E</td>
</tr>
<tr>
<td>20</td>
<td>D2.10</td>
<td>63J</td>
<td>63H</td>
</tr>
<tr>
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<td>63L</td>
<td>63K</td>
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</table>

#### Option #2
- **Fp = 1g**
- **Fpv = 0.375g**

<table>
<thead>
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<th>Brace Direction/Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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</thead>
<tbody>
<tr>
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<td>Trans./ Long. Brace Location</td>
<td>All-Dir. Brace Location</td>
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<tr>
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<td>63H</td>
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<tr>
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</table>

#### Option #3
- **Fp = 1g**
- **Fpv = 0.375g**

<table>
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<tr>
<th>Duct Weight (lbs/ft)</th>
<th>Brace Direction/Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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<tr>
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<td>Trans./ Long. Brace Location</td>
<td>All-Dir. Brace Location</td>
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<td>50F</td>
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</table>
## Seismic Cable Bracing Installation Requirements

### Lateral Force

\[ F_p = 0.25g \text{ (ASD)} \]

### Vertical Force

\[ F_{pv} = 0.375g \text{ (ASD)} \]

### Standard Cable Bracing for 45° Brace Angle

#### Brace Spacing - Option #1

<table>
<thead>
<tr>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>Brace Direction/Spacing</th>
<th>Brace Attachment Type</th>
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</thead>
<tbody>
<tr>
<td>TRANS./ LONG./ ALL-DIR.</td>
<td>TRANS./LONG. BRACE LOCATION</td>
<td>ALL-DIR. BRACE LOCATION</td>
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<tr>
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<td>D.6.10</td>
<td>D.6.11 D.6.12</td>
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<tr>
<td>20 FT</td>
<td>D.6.10</td>
<td>D.6.11 D.6.12</td>
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<tr>
<td>30 FT</td>
<td>D.6.10</td>
<td>D.6.11 D.6.12</td>
</tr>
<tr>
<td>40 FT</td>
<td>D.6.10</td>
<td>D.6.11 D.6.12</td>
</tr>
<tr>
<td>50 FT</td>
<td>D.6.20</td>
<td>D.6.21 D.6.22</td>
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</table>

#### Brace Spacing - Option #2

<table>
<thead>
<tr>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>Brace Direction/Spacing</th>
<th>Brace Attachment Type</th>
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</thead>
<tbody>
<tr>
<td>TRANS./ LONG./ ALL-DIR.</td>
<td>TRANS./LONG. BRACE LOCATION</td>
<td>ALL-DIR. BRACE LOCATION</td>
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<tr>
<td>10 FT</td>
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<td>D.6.11 D.6.12</td>
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<tr>
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<td>D.6.10</td>
<td>D.6.11 D.6.12</td>
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<td>D.6.11 D.6.12</td>
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</tr>
<tr>
<td>50 FT</td>
<td>D.6.20</td>
<td>D.6.21 D.6.22</td>
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</table>

#### Brace Spacing - Option #3

<table>
<thead>
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<th>Duct Support at 10'-0&quot; Max.</th>
<th>Brace Direction/Spacing</th>
<th>Brace Attachment Type</th>
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<tbody>
<tr>
<td>TRANS./ LONG./ ALL-DIR.</td>
<td>TRANS./LONG. BRACE LOCATION</td>
<td>ALL-DIR. BRACE LOCATION</td>
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<tr>
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<td>D.6.10</td>
<td>D.6.11 D.6.12</td>
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<td>D.6.10</td>
<td>D.6.11 D.6.12</td>
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<td>D.6.11 D.6.12</td>
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<tr>
<td>50 FT</td>
<td>D.6.20</td>
<td>D.6.21 D.6.22</td>
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</tbody>
</table>

### Duct Weight (LBS/FT)

<table>
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<th>Duct Weight (LBS/FT)</th>
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<th>30</th>
<th>40</th>
<th>50</th>
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<td>D6.22</td>
<td>D6.20</td>
<td>D6.21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MASON WEST, INC.

1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jiefu "Jeff" Zhang, SE
California SE No. S5270
### Round Duct Seismic Cable Bracing Installation Requirements

#### Lateral Force

\[ F_p = 0.5g \text{ (ASD)} \]

#### Vertical Force

\[ F_{pv} = 0.375g \text{ (ASD)} \]

<table>
<thead>
<tr>
<th>Duct Support at 10'-0&quot; Max.</th>
<th><strong>STANDARD CABLE BRACING FOR 45° BRACE ANGLE</strong></th>
<th><strong>BRACE SPACING - OPTION #1</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Installation Details</strong></td>
<td><strong>Brace Direction/Spacing</strong></td>
<td><strong>Hanger Attachment Type</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Trans./</strong></td>
<td><strong>Long./</strong></td>
</tr>
<tr>
<td></td>
<td>30 FT</td>
<td>60 FT</td>
</tr>
<tr>
<td>10 lbs/ft</td>
<td>D6.10</td>
<td>D6.11</td>
</tr>
<tr>
<td>20 lbs/ft</td>
<td>D6.20</td>
<td>D6.21</td>
</tr>
<tr>
<td>30 lbs/ft</td>
<td>D6.20</td>
<td>D6.21</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>STANDARD CABLE BRACING FOR 45° BRACE ANGLE</strong></th>
<th><strong>BRACE SPACING - OPTION #2</strong></th>
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<tbody>
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<td><strong>Trans./</strong></td>
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<td>D6.20</td>
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<tr>
<td>40 lbs/ft</td>
<td>D6.20</td>
</tr>
<tr>
<td>50 lbs/ft</td>
<td>D6.20</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>STANDARD CABLE BRACING FOR 45° BRACE ANGLE</strong></th>
<th><strong>BRACE SPACING - OPTION #3</strong></th>
</tr>
</thead>
<tbody>
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<td><strong>Installation Details</strong></td>
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<td>50 lbs/ft</td>
<td>D6.20</td>
</tr>
<tr>
<td>60 lbs/ft</td>
<td>D6.20</td>
</tr>
</tbody>
</table>

---

**MASON WEST, INC.**

1601 E. Miraloma Ave. Placentia, CA 92870
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Jiefu “Jeff” Zhang, SE
California SE No. S5270

PG 34
# Lateral Force

\[ F_p = 1.0g \text{ (ASD)} \]

# Vertical Force

\[ F_{pv} = 0.375g \text{ (ASD)} \]

## Seismic Cable Bracing Installation Requirements

### Standard Cable Bracing for 45° Brace Angle

#### Brace Spacing - Option #1

<table>
<thead>
<tr>
<th>Bracing Location</th>
<th>Brace Direction/Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
</tr>
</thead>
<tbody>
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<td><strong>Trans./Long./All-Dir.</strong></td>
<td><strong>Trans./Long. Brace Location</strong></td>
<td><strong>All-Dir. Brace Location</strong></td>
</tr>
<tr>
<td>10</td>
<td>D6.10 D6.11 D6.12</td>
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</tr>
<tr>
<td>20</td>
<td>D6.20 D6.21 D6.22</td>
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</tr>
<tr>
<td>50</td>
<td>D6.20 D6.21 D6.22</td>
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<td>50E</td>
</tr>
</tbody>
</table>

### Standard Cable Bracing for 45° Brace Angle

#### Brace Spacing - Option #2

<table>
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<tr>
<th>Bracing Location</th>
<th>Brace Direction/Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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<tbody>
<tr>
<td><strong>Duct Weight (lbs/ft)</strong></td>
<td><strong>Trans./Long./All-Dir.</strong></td>
<td><strong>Trans./Long. Brace Location</strong></td>
<td><strong>All-Dir. Brace Location</strong></td>
</tr>
<tr>
<td>10</td>
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<td>38A</td>
</tr>
<tr>
<td>20</td>
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<td>38C</td>
<td>38C</td>
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<tr>
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<td>D6.20 D6.21 D6.22</td>
<td>50E</td>
<td>50E</td>
</tr>
</tbody>
</table>
### SEISMIC CABLE X-PATTERN BRACING

**INSTALLATION REQUIREMENTS**

**LATERAL FORCE**
\[ F_p = 0.25g \text{ (ASD)} \]

**VERTICAL FORCE**
\[ F_{pv} = 0.375g \text{ (ASD)} \]

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>BRACE SPACING</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>BRACE ATTACHMENT TYPE</th>
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<td>38B</td>
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<tr>
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<td>D7.10</td>
<td>38C</td>
<td>38C</td>
</tr>
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<td>30 FT</td>
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</tr>
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<td>50 FT</td>
<td>D7.12</td>
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<td>50F</td>
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<th>BRACE ATTACHMENT TYPE</th>
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<td>D7.10</td>
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<tr>
<td>30 FT</td>
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<td>50D</td>
</tr>
<tr>
<td>50 FT</td>
<td>D7.12</td>
<td>63E</td>
<td>50E</td>
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<tr>
<td>60 FT</td>
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<table>
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<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>BRACE SPACING</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>BRACE ATTACHMENT TYPE</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
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### X-PATTERN CABLE BRACING FOR 45° BRACE ANGLE

#### BRACE SPACING - OPTION #1

<table>
<thead>
<tr>
<th>DUCT WEIGHT (LBS/FT)</th>
<th>BRACE SPACING</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>BRACE ATTACHMENT TYPE</th>
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<tbody>
<tr>
<td>10</td>
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<td>38A</td>
<td>38C</td>
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<tr>
<td>20</td>
<td>D7.11</td>
<td>50C</td>
<td>50E</td>
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<tr>
<td>30</td>
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<td>50D</td>
<td>50G</td>
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</tbody>
</table>

#### BRACE SPACING - OPTION #2

<table>
<thead>
<tr>
<th>DUCT WEIGHT (LBS/FT)</th>
<th>BRACE SPACING</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>BRACE ATTACHMENT TYPE</th>
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</thead>
<tbody>
<tr>
<td>10</td>
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<td>38B</td>
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<tr>
<td>20</td>
<td>D7.11</td>
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<td>30</td>
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<td>50G</td>
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#### BRACE SPACING - OPTION #3

<table>
<thead>
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<th>DUCT WEIGHT (LBS/FT)</th>
<th>BRACE SPACING</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>BRACE ATTACHMENT TYPE</th>
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</thead>
<tbody>
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<td>38A</td>
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<tr>
<td>20</td>
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<tr>
<td>60</td>
<td>D7.12</td>
<td>63F</td>
<td>50E</td>
</tr>
</tbody>
</table>
# SEISMIC CABLE X-PATTERN BRACING INSTALLATION REQUIREMENTS

## LATERAL FORCE
\[ F_p = 1.0g \text{ (ASD)} \]

## VERTICAL FORCE
\[ F_{pv} = 0.375g \text{ (ASD)} \]

### ROUND DUCT

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>BRACE SPACING - OPTION #1</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>INSTALLATION DETAILS</td>
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</table>
## Seismic Solid Bracing Installation Requirements

### Lateral Force

- **Fp = 0.25g (ASD)**
- **Vertical Force**

- **Fpv = 0.375g (ASD)**

### Solid (Rigid) Bracing for 45° Brace Angle

#### Brace Spacing - Option #1

<table>
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<tr>
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### Brace Spacing - Option #3

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</tbody>
</table>

### Duct Support at 10'-0" Max.

- **Duct Weight**: 10, 20, 30, 40, 50, 60 (LB/FT)
### LATERAL FORCE

\[ F_p = 0.5g \text{ (ASD)} \]

### VERTICAL FORCE

\[ F_{pv} = 0.375g \text{ (ASD)} \]

#### FACTORY BUILT DUCT

**SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS**

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>INSTALLATION DETAILS</th>
<th>HANGER ATTACHMENT TYPE</th>
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<td>ALL-DIR. 60 FT</td>
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**MASSON WEST, INC.**

1601 E. Miraloma Ave, Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com
**SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS**

**FACTORY BUILT DUCT**

**LATERAL FORCE**

- $F_p = 1.0g$ (ASD)

**VERTICAL FORCE**

- $F_{pv} = 0.375g$ (ASD)

### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

#### BRACE SPACING - OPTION #1

<table>
<thead>
<tr>
<th>DUCT WEIGHT (LBS/FT)</th>
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### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

#### BRACE SPACING - OPTION #2

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### SOLID (RIGID) BRACING FOR 45° BRACE ANGLE

#### BRACE SPACING - OPTION #3

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**MASON WEST, INC.**

1601 E. Miraloma Ave. Placentia, CA 92870

TEL (714) 630 - 0701, www.masonwest.com

**Jiefu "Jeff" Zhang, SE**

California SE No. S5270

PAGE B4.2

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

202 of 846
### SEISMIC CABLE BRACING INSTALLATION REQUIREMENTS

**LATERAL FORCE**  
Fp = 0.25g (ASD)  
**VERTICAL FORCE**  
Fpv = 0.375g (ASD)

#### STANDARD CABLE BRACING FOR 45° BRACE ANGLE

<table>
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**STANDARD CABLE BRACING FOR 45° BRACE ANGLE**  
BRACE SPACING - OPTION #2

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**STANDARD CABLE BRACING FOR 45° BRACE ANGLE**  
BRACE SPACING - OPTION #3

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</table>
## Lateral Force

Fp = 0.5g (ASD)

## Vertical Force

Fpv = 0.375g (ASD)

### Factory Built Duct

#### Seismic Cable Bracing Installation Requirements

<table>
<thead>
<tr>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>Brace Direction/Spacing</th>
<th>Brace Spacing - Option #1</th>
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<td>D8.22</td>
<td>50F</td>
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</table>

#### Installation Details

- **Brace Direction/Spacing:**
  - TRANS./ 10 FT
  - LONG./ 20 FT
  - ALL-DIR./ 20 FT

- **Hanger Attachment Type:**
  - TRANS./LONG.
  - ALL-DIR.

- **Brace Spacing:**
  - 30 FT
  - 60 FT

- **Duct Weight (lbs/ft):**
  - 10
  - 20
  - 30
  - 40
  - 50
  - 60

- **Brace Location:**
  - TRANS./LONG.
  - ALL-DIR.

- **Brace Attachment Type:**
  - 38A
  - 38B
  - 50A
  - 50C
  - 50D
  - 50E
  - 50F
  - 50G

---

**MASON WEST, INC.**

1601 E. Miraloma Ave. Placentia, CA 92870

**TEL (714) 630 - 0701, www.masonwest.com**

**Jiefu "Jeff" Zhang, SE**

California SE No. S5270

**PAGE B4.4**
<table>
<thead>
<tr>
<th>DUCT WEIGHT (LBS/FT)</th>
<th>Fp = 1g</th>
<th>Fpv = 0.375g</th>
<th>STANDARD CABLE BRACING FOR 45° BRACE ANGLE</th>
<th>BRACE SPACING - OPTION #1</th>
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## SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

### LATERAL FORCE

\[ F_p = 0.25g \text{ (ASD)} \]

### VERTICAL FORCE

\[ F_{pv} = 0.375g \text{ (ASD)} \]

### Installation Details

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</table>
## LATERAL FORCE

\( F_p = 0.5g \) (ASD)

## VERTICAL FORCE

\( F_{pv} = 0.375g \) (ASD)

### SEISMIC SOLID BRACING INSTALLATION REQUIREMENTS

#### INSTALLATION DETAILS

<table>
<thead>
<tr>
<th>WEIGHT (LBS/FT)</th>
<th>ELECTRICAL TRAY SUPPORT AT 10'-0&quot; MAX.</th>
<th>SOLID (RIGID) BRACING FOR 45° BRACE ANGLE</th>
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# Seismic Solid Bracing Installation Requirements

**Lateral Force**

\[ F_p = 1.0g \text{ (ASD)} \]

**Vertical Force**

\[ F_{pv} = 0.375g \text{ (ASD)} \]

## Solid (Rigid) Bracing for 45° Brace Angle

### Brace Spacing - Option #1

<table>
<thead>
<tr>
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<th>Brace Direction/Spacing</th>
<th>Hanger Attachment Type</th>
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<td>Trans./Long. Brace Location</td>
<td>All-Dir. Brace Location</td>
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<tr>
<td>10</td>
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<td>Trans./Long. Brace Location</td>
<td>All-Dir. Brace Location</td>
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### Brace Spacing - Option #3

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<td>All-Dir. Brace Location</td>
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## Installation Details

- **Weight (LB/FT)**
  - 10: E1.10 E1.11 E1.12
  - 20: E1.10 E1.11 E1.12
  - 30: E1.20 E1.21 E1.22
  - 40: E1.20 E1.21 E1.22
  - 50: E1.30 E1.31 E1.32

## Solid west, Inc.

1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jie Fu "Jeff" Zhang, SE
California SE No. S5270

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

208 of 846
### SEISMIC CABLE BRACING INSTALLATION REQUIREMENTS

#### LATERAL FORCE
\[ F_p = 0.25g \text{ (ASD)} \]

#### VERTICAL FORCE
\[ F_{pv} = 0.375g \text{ (ASD)} \]

**CABLE TRAY**

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**ELECTRICAL TRAY SUPPORT AT 10'-0" MAX.**

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**INSTALLATION DETAILS**

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**WEIGHT (LBS/FT)**

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**ELECTRICAL TRAY SUPPORT AT 10'-0" MAX.**

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<th>All-Dir.</th>
<th>Brace Location</th>
<th>Trans./Long.</th>
<th>All-Dir.</th>
<th>Brace Location</th>
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</table>
**SEISMIC CABLE BRACING INSTALLATION REQUIREMENTS**

**LATERAL FORCE**

\[ F_p = 0.5g \text{ (ASD)} \]

**VERTICAL FORCE**

\[ F_{pv} = 0.375g \text{ (ASD)} \]

### Installation Details

<table>
<thead>
<tr>
<th>Weight (LBS/FT)</th>
<th>Brace Direction/Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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<tbody>
<tr>
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<td><strong>Trans./Long./All-Dir.</strong></td>
<td><strong>Trans./Long. Brace Location</strong></td>
<td><strong>All-Dir. Brace Location</strong></td>
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#### Option #1

- **Fp = 0.5g**
- **Fpv = 0.375g**

<table>
<thead>
<tr>
<th>Weight (LBS/FT)</th>
<th>Trans./Long./All-Dir.</th>
<th>Brace Direction</th>
<th>Brace Attachment Type</th>
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#### Option #2

- **Fp = 0.5g**
- **Fpv = 0.375g**

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#### Option #3

- **Fp = 0.5g**
- **Fpv = 0.375g**

<table>
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<th>Trans./Long./All-Dir.</th>
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</table>

---

MAKSON WEST, INC.

1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jiefu "Jeff" Zhang, SE
California SE No. S5270

P A G E

B5.4
### Lateral Force
F<sub>p</sub> = 1.0g (ASD)

### Vertical Force
F<sub>pv</sub> = 0.375g (ASD)

## Seismic Cable Bracing Installation Requirements

<table>
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<th>Weight (lbs/ft)</th>
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<th>20</th>
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### Installation Details

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**Jiefu "Jeff" Zhang, SE**
California SE No. S5270

**PAGE**
B5.5
# Lateral Force
\[ F_p = 0.25g \text{ (ASD)} \]

# Vertical Force
\[ F_{pv} = 0.375g \text{ (ASD)} \]

## Seismic Cable X-Pattern Bracing Installation Requirements

### X-Pattern Cable Bracing for 45° Brace Angle

#### Brace Spacing - Option #1

<table>
<thead>
<tr>
<th>Weight (lbs/ft)</th>
<th>Brace Spacing</th>
<th>Hanger Attachment Type</th>
<th>Brace Attachment Type</th>
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#### Brace Spacing - Option #3

<table>
<thead>
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<tr>
<td>85</td>
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</table>
### LATERAL FORCE
Fp = 0.5g (ASD)

### VERTICAL FORCE
Fpv = 0.375g (ASD)

### SEISMIC CABLE X-PATTERN BRACING

#### INSTALLATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Fp = 0.5g</th>
<th>Fpv = 0.375g</th>
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<tr>
<td>X-PATTERN CABLE BRACING FOR 45° BRACE ANGLE</td>
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#### BRACE SPACING - OPTION #1

<table>
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<th>ELECTRICAL TRAY SUPPORT AT 10'-0&quot; MAX.</th>
<th>INSTALLATION DETAILS</th>
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<td>HANGER ATTACHMENT TYPE</td>
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#### BRACE SPACING - OPTION #3

<table>
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</tbody>
</table>

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

**PAGE**
B5.7
<table>
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</tbody>
</table>

**CABLE TRAY**

**SEISMIC CABLE X-PATTERN BRACING INSTALLATION REQUIREMENTS**

**LATERAL FORCE**

Fp = 1.0g (ASD)

**VERTICAL FORCE**

Fpv = 0.375g (ASD)
**HANGER ROD**
DIAMETER = \( \frac{3}{8}" \)

**PIPING/CONDUIT TRANSVERSE SEISMIC SOLID BRACING SYSTEM**
2"Ø PIPE/CONDUIT MAX

**KIT OPTIONS**
- S12T
- S1220T
- SH312T
- SH320T

---

**DETAIL B**

**SSBS OPTION**

**SPC OPTION**

---

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

4. FOR PIPE/CONDUIT SIZES UP TO 2"Ø MAX. USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-38 (REF. X8.4).

5. REF. SECTION A15 OR A25 FOR ALTERNATIVE ARRANGEMENT OF SEISMIC BRACES.

6. REF. PAGE A19.0 OR A28.0 FOR PIPE/CONDUIT CLAMP OPTION.

---

**PIPING/CONDUIT TRANSVERSE SEISMIC SOLID BRACING SYSTEM**

**2"Ø PIPE/CONDUIT MAX**

---

REF. N PAGES FOR BRACKET CONNECTION DETAILS

MASON IND. N.Y.

SSBS-12 OR SSBS-20 ¹

(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) ³

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

---

**TABLE: MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \)**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, ( F_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>170 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>170 LBS</td>
</tr>
</tbody>
</table>

* STL = STEEL PIPING  
** CI = CAST IRON PIPING
HANGER ROD
DIAMETER = 3/8"

PIPING/CONDUIT LONGITUDINAL
SEISMIC SOLID BRACING SYSTEM
2"Ø PIPE/CONDUIT MAX

REF. M PAGES FOR
CONNECTION DETAILS
3/8" ASTM A36 ATR, TYP
1\%x1\%x12GA SINGLE STRUT, ROD
STIFFENER, WHERE REQ'D 1, 2
MASON IND. N.Y. UCC ROD
STIFFENER CLAMP
TORQUE TO 10 FT-LBS, TYP 1

3/8" Ø NUT (T&B SNUGTIGHT)
MW-WPL LUG AS SHOWN OR
PIPE CLAMP OPTIONS 4, 5

ROD STIFFENER
CLAMP

1" MIN
T&B, TYP

DETAIL B

BRACE MEMBER 1
1\%x1\%x12GA SINGLE STRUT
(9"-6" MAX)
1\%x1\%x12GA DOUBLE STRUT
(14"-6" MAX)
(1) MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED
UNTIL NUT BREAKS OFF
(REF. PAGE X4.0) 3
MASON IND. N.Y. SHB-3/8 AS
SHOWN OR SSBS-12 OPTION 1

VIEW A-A

SACS OPTION

SPC OPTION

MAX ALLOWABLE FORCE PER
SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>425 LBS</td>
<td>150 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>245 LBS</td>
<td>150 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL
NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 18". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER
HOLE WHEN STRUT BRACE IS INSTALLED
INSIDE THE BRACKET AND (2) 1/2" DIA.
CONNECTIONS IN (2) OUTER HOLES WHEN
THE BRACE IS INSTALLED OUTSIDE OF THE
BRACKET. REF. X2.3 FOR CONNECTION
DETAILS.
4. FOR PIPE/CONDUIT SIZES UP TO 2"Ø MAX, USE
RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1)
OR USE MW-WPL-38 (REF. X8.4).
5. REF. PAGE A19.0 OR A28.0 FOR PIPE/CONDUIT
CLAMP OPTION.

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California SE No. S5270

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

216 of 846
**HANGER ROD**
Diameter = \(\frac{3}{8}\)"

**PIPING/CONDUIT ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM**
2"Ø PIPE/CONDUIT MAX

**KIT OPTIONS**
- S12A
- S1220A
- SH312A
- SH320A

**NOTES:**
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
4. MW-KY-38 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD, REF X2.4.
5. FOR PIPE/CONDUIT SIZES UP TO 2"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-38 (REF. X8.4).
6. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
7. REF. PAGE A19.0 OR A28.0 FOR PIPE/CONDUIT CLAMP OPTION.

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \(F_p\)**

<table>
<thead>
<tr>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAN. LONG.</td>
<td>TRAN. LONG.</td>
<td>TRAN. LONG.</td>
</tr>
<tr>
<td>30° - 45°</td>
<td>170 LBS</td>
<td>170 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>170 LBS</td>
<td>170 LBS</td>
</tr>
</tbody>
</table>

*STL = STEEL PIPING  
*CI = CAST IRON PIPING
HANGER ROD DIAMETER = ½"

PIPING/CONDUIT TRANSVERSE SEISMIC SOLID BRACING SYSTEM 3"Ø PIPE/CONDUIT MAX

REF. M PAGES FOR CONNECTION DETAILS

⅛" Ø ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS, TYP 1
1¾x1⅜x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2

½" Ø NUT (T&B SNUG TIGHT)
MW-WPL LUG AS SHOWN OR PIPE CLAMP OPTIONS 4, 5, 6
BOTH SIDES OF PIPE HANGER LUG, TYP
3" Ø PIPE/CONDUIT MAX
INSULATION WHERE REQ'D

ROD STIFFENER CLAMP
1" MIN T&B, TYP

REF. N PAGES FOR BRACKET CONNECTION DETAILS

MASON IND. N.Y. SSBS-12 OR SSBS-20 1
(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 3
REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE MEMBER 1, SEE VIEW A-A
(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 3
MASON IND. N.Y. SHB-1/2 AS SHOWN OR SSBS-12 OPTION 1

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0° - 15°</td>
<td>350 LBS</td>
</tr>
<tr>
<td>15° - 30°</td>
<td>460 LBS</td>
</tr>
<tr>
<td>30° - 45°</td>
<td>460 LBS</td>
</tr>
<tr>
<td>45° - 60°</td>
<td>350 LBS</td>
</tr>
<tr>
<td>60° - 90°</td>
<td>410 LBS</td>
</tr>
<tr>
<td>90° - 120°</td>
<td>220 LBS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>350</td>
<td>460</td>
<td>220</td>
</tr>
<tr>
<td>350</td>
<td>410</td>
<td>220</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. A2.3 FOR CONNECTION DETAILS.
4. FOR PIPE/CONDUIT SIZES UP TO 3" Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-50 (REF. X8.4).
5. REF. SECTION A15 OR A25 FOR ALTERNATIVE ARRANGEMENT OF SEISMIC BRACES.
6. REF. PAGE A19.0 OR A28.0 FOR PIPE/CONDUIT CLAMP OPTION.

KIT OPTIONS
S12T
S1220T
SH412T
SH420T

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PAGE C1.20

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

218 of 846
HANGER ROD DIAMETER = ½”

PIPING/CONDUIT LONUTUDINAL SEISMIC SOLID BRACING SYSTEM
3”Ø PIPE/CONDUIT MAX

KIT OPTIONS
S12L
S1220L
SH412L
SH420L

REF. M PAGES FOR CONNECTION DETAILS
½”Ø ASTM A36 ATR, TYP
1½x1½x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’D 1, 2
MASON IND. N.Y. UCC ROD STIFFENER CLAMP
TORQUE TO 10 FT-LBS, TYP 1
1/8”Ø NUT (T&B SNUG TIGHT)
MW-WPL LUG AS SHOWN OR PIPE CLAMP OPTIONS 4, 6
BOTH SIDES OF PIPE HANGER LUG, TYP.

REF. N PAGES FOR BRACKET CONNECTION DETAILS
MASON IND. N.Y.
SSBS-12 OR SSBS-20 1
(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF
(REF. PAGE X4.0) 3
REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE
BRACE MEMBER 1, SEE VIEW A-A

DETAIL B
BRACE MEMBER 1
1½x1½x12GA SINGLE STRUT (9’-6” MAX)
1½x1½x12GA DOUBLE STRUT (14’-6” MAX)
(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF
(REF. PAGE X4.0) 3
MASON IND. N.Y. SHB-1/2 AS SHOWN OR SSBS-12 OPTION 1

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>580 LBS</td>
<td>580 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>410 LBS</td>
<td>410 LBS</td>
</tr>
</tbody>
</table>

* STL = STEEL PIPING
** CI = CAST IRON PIPING

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
4. FOR PIPE/CONDUIT SIZES UP TO 3”Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-50 (REF. X8.4).
5. REF. PAGE A19.0 OR A28.0 FOR PIPE/CONDUIT CLAMP OPTION.
**HANGER ROD DIAMETER = \( \frac{1}{2}'' \)**

**PIPE/CONDUIT ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM**

**3''Ø PIPE/CONDUIT MAX**

**KIT OPTIONS**

- S12A
- S1220A
- SH412A
- SH420A

**DETAIL B**

**SSBS OPTION**

**SPC OPTION**

**VIEW A-A**

**NOTE:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25''. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. PROVIDE (1) 1/2'' DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2'' DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

4. MW-KY-50 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING SHBs OR SSBS-12 OPTION.

5. FOR PIPE/CONDUIT SIZES UP TO 3''Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-50 (REF. X8.4).

6. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

7. REF. PAGE A19.0 OR A28.0 FOR PIPE/CONDUIT CLAMP OPTION.
HANGER ROD DIAMETER = \( \frac{5}{8} \)"

**PIPING/CONDUIT TRANSVERSE SEISMIC SOLID BRACING SYSTEM**

5"Ø PIPE/CONDUIT MAX

- **PAYMEN**
- **S20T**
- **S2012T**
- **SH512T**
- **SH520T**

---

**DETAIL B**

**SSBS OPTION**

**SPC OPTION**

**VIEW A-A**

---

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

4. FOR PIPE/CONDUIT SIZES UP TO 5"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-63 (REF. X8.4).

5. REF. SECTION A15 OR A25 FOR ALTERNATIVE ARRANGEMENT OF SEISMIC BRACES.

6. REF. PAGE A19.0 FOR PIPE/CONDUIT CLAMP OPTION.

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California SE No. S5270

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**PAGE C1.30**
HANGER ROD
DIAMETER = \( \frac{5}{8}'' \)

PIPING/CONDUIT TRANSVERSE
SEISMIC SOLID BRACING SYSTEM
5"Ø PIPE/CONDUIT MAX

KIT OPTIONS
SH54T
SH5T

REF. M PAGES FOR
CONNECTION DETAILS
\( \frac{5}{8}'' \) ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD
STIFFENER CLAMP,
TORQUE TO 10 FT-LBS, TYP
1\( \frac{1}{4} \times \frac{1}{8} \times 12GA \) SINGLE STRUT, ROD
STIFFENER, WHERE REQ'D

MASON IND. N.Y. UCC ROD
STIFFENER CLAMP,
TORQUE TO 10 FT-LBS, TYP

REF. N PAGES FOR BRACKET
CONNECTION DETAILS
MASON IND. N.Y.
SHB-1/2 OR SHB-5/8

(2) MW-SSN-1/2 WITH MW-BON-1/2,
IN (2) OUTSIDE HOLES, TORQUED
UNTIL NUT BREAKS OFF (REF. PAGE X4.0)

REFER TO TABLE FOR ALLOWABLE
BRACE ANGLE RANGE

MAX ALLOWABLE FORCE PER
SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>750 LBS</td>
<td>300 LBS</td>
<td>270 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>575 LBS</td>
<td>300 LBS</td>
<td>270 LBS</td>
</tr>
</tbody>
</table>

* STL = STEEL PIPING
** CI = CAST IRON PIPING

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL
NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE
LIMITED BY ANCHORAGE CAPACITY.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 31". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER
HOLE WHEN STRUT BRACE IS INSTALLED
INSIDE THE BRACKET AND (2) 1/2" DIA.
CONNECTIONS IN (2) OUTER HOLES WHEN
THE BRACE IS INSTALLED OUTSIDE OF THE
BRACKET. REF. X2.3 FOR CONNECTION
DETAILS.
4. FOR PIPE/CONDUIT SIZES UP TO 5"Ø MAX, USE
RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1)
OR USE MW-WPL-63 (REF. X8.4).
5. REF. SECTION A15 OR A25 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.
6. REF. PAGE A19.0 OR A28.0 FOR PIPE/CONDUIT
CLAMP OPTION.
HANGER ROD DIAMETER = $\frac{5}{8}''$

PIPING/CONDUIT LONGITUDINAL SEISMIC SOLID BRACING SYSTEM
5''Ø PIPE/CONDUIT MAX

REF. M PAGES FOR CONNECTION DETAILS
$\frac{5}{8}''$Ø ASTM A36 ATR, TYP
$1\frac{1}{4}''\times\frac{3}{8}''\times12$GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D
MASON IND. N.Y. UCC ROD STIFFENER CLAMP
TORQUE TO 10 FT-LBS, TYP

MW-WPL LUG AS SHOWN OR PIPE CLAMP OPTIONS
BOTH SIDES OF PIPE HANGER LUG, TYP.

DETAIL B

ROD STIFFENER CLAMP
1'' MIN T&B, TYP

BRACE MEMBER
$1\frac{1}{4}''\times\frac{3}{8}''\times12$GA SINGLE STRUT
(9'-6'' MAX)
$1\frac{1}{4}''\times\frac{3}{8}''\times12$GA DOUBLE STRUT
(14'-6'' MAX)

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)
MASON IND. N.Y. SHB-5/8 AS SHOWN OR SSBS-20 OPTION

VIEW A-A

Piping/Conduit Longitudinal Seismic Solid Bracing System
5''Ø Pipe/Conduit Max

REF. N PAGES FOR BRACKET CONNECTION DETAILS
MASON IND. N.Y.
SSBS-12 OR SSBS-20

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE MEMBER, SEE VIEW A-A

MK OPTIONS
S20L
S2012L
SH512L
SH520L

HANGER LUG, TYP.

6'' MAX T&B, TYP
48'' O.C. MAX
L=158'' MAX

ROD STIFFENER

1'' MIN T&B, TYP

DETAIL B

ROD STIFFENER CLAMP

1'' MIN T&B, TYP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, $F_p$

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>580 LBS</td>
<td>580 LBS</td>
<td>580 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>410 LBS</td>
<td>410 LBS</td>
<td>410 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH ($L$) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2'' DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2'' DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
4. FOR PIPE/CONDUIT SIZES UP TO 5''Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-63 (REF. X8.4).
5. REF. PAGE A19.0 OR A28.0 FOR PIPE/CONDUIT CLAMP OPTION.

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH ($L$) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2'' DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2'' DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
4. FOR PIPE/CONDUIT SIZES UP TO 5''Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-63 (REF. X8.4).
5. REF. PAGE A19.0 OR A28.0 FOR PIPE/CONDUIT CLAMP OPTION.
KIT OPTIONS

SH54L
SH55L

REF. N PAGES FOR BRACKET CONNECTION DETAILS

MASON IND. N.Y.
SHB-1/2 OR SHB-5/8

(2) MW-SSN-1/2 WITH MW-BON-1/2, IN (2) OUTSIDE HOLES, TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)³ (2) REG. NUT FOR L3x3½ BRACE, SNUG TIGHT)

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE MEMBER ¹, SEE VIEW A-A

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTSIDE HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
4. FOR PIPE/CONDUIT SIZES UP TO 5"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-63 (REF. X8.4).
5. REF. PAGE A19.0 OR A28.0 FOR PIPE/CONDUIT CLAMP OPTION.
PIPING/CONDUIT ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM

5"Ø PIPE/CONDUIT MAX

**NOTES:**
1. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.

2. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

3. MW-KY-63 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD, REF X2.4.

4. FOR PIPE/CONDUIT SIZES UP TO 5"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-63 (REF. X8.4).

5. FOR PIPE/CONDUIT CLAMP OPTION.

**KITS OPTIONS**

- S20A
- S2012A
- SH512A
- SH520A

**DETAILS:**

- **VIEW A-A**
- **SSBS OPTION**
- **SPC OPTION**

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

<table>
<thead>
<tr>
<th>TRAN. LONG.</th>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>580 LBS</td>
<td>300 LBS</td>
<td>270 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>410 LBS</td>
<td>450 LBS</td>
<td>450 LBS</td>
</tr>
</tbody>
</table>

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

<table>
<thead>
<tr>
<th>TRAN. LONG.</th>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15° MAX</td>
<td>590 LBS</td>
<td>420 LBS</td>
<td>630 LBS</td>
</tr>
<tr>
<td>15° MAX</td>
<td>590 LBS</td>
<td>420 LBS</td>
<td>630 LBS</td>
</tr>
</tbody>
</table>

**REFERENCE TABLE FOR ALLOWABLE BRACE ANGLE RANGE**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15° MAX</td>
<td>590 LBS</td>
<td>420 LBS</td>
<td>630 LBS</td>
</tr>
<tr>
<td>15° MAX</td>
<td>590 LBS</td>
<td>420 LBS</td>
<td>630 LBS</td>
</tr>
</tbody>
</table>

**INSULATION WHERE REQ'D**

**HANGER ROD DIAMETER = 5/8"**

**HANGER ROD LUG, TYP.**

**1" MIN T&B, TYP.**

**5"Ø PIPE CONDUIT MAX**

**15° MAX**

**15° MAX**

**MASON IND. N.Y. SHB-5/8 AS SHOWN OR SSBS-20 OPTION 1, 4**

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
**PIPING/CONDUIT ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM**

5"Ø PIPE/CONDUIT MAX

**HANGER ROD DIAMETER = 5/8"**

**KIT OPTIONS**

SH54A

SH5A

---

**DETAILED INFORMATION**

- **REF. M PAGES FOR CONNECTION DETAILS**
  - 5/8" Ø ASTM A36 ATR, TYP
  - MASON IND. N.Y. UCC ROD STIFFENER CLAMP
  - TORQUE TO 10 FT-LBS, TYP

- **1 1/2 x 1 1/2 x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D**

- **MASON IND. N.Y. SHB-5/8**

---

**DETAIL B**

- 5/8" Ø NUT (T&B SNUG TIGHT)
  - MW-WPL LUG AS SHOWN OR PIPE
  - CLAMP OPTIONS 5, 6, 7
  - BOTH SIDES OF PIPE HANGER LUG, TYP.
  - 5/8" Ø PIPE/CONDUIT MAX
  - INSULATION WHERE REQ'D
  - ROD STIFFENER CLAMP

- **1" MIN T&B, TYP**

---

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, **

<table>
<thead>
<tr>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAN.</td>
<td>LONG.</td>
<td>TRAN.</td>
</tr>
<tr>
<td>30° - 45°</td>
<td>750 LBS</td>
<td>750 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>455 LBS</td>
<td>455 LBS</td>
</tr>
</tbody>
</table>

1. **REF. SECTION A10 OR A20 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.**

2. **PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.**

3. **PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.**

4. **MW-KY-63 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD. REF. X2.4.**

5. **FOR PIPE/CONDUIT SIZES UP TO 5"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-63 (REF. X8.4).**

6. **REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.**

7. **REF. PAGE A19.0 OR A28.0 FOR PIPE/CONDUIT CLAMP OPTION.**

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**PAGE C1.35**

---

**NOTES:**

- **REF. GENERAL NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.**

---

**SFC OPTION**

- **BRACE MEMBER**
  - 1 1/2 x 1 1/2 x 12GA SINGLE STRUT (5'-0" MAX)
  - 1 1/2 x 1 1/2 x 12GA DOUBLE STRUT (14'-6" MAX)
  - (1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)

---

**VIEW A-A**

---

**MW-KY-63, BOTTOM ONLY WHEN STACKING SHBs**

- **STL = STEEL PIPING**
  - **Ci = CAST IRON PIPING**

---

**10/09/2020**

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

California SE No. S5270

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**226 of 846**
PIPING TRANSVERSE
SEISMIC SOLID BRACING SYSTEM
12"Ø PIPE MAX

DETAIL B

SSBS OPTION

SPC OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, $F_p$

<table>
<thead>
<tr>
<th>WPL</th>
<th>8&quot;Ø PIPE MAX</th>
<th>12&quot;Ø PIPE MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPC (STL*)</td>
<td>630 LBS</td>
<td>580 LBS</td>
</tr>
<tr>
<td>SPC (CI**)</td>
<td>630 LBS</td>
<td>580 LBS</td>
</tr>
<tr>
<td>30° - 45°</td>
<td>630 LBS</td>
<td>580 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>570 LBS</td>
<td>570 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
4. FOR PIPE SIZES UP TO 12"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-75 OR -75A (REF. X8.4) FOR UP TO 8"Ø OR 12"Ø MAX, RESPECTIVELY.
5. REF. SECTION A15 FOR ALTERNATIVE ARRANGEMENT OF SEISMIC BRACES.
HANGER ROD DIAMETER = 3/4"

PIPING TRANSVERSE SEISMIC SOLID BRACING SYSTEM
12"Ø PIPE MAX

REF. M PAGES FOR CONNECTION DETAILS
3/4" Ø ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD STIFFENER CLAMP,
TORQUE TO 10 FT-LBS, TYP
1 1/2" x 1 1/2" x 12GA SINGLE STRUT, ROD
STIFFENER, WHERE REQ'D

3/4" Ø NUT (T&B SNUG TIGHT)
MW-WPL LUG 4, 5

1" MIN T&B, TYP

ROD STIFFENER CLAMP

BOTH SIDES OF PIPE HANGER LUG, TYP.
1/2" FOR WPL-75
1/4" FOR WPL-75A
12" Ø PIPE MAX

INSULATION WHERE REQ'D

SHAPE MEMBER ¹, SEE VIEW A-A

VIEW A-A

REF. N PAGES FOR BRACKET CONNECTION DETAILS
MASON IND. N.Y. SHB-1/2, SHB-5/8 OR SHB-3/4 ¹
(2) MW-SSN-1/2 WITH MW-BON-1/2,
IN (2) OUTSIDE HOLES, TORQUED
UNTIL NUT BREAKS OFF (REF.
PAGE X4.0) ³ ((2) REG. NUT FOR
L3x3x1/4 BRACE, SNUG TIGHT)

REF. TO TABLE FOR ALLOWABLE
BRACE ANGLE RANGE

BRACE ANGLE RANGE
MAX ALLOWABLE FORCE PER
SEISMIC BRACE ASSEMBLY, Fp
30° - 45° 1090 LBS
46° - 60° 750 LBS

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED
BY ANCHORAGE CAPACITY.

2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 37". REF.
APPROPRIATE M10 PAGES FOR DETAIL.

3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER
HOLE WHEN STRUT BRACE IS INSTALLED
INSIDE THE BRACKET AND (2) OUTSIDE HOLES
WHEN THE BRACE IS INSTALLED OUTSIDE OF THE
BRACKET. REF. X2.3 FOR CONNECTION
DETAILS.

4. FOR PIPE SIZES UP TO 8" Ø OR 12" Ø MAX, USE
MW-WPL-75 OR MW-WPL-75A (REF. X8.4),
RESPECTIVELY.

5. REF. SECTION A15 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.
**HANGER ROD**

**DIAMETER = 3/4”**

--

**PIPING LONGITUDINAL SEISMIC SOLID BRACING SYSTEM**

**12”Ø PIPE MAX**

---

**KIT OPTIONS**

| S20L  |
| S2012L |
| SH612L  |
| SH620L  |

---

**REF. M PAGES FOR CONNECTION DETAILS**

3/4” Ø ASTM A36 ATR, TYP

1-3/16x1-3/16x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2

MASON IND. N.Y. UCC ROD STIFFENER CLAMP

TORQUE TO 10 FT-LBS, TYP 1

---

**ROD STIFFENER CLAMP**

1” MIN T&B, TYP

---

**BOTH SIDES OF PIPE**

HANGER LUG, TYP.

---

**INSULATION**

WHERE REQ'D

12” Ø PIPE MAX

---

**MASON IND. N.Y. SHB-3/4 AS SHOWN OR SSBS-20 OPTION 1**

1” MIN T&B, TYP

---

**REFERENCE**

**Fp**

```
<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>630 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>570 LBS</td>
</tr>
</tbody>
</table>

* STL = STEEL PIPING  
** CI = CAST IRON PIPING
```

---

**NOTES:**

1. REF. SECTION A10 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

4. FOR PIPE SIZES UP TO 12”Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-75 OR -75A (REF. X8.4) FOR UP TO 8”Ø OR 12”Ø MAX, RESPECTIVELY.

---

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**PAGE**

C1.42
**HANGER ROD**
DIAMETER = 3/4"

**PIPING LONGITUDINAL SEISMIC SOLID BRACING SYSTEM**
12" Ø PIPE MAX

**KIT OPTIONS**
SH64L
SH65L
SH6L

---

**REF. M PAGES FOR CONNECTION DETAILS**

**1/4" Ø ASTM A36 ATR, TYP**

1/2" x 1/2" x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D

MASON IND. N.Y. UCC ROD STIFFENER CLAMP

TORQUE TO 10 FT-LBS, TYP

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

MASON IND. N.Y. SHB-1/2, SHB-5/8 OR SHB-3/4

(2) MW-SSN-1/2 WITH MW-BON-1/2, IN (2) OUTSIDE HOLES, TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) (2) REG. NUT FOR L3x3x1/4 BRACE, SNUG TIGHT

**REF. TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE**

**BRACE MEMBER 1, SEE VIEW A-A**

---

**DETAIL B**

**BRACE MEMBER 1**

1/2" x 1/2" x 12GA SINGLE STRUT
(5'-0" MAX)

1/2" x 1/2" x 12GA DOUBLE STRUT
(9'-6" MAX)

L3x3x1/4 (14'-6" MAX)

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) (2) REG. NUT FOR L3x3x1/4 BRACE, SNUG TIGHT

MASON IND. N.Y. SHB-3/4

---

**NOTES:**

1. REF. SECTION A10 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTSIDE HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

4. FOR PIPE SIZES UP TO 8" Ø OR 12" Ø MAX, USE MW-WPL-75 OR MW-WPL-75A (REF. X8.4), RESPECTIVELY.

---

**VIEW A-A**

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OPM-0043-13  
10/09/2020

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230 of 846
**HANGER ROD DIAMETER = 3/4”**

**PIPING ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM**
12"Ø PIPE MAX

**KIT OPTIONS**
- S20A
- S2012A
- SH612A
- SH620A

**MASON IND. N.Y. SHB-3/4 AS SHOWN OR SSBS-20 OPTION 1, 4**

**MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)**

**REFERENCES**
- M PAGES FOR BRACKET CONNECTION DETAILS
- N PAGES FOR BRACKET CONNECTION DETAILS

**NOTES:**
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
4. MW-KY-75 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD, REF X2.4.
5. FOR PIPE SIZES UP TO 12"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-75 OR -75A (REF. X8.4) FOR UP TO 8"Ø OR 12"Ø MAX, RESPECTIVELY.
6. REF. SECTION A15 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

**KIT OPTIONS**
- S20A
- S2012A
- SH612A
- SH620A

**REFERENCES**
- M PAGES FOR BRACKET CONNECTION DETAILS
- N PAGES FOR BRACKET CONNECTION DETAILS

**NOTES:**
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
4. MW-KY-75 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD, REF X2.4.
5. FOR PIPE SIZES UP TO 12"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-75 OR -75A (REF. X8.4) FOR UP TO 8"Ø OR 12"Ø MAX, RESPECTIVELY.
6. REF. SECTION A15 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
HANGER ROD DIAMETER = \( \frac{3}{4}'' \)

Pipings All-Directional Seismic Solid Bracing System
12"Ø Pipe Max

Kit Options
SH64A  
SH65A  
SH6A

**Notes:**
1. **Ref. Section A10 for General Notes.** Max allowable force, \( F_p \), may be limited by anchorage capacity.
2. Provide rod stiffening only where seismic brackets are attached to the rod and rod length (\( L \)) exceeds 37". Ref. appropriate M10 pages for detail.
3. Provide (1) 1/2" dia. connection in center hole when strut brace is installed inside the bracket and (2) 1/2" dia. connections in (2) outer holes when the brace is installed outside of the bracket. Ref. X2.3 for connection details.
4. MW-KY-75 must be used on top of bottom SHB when stacking (2) SHB on the same rod. Ref. X2.4.
5. For pipe sizes up to 8"Ø or 12"Ø max, use MW-WPL-75 or MW-WPL-75A (Ref. X8.4), respectively.

---

**Table: Max Allowable Force per Seismic Brace Assembly, \( F_p \)**

<table>
<thead>
<tr>
<th>Brace Angle Range</th>
<th>Max Allowable Force, ( F_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>1090 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>670 LBS</td>
</tr>
</tbody>
</table>

---

BRAcE MEmBeR \(^1\), SEE VIEW A-A

(1) MW-SSN-1/2 with MW-BON-1/2 torqued until nut breaks off (Ref. Page X4.0) \(^1\) (2) Reg. Nut for L3x3x\( \frac{3}{4}'' \) brace, snug tight

---

**Detail B**

<table>
<thead>
<tr>
<th>Brace Member (^1)</th>
<th>Max Allowable Force, ( F_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%x1%x12GA Single Strut (5'-0&quot; Max)</td>
<td>15° Max</td>
</tr>
<tr>
<td>1%x1%x12GA Double Strut (9'-6&quot; Max)</td>
<td>15° Max</td>
</tr>
<tr>
<td>L3x3x( \frac{3}{4}'' ) (14'-6&quot; Max)</td>
<td>15° Max</td>
</tr>
</tbody>
</table>

---

**View A-A**

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OPM-0043-13  
10/09/2020**

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فعلاً، لا أستطيع قراءة النص بالشكل الطبيعي من الصورة المقدمة. النص مكتوب بشكل سطحي ويتضمن العديد من العناصر الجغرافية والصيغة المحددة. إذا كنت بحاجة إلى مساعدة في شيء آخر، فأنا هنا لمساعدتك.
PIPING TRANSVERSE SEISMIC SOLID BRACING SYSTEM
18"Ø PIPE MAX

HANGER ROD DIAMETER = 3/4"

KIT OPTIONS
S3T

18"Ø PIPE MAX

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 27". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>2750 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>1740 LBS</td>
</tr>
</tbody>
</table>

MASON WEST, INC.
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Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
HANGER ROD DIAMETER = \( \frac{3}{4}'' \)

PIPING TRANSVERSE SEISMIC SOLID BRACING SYSTEM
18"Ø PIPE MAX

KIT OPTIONS
S3T

REF. M PAGES FOR CONNECTION DETAILS
COUPLING NUT
MIN 3x3x\( \frac{3}{4}'' \) OR 3"Øx\( \frac{3}{4}'' \) ASTM A36 PLATE
W/ 1\( \frac{1}{4}'' \)Ø HOLE & \( \frac{3}{4}'' \)Ø NUT, T&B TYP

\( \frac{3}{4}'' \)Ø ASTM A36 ATR, TYP
2"Ø ASTM A53 GR B SCH. 40 PIPE
\( \frac{3}{4}'' \)Ø NUT (T&B SNUG TIGHT), TYP
MW-WPL-75A PIPE HANGER LUG, (SEE PAGE X8.4)
BOTH SIDES OF PIPE HANGER LUG, TYP.
18"Ø PIPE MAX
INSULATION WHERE REQ'D

6" MAX T&B, TYP
L = 158" MAX

(2) \( \frac{1}{2}'' \)Ø BOLT AND NUT, SNUG TIGHT

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, ( F_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>2750 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>1740 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. REF. SECTION A15 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

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PAGE C1.46.1

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020
HANGER ROD DIAMETER = 3/4"

PIPING LONGITUDINAL SEISMIC SOLID BRACING SYSTEM
18"Ø PIPE MAX

1/4" Ø ASTM A36 ATR, TYP

1 1/4 x 1/2" x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2

MASON IND. N.Y. UCC ROD STIFFENER CLAMP

TYP OR TYP 1

TORQUE TO 10 FT-LBS, TYP

L=86" MAX

6" MAX T&B, TYP

42" O.C. MAX

MW-WPL-75A PIPE HANGER LUG, (SEE PAGE X8.4)

 BOTH SIDES OF PIPE HANGER LUG, TYP.

(2) 1/4" Ø BOLT AND NUT, SNUG TIGHT

NOTE:

1. REF. SECTION A10 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 27". REF. APPROPRIATE M10 PAGES FOR DETAIL.

NOTES:

1. REF. SECTION A10 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 27". REF. APPROPRIATE M10 PAGES FOR DETAIL.
**HANGER ROD**

**DIA**METER = $\frac{3}{4}''$

**PIPING LONGITUDINAL**

**SEISMIC SOLID BRACING SYSTEM**

18"Ø PIPE MAX

**KIT OPTIONS**

S3L

---

**VIEW A-A**

**NOTES:**

1. REF. SECTION A10 FOR GENERAL NOTES.
HANGER ROD
DIAMETER = \( \frac{3}{4}'' \)

PIPING ALL-DIRECTIONAL
SEISMIC SOLID BRACING SYSTEM
18''Ø PIPE MAX

KIT OPTIONS
S3A

BRACE MEMBER
L3x3x\( \frac{3}{4}'' \) (9'-6'' MAX)
L4x4x\( \frac{3}{4}'' \) (14'-6'' MAX)
(ASTM A36, Fy = 36 KSI)

(2) \( \frac{1}{2}'' \) Ø BOLT AND NUT, SNUG TIGHT

NOTE:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 27'. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND MAX OFFSET VALUES.
4. HANGER ROD IS REQUIRED AT ONLY ONE MW-WPL/BRACE BRACKET LOCATION.

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10/09/2020

PAGE
C1.48
**HANGER ROD**

**DIAMETER =\( \frac{3}{4} \)"**

---

**PIPING ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM**

**18"Ø PIPE MAX**

---

**KIT OPTIONS**

**S3A**

---

**NOTES:**

1. REF. SECTION A10 FOR GENERAL NOTES.

2. REF. SECTION A15 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND MAX OFFSET VALUES.

3. HANGER ROD IS REQUIRED AT ONLY ONE MW-WPL/BRACE BRACKET LOCATION.

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**VIEW A-A**

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**PAGE**

C1.48.1
**HANGER ROD**

**DIAMETER** = \( \frac{7}{8}" \)

---

**PIPING TRANSVERSE SEISMIC SOLID BRACING SYSTEM**

**12"Ø PIPE MAX**

---

**KIT OPTIONS**

**S2520T**

---

**REF. M PAGES FOR CONNECTION DETAILS**

\( \frac{7}{8}" Ø ASTM A36 ATR, TYP \)

**MASON IND. N.Y. SRC-1½" ROD STIFFENER CLAMP, TIGHTEN BY TURN OF NUT METHOD, SNUG TIGHT AND ADD 1/2 TURN.**

\( L 1\times 1\frac{1}{2} \times 1\frac{3}{4} " \) **ROD STIFFENER (ASTM A36, Fy = 36 KSI) WHERE REQ'D**

**MW-WPL-88 PIPE HANGER LUG, (SEE PAGE X8.4)**

**BOTH SIDES OF PIPE HANGER LUG, TYP.**

**12"Ø PIPE MAX**

**INSULATION WHERE REQ'D**

**ROD STIFFENER CLAMP**

**1" MIN T&B, TYP**

---

**DETAIL B**

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**VIEW A-A**

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**MASON IND. N.Y. SSBS-25**

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**BRACE MEMBER**, SEE VIEW A-A

---

**NOTE:**

1. REF. SECTION A10 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 43". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

4. REF. SECTION A15 FOR ALTERNATIVE ARRANGEMENT OF SEISMIC BRACES.

---

**BRACE ANGLE RANGE**

<table>
<thead>
<tr>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, ( F_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
</tr>
<tr>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

---

**NOTES:**

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PAGE C1.50

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239 of 846
**HANGER ROD**

**DIAMETER = 7/8"**

---

**PIPING LONGITUDINAL SEISMIC SOLID BRACING SYSTEM**

**12"Ø PIPE MAX**

---

**KIT OPTIONS**

**S2520L**

---

**NOTE:**

1. **REF. M PAGES FOR CONNECTION DETAILS**

2" Ø ASTM A36 ATR, TYP

**MASON IND. N.Y. SRC-1/2**

**1 ROD STIFFENER CLAMP, TIGHTEN BY TURN OF NUT METHOD, SNUG TIGHT AND ADD 1/2 TURN.**

**L1 1/2 X 1 1/2 X 1/4**, **ROD STIFFENER**

(ASTM A36, Fy = 36 KSI) WHERE REQ'D

---

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

**MASON IND. N.Y. SSBS-20**

---

**66" O.C. MAX**

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**1 L = 134" MAX**

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**REF. X4.0**

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**NOTE:**

2. **PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 43". REF. APPROPRIATE M10 PAGES FOR DETAIL.**

---

**NOTE:**

3. **PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
HANGER ROD DIAMETER = 7/8"

PIPING ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM
12" Ø PIPE MAX

KIT OPTIONS
S2520A

REFERENCE,
MASON IND. N.Y. SSBS-20

(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)

3

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE MEMBER 1, SEE VIEW A-A

Fp

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>0</th>
<th>30° - 45°</th>
<th>46° - 60°</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAN.</td>
<td>580 LBS</td>
<td>580 LBS</td>
<td></td>
</tr>
<tr>
<td>LONG.</td>
<td>410 LBS</td>
<td>410 LBS</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 43". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

4. REF. SECTION A15 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

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PAGE
C1.52
**HANGER ROD**

**DIAMETER = 1”**

---

**PIPING TRANSVERSE SEISMIC SOLID BRACING SYSTEM**

**18”Ø PIPE MAX**

---

**KIT OPTIONS**

**S2520T**

---

**REF. M PAGES FOR CONNECTION DETAILS**

1”Ø ASTM A36 ATR, TYP

**MASON IND. N.Y. SRC-1½”1/2 ROD STIFFENER CLAMP, TIGHTEN BY TURN OF NUT METHOD, SNUG TIGHT AND ADD ½ TURN. L1½x1½x½” ROD STIFFENER (ASTM A36, Fy = 36 KSI) WHERE REQ’D**

**1”Ø NUT (T&B SNUG TIGHT)**

---

**MW-WPL-100 PIPE HANGER LUG, (SEE PAGE X8.4)**

**BOTH SIDES OF PIPE HANGER LUG, TYP.**

**18”Ø PIPE MAX**

**INSULATION WHERE REQ’D**

---

**RD STIFFENER CLAMP**

**1” MIN T&B, TYP**

---

**NOTE:**

1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 50”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
4. REF. SECTION A15 FOR ALTERNATIVE ARRANGEMENT OF SEISMIC BRACES.
HANGER ROD
DIAMETER = 1"

PIPING LONGITUDINAL
SEISMIC SOLID BRACING SYSTEM
18" Ø PIPE MAX

KIT OPTIONS
S2520L

REF. M PAGES FOR
CONNECTION DETAILS
1" Ø ASTM A36 ATR, TYP

MASON IND. N.Y. SRC-1½ 1 Ø ROD
STIFFENER CLAMP, TIGHTEN BY
TURN OF NUT METHOD, SNUG
TIGHT AND ADD ½ TURN.
(L1½x1½x1¾, Ø ROD STIFFENER
(ASTM A36, Fy = 36 KSI) WHERE REQ'D 2

MW-WPL-100 PIPE HANGER
LUG, (SEE PAGE X8.4)

ROD
STIFFENER
CLAMP

(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF
(REF. PAGE X4.0) 3

REFER TO TABLE FOR ALLOWABLE
BRACE ANGLE RANGE
BRACE MEMBER 1, SEE VIEW A-A

1"Ø NUT (T&B SNUG TIGHT)

15° MAX

240 LBS

240 LBS

Fp

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 50". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER
HOLE WHEN STRUT BRACE IS INSTALLED
INSIDE THE BRACKET AND (2) 1/2" DIA.
CONNECTIONS IN (2) OUTER HOLES WHEN
THE BRACE IS INSTALLED OUTSIDE OF THE
BRACKET. REF. X2.3 FOR CONNECTION
DETAILS.
HANGER ROD
DIAMETER = 1"

PIPING ALL-DIRECTIONAL
SEISMIC SOLID BRACING SYSTEM
18"Ø PIPE MAX

REF. M PAGES FOR
CONNECTION DETAILS
1" Ø ASTM A36 ATR, TYP
MASON IND. N.Y. SRC-1/2 1 ROD
STIFFENER CLAMP, TIGHTEN BY
TURN OF NUT METHOD, SNUG
TIGHT AND ADD 1/2 TURN.
L1\frac{1}{2}\times L_{\text{MAX}}, ROD STIFFENER
(ASTM A36, F_y = 36 KSI) WHERE REQ'D
1" Ø NUT (T&B SNUG TIGHT)
MW-WPL-100 PIPE HANGER
LUG, (SEE PAGE X8.4)
BOTH SIDES OF PIPE
HANGER LUG, TYP.

DETAIL B

BRACE MEMBER 1
1\frac{1}{2}\times 1\frac{1}{2}\times 12GA SINGLE STRUT
(9'-6" MAX)
1\frac{1}{2}\times 1\frac{1}{2}\times 12GA DOUBLE STRUT
(14'-6" MAX)
(2) MW-SSN-1/2 WITH
MW-BON-1/2, IN (2) OUTSIDE
HOLES, TORQUED UNTIL NUT
BREAKS OFF (REF. PAGE X4.0)
MASON IND. N.Y.
SSBS-25 1

SPC OPTION

BRACE MEMBER 1
1\frac{1}{2}\times 1\frac{1}{2}\times 12GA SINGLE STRUT
(9'-6" MAX)
1\frac{1}{2}\times 1\frac{1}{2}\times 12GA DOUBLE STRUT
(14'-6" MAX)
(2) MW-SSN-1/2 WITH
MW-BON-1/2, IN (2) OUTSIDE
HOLES, TORQUED UNTIL NUT
BREAKS OFF (REF. PAGE X4.0)
MASON IND. N.Y.
SSBS-25 1

MAX ALLOWABLE
FORCE PER
SEISMIC BRACE
ASSEMBLY, F_p

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, F_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>580 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>410 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 50".
REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER
HOLE WHEN STRUT BRACE IS INSTALLED
INSIDE THE BRACKET AND (2) 1/2" DIA.
CONNECTIONS IN (2) OUTER HOLES WHEN
THE BRACE IS INSTALLED OUTSIDE OF THE
BRACKET. REF. X2.3 FOR CONNECTION
DETAILS.
4. REF. SECTION A15 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.
1. REF. SECTION A10 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXceeds 43". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. SECTION A15 FOR ALTERNATE ARRANGEMENT OF SEISMIC BRACES.

NOTES:

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>3000 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>2220 LBS</td>
</tr>
</tbody>
</table>

MAVEN IND. N.Y. SRC-2

1"Ø ASTM A36 ATR, TYP

MASON IND. N.Y. SSB-4

(2) ½"Ø BOLT AND NUT, SNUG TIGHT

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

(2) 5/8"Ø BOLT AND NUT, SNUG TIGHT

MASON IND. N.Y. SSB-4

W/ 1½" ID RING

DETAIL B

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PAGE

C1.63
**HANGER ROD**

**DIAMETER = 1”**

**REF. M PAGES FOR CONNECTION DETAILS**

1”Ø ASTM A36 ATR, TYP

MASON IND. N.Y. SRC-2 ¹ ROD STIFFENER CLAMP, TIGHTEN BY TURN OF NUT METHOD, SNUG TIGHT AND ADD ½ TURN.

L2x2x3/4 ROD STIFFENER (ASTM A36, Fy = 36 KSI) WHERE REQ'D ²

**KIT OPTIONS**

S4L

**PIPING LONGITUDINAL SEISMIC SOLID BRACING SYSTEM**

**18”Ø PIPE MAX**

**6” MAX T&B, TYP**

**66” O.C. MAX**

L=134” MAX

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

**MASON IND. N.Y. SSB-4 ¹**

(2) ¾”Ø BOLT AND NUT, SNUG TIGHT

REFERRED TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

**NOTE:**

1. REF. SECTION A10 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 43”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

**NOTE:**

1. REF. N PAGES FOR BRACKET CONNECTION DETAILS

MASON IND. N.Y. SSB-4 ¹

**BRACE MEMBER**

L³x³x³/² (9'-6” MAX)

L⁴x⁴x³/² (14'-6” MAX)

(ASTM A36, Fy = 36 KSI)

MASON IND. N.Y. SSB-4

W/ ½” Ø ID RING ¹

**DETAIL B**

**1”Ø NUT (T&B SNUG TIGHT)**

**INSULATION WHERE REQ'D**

**18” Ø PIPE MAX**

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE (°)</th>
<th>MAX ALLOWABLE FORCE, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>3850 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>2220 LBS</td>
</tr>
</tbody>
</table>

**NOTE:**

1. REF. SECTION A10 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 43”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
HANGER ROD
DIAMETER = 1"

PIPING ALL-DIRECTIONAL
SEISMIC SOLID BRACING SYSTEM
18"Ø PIPE MAX

KIT OPTIONS
S4A

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 43". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES AND
MAX OFFSET VALUES.
4. HANGER ROD IS REQUIRED AT ONLY ONE
MW-WPL/BRACE BRACKET LOCATION.

DETAIL B

1"Ø NUT (T&B SNUG TIGHT)

MW-WPL-100 PIPE HANGER
LUG, TYP (SEE PAGE X8.4) 3

BOTH SIDES OF PIPE
HANGER LUG, TYP.

18"Ø PIPE MAX
INSULATION WHERE REQ'D

VIEW A-A

BRACE MEMBER
L3x3x⅞ (9'-6" MAX)
L4x4x⅞ (14'-6" MAX)
(ASTM A36, Fy = 36 KSI)
(2) ⅜" Ø BOLT AND
NUT, SNUG TIGHT
MASON IND. N.Y. SSB-4
W/ 1½" ID RING 1
DETAIL B

MAX ALLOWABLE
FORCE PER
SEISMIC BRACE
ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>2720 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>1570 LBS</td>
</tr>
</tbody>
</table>

1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 43". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES AND
MAX OFFSET VALUES.
4. HANGER ROD IS REQUIRED AT ONLY ONE
MW-WPL/BRACE BRACKET LOCATION.
**HANGER ROD**
Diameter = 1 ¼"

**PIPING TRANSVERSE SEISMIC SOLID BRACING SYSTEM**
24"Ø Pipe Max

**KIT OPTIONS**
S4T

**NOTES:**
1. Ref. Section A10 for General Notes.
2. Provide Rod Stiffening only where Seismic Brackets are attached to the Rod and Rod Length (L) exceeds 62". Ref. Appropriate M10 Pages for Detail.

**DETAIL B**

**VIEW A-A**

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**PAGE**
C1.70

**JEFFREY Y. KIKUMOTO**
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020
HANGER ROD
DIAMETER = 1¼"

PIPING LONGITUDINAL
SEISMIC SOLID BRACING SYSTEM
24"Ø PIPE MAX

REF. M PAGES FOR
CONNECTION DETAILS
1½"Ø ASTM A36 ATR, TYP
MASON IND. N.Y. SRC-2 ¹ ROD
STIFFENER CLAMP, TIGHTEN BY
TURN OF NUT METHOD, SNUG
TIGHT AND ADD ½ TURN.
L2x2x¾" ROD STIFFENER
(ASTM A36, Fy = 36 KSI) WHERE REQ'D

MW-WPL-125 PIPE HANGER
LUG, (SEE PAGE X8.4)
both sides of pipe
hanger lug, t yp.

1" MIN T&B, TYP

DETAIL B

1½"Ø NUT (T&B SNUG TIGHT)
INSULATION WHERE REQ'D

24" Ø PIPE MAX

BRACE MEMBER
L3x3x¾" (9'-6" MAX)
L4x4x¾" (14'-6" MAX)
(ASTM A36, Fy = 36 KSI)

(2) ½" Ø BOLT AND
NUT, SNUG TIGHT

DETAIL B

(2) ½" Ø BOLT AND
NUT, SNUG TIGHT

VIEW A-A

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 62". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
HANGER ROD
DIAMETER = 1 1/4"

PIPING ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM
24"Ø PIPE MAX

KIT OPTIONS
S4A

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 62". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND MAX OFFSET VALUES.
4. HANGER ROD IS REQUIRED AT ONLY ONE MW-WPL/BRACE BRACKET LOCATION.

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PAGE C1.72
HANGER ROD
DIAMETER = 1¼"

PIPING TRANSVERSE
SEISMIC SOLID BRACING SYSTEM
24"Ø PIPE MAX

KIT OPTIONS
S4T

1. REF. M PAGES FOR
CONNECTION DETAILS
1¼" Ø ASTM A36 ATR, TYP
MASON IND. N.Y. SRC-2 ¹ ROD
STIFFENER CLAMP, TIGHTEN BY
TURN OF NUT METHOD, SNUG
TIGHT AND ADD ½ TURN.
L2x2x½" ROD STIFFENER
(ASTM A36, Fy = 36 KSI) WHERE REQ’D
1¼" Ø NUT (T&B SNUG TIGHT)

MW-WPL-125 PIPE HANGER
LUG, (SEE PAGE X8.4) ³
BOTH SIDES OF PIPE
HANGER LUG, TYP.
24"Ø PIPE MAX

1" MIN T&B, TYP

15° MAX
15° MAX

VIEW A-A

DETAIL B

NOTE:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 46". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 46”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
**HANGER ROD**

DIAMETER = 1 1/4"

**PIPING ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM**

24" Ø PIPE MAX

**KIT OPTIONS**

S4A

---

**NOTES:**

1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 46". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND MAX OFFSET VALUES.
4. HANGER ROD IS REQUIRED AT ONLY ONE MW-WPL/BRACE BRACKET LOCATION.
HANGER ROD DIAMETER = 3/8"

PIPING/CONDUIT TRANSVERSE SEISMIC CABLE BRACING SYSTEM
2"Ø PIPE/CONDUIT MAX

KIT OPTIONS
C0T

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. FOR PIPE/CONDUIT SIZES UP TO 2"Ø MAX, USE RESPECTIVE MW-SPC PIPE CLAMP SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-38 (REF. X8.4).
4. REF. SECTION A15 OR A25 ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
5. REF. PAGE A19.1 OR A28.1 FOR PIPE/CONDUIT CLAMP OPTION.

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PAGE C2.10

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10/09/2020
254 of 846
HANGER ROD
DIAMETER = \frac{3}{8}"

PIPING/CONDUIT LONGITUDINAL
SEISMIC CABLE BRACING SYSTEM
2"Ø PIPE/CONDUIT MAX

KIT OPTIONS
C0L

MASON IND. N.Y. SCB-0

(1) \frac{3}{8}" Ø BOLT AND NUT TORQUE TO 30 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

REF. N PAGES FOR BRACKET CONNECTION DETAILS

MASON IND. N.Y. SCBH-0

(1) \frac{3}{8}" Ø BOLT AND NUT TORQUE TO 30 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

\frac{3}{8}" Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7X19 STRAND CORE

INSULATION WHERE REQ'D

2" Ø PIPE/CONDUIT MAX

DETAIL B

ROD STIFFENER CLAMP

1" MIN T&B, TYP

(1) \frac{3}{8}" Ø BOLT AND NUT TORQUE TO 30 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

MASON IND. N.Y. SCBH-0

SPC OPTION

MAX ALLOWABLE FORCE PER SEISMIC Brace ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>270 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>190 LBS</td>
</tr>
</tbody>
</table>

* STL = STEEL PIPING
** CI = CAST IRON PIPING

NOTES:

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. FOR PIPE/CONDUIT SIZES UP TO 2"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-38 (REF. X8.4).

4. REF. PAGE A19.1 OR A28.1 FOR PIPE/CONDUIT CLAMP OPTION.
HANGER ROD DIAMETER = 3/8"

PIPING/CONDUIT ALL-DIRECTIONAL SEISMIC CABLE BRACING SYSTEM 2"Ø PIPE/CONDUIT MAX

KIT OPTIONS
C0A

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS, TYP

1½x1½x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D

1/4" Ø ASTM A36 ATR, TYP

MASON IND. N.Y. SCB-01

1/4" Ø BOLT AND NUT TORQUE TO 30 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

1/2" Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7X19 STRAND CORE

3/8" NUT (T&B SNUG TIGHT)

2" Ø PIPE/CONDUIT MAX

INSULATION WHERE REQ'D

ROD STIFFENER CLAMP

1" MIN T&B, TYP

Fp

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>WPL (TRANS. LONG.)</th>
<th>SPC (STL*) (TRANS. LONG.)</th>
<th>SPC (CI**) (TRANS. LONG.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>170 LBS</td>
<td>270 LBS</td>
<td>170 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>170 LBS</td>
<td>170 LBS</td>
<td>170 LBS</td>
</tr>
</tbody>
</table>

STL = STEEL PIPING
** CI = CAST IRON PIPING

NOTES:

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. FOR PIPE/CONDUIT SIZES UP TO 2" Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-38 (REF. X8.4).
4. REF. PAGE A19.1 OR A28.1 FOR PIPE/CONDUIT CLAMP OPTION.

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PAGE C2.12

10/09/2020
**HANGER ROD**

**DIAMETER = ½”**

**PIPING/CONDUIT TRANSVERSE**

**SEISMIC CABLE BRACING SYSTEM**

**3”Ø PIPE/CONDUIT MAX**

**KIT OPTIONS**

**C1T**

**REF. M PAGES FOR**

**CONNECTION DETAILS**

½” Ø ASTM A36 ATR, TYP

MASON IND. N.Y. UCC ROD

STIFFENER CLAMP,

TORQUE TO 10 FT-LBS, TYP.¹

1⅛x1⅛x12GA SINGLE STRUT, ROD

STIFFEN, WHERE REQ’D.¹, ²

½” Ø NUT (T&B SNUG TIGHT)

MW-WPL LUG AS SHOWN

OR MW-SPC PIPE CLAMP

OPTIONS 3, 4, 5

**REF. N PAGES FOR BRACKET**

**CONNECTION DETAILS**

MASON IND. N.Y. SCB-1¹

(2) ½” Ø BOLTS AND NUTS TORQUE

TO 25 FT-LBS OR USE 30 FT-LBS

MIN BREAK AWAY NUTS (REF.

PAGE X4.0)

**REFER TO TABLE FOR ALLOWABLE**

**BRACE ANGLE RANGE**

½” Ø PRESTRETCHED GALVANIZED

 AIRCRAFT CABLE 7X19 STRAND

CORE¹

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL

NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE

SEISMIC BRACKET IS ATTACHED TO THE ROD

AND ROD LENGTH (L) EXCEEDS 25”. REF.

APPROPRIATE M10 PAGES FOR DETAIL.

3. FOR PIPE/CONDUIT SIZES UP TO 3”Ø MAX, USE

RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1)

OR USE MW-WPL-50 (REF. X8.4).

4. REF. SECTION A15 OR A25 ALTERNATE

ARRANGEMENTS OF SEISMIC BRACES.

5. REF. PAGE A19.1 OR A28.1 FOR PIPE/CONDUIT

CLAMP OPTION.

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OPM-0043-13

10/09/2020

CALIFORNIA BUILDING CODE, 2013

**PAGE**

C2.20
HANGER ROD DIAMETER = \( \frac{1}{2} \)"

PIPING/CONDUIT LONITUDINAL SEISMIC CABLE BRACING SYSTEM
3"Ø PIPE/CONDUIT MAX

KIT OPTIONS
C1L

REF. M PAGES FOR CONNECTION DETAILS
\( \frac{3}{4} \)" Ø ASTM A36 ATR, TYP
1\( \times \frac{3}{8} x 12 \)GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS, TYP 1

\( \frac{1}{2} \)" Ø NUT (T&B SNUG TIGHT)

DETAIL B

ROD STIFFENER CLAMP

1" MIN T&B, TYP

REF. N PAGES FOR BRACKET CONNECTION DETAILS

MASON IND. N.Y. SCB-1 1

(2) \( \frac{3}{4} \)" Ø BOLTS AND NUTS TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUTS (REF. PAGE X4.0)

REF. PAGE X4.0

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

\( \frac{3}{4} \)" Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7X19 STRAND CORE 1

INSULATION WHERE REQ'D

3" Ø PIPE/CONDUIT MAX

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \)

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE ( \theta )</th>
<th>MAX ALLOWABLE FORCE WPL SPC (STL*) SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>540 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>380 LBS</td>
</tr>
</tbody>
</table>

* STL = STEEL PIPING
** CI = CAST IRON PIPING

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. FOR PIPE/CONDUIT SIZES UP TO 3" Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-50 (REF. X8.4).
4. REF. PAGE A19.1 OR A28.1 FOR PIPE/CONDUIT CLAMP OPTION.

VIEW A-A

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P A G E

C2.21

Jeff Kikumoto  
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

PAGE 258 of 846
HANGER ROD
DIAMETER = ½"

PIPING/CONDUIT ALL-DIRECTIONAL
SEISMIC CABLE BRACING SYSTEM
3"Ø PIPE/CONDUIT MAX

KIT OPTIONS
C1A

MASON IND. N.Y. UCC ROD
STIFFENER CLAMP,
TORQUE TO 10 FT-LBS, TYP
1½x1½x12GA SINGLE STRUT, ROD
STIFFENER, WHERE REQ'D 1, 2

½"Ø NUT (T&B SNUg TIGHT)

DETAIL B

3"Ø PIPE/CONDUIT MAX
INSULATION WHERE REQ'D

1" MIN
T&B, TYP

ROD STIFFENER
CLAMP

MW-WPL LUG AS SHOWN OR MW-SPC PIPE CLAMP OPTIONS 3, 4

MAX ALLOWABLE FORCE PER
SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>300 LBS</td>
<td>500 LBS</td>
<td>500 LBS</td>
</tr>
<tr>
<td>45° - 60°</td>
<td>290 LBS</td>
<td>290 LBS</td>
<td>220 LBS</td>
</tr>
<tr>
<td>60° - 90°</td>
<td>220 LBS</td>
<td>220 LBS</td>
<td>220 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. FOR PIPE/CONDUIT SIZES UP TO 3"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-50 (REF. X8.4).
4. REF. PAGE A19.1 OR A28.1 FOR PIPE/CONDUIT CLAMP OPTION.
HANGER ROD
DIAMETER = 5/8"

PIPING/CONDUIT TRANSVERSE
SEISMIC CABLE BRACING SYSTEM
5"Ø PIPE/CONDUIT MAX

KIT OPTIONS
C1T

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL
   NOTES.
2. PROVIDE ROD STIFFENER ONLY WHERE
   SEISMIC BRACKET IS ATTACHED TO THE ROD
   AND ROD LENGTH (L) EXCEEDS 31". REF
   APPROPRIATE M10 PAGES FOR DETAILS.
3. FOR PIPE/CONDUIT SIZES UP TO 5"Ø MAX, USE
   RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1)
   OR USE MW-WPL-63 (REF. X8.4).
4. REF. SECTION A15 OR A25 ALTERNATE
   ARRANGEMENTS OF SEISMIC BRACES.
5. REF. PAGE A19.1 OR A28.1 FOR PIPE/CONDUIT
   CLAMP OPTION.

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P A G E
C2.30
**HANGER ROD**
Diameter = 5/8”

**PIPING/CONDUIT LONGITUDINAL SEISMIC CABLE BRACING SYSTEM**
5”Ø PIPE/CONDUIT MAX

**KIT OPTIONS**
C1L

---

**REF. M PAGES FOR CONNECTION DETAILS**

1/8” x 1/8” x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS, TYP 1

5/8” Ø NUT (T&B SNUG TIGHT)

**DETAIL B**

**ROD STIFFENER CLAMP**

1” MIN T&B, TYP

**VIEW A-A**

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

MASON IND. N.Y. SCB-1 1

(2) 5/8” Ø BOLTS AND NUTS TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUTS (REF. PAGE X4.0)

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

5/8” Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7X19 STRAND CORE 1

**SPC OPTION**

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0° - 30°</td>
<td>540 LBS</td>
<td>540 LBS</td>
<td>540 LBS</td>
</tr>
<tr>
<td>30° - 45°</td>
<td>380 LBS</td>
<td>380 LBS</td>
<td>380 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>380 LBS</td>
<td>380 LBS</td>
<td>380 LBS</td>
</tr>
</tbody>
</table>

* STL = STEEL PIPING
** CI = CAST IRON PIPING

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31”. REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. FOR PIPE/CONDUIT SIZES UP TO 5”Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-63 (REF. X8.4).
4. REF. PAGE A19.1 OR A28.1 FOR PIPE/CONDUIT CLAMP OPTION.
HANGER ROD DIAMETER = $\frac{5}{8}''$

PIPING/CONDUIT ALL-DIRECTIONAL SEISMIC CABLE BRACING SYSTEM
5''Ø PIPE/CONDUIT MAX

KIT OPTIONS
C1A

MASON IND. N.Y. SCB-1

REF. N PAGES FOR BRACKET CONNECTION DETAILS

MASON IND. N.Y. SCBH-1

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

1/4'' Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7X19 STRAND CORE

DETAIL B

ROD STIFFENER CLAMP

1'' MIN T&B, TYP

Fp

SPC OPTION

VIEW A-A

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td>300 LBS</td>
<td>300 LBS</td>
<td>300 LBS</td>
</tr>
<tr>
<td>30° - 45°</td>
<td>540 LBS</td>
<td>540 LBS</td>
<td>540 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>380 LBS</td>
<td>380 LBS</td>
<td>380 LBS</td>
</tr>
<tr>
<td>61° - 90°</td>
<td>270 LBS</td>
<td>270 LBS</td>
<td>270 LBS</td>
</tr>
</tbody>
</table>

NOTES:

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAILS.

3. FOR PIPE/CONDUIT SIZES UP TO 5''Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-63 (REF. X8.4).

4. REF. PAGE A19.1 OR A28.1 FOR PIPE/CONDUIT CLAMP OPTION.
**HANGER ROD**

Diameter = \( \frac{3}{4}'' \)

---

**PIPING TRANSVERSE SEISMIC CABLE BRACING SYSTEM**

12''Ø PIPE MAX

---

**KIT OPTIONS**

C2T

---

**REF. M PAGES FOR CONNECTION DETAILS**

\( \frac{3}{4}'' \) ASTM A36 ATR, TYP

MASON IND. N.Y. UCC ROD

STIFFENER CLAMP

TORQUE TO 10 FT-LBS, TYP

\( \frac{3}{4}'' \) x 1\( \frac{1}{2}'' \) x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D

\( \frac{3}{4}'' \) Ø NUT (T&B SNUG TIGHT)

MW-WPL LUG AS SHOWN OR MW-SPC PIPE CLAMP OPTIONS 3, 4

---

**DETAIL B**

12''Ø PIPE MAX

INSULATION WHERE REQ'D

ROD STIFFENER CLAMP

---

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \)**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>8''Ø PIPE MAX</th>
<th>12''Ø PIPE MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>990 LBS</td>
<td>580 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>580 LBS</td>
<td>730 LBS</td>
</tr>
<tr>
<td>61° - 75°</td>
<td>460 LBS</td>
<td>250 LBS</td>
</tr>
<tr>
<td>76° - 90°</td>
<td>370 LBS</td>
<td>370 LBS</td>
</tr>
</tbody>
</table>

* STL = STEEL PIPING

**CI** = CAST IRON PIPING

---

**NOTES:**

1. REF. SECTION A10 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37''. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. FOR PIPE SIZES UP TO 12''Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-75 OR -75A (REF. X8.4) FOR UP TO 8''Ø OR 12''Ø MAX, RESPECTIVELY. MW-SPC MAY REDUCE MAX ALLOWABLE \( F_p \).

4. REF. SECTION A15 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

---

**DETAIL B**

MW-WPL LUG AS SHOWN OR MW-SPC PIPE CLAMP OPTIONS 3, 4

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**NOTES: (continued)**

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**SPC OPTION**

STANDARD WASHER, MIN OD=2.5xROD DIA.

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**VIEW A-A**

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**PAGE**

C2.40

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Jeffrey Y. Kikumoto  
OPM-0043-13  
10/09/2020  
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto  
10/09/2020  
263 of 846
HANGER ROD DIAMETER = 3/4"

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS, TYP

3/4"Ø BOLTS AND NUTS, MIN BREAK AWAY NUTS (REF. PAGE X4.0)

3/4"Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7X19 STRAND CORE

BOTH SIDES OF PIPE HANGER LUG, TYP. 

FOR WPL-75/75A

12" Ø PIPE MAX

MW-WPL LUG AS SHOWN OR MW-SPC PIPE CLAMP OPTIONS

1/2" Ø NUT (T&B SNUG TIGHT) DETAIL B

INSULATION WHERE REQ'D

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>8&quot; Ø PIPE MAX</th>
<th>12&quot; Ø PIPE MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>990 LBS</td>
<td>990 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>460 LBS</td>
<td>460 LBS</td>
</tr>
<tr>
<td>61° - 75°</td>
<td>800 LBS</td>
<td>990 LBS</td>
</tr>
</tbody>
</table>

* STL = STEEL PIPING  ** CI = CAST IRON PIPING

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. FOR PIPE SIZES UP TO 12"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-75 OR -75A (REF. X8.4) FOR UP TO 8"Ø OR 12"Ø MAX, RESPECTIVELY.

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10/09/2020

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PAGE C2.41
HANGER ROD DIAMETER = \(3/4"\)

PIPING ALL-DIRECTIONAL SEISMIC CABLE BRACING SYSTEM
12"Ø PIPE MAX

REF. M PAGES FOR CONNECTION DETAILS
\(3/4"\) ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD STIFFENER CLAMP,
TORQUE TO 10 FT-LBS, TYP
1\(1/2\times1\frac{1}{2}\times12GA SINGLE STRUT, ROD
STIFFENER, WHERE REQ'D\)

1/8" NUT (T&B SNUG TIGHT)
DETAIL B

BOTH SIDES OF PIPE HANGER LUG, TYP.

12"Ø PIPE MAX

ROD STIFFENER WHERE REQ'D

FOR WPL-75
1/2 FOR WPL-75A

1" MIN
T&B, TYP

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. FOR PIPE SIZES UP TO 12"Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-75 OR -75A (REF. X8.4) FOR UP TO 8"Ø OR 12"Ø MAX, RESPECTIVELY.
HANGER ROD
DIAMETER = \( \frac{7}{8} '' \)

PIPING TRANSVERSE
SEISMIC CABLE BRACING SYSTEM
12''Ø PIPE MAX

KIT OPTIONS
C2T

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 43''. REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. REF. SECTION A15 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
HANGER ROD DIAMETER = 7/8"

PIPING LONGITUDINAL SEISMIC CABLE BRACING SYSTEM
12" Ø PIPE MAX

KIT OPTIONS
C2L

1. REF. M PAGES FOR CONNECTION DETAILS
7/8" Ø ASTM A36 ATR, TYP
MASON IND. N.Y. SRC-1 1/2 1 ROD STIFFENER Clamp, Tighten by turn of nut method, snug tight and add 1/2 turn.
L=134" MAX
6" Ø Rod Stiffener
(7/8" x 1/2" x 1/4") Rod Stiffener (ASTM A36, Fy = 36 KSI) WHERE REQ'D 2
7/8" Ø Nut (T&B Snug Tight)
DETAIL B

6" MAX T&B, TYP
66" O.C. MAX

2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 43". REF. APPROPRIATE M10 PAGES FOR DETAILS.

3. DETAILS:

MW-WPL-88 PIPE HANGER LUG, (SEE PAGE X8.4)
INSULATION WHERE REQ'D
12" Ø PIPE MAX

BRACE ANGLE RANGE 0 MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
30° - 45° 990 LBS
46° - 60° 460 LBS

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HANGER ROD
DIAMETER = 7/8"

PIPING ALL-DIRECTIONAL SEISMIC CABLE BRACING SYSTEM
12" Ø PIPE MAX

MASON IND. N.Y. SRC-1
1/2 1/2 1/2 ROD
STIFFENER CLAMP, TIGHTEN
BY TURN OF NUT METHOD,
SNUG TIGHT AND ADD 1/2 TURN.
L1/2 x 1/2 x 1/2, ROD STIFFENER
(ASTM A36, Fy = 36 KSI) WHERE REQ'D

3/4" NUT (T&B SNUG TIGHT)

1" MIN
T&B, TYP

ROD STIFFENER
CLAMP

12" Ø PIPE MAX
INSULATION WHERE REQ'D

6" MAX
T&B, TYP

66" O.C.
MAX

L=134" MAX

VIEW A-A

NOTES:
1. REF. SECTION A10 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 43". REF. APPROPRIATE M10 PAGES FOR DETAILS.

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C2.52

PAGE

MASON IND. N.Y. SCBH-2
1

(2) 5/8" BOLTS AND NUTS, TORQUE TO 45 FT-LBS OR USE 45 FT-LBS MIN BREAK AWAY NUTS (REF. PAGE X4.0)

MASON IND. N.Y. SCB-2
1

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

3/16" Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7X19 STRAND CORE

(2) 3/16" BOLTS AND NUTS, TORQUE TO 45 FT-LBS OR USE 45 FT-LBS MIN BREAK AWAY NUTS (REF. PAGE X4.0)

MW-WPL-88 PIPE HANGER LUG, (SEE PAGE X8.4)

BRACE ANGLE RANGE

0

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

TRAN. LONG.

30° - 45° 990 lbs 990 lbs
46° - 60° 460 lbs 460 lbs
HANGER ROD DIAMETER = 3/8"

PIPING/CONDUIT TRANSVERSE SEISMIC SOLID BRACING SYSTEM
2"Ø PIPE/CONDUIT MAX

REF. M PAGES FOR CONNECTION DETAILS
3/8"Ø ASTM A36 ATR
T&B NUT (SNUG TIGHT), TYP
MIN 3/16 x 15/16 x 15/8 ASTM A36 STRUT WASHER, TYP
HOLE SHALL BE 3/8" Ø GREATER THAN ATR DIA.
MW-WPL LUG AS SHOWN OR MW-SPC PIPE CLAMP OPTION 2
2"Ø PIPE/CONDUIT MAX
INSULATION WHERE REQ'D

NOTES:
1. BRACE MEMBER MAY BE PROVIDED WITH ROUND HOLES SIZED FOR HANGER RODS. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.
2. FOR PIPE/CONDUIT SIZES UP TO 2" Ø MAX, USE RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR USE MW-WPL-38 (REF. X8.4).

L3x3x3/4, 3" LG (ASTM A36, Fy = 36 KSI)
MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.9)

SPC OPTION

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>170 LBS</td>
<td>330 LBS</td>
<td>60 LBS</td>
</tr>
</tbody>
</table>

* STL = STEEL PIPING
** CI = CAST IRON PIPING
**HANGER ROD**
Diameter = ½"  

**PIPING/CONDUIT TRANSVERSE SEISMIC SOLID BRACING SYSTEM**

**3"Ø PIPE/CONDUIT MAX**

- **Ref. M Pages for Connection Details**
- **½"Ø ASTM A36 ATR**
- **T&B Nut (Snug Tight), Typ**
- **MIN ⅝x⅝x⅛ ASTM A36 Strut Washer, Typ**
- **Hole Shall Be ⅝"Ø Greater Than ATR Dia.**
- **MW-WPL Lug As Shown**
  - OR MW-SPC Pipe Clamp Option ²
- **3"Ø Pipe/Conduit Max**
- **Insulation Where Req'd**

**Notes:**
1. **Brace Member** may be provided with round holes sized for hanger rods. Ref. X7.0 & X7.1 for strut member data.
2. For pipe/conduit sizes up to 3"Ø Max, use respective MW-SPC size (Ref. X8.3-X8.3.1) or use MW-WPL-50 (Ref. X8.4).

---

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

<table>
<thead>
<tr>
<th>WPL</th>
<th>SPC (STL*)</th>
<th>SPC (CI**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>350 LBS</td>
<td>460 LBS</td>
<td>220 LBS</td>
</tr>
</tbody>
</table>

* STL = STEEL PIPING  
** CI = CAST IRON PIPING

---

**SPC Option**

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OPM-0043-13
10/09/2020

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270 of 846
HANGER ROD
DIAMETER = 5/8"

PIPING/CONDUIT TRANSVERSE
SEISMIC SOLID BRACING SYSTEM
5"Ø PIPE/CONDUIT MAX

REF. M PAGES FOR
CONNECTION DETAILS
5/8" Ø ASTM A36 ATR

T&B NUT (SNUG TIGHT), TYP

MIN 3/16x1/2x1/8 ASTM A36
STRUT WASHER, TYP

HOLE SHALL BE 5/8" Ø
GREATER THAN ATR DIA.

MW-WPL LUG AS SHOWN
OR MW-SPC PIPE CLAMP
OPTION 2

5"Ø PIPE/CONDUIT MAX
INSULATION WHERE REQ'D

1" MIN STRUT EDGE

NOTE:
1. BRACE MEMBER MAY BE PROVIDED WITH
ROUND HOLES SIZED FOR HANGER RODS. REF.
X7.0 & X7.1 FOR STRUT MEMBER DATA.
2. FOR PIPE/CONDUIT SIZES UP TO 5" Ø MAX, USE
RESPECTIVE MW-SPC SIZE (REF. X8.3-X8.3.1) OR
USE MW-WPL-63 (REF. X8.4).

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OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
271 of 846
**Rectangular Duct Longitudinal Seismic Solid Bracing System**

**30 PLF Max**

**Kit Options**
- TS12L
- TS1220L
- TSH312L
- TSH320L

** NOTES:**
1. **Ref. Section A1 for General Notes.**
2. **Provide rod stiffeners only where seismic brackets are attached to the rod and rod length (L) exceeds 18”. Ref. Appropriate M10 Pages for Detail.**
3. **Ref. Page A6.0 - A6.2 for Alternate Arrangements of Seismic Braces and Angle or HSS Member as Trapeze.**
4. **Provide (1) 1/2” Dia. Connection in Center Hole when strut brace is installed inside the bracket and (2) 1/2” Dia. Connections in (2) outer holes when the brace is installed outside of the bracket. Ref. X2.3 for Connection Details.**
5. **Design Professional shall consider eccentric load distribution when determining the Fp value used in Design.**

**Bracket Connection Details**
- Mason Ind. N.Y. SSBS-12 or SSBS-20
- 1" x 1 1/2x12GA Single Strut, Rod Stiffener, Where Req’d 1, 2
- Mason Ind. N.Y. USR Rod Stiffener Clamp, Torque to 10 FT-LBS

**Refer to Table for Allowable Brace Angle Range**

<table>
<thead>
<tr>
<th>Brace Angle Range</th>
<th>Max Allowable Force Per Seismic Brace Assembly, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>425 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>245 LBS</td>
</tr>
</tbody>
</table>

**Stiffener Details**
- 1 1/4" x 1 1/2x12GA Single Strut (9’-6” Max)
- 1 1/4" x 1 1/2x12GA Double Strut (14’-6” Max)

**Connection Details**
- 1/2" Dia. Connection in Center Hole when strut brace is installed inside the bracket and (2) 1/2” Dia. Connections in (2) outer holes when the brace is installed outside of the bracket. Ref. X2.3 for Connection Details.

**Hanger Rod Details**
- Diameter = 3/8"
HANGER ROD
DIAMETER = 3/8"

RECTANGULAR DUCT ALL-DIRECTIONAL
SEISMIC SOLID BRACING SYSTEM
30 PLF MAX

KIT OPTIONS
TS12A
TS1220A
TSH312A
TSH320A

REF. M PAGES FOR CONNECTION DETAILS
3/8" Ø ASTM A36 ATR, TYP
1 1/2 x 1 1/2 x 12GA SINGLE STRUT,
ROD STIFFENER, WHERE
REQ'D 1, 2
MASON IND. N.Y. UCC ROD
STIFFENER CLAMP, TORQUE
TO 10 FT-LBS 1, TYP
1" MIN
T&B, TYP

6" MAX
T&B, TYP
28" O.C. MAX
L=158" MAX
1" MIN

MASON IND. N.Y. SSBS-12 OR SSBS-20
1
1" MIN
T&B, TYP

REF. N PAGES FOR BRACKET
CONNECTION DETAILS
(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF
(REF. PAGE X4.0) 4

REFER TO TABLE FOR ALLOWABLE
BRACE ANGLE RANGE

1/2 x 1 3/8 x 12GA SINGLE STRUT (14"-6" MAX)

(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 4

MIN. 3/16 x 1 3/8 x 15/16 ASTM A36
STRUT WASHER, TYP

T&B NUT (SNUG TIGHT), U.O.N.

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC
BRACKETS ARE ATTACHED TO THE ROD AND ROD
LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10
PAGES FOR DETAIL.

3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES AND ANGLE
OR HSS MEMBER AS TRAPEZE.

4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE
WHEN STRUT BRACE IS INSTALLED INSIDE THE
BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2)
OUTER HOLES WHEN THE BRACE IS INSTALLED
OUTSIDE OF THE BRACKET. REF. X2.3 FOR
CONNECTION DETAILS.

5. MW-KY-38 (REF. X2.4) MUST BE USED ON TOP OF
BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME
ROD.

6. DESIGN PROFESSIONAL SHALL CONSIDER
ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING
THE Fp VALUE USED IN DESIGN.

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PAGE
D1.12

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
274 of 846
**HANGER ROD**
DIA. = 1/2"

**RECTANGULAR DUCT TRANSVERSE SEISMIC SOLID BRACING SYSTEM**
60 PLF MAX

**KIT OPTIONS**
TS12T
TS1220T
TSH412T
TSH420T

**REFERENCES**
1. REF. N PAGES FOR BRACKET CONNECTION DETAILS
   MASON IND. N.Y.
   SSBS-12 OR SSBS-20
   (1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)
   REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE
   BRACE MEMBER
   1/8 x 1/2 x 12 GA SINGLE STRUT (9'-6") MAX
   1/8 x 1/2 x 12 GA DOUBLE STRUT (14'-6") MAX
   2.5° MAX

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, F_p**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>580 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>410 LBS</td>
</tr>
</tbody>
</table>

**NOTES:**
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. ANGLE MAY BE INCREASED UP TO 15°, REF. PAGE A5.0.
**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

MASON IND. N.Y. SSBS-12 OR SSBS-20

1. MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)

**REF. M PAGES FOR CONNECTION DETAILS**

1/2" Ø ASTM A36 ATR, TYP

1/8" x 1/4" x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D, 1, 2

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, 2

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.

4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

**BRACE ANGLE RANGE**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>580 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>410 LBS</td>
</tr>
</tbody>
</table>

**HANGER ROD DIAMETER = 1/2’’**

**RECTANGULAR DUCT LONGITUDINAL SEISMIC SOLID BRACING SYSTEM 60 PLF MAX**

**KIT OPTIONS**

- TS12L
- TS1220L
- TSH412L
- TSH420L

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10/09/2020
HANGER ROD DIAMETER = ½"

RECTANGULAR DUCT ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM
60 PLF MAX

KIT OPTIONS
TS12A
TS1220A
TSH412A
TSH420A

VIEW A-A

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P A G E
D1.22

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
277 of 846
HANGER ROD
DIAMETER = \( \frac{5}{8} \)"

RECTANGULAR DUCT TRANSVERSE
SEISMIC SOLID BRACING SYSTEM
100 PLF MAX

<table>
<thead>
<tr>
<th>KIT OPTIONS</th>
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<tbody>
<tr>
<td>TS20T</td>
</tr>
<tr>
<td>TS2012T</td>
</tr>
<tr>
<td>TSH512T</td>
</tr>
<tr>
<td>TSH520T</td>
</tr>
</tbody>
</table>

D1.30

HANGER ROD
DIAMETER = \( \frac{5}{8} \)"

48" O.C. MAX

MIN. \( \frac{3}{4} \times \frac{5}{8} \times \frac{1}{8} \) ASTM A36 STRUT WASHER, TYP

T&B NUT (SNUG TIGHT), U.O.N.

1" MIN T&B, TYP

MIN. 6" MAX T&B, TYP

48" O.C. MAX

L = 158"

MIN. 1" MAX TYP

31/2" MIN T&B, TYP

1" MAX TYP

1/2" MAX T&B, TYP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>590 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>420 LBS</td>
</tr>
</tbody>
</table>

NOTES:

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.

4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

5. ANGLE MAY BE INCREASED UP TO 15°, REF. PAGE A5.0.

SSBS OPTION

1/2" MAX TYP

1" MAX TYP

2.5" MAX TYP

2.5" MAX TYP

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California SE No. S5270
HANGER ROD
DIAMETER = \( \frac{5}{8}'' \)

RECTANGULAR DUCT LONGITUDINAL
SEISMIC SOLID BRACING SYSTEM
100 PLF MAX

MASON IND. N.Y. SSBS-12 OR SSBS-20

**BRACE MEMBER**
1.5x1\(\frac{1}{4}\)x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D, T&B, TYP
1.5x1\(\frac{1}{4}\)x12GA DOUBLE STRUT (5'-0'' MAX)

**HANGER ROD**
DIAMETER = \( \frac{5}{8}'' \)

1. REF. M PAGES FOR CONNECTION DETAILS
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. PROVIDE (1) 1/2'' DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2'' DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

**TABLE FOR ALLOWABLE BRACE ANGLE RANGE**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>590 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>420 LBS</td>
</tr>
</tbody>
</table>

**NOTES:**
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. PROVIDE (1) 1/2'' DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2'' DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

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PAGE D1.31

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
279 of 846
HANGER ROD DIAMETER = $\frac{5}{6}$"

RECTANGULAR DUCT ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM
100 PLF MAX

KIT OPTIONS
TS20A
TS2012A
TSH512A
TSH520A

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. MW-KY-63 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.
6. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE $F_p$ VALUE USED IN DESIGN.
HANGER ROD
DIAMETER = 5/8"

RECTANGULAR DUCT TRANSVERSE
SEISMIC SOLID BRACING SYSTEM
100 PLF MAX

KIT OPTIONS
TSH54T
TSH5T

1. REF. SECTION A1 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.
2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
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5. ANGLE MAY BE INCREASED UP TO 15°, REF. PAGE A5.0

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Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020

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281 of 846
NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, \( F_p \), MAY BE LIMITED BY ANCHORAGE CAPACITY.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
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5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \( F_p \) VALUE USED IN DESIGN.
HANGER ROD DIAMETER = 5/8"

RECTANGULAR DUCT ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM
100 PLF MAX

KIT OPTIONS
TSH54A
TSH55A

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
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5. MW-KY-63 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.
6. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
HANGER ROD
DIAMETER = 3/8"

ROUND DUCT TRANSVERSE
SEISMIC SOLID BRACING SYSTEM
30 PLF MAX

REF. M PAGES FOR
CONNECTION DETAILS

1/2 x 1/2 x 12GA SINGLE STRUT, ROD STIFFENER,
WHERE REQ'D 1, 2

MASON IND. N.Y.
UCC ROD STIFFENER
CLAMP, TORQUE TO
10 FT-LBS 1, TYP

(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF
(REF. PAGE X4.0) 3

REFER TO TABLE FOR ALLOWABLE
BRACE ANGLE RANGE

3"x12GA SPLIT STEEL
STRAP (MIN. 33KSI)

(2) #10 ITW BUILDEX TEKS
SCREW (REF. ICC-ES
ESR-1976) FROM RADIUS
CORNER OF STEEL STRAP,
(T&B TYP.) AND (1) #10 @
12" O.C. MAX THEREAFTER

ALTERNATIVE TO SMS
FOR DUCT ≥ 18 GA
START FROM DUCT EDGE

BRACE MEMBER 1
1/2" x 1/2" x 12GA SINGLE STRUT (9'-6" MAX)
1/2" x 1/2" x 12GA DOUBLE STRUT (14'-6" MAX)

MASON IND. N.Y.
SSBS-12 OR SSBS-20 1

1" MIN
T&B, TYP

2.5° MAX 4

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENER ONLY WHERE
SEISMIC BRACKET IS ATTACHED TO THE ROD
AND ROD LENGTH (L) EXCEEDS 18". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER
HOLE WHEN STRUT BRACE IS INSTALLED
INSIDE THE BRACKET AND (2) 1/2" DIA.
CONNECTIONS IN (2) OUTER HOLES WHEN THE
BRACE IS INSTALLED OUTSIDE OF THE
BRACKET. REF. X2.3 FOR CONNECTION
DETAILS.
4. ANGLE MAY BE INCREASED UP TO 15°, REF.
PAGE A5.0

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P A G E
D2.10
**HANGER ROD DIAMETER = 3/8"**

**ROUND DUCT LONGITUDINAL SEISMIC SOLID BRACING SYSTEM**

**30 PLF MAX**

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**KIT OPTIONS**

- TS12L
- TS1220L
- TSH312L
- TSH320L

---

**REF. M PAGES FOR CONNECTION DETAILS**

- 3/8"Ø ASTM A36 ATR, TYP
- 1½x1½x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D

**MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS, TYP**

- T&B NUT (SNUG TIGHT), U.O.N.
- 3"x12GA SPLIT STEEL STRAP (MIN. 33KSI)

**SSBS OPTION**

- (2) #10 ITW BUILDEX TEKS SCREW (REF. ICC-ES ESR-1976) FROM RADIUS CORNER OF STEEL STRAP, (T&B TYP.) AND (1) #10 @ 12" O.C. MAX THEREAFTER

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**VIEW A-A**

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**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
HANGER ROD
DIAMETER = 3/8"

ROUND DUCT ALL-DIRECTIONAL
SEISMIC SOLID BRACING SYSTEM
30 PLF MAX

REF. M PAGES FOR
CONNECTION DETAILS

1/2" DIA. L=158" MAX

1/2x1/2" X 12GA SINGLE STRUT, ROD STIFFENER
WHERE REQ'D 1, 2

MASON IND. N.Y.
UCC ROD STIFFENER
CLAMP, TORQUE TO
10 FT-LBS 1, TYP

1/2" MIN
MAX
TYP

1" MIN
T&B, TYP

6" MAX
T&B, TYP

28" O.C.
MAX

L=158" MAX

1" MIN
T&B, TYP

(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 1

REFER TO TABLE FOR ALLOWABLE
BRACE ANGLE RANGE

BRACE MEMBER 1

1/2x1/2x12GA SINGLE STRUT (14'-6" MAX)

NOTES:

1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 18". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER
HOLE WHEN STRUT BRACE IS INSTALLED
INSIDE THE BRACKET AND (2) 1/2" DIA.
CONNECTIONS IN (2) OUTER HOLES WHEN THE
BRACE IS INSTALLED OUTSIDE OF THE
BRACKET. REF. X2.3 FOR CONNECTION
DETAILS.
4. MW-KY-38 (REF. X2.4) MUST BE USED ON TOP
OF BOTTOM SHB WHEN STACKING (2) SHB ON
THE SAME ROD.

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P A G E

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10/09/2020

286 of 846
**VIEW A-A**

**HANGER ROD**
**DIAMETER = ½”**

**ROUND DUCT TRANSVERSE**
**SEISMIC SOLID BRACING SYSTEM**
**60 PLF MAX**

**MASON WEST, INC.**
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---

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOMES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

4. ANGLE MAY BE INCREASED UP TO 15°, REF. PAGE A5.0

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**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

**REF. M PAGES FOR CONNECTION DETAILS**

**HANGER ROD**
**DIAMETER = 1/2” Ø ASTM A36 ATR, TYP**

**13/16 x13/16 x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’d 1, 2**

**MASON IND. N.Y.**
**UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP**

**3/8” Ø ATR, TYP 38” O.C. MAX**

**L=158” MAX**

**6” MAX T&B, TYP**

**1” MIN T&B, CURB**

**1” MIN TYP**

**1/2” MAX TYP**

**1” MIN TYP**

**1” MIN TYP**

**3/8” MAX TYP**

**ALTERNATIVE TO SMS FOR DUCT ≥ 18 GA**
**START FROM DUCT EDGE**

**3”x8GA SPLIT STEEL STRAP (MIN. 33KSI)**

**(2) #10 ITW BUILDTEX TEKS SCREW (REF. ICC-ES ESR-1976) FROM RADIUS CORNER OF STEEL STRAP, (T&B TYP.) AND (1) #10 @ 1/2” O.C. MAX THEREAFTER**

**13/16 x13/16 x12GA SINGLE STRUT (9’-6” MAX)**

**13/16 x13/16 x12GA DOUBLE STRUT (14’-6” MAX)**

---

**BRACE MEMBER**
**1**

**(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. X4.0)**

**MASON IND. N.Y. SHB-1/2 AS SHOWN OR SSBS-12 OPTION 1 SSBS-12 MAY BE ATTACHED TO TOP OR BOTTOM OF STRAP T&B NUT (SNUG TIGHT), U.O.N.**

---

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

- **30° - 45°**
  - **580 LBS**
- **46° - 60°**
  - **410 LBS**

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**KIT OPTIONS**

- **TS12T**
- **TS1220T**
- **TSH412T**
- **TSH420T**

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**California SE No. S5270**

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**PAGE**
**D2.20**
**HANGER ROD**
Diameter = ½"

**ROUND DUCT LONGITUDINAL SEISMIC SOLID BRACING SYSTEM**
60 PLF Max

**REF. M PAGES FOR CONNECTION DETAILS**
½"Ø ASTM A36 ATR, TYP

**MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS ¹, TYP**

**T&B NUT (SNUG TIGHT), U.O.N.**
3"x8GA SPLIT STEEL STRAP (MIN. 33KSI)

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

**MASON IND. N.Y. SSBS-12 OR SSBS-20 ¹**

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) ³

MASON IND. N.Y. SHB-1/2 AS SHOWN OR SSBS-12 OPTION ¹ SSBS-12 MAY BE ATTACHED TO TOP OR BOTTOM OF STRAP

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**
30° - 45° 580 LBS
46° - 60° 410 LBS

**ALTERNATIVE TO SMS FOR DUCT ≥ 18 GA START FROM DUCT EDGE**

**NOTES:**
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

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**PAGE**
D2.21

**KIT OPTIONS**
TS12L
TS1220L
TSH412L
TSH420L
**HANGER ROD**

DIA METER = \( \frac{1}{2}'' \)

---

**ROUND DUCT ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM**

60 PLF MAX

---

**MASON IND. N.Y.**

UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS

---

**NOTE:**

1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH \( L \) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) \( \frac{1}{2}'' \) DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) \( \frac{1}{2}'' \) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
4. MW-KY-50 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.

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**BRACE ANGLE RANGE**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, ( F_p )</th>
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</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>500 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>290 LBS</td>
</tr>
</tbody>
</table>

**NOTES:**

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**KIT OPTIONS**

TS12A
TS1220A
TSH412A
TSH420A

---

**KIT OPTIONS**

TS12A
TS1220A
TSH412A
TSH420A

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**PAGE D2.22**

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**10/09/2020**

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OPM-0043-13
10/09/2020

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289 of 846
VIEW A-A
ROUND DUCT LONGITUDINAL SEISMIC SOLID BRACING SYSTEM
60 PLF MAX

VIEW A-A

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P A G E
D2.31

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

291 of 846
HANGER ROD
DIAMETER = 5/8"

ROUND DUCT ALL-DIRECTIONAL
SEISMIC SOLID BRACING SYSTEM
60 PLF MAX

MASON IND. N.Y.
SHB-1/2 OR SHB-5/8

HANGER ROD
DIAMETER = 5/8"

1" MIN
TYP

1 1/2" MAX
TYP

MASON IND. N.Y.
UCC ROD STIFFENER
CLAMP, TORQUE TO
10 FT-LBS

T&B, TYP

6" MAX
T&B, TYP

48" O.C. MAX

L=158" MAX

1/2" MIN

VIEW A-A

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
4. MW-KY-63 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.

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PAGE
D2.32

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
292 of 846
**FACTORY BUILT VENT DUCT TRANSVERSE SEISMIC SOLID BRACING SYSTEM**

**30 PLF MAX**

**HANGER ROD**

Diameter = $\frac{3}{8}$" **REF. M PAGES FOR CONNECTION DETAILS**

$\frac{3}{8}$" Ø ASTM A36 ATR, TYP

$1\frac{1}{2}$ x $1\frac{1}{2}$ 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D $^{1,2}$

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS $^{1}$, TYP

**VENT INNER WALL**

**VENT OUTER WALL**

**MIN PL $\frac{3}{8} \times 1\frac{1}{2} \times 1\frac{1}{2}$ ASTM A36, TYP**

**MIN L $1\frac{1}{2}$ x $1\frac{1}{2}$ x ASTM A36, FULL ANGLE RING SUPPORT**

**A**

**MASON IND. **N.Y. SSBS-12 OR SSBS-20 $^{1}$

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) $^{3}$

**BRACE MEMBER** $^{1}$

$1\frac{3}{4}$ x $1\frac{1}{2}$ 12GA SINGLE STRUT (9'-6" MAX)  

$1\frac{3}{4}$ x $1\frac{1}{2}$ 12GA DOUBLE STRUT (14'-6" MAX)

**NOTEs:**

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

4. ANGLE MAY BE INCREASED UP TO 15°, REF. PAGE A5.0.

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**JEFFREY Y. KIKUMOTO**

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10/09/2020

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**PAGE**

D3.10
HANGER ROD DIAMETER = \(\frac{3}{8}\)"

FACTORY BUILT VENT DUCT LONGITUDINAL SEISMIC SOLID BRACING SYSTEM
30 PLF MAX

REF. M PAGES FOR CONNECTION DETAILS
\(\frac{3}{8}\)" Ø ASTM A36 ATR, TYP

MASON IND. N.Y. UCC ROD STIFFENER, WHERE REQ'D 1, 2

REF. N PAGES FOR BRACKET CONNECTION DETAILS
MASON IND. N.Y.
SSBS-12 OR SSBS-20 1

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 5
REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 5
MASON IND. N.Y. SHB-3/8 AS SHOWN OR SSBS-12 OPTION 1, 4

REF. T PAGES FOR TRAPEZE MEMBER SIZES 3, 4

T&B NUT (SNUG TIGHT), U.O.N.

1/2" MAX

3/8" BOLT AND NUT (SNUG TIGHT), TYP

18" SQ. MIN

32" SQ. MAX

6" Ø MIN
20" Ø MAX

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

30° - 45° 425 LBS
46° - 60° 245 LBS

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. TRAPEZE MEMBERS TO BE STEEL ANGLE ONLY.
4. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE MEMBER AS TRAPEZE.
5. PROVIDE 1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND 2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
**HANGER ROD**

- Diameter = $\frac{3}{8}''$

**FACTORY BUILT VENT DUCT ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM**

- 30 PLF MAX

**Kit Options**

- TS12A
- TS1220A
- TSH312A
- TSH320A

---

**View A-A**

- Plate Support Assembly
- VENT OUTER WALL
- VENT INNER WALL
- T&B NUT (SNUG TIGHT), U.O.N.

**KIT OPTIONS**

- TS12A
- TS1220A
- TSH312A
- TSH320A

---

**Notes:**

1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18''. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. TRAPEZE MEMBERS TO BE STEEL ANGLE ONLY.
4. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE MEMBER AS TRAPEZE.
5. PROVIDE (1) 1/2'' DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2'' DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
6. MW-KY-38 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.
HANGER ROD
DIAMETER = 1/2"

FACTORY BUILT VENT DUCT TRANSVERSE
SEISMIC SOLID BRACING SYSTEM
60 PLF MAX

REF. M PAGES FOR
CONNECTION DETAILS

1/2" Ø ASTM A36 ATR, TYP
1 3/4" x 1 1/2" x 12GA SINGLE STRUT, ROD STIFFENER,
WHERE REQ'D 1, 2

MASON IND. N.Y. UCC ROD
STIFFENER CLAMP, TORQUE
TO 10 FT-LBS 1, TYP

VENT INNER WALL
VENT OUTER WALL

MIN PL 3/4" x 1 1/2" x 1 1/2"
ASTM A36, TYP

TYP 3/4" MIN

1" MIN
T&B, TYP

1 1/2" MIN
L=158" MAX

3" O.C. MAX

(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 1

MASON IND. N.Y. SHB-1/2 1
T&B NUT (SNUG TIGHT), U.O.N.

MIN. L1 3/16" x 1 1/2" x 3/8" ASTM A36
FULL ANGLE RING SUPPORT

30° - 45° 580 LBS
46° - 60° 410 LBS

BRACE ANGLE RANGE

MAX ALLOWABLE
FORCE PER SEISMIC BRACE
ASSEMBLY, Fp

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENER ONLY WHERE
SEISMIC BRACKET IS ATTACHED TO THE ROD
AND ROD LENGTH (L) EXCEEDS 25". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER
HOLE WHEN STRUT BRACE IS INSTALLED
INSIDE THE BRACKET AND (2) 1/2" DIA.
CONNECTIONS IN (2) OUTER HOLES WHEN THE
BRACE IS INSTALLED OUTSIDE OF THE
BRACKET. REF. X2.3 FOR CONNECTION
DETAILS.
4. ANGLE MAY BE INCREASED UP TO 15°, REF.
PAGE A5.0.

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Jeffrey Y. Kikumoto
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020

PAGE
D3.20

HANGER ROD DIAMETER = ½”

FACTORY BUILT VENT DUCT LONGITUDINAL SEISMIC SOLID BRACING SYSTEM 60 PLF MAX

KIT OPTIONS TSH4L

1” MIN T&B, TYP

½” Ø ASTM A36 ATR, TYP

1½ x 1½ x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’d

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP

38” O.C. MAX

L = 158” MAX

6” MAX T&B, TYP

1” MIN T&B, TYP

1½ MAX

½” MAX

½” Ø BOLT AND NUT (SNUG TIGHT), TYP

15° MAX

15° MAX

PLATE SUPPORT ASSEMBLY

¾” Ø BOLT AND NUT (SNUG TIGHT), TYP

34” SQ. MIN

60” SQ. MAX

48” Ø MAX

VENT INNER WALL

VENT OUTERT WALL

REFERENCES:

MASON IND. N.Y. SHB-1/2 1, 4

(2) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 5

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE MEMBER

1½ x 1½ x 12GA SINGLE STRUT (9’-6” MAX)

1½ x 1½ x 12GA DOUBLE STRUT (14’-6” MAX)

MASON IND. N.Y. SHB-1/2 1, 4

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 5

NOTE:

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. TRAPEZE MEMBERS TO BE STEEL ANGLE ONLY.

4. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE MEMBER AS TRAPEZE.

5. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

REFERENCES:

MASON IND. N.Y. SHB-1/2 1, 4

(2) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 5

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE ANGLE RANGE

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>Angle Range</th>
<th>Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>580 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>400 LBS</td>
</tr>
</tbody>
</table>

NOTES:

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

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REFERENCES:

MASON IND. N.Y. SHB-1/2 1, 4

(2) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 5

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE ANGLE RANGE

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
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<th>Angle Range</th>
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1. REF. SECTION A1 FOR GENERAL NOTES.

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3. TRAPEZE MEMBERS TO BE STEEL ANGLE ONLY.

4. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE MEMBER AS TRAPEZE.

5. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

REFERENCES:

MASON IND. N.Y. SHB-1/2 1, 4

(2) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 5

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE ANGLE RANGE

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
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<th>Angle Range</th>
<th>Force</th>
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<td>46° - 60°</td>
<td>400 LBS</td>
</tr>
</tbody>
</table>
**FACTORY BUILT VENT DUCT ALL-DIRECTIONAL SEISMIC SOLID BRACING SYSTEM 60 PLF MAX**

**KIT OPTIONS**

| TSH4A |

**HANGER ROD DIAMETER = ½”**

MASON IND. N.Y. SHB-1/2

1 4 6

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

1 ½” Ø ASTM A36 ATR, TYP

1 3/4” x 1 1/2” x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’D 1, 2

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP

**VIEW A-A**

**PLATE SUPPORT ASSEMBLY**

VENT OUTER WALL

VENT INNER WALL

T&B NUT (SNUG TIGHT), U.O.N.

**REF. T PAGES FOR TRAPEZE MEMBER SIZES 3, 4**

**REF. M PAGES FOR CONNECTION DETAILS**

1/8” Ø BOLT AND NUT (SNUG TIGHT), TYP

MASON IND. N.Y. SHB-1/2, TYP 1, 4, 6

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

MASON IND. N.Y. SHB-1/2 1

(2) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 5

**REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE**

<table>
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<tr>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
</tr>
<tr>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

**NOTES:**

1. **REF. SECTION A1 FOR GENERAL NOTES.**

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. TRAPEZE MEMBERS TO BE STEEL ANGLE ONLY.

4. **REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE MEMBER AS TRAPEZE.**

5. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

6. MW-KY-50 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.

**Jiefu "Jeff" Zhang, SE**

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**PAGE D3.22**
**RECTANGULAR DUCT TRANSVERSE SEISMIC CABLE BRACING SYSTEM**

**HANGER ROD DIAMETER = 3/8"**

- **REF. M PAGES FOR CONNECTION DETAILS**
- **3/8" Ø ASTM A36 ATR, TYP**
- **1 1/8 x 11/16 x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2**
- **MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP**
- **6" MAX T&B, TYP**
- **L=158" MAX**

---

**VIEW A-A**

- **6" MAX T&B, TYP**
- **28" O.C. MAX**
- **2.5" MAX TYP 4**
- **1" MIN T&B, TYP**
- **1" MIN T&B, TYP**
- **1" MIN T&B, TYP**
- **2.5" MAX TYP 4**

**NOTES:**

1. **REF. SECTION A1 FOR GENERAL NOTES.**
2. **PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18", REF. APPROPRIATE M10 PAGES FOR DETAIL.**
3. **REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.**
4. **ANGLE MAY BE INCREASED TO 15°, REF. PAGE A5.0.**

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**D4.11**

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

300 of 846
**HANGER ROD**
Diameter = 3/8"

**RECTANGULAR DUCT ALL-DIRECTIONAL SEISMIC CABLE BRACING SYSTEM**
30 PLF MAX

---

**KIT OPTIONS**
TC0A

---

**REVIEW A-A**

---

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.

4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
**RECTANGULAR DUCT TRANSVERSE SEISMIC CABLE BRACING SYSTEM**

**HANGER ROD DIAMETER = ½”**

**KIT OPTIONS**

- TC1T

---

**HANGER ROD**

- Diameter = ½”

**STIFFENER CLAMP**

- ½” Ø ASTM A36 ATR, TYP
- 1½x1½x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’D
- MASON IND. N.Y. UCROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS

**MASON IND. N.Y. SCBH-1**

- (2) ½” Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

**MASON IND. N.Y. SCB-1**

- ½” Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE

**MAX ALLOWABLE BRACE ANGLE RANGE**

<table>
<thead>
<tr>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>350 LBS</td>
<td>540 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>380 LBS</td>
<td>540 LBS</td>
</tr>
</tbody>
</table>

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.

4. ANGLE MAY BE INCREASED TO 15°, REF. PAGE A5.0.
**HANGER ROD DIAMETER = ½”**

**RECTANGULAR DUCT LONGITUDINAL SEISMIC CABLE BRACING SYSTEM**

**60 PLF MAX**

**KIT OPTIONS**

**TC1L**

---

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

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4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

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**PAGE D4.21**

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**DATE: 10/09/2020**

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
HANGER ROD DIAMETER = 1/2"

RECTANGULAR DUCT ALL-DIRECTIONAL SEISMIC CABLE BRACING SYSTEM 60 PLF MAX

REF. M PAGES FOR CONNECTION DETAILS

1/2" Ø ASTM A36 ATR, TYP
13/8" x 13/8 x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2
MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP

MASON IND. N.Y. SCB-1 1

STANDARD WASHER, MIN OD=2.5xROD DIA., TYP
(3) #10 ITW BUILDEX TEKS SCREW 1" O.C. AND 1" MAX FROM EDGE, BOTH SIDES, TYP
IF TRAPEZE STEEL THICKNESS IS > 12GA, USE #12-24 ITW BUILDEX TEKS SCREWS.

ALTERNATIVE TO SMS FOR DUCT ≥ 18 GA START FROM DUCT EDGE

1/2" Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE 1

(2) 1/2" Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>500 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>290 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
**MASON WEST, INC.**
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---

**HANGER ROD**
Diameter \( = \frac{5}{8}'' \)

**RECTANGULAR DUCT TRANSVERSE SEISMIC CABLE BRACING SYSTEM**
100 PLF MAX

**KIT OPTIONS**
TC1T

---

**REF. M PAGES FOR CONNECTION DETAILS**

\( \frac{5}{8}'' \) ASTM A36 ATR, TYP

1\( \frac{1}{2} \times \frac{3}{4} \times 12GA \) SINGLE STRUT, ROD STIFFENER, WHERE REQ'D

MASON IND. N.Y. UCC ROD STIFFENER CLAMP,
TORQUE TO 10 FT-LBS \(^1\), TYP

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

MASON IND. N.Y. SCB-1 \(^1\)

**REF. T PAGES FOR TRAPEZE MEMBER SIZES**

1. **KIT OPTIONS**
   TC1T

   (2) \( \frac{5}{8}'' \) Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

   MASON IND. N.Y. SCBH-1 \(^1, 3\)

   **REF. T PAGES FOR TRAPEZE MEMBER SIZES**

   MIN \( \frac{3}{16}'' \times \frac{1}{8}'' \) ASTM A36 STRUT WASHER, TYP

   T&B NUT (SNUG TIGHT), U.O.N.

   **REF. M PAGES FOR CONNECTION DETAILS**

   1'' MIN T&B, TYP

   6'' MAX T&B, TYP

   **6'' MAX T&B, TYP**

   40'' O.C. MAX

   \( L=158'' \) MAX

   **2.5'' Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE \(^1\)**

   **REF. T PAGES FOR TRAPEZE MEMBER SIZES**

   **REF. M PAGES FOR CONNECTION DETAILS**

   \( \frac{5}{8}'' \) Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE \(^1\)

   **REF. M PAGES FOR CONNECTION DETAILS**

   \( \frac{5}{8}'' \) Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE \(^1\)

---

**NOTES:**

1. **REF. SECTION A1 FOR GENERAL NOTES.**

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. **REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.**

4. ANGLE MAY BE INCREASED TO 15°, REF. PAGE A5.0.

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**VIEW A-A**

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**MAX ALLOWABLE BRACE ANGLE RANGE**

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<th>BRACE ANGLE RANGE</th>
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<td>540 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>380 LBS</td>
</tr>
</tbody>
</table>

---

**DATE: 10/09/2020**

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**Jiefu "Jeff" Zhang, SE**
California SE No. S5270

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**PAGE**

**D4.30**

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**OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto**

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**305 of 846**

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**10/09/2020**

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**Jeffrey Y. Kikumoto**

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**OPM-0043-13**

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**10/09/2020**

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**OPM-0043-13**

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**10/09/2020**

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**305 of 846**
**MASON WEST, INC.**  
1601 E. Miraloma Ave. Placentia, CA 92870  
TEL (714) 630 - 0701, www.masonwest.com

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

---

**HANGER ROD**  
**DIAMETER = 5/8"**

**RECTANGULAR DUCT LONITUDINAL SEISMIC CABLE BRACING SYSTEM**  
**100 PLF MAX**

**KIT OPTIONS**  
**TC1L**

**VIEW A-A**

---

**MAJOR FEATURES:**

- **1" MIN T&B, TYP**
- **6" MAX T&B, TYP**
- **MASON IND. N.Y. SCB-1**
- **MASON IND. N.Y. SCBH-1**
- **REF. M PAGES FOR CONNECTION DETAILS**
- **REF. N PAGES FOR BRACKET CONNECTION DETAILS**
- **REF. T PAGES FOR TRAPEZE MEMBER SIZES**
- **ALTERNATIVE TO SMS FOR DUCT ≥ 18 GA START FROM DUCT EDGE**
- **IF TRAPEZE STEEL THICKNESS IS > 12GA, USE # 12-24 ITW BUILDEX TEKS SCREWS.**

---

**BRACE ANGLE RANGE**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>540 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>380 LBS</td>
</tr>
</tbody>
</table>

---

**MASSATIVE REFERENCES:**

- **REF. SECTION A1 FOR GENERAL NOTES.**
- **REF. ICC-ES ESR-1976**
- **REF. APPLICABLE M10 PAGES FOR DETAIL.**
- **REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.**

---

**DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.**

---

**OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto**  
10/09/2020  
10/09/2020  
306 of 846
HANGER ROD DIAMETER = 5/8"

RECTANGULAR DUCT ALL-DIRECTIONAL SEISMIC CABLE BRACING SYSTEM
100 PLF MAX

MASON IND. N.Y. UCC ROD STIFFENER, WHERE REQ'D 1, 2
MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP

6" MAX T&B, TYP
48" O.C. MAX
L=158" MAX

(2) ½" Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

½" Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE 1

(2) ½" Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>30° - 45°</th>
<th>46° - 60°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fp</td>
<td>540 LBS</td>
<td>380 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRI LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
Hanger Rod
Diameter = 3/8"

Rectangular Duct X-Pattern
Seismic Cable Bracing System
30 PLF MAX

Kit Options
TC0X

Notes:
2. Provide rod stiffeners only where seismic brackets are attached to the rod and rod length (L) exceeds 18". Ref. appropriate M10 pages for detail.
3. Ref. Page A6.0 - A6.2 for Alternate Arrangements of Seismic Braces and Angle or HSS Member as Trapeze.
4. Fp shall be a single load applied in any horizontal direction. Multiple arrows do not signify simultaneous Fp loads acting at one time. Design professional shall consider eccentric load distribution when determining the Fp value used in design.

View A-A

Alternative to SMS for Duct ≥ 18 GA start from Duct Edge

1" Max TYP

1" Min TYP

6" Max TYP

Ref. M Pages for Connection Details
3/8" Ø ASTM A36 ATR, TYP
1 5/8"x1 1/2x12GA Single Strut, Rod Stiffener, Where Req'd
Mason Ind. N.Y. UCC Rod Stiffener Clamp, Torque to 10 FT-LBS

Ref. N Pages for Bracket Connection Details
Mason Ind. N.Y. SCBH-0

(1) 5/8" Ø Bolt and Nut, Torque to 30 FT-LBS or Use 30 FT-LBS Min Break Away Nut (Ref. Page X4.0)

Refer to Table for Max Allowable Brace Angle Range

3/4" Ø Prestretched Galvanized Aircraft Cable 7x19 Strand Core

(1) 5/8" Ø Bolt and Nut, Torque to 30 FT-LBS or Use 30 FT-LBS Min Break Away Nut (Ref. Page X4.0)

Ref. T Pages for Trapeze Member Sizes

(2) #10 Itw Buildex Tek Screws 1" O.C. and 1" Max From Edge, Both Sides, TYP
(Ref. ICC-ES ESR-1976).
If Trapeze Steel Thickness is > 12GA, Use #12-24 Itw Buildex Tek Screws.

Max Allowable Force Per Seismic Brace Assembly, Fp

<table>
<thead>
<tr>
<th>Brace Angle Range</th>
<th>Max Allowable Force, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>270 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>170 LBS</td>
</tr>
</tbody>
</table>

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OPM-0043-13
10/09/2020

Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

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P A G E

D5.10
**MASON WEST, INC.**

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**HANGER ROD DIAMETER = 1/2"**

**RECTANGULAR DUCT X-PATTERN SEISMIC CABLE BRACING SYSTEM 60 PLF MAX**

**KIT OPTIONS**

**TC1X**

---

**VIEW A-A**

---

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.

4. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
**HANGER ROD**
Diameter = $\frac{5}{8}''$

**RECTANGULAR DUCT X-PATTERN**
SEISMIC CABLE BRACING SYSTEM
100 PLF MAX

**KIT OPTIONS**
TC1X

---

**REF. M PAGES FOR**
CONN. DETAILS

$\frac{3}{8}''$ Ø ASTM A36 ATR, TYP
1½x1½x12GA SINGLE STRUT,
ROD STIFFENER, WHERE
REQ'D 1, 2

MASON IND. N.Y. UCC ROD
STIFFENER CLAMP,
TORQUE TO 10 FT-LBS, TYP

---

**REF. N PAGES FOR**
BRACKET
CONN. DETAILS

MASON IND. N.Y. SCB-1 1

---

**REF. T PAGES**
FOR TRAPEZE
MEMBER SIZES 1

---

**MASON IND. N.Y. SCB-1**
1, 3

---

**REF. T PAGES**
FOR TRAPEZE
MEMBER SIZES 1

---

**MIN $\frac{3}{16}$x1½x1½ ASTM A36 STRUT WASHER, TYP**
T&B NUT (SNUG TIGHT), U.O.N.

**30° - 45°** MAX ALLOWABLE FORCE PER
SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>540 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>380 LBS</td>
</tr>
</tbody>
</table>

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.

4. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

**VIEW A-A**
**HANGER ROD DIAMETER = \( \frac{3}{8}'' \)**

**ROUND DUCT TRANSVERSE SEISMIC CABLE BRACING SYSTEM 30 PLF MAX**

1. **MASON IND. N.Y. SCBH-0 1**
   - 1\(\frac{3}{8}\)x1\(\frac{1}{2}\)x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2
   - MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP

2. **1'' MIN T&B, TYP**

3. **28'' O.C. MAX**

4. **L=158'' MAX**

5. **6'' MAX TYP T&B**

6. **\( \frac{3}{8}'' \) PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE 1**

**NOTES:**
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18''. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. ANGLE MAY BE INCREASED TO 15°, REF. PAGE A5.0.

**VIEW A-A**

**BRACE ANGLE RANGE**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>0° - 30°</td>
<td>270 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>190 LBS</td>
</tr>
</tbody>
</table>

**ALTERNATIVE TO SMS FOR DUCT \( \geq 18 \) GA START FROM DUCT EDGE**

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**PAGE**

D6.10
**HANGER ROD DIAMETER = 3/8"**

**ROUND DUCT LONGITUDINAL SEISMIC CABLE BRACING SYSTEM 30 PLF MAX**

**KIT OPTIONS**

TC0L

---

**BRACE MAY BE ATTACHED TO TOP OR BOTTOM OF STRAP**

- 3/8" Ø BOLT AND NUT, TORQUE TO 30 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

**3/8" PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE**

**T&B NUT (SNUG TIGHT), U.O.N. 3"x12GA SPLIT STEEL STRAP**

**ALTERNATIVE TO SMS FOR DUCT ≥ 18 GA START FROM DUCT EDGE**

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>270 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>190 LBS</td>
</tr>
</tbody>
</table>

---

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
HANGER ROD DIAMETER = \( \frac{3}{8}'' \)

ROUND DUCT ALL-DIRECTIONAL SEISMIC CABLE BRACING SYSTEM
30 PLF MAX

MASON IND. N.Y. SCBH-0

BRACE MAY BE ATTACHED TO TOP OR BOTTOM OF STRAP T&B NUT (SNUG TIGHT), U.O.N.

\( \frac{3}{8}'' \) Ø BOLT AND NUT, TORQUE TO 30 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

REFER TO TABLE FOR MAX ALLOWABLE BRACE ANGLE RANGE

REF. N PAGES FOR BRACKET CONNECTION DETAILS

MASON IND. N.Y. SCBH-0

L=158' MAX

6'' MAX TYP T&B

\( \frac{3}{8}'' \) Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE

\( \frac{3}{8}'' \) Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE

1" MIN T&B, TYP

1' MAX TYP

\( \frac{1}{2} \)" MAX TYP

(1) \( \frac{3}{8}'' \) Ø BOLT AND NUT, TORQUE TO 30 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

MASON IND. N.Y. SCBH-0

BRACE MAY BE ATTACHED TO TOP OR BOTTOM OF STRAP T&B NUT (SNUG TIGHT), U.O.N.

3''x12GA SPLIT STEEL STRAP

15° MAX TYP

15° MAX TYP

15° MAX TYP

ALTERNATIVE TO SMS FOR DUCT ≥ 18 GA START FROM DUCT EDGE

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.

View A-A

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PAGE
D6.12

313 of 846
HANGER ROD
DIAMETER = ½"

ROUND DUCT TRANSVERSE
SEISMIC CABLE BRACING SYSTEM
60 PLF MAX

KIT OPTIONS
TC1T

REF. M PAGES FOR
CONNECTION DETAILS
¾" Ø ASTM A36 ATR, TYP
1½"x1½x12GA SINGLE
STRUT, ROD STIFFENER,
WHERE REQ'D 1, 2
MAVEN IND. N.Y.
UCC ROD STIFFENER
CLAMP, TORQUE TO
10 FT-LBS 1, TYP

1" MIN
T&B, TYP

38" O.C.
MAX

1½" MAX TYP

MASON IND. N.Y. SCB-1 1
(2) ¾" Ø BOLTS AND NUTS,
TORQUE TO 25 FT-LBS OR USE
30 FT-LBS MIN BREAK AWAY NUT
(REF. PAGE X4.0)

T&B NUT (SNUG TIGHT), U.O.N.

MAX ALLOWABLE BRACE ANGLE RANGE

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, ( F_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>540 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>380 LBS</td>
</tr>
</tbody>
</table>

3"x8GA SPLIT
STEEL STRAP

(2) #10 ITW BUILDEX TEKS
SCREW FROM RADIUS
CORNER OF STEEL STRAP,
(T&B TYP.) AND (1) #10 @ 12"
O.C. MAX THEREAFTER.
(REF. ICC-ES ESR-1976)

2.5" MAX TYP

2.5" MAX TYP

STANDARD WASHER,
MIN OD=2.5xROD DIA.,
TYP

ALTERNATIVE TO
SMS FOR DUCT ≥ 18
GA START FROM
DUCT EDGE

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 25". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. ANGLE MAY BE INCREASED TO 15°, REF.
PAGE A5.0.

VIEW A-A
HANGER ROD DIAMETER = \( \frac{1}{2}'' \)

ROUND DUCT ALL-DIRECTIONAL SEISMIC CABLE BRACING SYSTEM
60 PLF MAX

KIT OPTIONS
TC1A

REF. M PAGES FOR CONNECTION DETAILS

\( \frac{3}{8}'' \) ASTM A36 ATR, TYP

1\( \frac{1}{2}'' \times 1\frac{1}{2}'' \times 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D

MASON IND. N.Y.
UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS \( \frac{1}{2}'' \), TYP

L=158 MAX

1'' MIN T&B, TYP

1-1/8'' MAX TYP

\( \frac{1}{2}'' \) PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \)

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE, ( F_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>500 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>290 LBS</td>
</tr>
</tbody>
</table>

MASON IND. N.Y. SCBH-1

BRACE MAY BE ATTACHED TO TOP OR BOTTOM OF STRAP

T&B NUT (SNUG TIGHT), U.O.N.

(2) \( \frac{3}{8}'' \) BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

(2) #10 ITW BUILDDEX TEKS SCREW FROM RADIUS CORNER OF STEEL STRAP, (T&B TYP.) AND (1) #10 @ 12'' O.C. MAX THEREAFTER. (REF. ICC-ES ESR-1976)

3''x8GA SPLIT STEEL STRAP

STANDARD WASHER, MIN OD=2.5xROD DIA., TYP

ALTERNATIVE TO SMS FOR DUCT \( \geq 18 \) GA START FROM DUCT EDGE

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25''. REF. APPROPRIATE M10 PAGES FOR DETAIL.

VIEW A-A

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PAGE D6.22

10/09/2020
**HANGER ROD DIAMETER = 3/8"**

**ROUND DUCT X-PATTERN SEISMIC CABLE BRACING SYSTEM 30 PLF MAX**

**KIT OPTIONS**
TC0X

---

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18”. REF. APPROPRIATE M10 PAGES FOR DETAILS.

3. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME.

---

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---

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---

PAGE D7.10
HANGER ROD DIAMETER = \(\frac{1}{2}\)"

ROUND DUCT X-PATTERN SEISMIC CABLE BRACING SYSTEM
30 PLF MAX

MASON IND. N.Y. SCBH-1

1. BRACE MAY BE ATTACHED TO TOP OR BOTTOM OF STRAP T&B NUT (SNUG TIGHT), U.O.N.

2. Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

3. Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE

ALTERNATIVE TO SMS FOR DUCT ≥ 1 8 GA START FROM DUCT EDGE

STANDARD WASHER, MIN OD=2.5xROD DIA., TYP

3"x12GA SPLIT STEEL STRAP

VIEW A-A

BRACE ANGLE RANGE | MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
---|---
30° - 45° | 520 LBS
46° - 60° | 300 LBS

1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME.

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P A G E D7.11

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318 of 846
D7.12

HANGER ROD
DIAMETER = 5/8"

ROUND DUCT X-PATTERN
SEISMIC CABLE BRACING SYSTEM
60 PLF MAX

KIT OPTIONS
TC1X

1" MIN
T&B, TYP

1/2"
MAX
TYP

1/2"
MIN
TYP

1/2"
MAX
TYP

T&B NUT (SNUG TIGHT), U.O.N.
3"x8GA SPLIT STEEL STRAP

(2) 5/8" BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

MASON IND. N.Y. SCBH-1
1 BRACE MAY BE ATTACHED TO TOP OR BOTTOM OF STRAP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

30° - 45° 540 LBS
46° - 60° 380 LBS

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME.
HANGER ROD DIAMETER = 3/8"

FACTOR-BUILT VENT DUCT TRANSVERSE SEISMIC CABLE BRACING SYSTEM
30 PLF MAX

VIEW A-A

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. ANGLE MAY BE INCREASED TO 15°, REF. PAGE A5.0.
FACTOR-BUILT VENT DUCT LONGITUDINAL
SEISMIC CABLE BRACING SYSTEM
30 PLF MAX

1" MIN
T&B,
TYP

28" O.C.
MAX
L=158"
MAX

1/2" Ø BOLT AND NUT, TORQUE TO 30 FT-LBS OR USE 30 FT-LBS
MIN BREAK AWAY NUT (REF. PAGE X4.0)

REF. M PAGES FOR
CONNECTION DETAILS

3/8" Ø ASTM A36 ATR, TYP

1 3/4"x1 1/2"x12GA SINGLE STRUT, ROD
STIFFENER, WHERE REQ'D

MASON IND. N.Y. UCC ROD
STIFFENER CLAMP, TORQUE
TO 10 FT-LBS, TYP

1 3/8" Ø PRESTRETCHED GALVANIZED
AIRCRAFT CABLE 7X19 STRAND CORE

(1) 3/8" Ø BOLT AND NUT, TORQUE
TO 30 FT-LBS OR USE 30 FT-LBS
MIN BREAK AWAY NUT (REF. PAGE X4.0)

MASON IND. N.Y. SCBH-0

REF. N PAGES FOR BRACKET
CONNECTION DETAILS

REFERENCE TO TABLE FOR MAX
ALLOWABLE BRACE ANGLE RANGE

BRACE
ANGLE
RANGE
0° - 30°
30° - 45°
45° - 60°
60° - 90°

MAX ALLOWABLE
FORCE PER
SEISMIC BRACE
ASSEMBLY, Fp
270 LBS
270 LBS
190 LBS
75 LBS

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC
BRACKETS ARE ATTACHED TO THE ROD AND ROD
LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10
PAGES FOR DETAILS.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES AND ANGLE
MEMBER AS TRAPEZE.

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10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
HANGER ROD DIAMETER = 3/8"

FACTORY-BUILT VENT DUCT ALL-DIRECTIONAL SEISMIC CABLE BRACING SYSTEM 30 PLF MAX

KIT OPTIONS TC0A

VIEW A-A

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. TRAPEZE MEMBERS TO BE STEEL ANGLE ONLY.
4. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE MEMBER AS TRAPEZE.
HANGER ROD DIAMETER = ½"

FACTORY-BUILT VENT DUCT TRANSVERSE SEISMIC CABLE BRACING SYSTEM
60 PLF MAX

KIT OPTIONS TC1T

REF. M PAGES FOR CONNECTION DETAILS
¾" Ø ASTM A36 ATR, TYP
½" x 1½ x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2
MASON IND. N.Y. UCC
ROD STIFFENER
CLAMP, TORQUE TO 10 FT-LBS 1, TYP

6" MAX
TYP T&B

38" O.C. MAX

L=158" MAX

1" MIN
T&B, TYP

1/2" Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE 1

MIN PL ¾ x 1½ x 1½ ASTM A36 TYP

2.5° MAX TYP 3

2.5° MAX TYP 3

VENT INNER WALL
VENT OUTER WALL

MASON IND. N.Y. SCB-1 1
T&B NUT (SNUG TIGHT), U.O.N.

MIN L 1½ x 1½ x ¾ ASTM A36
FULL ANGLE RING SUPPORT

MIN Ø=2.5xROD DIA., TYP

56" Ø MAX

60" MAX

30° - 45° 540 LBS
46° - 60° 380 LBS

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

BRACE ANGLE RANGE 0

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. ANGLE MAY BE INCREASED TO 15°, REF. PAGE A5.0.

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10/09/2020

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10/09/2020
FACTORY-BUILT VENT DUCT LONGITUDINAL SEISMIC CABLE BRACING SYSTEM
60 PLF MAX

HANGER ROD DIAMETER = ½”

MASON IND. N.Y. SCBH-1

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS, TYP

MASON IND. N.Y. SCB-1

1½” Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

38” O.C. MAX
L=158” MAX

REF. M PAGES FOR CONNECTION DETAILS

½” Ø ASTM A36 ATR, TYP
1½x1½x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’D

1” MIN T&B, TYP
6” MAX T&B, TYP

15” MAX, TYP.

PLATE SUPPORT ASSEMBLY

3½” Ø BOLT AND NUT (SNUG TIGHT), TYP

22” Ø MIN
48” Ø MAX
34” SQ. MIN
60” SQ. MAX

VENT OUTER WALL

VENT INNER WALL

½” Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7X19 STRAND CORE

REF. N PAGES FOR BRACKET CONNECTION DETAILS

MASON IND. N.Y.

1” MIN T&B, TYP
6” MAX, TYP

REF. T PAGES FOR TRAPEZE MEMBER SIZES

T&B NUT (SNUG TIGHT), U.O.N.

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

30° - 45° 540 LBS
46° - 60° 380 LBS

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE MEMBER AS TRAPEZE.

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HANGER ROD DIAMETER = ½”

FACTORY-BOUGHT VENT DUCT ALL-DIRECTIONAL SEISMIC CABLE BRACING SYSTEM
60 PLF MAX

KIT OPTIONS
TC1A

MASON IND. N.Y. SCBH-1

HANGER ROD DIAMETER = ½”

REF. M PAGES FOR CONNECTION DETAILS

½” Ø ASTM A36 ATR, TYP

1⅞ x 1⅞ x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQD

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS, TYP

6” MAX, T&B, TYP

HANGER ROD DIAMETER = ⅜”

1” MIN T&B, TYP

38” O.C. MAX

L = 158” MAX

½” Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7X19 STRAND CORE

(2) ⅜” Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

MASON IND. N.Y. SCB-1

REF. N PAGES FOR BRACKET CONNECTION DETAILS

(2) ⅜” Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

MASON IND. N.Y. SCB-1

REF. T PAGES FOR TRAPEZE MEMBER SIZES

PLATE SUPPORT ASSEMBLY

VENT OUTER WALL

VENT INNER WALL

T&B NUT (SNUG TIGHT), U.O.N.

⅜” Ø BOLT AND NUT (SNUG TIGHT), TYP

1½” MIN, 6” MAX, TYP

STANDARD WASHER, MIN OD = 2.5 x ROD DIA., TYP

22” Ø MIN, 48” Ø MAX

34” SQ. MIN, 60” SQ. MAX

⅝” Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

MASON IND. N.Y. SCB-1

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. TRAPEZE MEMBERS TO BE STEEL ANGLE ONLY.
4. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE MEMBER AS TRAPEZE.

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OPM-0043-13
325 of 846
HANGER ROD
DIAMETER = \( \frac{3}{8} \)"

IN-LINE DUCT DEVICE
SEISMIC SOLID BRACING SYSTEM
250 LB MAX

KIT OPTIONS
TS12A
TS1220A
TSH312A
TSH320A

REF. M PAGES FOR CONNECTION DETAILS

TS12A
TS1220A
TSH312A
TSH320A

D9.10

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326 of 846

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**HANGER ROD**
DIAMETER = $\frac{3}{8}''$

**IN-LINE DUCT DEVICE**
SEISMIC SOLID BRACING SYSTEM
250 LB MAX

**KIT OPTIONS**
- S12SE
- S1220SE
- SH312SE
- SH320SE

**NOTES:**
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18''. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. MW-KY-38 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.
6. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE $F_p$ VALUE USED IN DESIGN.

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, $F_p$**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>$F_p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>300 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>170 LBS</td>
</tr>
</tbody>
</table>

**REFERENCES:**
- MASON IND. N.Y. SSBS-12 OR SSBS-20
- MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS, TYP
- MASON IND. N.Y. SHB-3/8 AS SHOWN OR SSBS-12 OPTION, TYP
- £¢

**ALTERNATIVE TO SMS FOR DUCT ≥ 18 GA**
START FROM DUCT EDGE
(2) #10 ITW BUILDEX TEKS SCREW
(REF. ICC-ES ESR-1976) 1" O.C.
AND 1" MAX FROM EDGE, BOTH SIDES, TYP

**SSBS OPTION**

**VIEW A-A**

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**PAGE**
D9.11
HANGER ROD DIAMETER = ½”

IN-LINE DUCT DEVICE
SEISMIC SOLID BRACING SYSTEM
1000 LB MAX

KIT OPTIONS
S12SE
S1220SE
SH412SE
SH420SE

REF. M PAGES FOR CONNECTION DETAILS
½”Ø ASTM A36 ATR, TYP
1 ⅛ x ⅛ x 12 GA SINGLE STRUT, ROD STIFFENER
WHERE REQ’D 1, 2
MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP

1” MIN
T&B, TYP

6” MAX
T&B, TYP
38” O.C. MAX
L=158” MAX
1” MIN

MASON IND. N.Y. SSBS-12 OR SSBS-20 1
(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF
(REF. PAGE X4.0) 1

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE
BRACE MEMBER 1
3/16 x 1/2 x 12 GA SINGLE STRUT (9-6” MAX)
3/16 x 1/2 x 12 GA DOUBLE STRUT (14-6” MAX)

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED
UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 1
MASON IND. N.Y. SHB-1/2 AS SHOWN OR SSBS-12
OPTION 1, 3, 5

MIN. 20 GA IN-LINE DUCT DEVICE

LONGITUDINAL BRACE CAN BE MASON IND. N.Y.
SHB-1/2 AS SHOWN OR SSBS-12 OPTION, TYP. 1, 3, 5

BRACE ANGLE RANGE
MIN ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
30° - 45° 500 LBS
46° - 60° 290 LBS

ALTERNATIVE TO SMS FOR DUCT ≥ 18 GA
START FROM DUCT EDGE (4) #10 ITW BUILDDEX TEKS SCREW
(REF. ICC-ES ESR-1976) 1” O.C.
AND 1” MAX FROM EDGE, BOTH SIDES, TYP

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. PROVIDE (1) ½” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) ½” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. MW-KY-50 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.
6. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

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10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
Page 328 of 846
HANGER ROD
DIAMETER = 5/8"

IN-LINE DUCT DEVICE
SEISMIC SOLID BRACING SYSTEM
2000 LB MAX

KIT OPTIONS
S20SE
S2012SE
SH512SE
SH520SE

1/8" Ø ASTM A36 ATR, TYP
1 1/2" x 1 1/2" x 12 GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2
MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP
1" MIN T&B, TYP

MASON IND. N.Y. SSBS-12 OR SSBS-20 1
(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 4
MASON IND. N.Y. SHB-5/8 AS SHOWN OR SSBS-20 OPTION 1, 3, 5

1 1/2" x 1 1/2" x 12 GA SINGLE STRUT (5'-0" MAX)
1 1/2" x 1 1/2" x 12 GA DOUBLE STRUT (14'-6" MAX)

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

BRACE ANGLE RANGE

30° - 45° 630 LBS
45° - 60° 450 LBS

MIN. 20 GA IN-LINE DUCT DEVICE

LONGITUDINAL BRACE CAN BE MASON IND. N.Y. SHB-5/8 AS SHOWN OR SSBS-20 OPTION, TYP, 1, 3, 5

T&B NUT (SNUG TIGHT), U.O.N.

ALTERNATIVE TO SMS FOR DUCT ≥ 18 GA
START FROM DUCT EDGE
(4) #10 ITW BUILDDEX TEKS SCREW (REF. ICC-ES ESR-1976) 1” O.C.
AND 1” MAX FROM EDGE, BOTH SIDES, TYP

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. MW-KY-63 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.
6. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

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PAGE
D9.13
HANGER ROD
DIAMETER = \( \frac{3}{8} \)"

IN-LINE DUCT DEVICE
SEISMIC CABLE BRACING SYSTEM
250 LB MAX

MASON IND. N.Y. SCBH-0

1" MIN T&B, TYP

1" MIN T&B, TYP

6" MAX T&B, TYP

28" O.C. MAX

L=158" MAX

\( \frac{3}{8} \)" Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE

(1) \( \frac{3}{8} \)" BOLT AND NUT, TORQUE TO 30 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

MIN. 20GA IN-LINE DUCT DEVICE

MIN. 1½x1½x1¾ ASTM A36 STRUT WASHER, TYP

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS TYP

1½x1½x1¾ ASTM A36 ATR, TYP

WHERE REQ'D

REFERENCE M. PAGES FOR CONNECTION DETAILS

REFERENCE N. PAGES FOR BRACKET CONNECTION DETAILS

3" MAX T&B, TYP

1" MIN T&B, TYP

24" MIN

12" MAX

ALTERNATIVE TO SMS FOR DUCT ≥ 18 GA START FROM DUCT EDGE

KIT OPTIONS

COX

NOTES:

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.

4. \( F_p \) SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS \( F_p \) LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \( F_p \) VALUE USED IN DESIGN.

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PAGE D10.10

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330 of 846
HANGER ROD
DIAMETER = 3/8"

IN-LINE DUCT DEVICE
SEISMIC CABLE BRACING SYSTEM
250 LB MAX

KIT OPTIONS
COSE

REF. M PAGES FOR CONNECTION DETAILS
3/8" Ø ASTM A36 ATR, TYP
1 1/2 x 1/2 x 12GA SINGLE
STRUT, ROD STIFFENER,
WHERE REQ'D
MASON IND. N.Y. UCC ROD
STIFFENER CLAMP, TORQUE
TO 10 FT-LBS, TYP

1" MIN
T&B, TYP

6" MAX
T&B, TYP

0

28"

L=158"

MAX

7/8" Ø PRESTRETCHED GALVANIZED
AIRCRAFT CABLE 7x19 STRAND CORE

(1) 7/8" BOLT AND NUT, TORQUE TO
30 FT-LBS OR USE 30 FT-LBS MIN
BREAK AWAY NUT (REF. PAGE X4.0)

REFER TO TABLE FOR MAX
ALLOWABLE BRACE ANGLE RANGE

MASON IND.
N.Y. SCBH-0

1, 3

MIN. 20GA IN-LINE
DUCT DEVICE

MIN 7/16 x 1/2 x 1/2 ASTM A36
STRUT WASHER, TYP

T&B NUT (SNUG TIGHT), U.O.N.

ALTERNATIVE TO SMS
FOR DUCT ≥ 18 GA
START FROM DUCT EDGE

ALTERNATE BRACE
ARRANGEMENT OPTION

270 LBS

170 LBS

MAX ALLOWABLE
FORCE PER
SEISMIC BRACE
ASSEMBLY, Fp

30° - 45°
46° - 60°

15° MAX TYP
15° MAX TYP
15° MAX TYP
15° MAX TYP

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 18". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES AND
ANGLE OR HSS MEMBER AS TRAPEZE.
4. DESIGN PROFESSIONAL SHALL CONSIDER
ECCENTRIC LOAD DISTRIBUTION WHEN
DETERMINING THE Fp VALUE USED IN DESIGN.
5. ALL-DIRECTIONAL AND TRANSVERSE BRACE
COMBINATION CONFIGURATION MAY BE USED
IN LIEU OF CORNER BRACE ARRANGEMENT.

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PAGE
D10.11
MASON IND. N.Y. SCBH-1

1” MIN T&B, TYP

STANDARD WASHER, MIN OD=2.5xROD DIA., TYP
(3) #10 ITW BUILDEX TEKS SCREW 1” O.C. AND 1” MAX FROM EDGE, BOTH SIDES, TYP
(REF. ICC-ES ESR-1976)

15° MAX TYP

ALTERNATIVE TO SMS FOR DUCT ≥ 18 GA START FROM DUCT EDGE

ALTERNATIVE BRACE ARRANGEMENT OPTION

MIN 3/16x5/16x11/16 ASTM A36 STRUT WASHER, TYP

T&B NUT (SNUG TIGHT), U.O.N.

Fp

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

30° - 45°  500 LBS
46° - 60°  290 LBS

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. ALL-DIRECTIONAL AND TRANSVERSE BRACE COMBINATION CONFIGURATION MAY BE USED IN LIEU OF CORNER BRACE ARRANGEMENT.

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PAGE
D10.12

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10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto  

332 of 846
HANGER ROD
DIAMETER = 5/8"

IN-LINE DUCT DEVICE
SEISMIC CABLE BRACING SYSTEM
2000 LB MAX

KIT OPTIONS
C1SE

1/2" Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE

(2) 5/8" PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

30° - 45° 540 LBS
46° - 60° 380 LBS

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. ALL-DIRECTIONAL AND TRANSVERSE BRACE COMBINATION CONFIGURATION MAY BE USED IN LIEU OF CORNER BRACE ARRANGEMENT.
HANGER ROD DIAMETER = \( \frac{3}{8}'' \)

SUSPENDED EQUIPMENT
SEISMIC SOLID BRACING SYSTEM
185 LB MAX VERTICAL LOAD PER HANGER

KIT OPTIONS
S12SE
S1220SE
SH312SE
SH320SE

VIEW A-A

SSBS OPTION

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

P A G E

D11.10

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. MW-KY-38 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.

ADDITIONAL GRAVITY HANGERS MAY BE REQUIRED PER EQUIPMENT MANUFACTURER’S GUIDELINES.

7. ALTERNATE TO SHOWN HANGER/BRACE ATTACHMENT TO EQUIPMENT, HANGER RODS/BRACES MAY BE ATTACHED PER EQUIPMENT OSP OR TO EQUIPMENT MANU. CLIPS WITH ASTM A653 GR33 20GA MIN. THICKNESS & \( \frac{3}{8}'' \) MIN. STEEL EDGE DISTANCE.

8. ATTACHMENT TO THE EQUIPMENT SHALL BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL.
**HANGER ROD**

**DIAMETER = ½”**

---

**SUSPENDED EQUIPMENT**

**SEISMIC SOLID BRACING SYSTEM**

**375 LB MAX VERTICAL LOAD PER HANGER**

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**KIT OPTIONS**

S12SE
S1220SE
SH412SE
SH420SE

---

**VIEW A-A**

---

**SSBS OPTION**

---

**MASON WEST, INC.**

1601 E. Miraloma Ave. Placentia, CA 92870
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---

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHERE STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. MW-KY-50 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.
6. ADDITIONAL GRAVITY HANGERS MAY BE REQUIRED PER EQUIPMENT MANUFACTURER’S GUIDELINES.
7. ALTERNATE TO SHOWN HANGER/BRACE ATTACHMENT TO EQUIPMENT, HANGER RODS/BRACES MAY BE ATTACHED PER EQUIPMENT OSP OR TO EQUIPMENT MANU. CLIPS WITH ASTM A653 GR33 18GA MIN. THICKNESS & ¾” MIN. STEEL EDGE DISTANCE.
8. ATTACHMENT TO THE EQUIPMENT SHALL BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL.
1. REF. SECTION A1 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

5. MW-KY-63 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.

6. ADDITIONAL GRAVITY HANGERS MAY BE REQUIRED PER EQUIPMENT MANUFACTURER’S GUIDELINES.

7. ALTERNATE TO SHOWN HANGER/BRACE ATTACHMENT TO EQUIPMENT, HANGER RODS/BRACES MAY BE ATTACHED PER EQUIPMENT MANUFACTURER’S GUIDELINES WITH ASTM A653 GR33 16GA MIN. THICKNESS & 15/16” MIN. STEEL EDGE DISTANCE.

8. ATTACHMENT TO THE EQUIPMENT SHALL BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL.
**HANGER ROD**
Diameter = 3/4”

**SUSPENDED EQUIPMENT**
SEISMIC SOLID BRACING SYSTEM
1250 LB MAX VERTICAL LOAD PER HANGER

**KIT OPTIONS**
SH64SE
SH65SE
SH6SE

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**VIEW A-A**

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**TABLE OF MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>1090 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>670 LBS</td>
</tr>
</tbody>
</table>

**NOTES:**
1. REF. SECTION A1 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. MW-KY-75 (REF. X2.4) MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.
6. ADDITIONAL GRAVITY HANGERS MAY BE REQUIRED PER EQUIPMENT MANUFACTURER’S GUIDELINES.
7. ALTERNATE TO SHOWN HANGER/BRACE ATTACHMENT TO EQUIPMENT, HANGER RODS/BRACES MAY BE ATTACHED PER EQUIPMENT OSP OR TO EQUIPMENT MANU. CLIPS WITH ASTM A653 GR33 14GA MIN. THICKNESS & 1/8” MIN. STEEL EDGE DISTANCE.
8. ATTACHMENT TO THE EQUIPMENT SHALL BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL.
HANGER ROD
DIAMETER = \( \frac{3}{8} \)"

SUSPENDED EQUIPMENT
SEISMIC CABLE BRACING SYSTEM
185 LB MAX VERTICAL LOAD PER HANGER

MASON IND. N.Y. SCBH-0
1, 3

HANGER ROD
DIAMETER = \( \frac{3}{8} \)"

MASON IND. N.Y. UCC ROD
STIFFENER CLAMP, TORQUE TO 10 FT-LBS \(^1\), TYP
1" MIN T&B, TYP

\( \frac{3}{4} \)" MIN. TYP

\( \frac{3}{8} \)" Ø ASTM A36 ATR, TYP \(^4\)
1\( \frac{3}{8} \)\( \times \)1\( \frac{3}{8} \)\( \times \)12GA SINGLE STRUT, ROD STIFFENER
WHERE REQ'D \(^1, 2\)

\( \frac{3}{8} \)" Ø BOLT AND NUT, TORQUE TO 30 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

\( \frac{3}{8} \)" Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE \(^1\)

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \)

30° - 45°
270 LBS

46° - 60°
170 LBS

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. ADDITIONAL GRAVITY HANGERS MAY BE REQUIRED PER EQUIPMENT MANUFACTURER'S GUIDELINES.
5. ALTERNATE TO SHOWN HANGER/BRACE ATTACHMENT TO EQUIPMENT. HANGER RODS/BRACES MAY BE ATTACHED TO EQUIPMENT MANU. CLIPS WITH ASTM A653 GR 33 20GA MIN. THICKNESS & \( \frac{3}{8} \)" MIN. STEEL EDGE DISTANCE.
6. ATTACHMENT TO THE EQUIPMENT SHALL BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL.

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PAGE
D12.10
**HANGER ROD**

**Diameter = ½”**

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**SUSPENDED EQUIPMENT**

**SEISMIC CABLE BRACING SYSTEM**

**375 LB MAX VERTICAL LOAD PER HANGER**

---

**KIT OPTIONS**

**C1SE**

---

**REF. M PAGES FOR CONNECTION DETAILS**

¾”Ø ASTM A36 ATR, TYP

4

1⅛”x1⅛”x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’D

1.2

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS, TYP

1

1” MIN T&B, TYP

---

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

MASON IND. N.Y. SCB-1

1

(2) ⅞”Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

---

**REFER TO TABLE FOR MAX ALLOWABLE BRACE ANGLE RANGE**

⅛”Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE

1

(2) ⅞”Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

MASON IND. N.Y. SCBH-1

1.3

EQUIPMENT THICKNESS = ASTM A653 GR 33 18GA MIN.

5.6

REG. NUT, T&B, TYP

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**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. ADDITIONAL GRAVITY HANGERS MAY BE REQUIRED PER EQUIPMENT MANUFACTURER’S GUIDELINES.

5. ALTERNATE TO SHOWN HANGER/BRACE ATTACHMENT TO EQUIPMENT. HANGER RODS/BRACES MAY BE ATTACHED PER EQUIPMENT OSP OR TO EQUIPMENT MANUFACTURER’S CLIPS WITH ASTM A653 GR 33 18GA MIN. THICKNESS & ⅛” MIN. STEEL EDGE DISTANCE.

6. ATTACHMENT TO THE EQUIPMENT SHALL BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL.
HANGER ROD DIAMETER = \( \frac{5}{8}'' \)

SUSPENDED EQUIPMENT SEISMIC CABLE BRACING SYSTEM
750 LB MAX VERTICAL LOAD PER HANGER

KIT OPTIONS
C1SE

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1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. ADDITIONAL GRAVITY HANGERS MAY BE REQUIRED PER EQUIPMENT MANUFACTURER’S GUIDELINES.
5. ALTERNATE TO SHOWN HANGER/BRACE ATTACHMENT TO EQUIPMENT. HANGER RODS/BRACES MAY BE ATTACHED PER EQUIPMENT OSP OR TO EQUIPMENT MANU. CLIPS WITH ASTM A653 GR 33 18GA MIN. THICKNESS & \( \frac{15}{16}'' \) MIN. STEEL EDGE DISTANCE.
6. ATTACHMENT TO THE EQUIPMENT SHALL BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL.
HANGER ROD
DIAMETER = \(\frac{3}{4}\)"

SUSPENDED EQUIPMENT
SEISMIC CABLE BRACING SYSTEM
1250 LB MAX VERTICAL LOAD PER HANGER

KIT OPTIONS
C2SE

REF. N PAGES FOR BRACKET CONNECTION DETAILS
MASON IND. N.Y. SCB-2 1

REF. M PAGES FOR CONNECTION DETAILS
\(\frac{3}{4}\)" Ø ASTM A36 ATR, TYP 4
1½" x 1½" x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2
MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP
1" MIN T&B, TYP

6" MAX T&B, TYP
57° O.C. MAX
L=158" MAX

Refer to Table for Max Allowable Brace Angle Range

\(\frac{3}{8}\)" Ø Prestretched Galvanized Aircraft Cable 7x19 Strand Core 1

(2) \(\frac{3}{8}\)" Ø Bolts and Nuts, Torque to 45 FT-LBS or use 45 FT-LBS Min Break Away Nut (Ref. Page X4.0)

MASON IND. N.Y. SCBH-2 1, 3

EQUIPMENT THICKNESS =
ASTM A653 GR 33 16GA MIN. 5, 6
REG. NUT, T&B, TYP

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. ADDITIONAL GRAVITY HANGERS MAY BE REQUIRED PER EQUIPMENT MANUFACTURER'S GUIDELINES.
5. ALTERNATE TO SHOWN HANGER/BRACE ATTACHMENT TO EQUIPMENT, HANGER RODS/BRACES MAY BE ATTACHED PER EQUIPMENT OSP OR TO EQUIPMENT MANUFACTURER CLIPS WITH ASTM A653 GR 33 16GA MIN. THICKNESS & \(\frac{1}{8}\)" MIN. STEEL EDGE DISTANCE.
6. ATTACHMENT TO THE EQUIPMENT SHALL BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL.

PAGE
D12.13

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10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

10/09/2020

341 of 846
HANGER ROD
DIAMETER = 3/8"

SUSPENDED EQUIPMENT
SEISMIC CABLE BRACING SYSTEM
185 LB MAX VERTICAL LOAD PER HANGER

KIT OPTIONS
COX

REF. N PAGES FOR BRACKET
CONNECTION DETAILS
MASON IND. N.Y. SCB-0 1
MASON IND. N.Y. UCC ROD
STIFFENER CLAMP, TORQUE TO
10 FT-LBS 1, TYP
1" MIN T&B, TYP

HANGER ROD
DIAMETER = 3/8"

6" MAX T&B, TYP
2" O.C. MAX
L=158" MAX

1/2" Ø PRESTRETCHED GALVANIZED
AIRCRAFT CABLE 7x19 STRAND CORE 1

(1) 3/8" Ø BOLT AND NUT, TORQUE TO
30 FT-LBS OR USE 30 FT-LBS MIN
BREAK AWAY NUT (REF. PAGE X4.0)

MASON IND. N.Y. SCBH-0 1, 3
EQUIPMENT THICKNESS =
ASTM A653 GR 33 20GA MIN. 5, 6
REG. NUT, T&B, TYP

MAX ALLOWABLE
FORCE PER SEISMIC BRACE
ASSEMBLY, Fp

TABLE FOR MAX
ALLOWABLE BRACE ANGLE RANGE

30° - 45° 270 LBS
46° - 60° 190 LBS

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 18". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.
4. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY
HORIZONTAL DIRECTION. MULTIPLE ARROWS
DO NOT SIGNIFY SIMULTANEOUS Fp LOADS
ACTING AT ONE TIME. DESIGN PROFESSIONAL
SHALL CONSIDER ECCENTRIC LOAD
DISTRIBUTION WHEN DETERMINING THE Fp
VALUE USED IN DESIGN.
5. ALTERNATE TO SHOWN HANGER/BRACE
ATTACHMENT TO EQUIPMENT, HANGER
RODS/BRACES MAY BE ATTACHED PER
EQUIPMENT OSP OR TO EQUIPMENT MANU.
CLIPS WITH ASTM A653 GR 33 20GA MIN.
THICKNESS & 3/16" MIN. STEEL EDGE
DISTANCE.
6. ATTACHMENT TO THE EQUIPMENT SHALL BE
DESIGNED AND SUBMITTED TO OSHPD FOR
APPROVAL.

VIEW A-A

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PAGE
D13.10

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto 342 of 846
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VIEW A-A

HANGER ROD DIAMETER = ½"

SUSPENDED EQUIPMENT SEISMIC CABLE BRACING SYSTEM
375 LB MAX VERTICAL LOAD PER HANGER

KIT OPTIONS
C1X

STANDARD WASHER, MIN OD=2.5xROD DIA., TYP

6" MAX T&B, TYP
38" O.C. MAX
L=158" MAX

½"Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND CORE

(2) ½"Ø BOLTS AND NUTS, TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

MASON IND. N.Y. SCBH-1, TYP

EQUIPMENT THICKNESS = ASTM A653 GR 33 18GA MIN. T&B, TYP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

BRACE ANGLE RANGE

30° - 45° 540 LBS
46° - 60° 380 LBS

NOTES:

1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. ADDITIONAL GRAVITY HANGERS MAY BE REQUIRED PER EQUIPMENT MANUFACTURER'S GUIDELINES.
6. ALTERNATE TO SHOWN HANGER/BRACE ATTACHMENT TO EQUIPMENT, HANGER RODS/BRACES MAY BE ATTACHED PER EQUIPMENT OSP OR TO EQUIPMENT MANUFACTURER'S GUIDELINES.
7. ATTACHMENT TO THE EQUIPMENT SHALL BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL.
SUSPENDED EQUIPMENT SEISMIC CABLE BRACING SYSTEM
750 LB MAX VERTICAL LOAD PER HANGER

HANGER ROD DIAMETER = 5/8"

EQUIPMENT THICKNESS = ASTM A653 GR 33 18GA MIN.
REG. NUT, T&B, TYP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE, LB</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>540</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>380</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. ADDITIONAL GRAVITY HANGERS MAY BE REQUIRED PER EQUIPMENT MANUFACTURER’S GUIDELINES.
6. ALTERNATE TO SHOWN HANGER/BRACE ATTACHMENT TO EQUIPMENT. HANGER RODS/BRACES MAY BE ATTACHED PER EQUIPMENT OSP OR TO EQUIPMENT MANU. CLIPS WITH ASTM A653 GR 33 18GA MIN. THICKNESS & 15/16" MIN. STEEL EDGE DISTANCE.
7. ATTACHMENT TO THE EQUIPMENT SHALL BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL.

VIEW A-A
HANGER ROD DIAMETER = \( \frac{3}{4}" \)

SUSPENDED EQUIPMENT SEISMIC CABLE BRACING SYSTEM
1250 LB MAX VERTICAL LOAD PER HANGER

REF. M PAGES FOR CONNECTION DETAILS
\( \frac{3}{4}" \) Ø ASTM A36 ATR, TYP 5
1\% x 1\% x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2
MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP
1" MIN T&B, TYP

6" MAX T&B, TYP
57" O.C. MAX
L=158" MAX

1\%" Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7x19 STRAND Core 1

(2) \( \frac{3}{4}" \) Ø BOLTS AND NUTS, TORQUE TO 45 FT-LBS OR USE 45 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

REFER TO TABLE FOR MAX ALLOWABLE BRACE ANGLE RANGE

\( \frac{3}{4}" \) Ø ASTM A693 GR 33 16GA MIN. 5, 7
REG. NUT, T&B, TYP

EQUIPMENT THICKNESS = ASTM A653 GR 33 16GA MIN.

NOTES:

1. REF. SECTION A1 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A6.0 & A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. \( F_p \) SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS \( F_p \) LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \( F_p \) VALUE USED IN DESIGN.

5. ADDITIONAL GRAVITY HANGERS MAY BE REQUIRED PER EQUIPMENT MANUFACTURER'S GUIDELINES.

6. ALTERNATE TO SHOWN HANGER/BRACE ATTACHMENT TO EQUIPMENT. HANGER RODS/BRACES MAY BE ATTACHED PER EQUIPMENT OSP OR TO EQUIPMENT MANU. CLIPS WITH ASTM A653 GR 33 16GA MIN. THICKNESS & \( \frac{1}{16}" \) MIN. STEEL EDGE DISTANCE.

7. ATTACHMENT TO THE EQUIPMENT SHALL BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL.

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PAGE
D13.13

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California SE No. S5270

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
345 of 846
**HANGER ROD DIAMETER = 3/8”**

**RECTANGULAR DUCT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM**

**30 PLF MAX**

---

**Notes:**

1. TRAPEZE MEMBER MAY BE PROVIDED WITH ROUND HOLES SIZED FOR HANGER RODS. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.

2. SEPARATE LONGITUDINAL BRACING SHALL BE PROVIDED FOR THE DUCT RUN AS DISCUSSED IN SECTION A1.

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PAGE D14.10

10/09/2020

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346 of 846
**HANGER ROD**

Diameter = \( \frac{3}{8} \)"

**RECTANGULAR DUCT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM**

30 PLF MAX

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**KIT OPTIONS**

- TS12L
- TS1220L
- TSH312L
- TSH320L

**CHART**

<table>
<thead>
<tr>
<th>Brace Angle Range</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, ( F_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>670 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>670 LBS</td>
</tr>
<tr>
<td>MAX.</td>
<td>170 LBS</td>
</tr>
</tbody>
</table>

**NOTES:**

1. REF. SECTION A1 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A6.0 - A6.2 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES AND ANGLE OR HSS MEMBER AS TRAPEZE.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \( F_p \) VALUE USED IN DESIGN.

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**VIEW A-A**

**SSBS OPTION**

MIN. \( \frac{3}{8} \)Øx1\( \frac{1}{2} \)x1\( \frac{1}{2} \) ASTM A36 STRUT WASHER AT OPEN FACE OF STRUT, TYP

REF. M PAGES FOR CONNECTION DETAILS AND ALTERNATE CONNECTION OPTIONS

**OPTION 1: SINGLE STRUT TRAPEZE**

(4) #10 ITW BUILDEX TEKS SCREW (REF. ICC-ES ESR-1976) 1" O.C. AND 1" MIN FROM EDGE, TYP. (REF. ICC-ES ESR-1976)

**OPTION 2: SINGLE STRUT TRAPEZE**

1\( \frac{1}{2} \)x1\( \frac{1}{2} \)x12GA SINGLE STRUT

## References

- MASON IND. N.Y. SHB-3/8 AS SHOWN OR SSBS-12 OPTION
- T&B NUT (SNUG TIGHT), U.O.N.
- (1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)
- 4" HANGER ROD DIAMETER = \( \frac{3}{8} \)"
- 30 PLF MAX BRACE MEMBER
- 1\( \frac{1}{2} \)x1\( \frac{1}{2} \)x12GA SINGLE STRUT (14'-6" MAX)
- MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS TYP
- 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
- DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \( F_p \) VALUE USED IN DESIGN.

---

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**PAGE D14.12**

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**347 of 846**
**HANGER ROD DIAMETER = \(\frac{1}{2}\)"**

**RECTANGULAR DUCT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM**

**60 PLF MAX**

---

**NOTES:**

1. TRAPEZE MEMBER MAY BE PROVIDED WITH ROUND HOLES SIZED FOR HANGER RODS. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.

2. SEPARATE LONGITUDINAL BRACING SHALL BE PROVIDED FOR THE DUCT RUN AS DISCUSSED IN SECTION A1.

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**PAGE**

D14.20
HANGER ROD DIAMETER = ½”

RECTANGULAR DUCT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM
60 PLF MAX

REF. M PAGES FOR CONNECTION DETAILS

½” Ø ASTM A36 ATR, TYP

1 3/16 x 5/8 x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’d 1, 2

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP

NOTE: VS12L

DIAMETER = 1 1/2”

ALTERNATIVE TO SMS FOR DUCT ≥ 1 8 GA START FROM DUCT EDGE

ALTERNATIVE TO SSBS OPTION

MIN. 3/16 x 5/8 x 1 1/2” ASTM A36 STRUT WASHER AT OPEN FACE OF STRUT, TYP

REF. M PAGES FOR CONNECTION DETAILS AND ALTERNATE CONNECTION OPTIONS

L3 x 3 x 3/8” LG. (ASTM A36, Fy = 36 KSI) & MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0), TYP FOR ALTERNATE CONNECTION OPTIONS BELOW

OPTION 1: SINGLE STRUT TRAPEZE

(4) #10 ITW BUILDEX TEKS SCREW 1” O.C. AND 1” MIN FROM EDGE, TYP. (REF. ICC-ES ESR-1976)

NOTE:
1. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

VIEW A-A

OPTION 2: SINGLE STRUT TRAPEZE

(4) #10 ITW BUILDEX TEKS SCREW 1” O.C. AND 1” MIN FROM EDGE, TYP. (REF. ICC-ES ESR-1976)

NOTE:
1. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

15° MAX FP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, FP

TPR. LONG.

30° - 45° 670 LBS 500 LBS

46° - 60° 670 LBS 290 LBS

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D14.22

PAGE

349 of 846
HANGER ROD DIAMETER = 5/8"

RECTANGULAR DUCT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM
100 PLF MAX

- REF. M PAGES FOR CONNECTION DETAILS
- 5/8"Ø ASTM A36 ATR, TYP
- (2) #10 ITW BUILDEX TEKS SCREW 1" O.C. AND 1" MAX FROM EDGE, BOTH SIDES, TYP (REF. ICC-ES ESR-1976).
  - IF TRAPEZE STEEL THICKNESS IS > 12GA, USE #12-24 ITW BUILDEX TEKS SCREWS.

- L3x3x⅛, 3" LG. (ASTM A36, Fy = 36 KSI) SEE BELOW FOR ALTERNATE CONNECTION OPTIONS
- REF. M PAGES FOR CONNECTION DETAILS AND ALTERNATE CONNECTION OPTIONS
- ASTM A307 3/8Ø BOLT & NUT (SNUG TIGHT) REF. T PAGES FOR TRAPEZE MEMBER SIZES
- MIN 3/4x1⅝x1⅜ ASTM A36 STRUT WASHER, (TYP AT OPEN SIDE OF STRUT)

NOTES:
1. TRAPEZE MEMBER MAY BE PROVIDED WITH ROUND HOLES SIZED FOR HANGER RODS. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.
2. SEPARATE LONGITUDINAL BRACING SHALL BE PROVIDED FOR THE DUCT RUN AS DISCUSSED IN SECTION A1.

OPTION 1: SINGLE STRUT TRAPEZE

- 1⅝x1⅝x12GA SINGLE STRUT
- MW-SSN-1/2 WITH MW-BON-1/2, TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)
- (4) #10 ITW BUILDEX TEKS SCREW 1" O.C. AND 1" MIN FROM EDGE, TYP (REF. ICC-ES ESR-1976)

OPTION 2: SINGLE STRUT TRAPEZE

- 6" MAX TYP
- 1" MAX TYP
- 1" MIN

T&B NUT (SNUG TIGHT), TYP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

- 670 LBS

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D14.30

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350 of 846
**Hanger Rod Diameter** = \(\frac{5}{8}"\)

**Rectangular Duct All-Directional Trapeze Seismic Solid Bracing System**

100 PLF MAX

**Kit Options**

- TS20L
- TSH520L

---

**Option 1: Single Strut Trapeze**

- 6" MAX T&B, TYP
- L=158" MAX
- 1" MIN

**Option 2: Single Strut Trapeze**

- 6" MAX T&B, TYP
- L=158" MAX
- 1" MIN

---

**Notes:**

1. **Ref. Section A1 for General Notes.**
2. **Provide rod stiffeners only where seismic brackets are attached to the rod and rod length (L) exceeds 31".** Ref. appropriate M10 pages for details.
3. **Ref. Page A6.0 - A6.2 for alternate arrangements of seismic braces and angle or HSS member as Trapeze.**
4. **Provide (1) 1/2" dia. connection in center hole when strut brace is installed inside the bracket and (2) 1/2" dia. connections in (2) outer holes when the brace is installed outside of the bracket. Ref. X2.3 for connection details.**
5. **Design professional shall consider eccentric load distribution when determining the \(F_p\) value used in design.
HANGER ROD
DIAMETER = 3/8"

CABLE TRAY TRANSVERSE
TRAPEZE SEISMIC SOLID BRACING SYSTEM
20 PLF MAX

REF. M PAGES FOR
CONNECTION DETAILS

1/2" ø ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD
STIFFENER CLAMP,
TORQUE TO 10 FT-LBS TYP
1 1/2 x 1 1/2 x 12 GA SINGLE STRUT,
ROD STIFFENER, WHERE
REQ'D. 1. 2

DETAIL B
CABLE TRAY (MIN. 12 GA)

VIEW A-A

KIT OPTIONS
TS12T
TS1220T
TSH312T
TSH320T

REF. N PAGES FOR BRACKET
CONNECTION DETAILS
MASON IND. N.Y.
SSBS-12 OR SSBS-20

1. MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF
(REF. PAGE X4.0) 4

REFER TO TABLE FOR ALLOWABLE
BRACE ANGLE RANGE

BRACE MEMBER
1 1/2 x 1 1/2 x 12 GA SINGLE STRUT (9'-6" MAX)
1 1/2 x 1 1/2 x 12 GA DOUBLE STRUT (14'-6" MAX)

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED
UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 4

HANGER ROD
DIAMETER = 3/8"

CABLE TRAY TRANSVERSE
TRAPEZE SEISMIC SOLID BRACING SYSTEM
20 PLF MAX

28" O.C. MAX
L=158" MAX

NOTES:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC
BRACKETS ARE ATTACHED TO THE ROD AND ROD
LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10
PAGES FOR DETAIL.
3. REF. PAGE A25.0 FOR ALTERNATE ARRANGEMENTS
OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE
WHEN STRUT BRACE IS INSTALLED INSIDE THE
BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2)
OUTER HOLES WHEN THE BRACE IS INSTALLED
OUTSIDE OF THE BRACKET. REF. X2.3 FOR
CONNECTION DETAILS.
5. TO INCREASE ANGLE UP TO 15°, REF. PAGE A24.1.
6. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE
TRAY MAY BE STAGGERED PROVIDED THAT THE 1"
EDGE DISTANCE AND 1" SPACING IS SATISFIED.
**CABLE TRAY LONGITUDINAL TRAPEZE SEISMIC SOLID BRACING SYSTEM**

20 PLF MAX

**REF. M PAGES FOR CONNECTION DETAILS**

1/8” ASTM A36 ATR, TYP

MASON IND. N.Y. UCC ROD STIFFENER CLAMP,

TORQUE TO 10 FT-LBS 1, TYP

1/2\(\times\)1\(\times\)12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

MASON IND. N.Y.

SSBS-12 OR SSBS-20 1

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) 4

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

**HANGER ROD DIAMETER = 3/8”**

**SSBS OPTION**

L1\(\frac{1}{2}\)\(\times\)1\(\times\)\(\frac{3}{16}\) 3” LG. ANGLE CLIP MUST BE AT BOTH SIDES OF TRAPEZE, TYP

CABLE TRAY (MIN. 12GA)

Fp

3/4”

1” MIN T&B, TYP

(2) #12 ITW BUILDEX TEKS SCREW, TYP (REF. ICC-ES ESR-1976)

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**PAGE**

E1.11

**NOTES:**

1. REF. SECTION A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A25.0 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

6. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1” EDGE DISTANCE AND 1” SPACING IS SATISFIED.
HANGER ROD
DIAMETER = 3/8"

CABLE TRAY ALL-DIRECTIONAL
TRAPEZE SEISMIC SOLID BRACING SYSTEM
20 PLF MAX

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VIEW A-A

LONGITUDINAL BRACE CAN
BE MASON IND. N.Y.
SHB-3/8 AS SHOWN OR
SSBS-12 OPTION, TYP 1, 3, 5
MIN 3/4 x 1/2 x 1/8 ASTM A36
STRUT WASHER, (TYP AT
OPEN SIDE OF STRUT),
T&B NUT (SNUG TIGHT), TYP

NOTE:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC
BRACKETS ARE ATTACHED TO THE ROD AND ROD
LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10
PAGES FOR DETAIL.
3. REF. PAGE A25.0 FOR ALTERNATE ARRANGEMENTS
OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE
WHEN STRUT BRACE IS INSTALLED INSIDE THE
BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2)
OUTER HOLES WHEN THE BRACE IS INSTALLED
OUTSIDE OF THE BRACKET. REF. X2.3 FOR
CONNECTION DETAILS.
5. MW-KY-38 MUST BE USED ON TOP OF BOTTOM SHB
WHEN STACKING (2) SHB ON THE SAME ROD, REF
X2.4.
6. DESIGN PROFESSIONAL SHALL CONSIDER
ECCENTRIC LOAD DISTRIBUTION WHEN
DETERMINING THE Fp VALUE USED IN DESIGN.
7. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE
TRAY MAY BE STAGGERED PROVIDED THAT THE 1"
EDGE DISTANCE AND 1" SPACING IS SATISFIED.
HANGER ROD DIAMETER = ½"

CABLE TRAY TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM
45 PLF MAX

KIT OPTIONS
TS12T
TS1220T
TSH412T
TSH420T

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PAGE E1.20

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 
REF. M PAGES FOR CONNECTION DETAILS
2/½Ø ASTM A36 ATR, TYP

SSFBS OPTION
MIN ¾x1½x12GA SINGLE STRUT, (1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
30° - 45° 580 LBS
46° - 60° 410 LBS

REF. T3 PAGES FOR TRAPEZE MEMBER SIZES

NOTES:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. MIN ¾x1½x12GA DOUBLE STRUT (9'-6" MAX)
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. TO INCREASE ANGLE UP TO 15°, REF. PAGE A24.1.
6. ITW BUILDDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.
HANGER ROD DIAMETER = ½"

CABLE TRAY LONGITUDINAL TRAPEZE SEISMIC SOLID BRACING SYSTEM

45 PLF MAX

KIT OPTIONS
TS12L
TS1220L
TSH412L
TSH420L

REF. M PAGES FOR CONNECTION DETAILS
½"Ø ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS ¹, TYP
1½ x 1½ x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’D ¹, ²

REF. N PAGES FOR BRACKET CONNECTION DETAILS
MASON IND. N.Y. SSBS-12 OR SSBS-20 ¹
(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) ⁴
REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE MEMBER ¹
1½ x 1½ x 12GA SINGLE STRUT (9’-6” MAX)
1½ x 1½ x 12GA DOUBLE STRUT (14’-6” MAX)

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) ⁴
MASON IND. N.Y. SHB-1/2 AS SHOWN OR SSBS-12 OPTION ¹, ³
MIN ¾ x 1½ x 1½ ASTM A36 STRUT WASHER, (TYP. AT OPEN SIDE OF STRUT)

REF. T3 PAGES FOR TRAPEZE MEMBER SIZES ¹
T&B NUT (SNUG TIGHT), TYP

(2) #12 ITW BUILDEX TEKS SCREW, TYP (REF. ICC-ES ESR-1976)

Fp⁵

3/4”

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
30° - 45° 580 LBS
46° - 60° 410 LBS

NOTES:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A25.0 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
6. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1” EDGE DISTANCE AND 1” SPACING IS SATISFIED.

SSBS OPTION

L1½ x 1½ x ¾, 3” LG. ANGLE CLIP MUST BE AT BOTH SIDES OF TRAPEZE, TYP
CABLE TRAY (MIN. 12GA)

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P A G E

E1.21

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10/09/2020

356 of 846
**HANGER ROD**

DIA = \( \frac{1}{2}" \)

**CABLE TRAY ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM**

45 PLF MAX

**KIT OPTIONS**

- TS12A
- TS220A
- TSH412A
- TSH420A

**REF. M PAGES FOR CONNECTION DETAILS**

\( \frac{1}{2}" \) Ø ASTM A36 ATR, TYP

MASON IND. N.Y. UCC ROD STIFFENER CLAMP,
TORQUE TO 10 FT-LBS \(^1\), TYP

\( \frac{1}{2} \times \frac{3}{4} \times 12GA \) SINGLE STRUT,
ROD STIFFENER, WHERE
REQ'ed \(^1\), \(^2\)

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

MASON IND. N.Y.

SSBS-12 OR SSBS-20

**NOTE:**

(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF
(REF. PAGE X4.0) \(^4\)

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

<table>
<thead>
<tr>
<th>BRACE MEMBER (^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{1}{2} \times \frac{3}{4} \times 12GA ) SINGLE STRUT (9'-6&quot; MAX)</td>
</tr>
<tr>
<td>( \frac{1}{2} \times \frac{3}{4} \times 12GA ) DOUBLE STRUT (14'-6&quot; MAX)</td>
</tr>
</tbody>
</table>

**REF. T3 PAGES FOR TRAPEZE MEMBER SIZES \(^1\)**

**SSBS OPTION**

LONGITUDINAL BRACE CAN BE MASON IND. N.Y.

SHB-1/2 AS SHOWN OR SSBS-12 OPTION, TYP \(^1\), \(^3\), \(^5\)

MIN \( \frac{3}{4} \times \frac{3}{4} \times \frac{3}{4} \) ASTM A36 STRUT WASHER, (TYP AT OPEN SIDE OF STRUT).

T&B NUT (SNUG TIGHT), TYP

**NOTES:**

1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A25.0 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. MW-KY-50 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD, REF X2.4.
6. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
7. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.
HANGER ROD DIAMETER = 5/8"

CABLE TRAY TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM 85 PLF MAX

KIT OPTIONS
TS20T
TSH520T

REF. M PAGES FOR CONNECTION DETAILS
1/2" Ø ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS¹, TYP
1 1/4 x 1 1/4 x 12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D ¹, 2

DETAIL B

CABLE TRAY (MIN. 12GA)

1" MIN TYP
6" MAX TYP

1/2" MIN T&B, TYP

1/2" MIN T&B, TYP

MASON IND. N.Y. SHB-5/8 AS SHOWN OR SSBS-20 OPTION ¹, 3
MIN 1 1/2 x 1 1/2 x 12GA ASTM A36 STRUT/WASHER, (TYP AT OPEN SIDE OF STRUT).
T&B NUT (SNUG TIGHT), TYP

REF. T3 PAGES FOR TRAPEZE MEMBER SIZES ¹

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
30° - 45° 580 LBS
46° - 60° 410 LBS

NOTES:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A25.0 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. TO INCREASE ANGLE UP TO 15°, REF. PAGE A24.1.
6. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.

VIEW A-A

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PAGE E1.30

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
358 of 846
NOTE:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31".  REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A25.0 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET.  REF. X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
6. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.
HANGER ROD DIAMETER = 5/8"

CABLE TRAY ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM
85 PLF MAX

KIT OPTIONS
TS20A
TSH520A

NOTE:
1. USE MASON IND. N.Y. SHB-5/8 AS SHOWN OR SSBS-20 OPTION, TYP 1, 3, 5

DETAIL B

LONGITUDINAL BRACE CAN BE MASON IND. N.Y.
SHB-5/8 AS SHOWN OR SSBS-20 OPTION, TYP 1, 3, 5

VIEW A-A

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E1.32
CABLE TRAY TRANSVERSE
TRAPEZE SEISMIC CABLE BRACING SYSTEM
20 PLF MAX

MIN. 3/8" DIAM. HANGER ROD

MIN. 3/8" Ø ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD
STIFFENER CLAMP,
TORQUE TO 10 FT-LBS 1, TYP

1-1/8" x 1/2" x 12GA SINGLE STRUT,
ROD STIFFENER, WHERE
REQ'D 1, 2

MIN. 3/8" x 1/2" x 1/8" ASTM A36
STRUT WASHER, TYP
CABLE TRAY (MIN. 12GA)

6" MAX T&B, TYP

28" O.C. MAX

L=158" MAX

1" MIN T&B, TYP

(1) 3/8" Ø BOLT AND NUT TORQUE TO
30 FT-LBS OR USE 30 FT-LBS MIN
BREAK AWAY NUT (REF. PAGE X4.0)

REF. T3 PAGES FOR
TRAPEZE MEMBER SIZES 1

MASON IND. N.Y. SCBH-0 1, 3
T&B NUT (SNUG TIGHT), TYP
REF. T3 PAGES FOR
CONNECTION DETAILS

MAX ALLOWABLE
FORCE PER
SEISMIC BRACE
ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>270 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>190 LBS</td>
</tr>
</tbody>
</table>

NOTES:

1. REF. SECTION A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 18". REF.
APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A25.0 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.

4. TO INCREASE ANGLE UP TO 15°, REF. PAGE
A24.1.

5. ITW BUILDEX TEKS SCREW ATTACHMENT TO
CABLE TRAY MAY BE STAGGERED PROVIDED
THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.

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E2.10
**HANGER ROD DIAMETER = 3/8”**

**CABLE TRAY LONGITUDINAL TRAPEZE SEISMIC CABLE BRACING SYSTEM**

**20 PLF MAX**

**KIT OPTIONS**

**TCOL**

---

**NOTES:**

1. REF. SECTION A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. PAGE A25.0 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

5. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1” EDGE DISTANCE AND 1” SPACING IS SATISFIED.

---

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---

**PAGE**

E2.11
**Hanger Rod Diameter** = \( \frac{3}{8}" \)

**Cable Tray All-Directional Trapeze Seismic Cable Bracing System**

**Kit Options**

TC0A

---

**Diagram Details**

- **View A-A**

**Notes:**

1. **Ref. Section A20 for General Notes.**

2. **Provide Rod Stiffeners Only Where Seismic Brackets are Attached to the Rod and Rod Length (L) Exceeds 18". Ref. Appropriate M10 Pages for Detail.**

3. **Ref. Page A25.0 for Alternative Arrangements of Seismic Braces.**

4. **Design Professional Shall Consider Eccentric Load Distribution When Determining the \( F_p \) Value Used in Design.**

5. **ITW Buildex Tek Screw Attachment to Cable Tray May be Staggered Provided That the 1" Edge Distance and 1" Spacing is Satisfied.**
HANGER ROD DIAMETER = \( \frac{1}{2} " \)

CABLE TRAY TRANSVERSE TRAPEZE SEISMIC CABLE BRACING SYSTEM
45 PLF MAX

KIT OPTIONS
TC1T

NOTES:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. REF. PAGE A25.0 FOR ALTERNATIVE ARRANGEMENTS OF SEISMIC BRACES.
4. TO INCREASE ANGLE UP TO 15°, REF. PAGE A24.1.
5. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.

VIEW A-A

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P A G E
E2.20

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OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
364 of 846
NOTES:

1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. REF. PAGE A25.0 FOR ALTERNATIVE ARRANGEMENTS OF SEISMIC BRACES.
4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.

CABLE TRAY LONGITUDINAL TRAPEZE SEISMIC CABLE BRACING SYSTEM
45 PLF MAX

REF. M PAGES FOR CONNECTION DETAILS
½" Ø ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD STIFFENER CLAMP,
TORQUE TO 10 FT-LBS 1, TYP
1½x1½x12GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2
MIN ½½x1½x1½ ASTM A36 STRUT WASHER, TYP

6" MAX T&B, TYP
38" O.C. MAX
L=158" MAX

1" MIN T&B, TYP

(2) ½" Ø BOLTS AND NUTS TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK WAY NUT (REF. PAGE X4.0)

MASON IND. N.Y. SCBH-1 1, 3
REF. T3 PAGES FOR TRAPEZE MEMBER SIZES 1
T&B NUT (SNUG TIGHT), TYP

L1½x1½x¾e, 3" LG. ANGLE CLIP MUST BE AT BOTH SIDES OF TRAPEZE, TYP
CABLE TRAY (MIN. 12GA)

(2) #12 ITW BUILDEX TEKS SCREW, TYP (REF. ICC-ES ESR-1976)

STANDARD WASHER, MIN OD=2.5xROD DIA., TYP

VIEW A-A

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>30° - 45°</th>
<th>45° - 60°</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX ALLOWABLE FORCE</td>
<td>540 LBS</td>
<td>380 LBS</td>
</tr>
</tbody>
</table>

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PAGE E2.21

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10/09/2020

365 of 846
HANGER ROD DIAMETER = $\frac{5}{8}"$

CABLE TRAY TRANSVERSE TRAPEZE SEISMIC CABLE BRACING SYSTEM
85 PLF MAX

NOTES:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. REF. PAGE A25.0 FOR ALTERNATIVE ARRANGEMENTS OF SEISMIC BRACES.
4. TO INCREASE ANGLE UP TO 15°, REF. PAGE A24.1.
5. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.

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PAGE
E2.30

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
367 of 846
NOTES:

1. REF. SECTION A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAILS.

3. REF. PAGE A25.0 FOR ALTERNATIVE ARRANGEMENTS OF SEISMIC BRACES.

4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE $F_p$ VALUE USED IN DESIGN.

5. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.
HANGER ROD DIAMETER = $\frac{5}{8}''$

CABLE TRAY ALL-DIRECTIONAL TRAPEZE SEISMIC CABLE BRACING SYSTEM
85 PLF MAX

NOTES:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH ($L$) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. REF. PAGE A25.0 FOR ALTERNATIVE ARRANGEMENTS OF SEISMIC BRACES.
4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE $F_p$ VALUE USED IN DESIGN.
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P A G E

E2.32

MASTON IND. N.Y. UCC ROD STIFFENER CLAMP,
TORQUE TO 10 FT-LBS, TYP.

MIN $\frac{3}{16}''\times\frac{3}{16}''\times\frac{3}{16}''$ ASTM A36 STRUT WASHER, TYP.

CABLE TRAY (MIN. 12GA)

$\frac{5}{8}''$ Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7X19 STRAND CORE

1" MIN T&B, TYP.

$\frac{7}{8}''$ 48" O.C. MAX.

$\frac{7}{8}''$ MAX TYP.

$\frac{1}{2}''$ MIN TYP.

$\frac{1}{4}''$ 3" LG. ANGLE CLIP

$\frac{1}{2}''$ MAX TYP.

$\frac{1}{2}''$ MAX TYP.

$\frac{1}{2}''$ MAX TYP.

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, $F_p$

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>540 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>380 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENERS ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH ($L$) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. REF. PAGE A25.0 FOR ALTERNATIVE ARRANGEMENTS OF SEISMIC BRACES.
4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE $F_p$ VALUE USED IN DESIGN.
5. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.
HANGER ROD
DIAMETER = 3/8"

CABLE TRAY X-PATTERN
TRAPEZE SEISMIC CABLE BRACING SYSTEM
20 PLF MAX

KIT OPTIONS
TC0X

NOTES:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A25.0 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. ITW BUILDTEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.
HANGER ROD DIAMETER = ½"

NOTES:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAILS.
3. REF. PAGE A25.0 FOR ALTERNATIVE ARRANGEMENTS OF SEISMIC BRACES.
4. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1” EDGE DISTANCE AND 1” SPACING IS SATISFIED.

CABLE TRAY X-PATTERN TRAPEZE SEISMIC CABLE BRACING SYSTEM
45 PLF MAX

KIT OPTIONS TC1X

VIEW A-A

STANDARD WASHER, MIN OD=2.5xROD DIA., TYP
ANGLE CLIP MUST BE AT BOTH SIDES OF TRAPEZE, TYP

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PAGE E3.11

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10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
371 of 846
NOTES:

1. REF. SECTION A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENER ONLY WHERE SEISMIC BRACKET IS ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAILS.

3. REF. PAGE A25.0 FOR ALTERNATIVE ARRANGEMENTS OF SEISMIC BRACES.

4. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

5. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.

---

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E3.12

372 of 846
**HANGER ROD DIAMETER = 3/8"**

**CABLE TRAY TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM 20 PLF MAX**

REF. M PAGES FOR CONNECTION DETAILS

**CABLE TRAY (MIN. 12GA)**

L3x3x\(\frac{3}{4}\) 3" LG. (ASTM A36, Fy = 36 KSI) & MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.8), TYP FOR ALTERNATE CONNECTION OPTIONS BELOW

1 1/2" MIN FROM EDGE, TYP REF. ICC-ES ESR-1976

**TRAPEZE SPAN**

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

670 LBS

**NOTES:**

1. TRAPEZE MEMBER MAY BE PROVIDED WITH ROUND HOLES SIZED FOR HANGER RODS. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.

2. SEPARATE LONGITUDINAL BRACING SHALL BE PROVIDED FOR THE CABLE TRAY RUN AS DISCUSSED IN SECTION A20.

3. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.
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MASON IND. N.Y.
SSBS-12 OR SSBS-20

REF. M PAGES FOR CONNECTION DETAILS
MASON IND. N.Y.
SBS-12 OR SBS-20

1) MW-SSN-1/2 WITH MW-BON-1/2
TYP. TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)

2) #12 ITW BUILDEx TEKS SCREW, TYP.
(REF. ICC-ES ESR-1976)

3) 15° MAX

4) #10 ITW BUILDEx TEKS SCREW 1" O.C.
AND 1" MIN FROM EDGE, TYP. (REF.
ICC-ES ESR-1976)

5) L3x3x3/8 3" LG. (ASTM A36)
Fy = 36 KSI) & MW-SSN-1/2
W/ MW-BON-1/2 TORQUED
UNTIL NUT BREAKS OFF
(REF. PAGE X4.0), TYP. FOR
ALTERNATE CONNECTION
OPTIONS BELOW

6) 1/2" MIN

NOTES:
1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 18". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A25.0 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER
HOLE WHEN STRUT BRACE IS INSTALLED
INSIDE THE BRACKET AND (2) 1/2" DIA.
CONNECTIONS IN (2) OUTER HOLES WHEN
THE BRACE IS INSTALLED OUTSIDE OF THE
BRACKET. REF. X2.3 FOR CONNECTION
DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER
ECCENTRIC LOAD DISTRIBUTION WHEN
DETERMINING THE Fp VALUE USED IN DESIGN.
6. ITW BUILDEx TEKS SCREW ATTACHMENT TO
CABLE TRAY MAY BE STAGGERED PROVIDED
THAT THE 1" EDGE DISTANCE AND 1"
SPACING IS SATISFIED.

OPTION 1: SINGLE STRUT TRAPEZE

OPTION 2: SINGLE STRUT TRAPEZE

OPTION 3: DOUBLE STRUT TRAPEZE
HANGER ROD DIAMETER = 1/2"

CABLE TRAY TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM 45 PLF MAX

REF. M PAGES FOR CONNECTION DETAILS
1/2" Ø ASTM A36 ATR, TYP

CABLE TRAY (MIN. 12GA)

9'-6" MAX

EQ

EQ

L3x3x1/8, 3" LG. (ASTM A36, Fy = 36 KSI) & MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.8), TYP FOR ALTERNATE CONNECTION OPTIONS BELOW

SINGLE STRUT TRAPEZE

(4) #12 ITW BUILDEX TEKS SCREW, TYP

1" O.C. AND 1" MIN FROM EDGE, TYP REF. ICC-ES ESR-1976)

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

670 LBS

OPTION 1: SINGLE STRUT TRAPEZE

1 5/8 x 1 5/8 x 12GA SINGLE STRUT

OPTION 3: DOUBLE STRUT TRAPEZE

1 5/8 x 1 5/8 x 12GA SINGLE STRUT

SINGLE STRUT TRAPEZE

L1 1/2 x 1 3/16 x 3" LG. ANGLE CLIP

1 1/8" MIN

MAX TYP

6" TYP

TRAPEZE SPAN

T&B NUT (SNUG TIGHT), TYP

TRAPEZE MEMBER SIZES 1
MIN 3/8 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER, (TYP AT OPEN SIDE OF STRUT)

NOTE:
1. TRAPEZE MEMBER MAY BE PROVIDED WITH ROUND HOLES Sized FOR HANGER RODS. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.
2. SEPARATE LONGITUDINAL BRACING SHALL BE PROVIDED FOR THE CABLE TRAY RUN AS DISCUSSED IN SECTION A20.
3. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.

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E4.20

10/09/2020
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375 of 846
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**CABLE TRAY ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM**

45 PLF MAX

---

**HANGER ROD DIAMETER = \frac{1}{2}''**

---

**SSBS OPTION**

**(2) #12 ITW BUILDEX TEKS SCREW, TYP** (REF. ICC-ES ESR-1976)

REF. M PAGES FOR CONNECTION DETAILS AND ALTERNATE CONNECTION OPTIONS

L3x3\(\frac{3}{8}'\) 3" LG. (ASTM A36, Fy = 36 KSI) & MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0), TYP FOR ALTERNATE CONNECTION OPTIONS BELOW

---

**OPTION 1: SINGLE STRUT TRAPEZE**

**(4) #10 ITW BUILDEX TEKS SCREW 1" O.C. AND 1" MIN FROM EDGE, TYP. (REF. ICC-ES ESR-1976)**

---

**OPTION 2: SINGLE STRUT TRAPEZE**

**(4) #10 ITW BUILDEX TEKS SCREW 1" O.C. AND 1" MIN FROM EDGE, TYP. (REF. ICC-ES ESR-1976)**

---

**OPTION 3: DOUBLE STRUT TRAPEZE**

---

**VIEW A-A**

---

**MASON IND. N.Y.**

---

**SSBS-12 OR SSBS-20**

---

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

MASON IND. N.Y.

---

**REF. M PAGES FOR CONNECTION DETAILS**

---

**MIN 3\(\frac{1}{2}'\)x\(\frac{1}{2}'\)x\(\frac{3}{16}''\) ASTM A36 STRUT WASHER, (TYP. AT OPEN SIDE OF STRUT)**

---

**T&B NUT (SNUG TIGHT), TYP** (1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)

---

**NOTES:**

1. REF. SECTION A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. PAGE A25.0 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLE WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
6. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1" EDGE DISTANCE AND 1" SPACING IS SATISFIED.
HANGER ROD DIAMETER = 5/8”

CABLE TRAY TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM 85 PLF MAX

REF. M PAGES FOR CONNECTION DETAILS
5/8” Ø ASTM A36 ATR, TYP

REF. T3 PAGES FOR TRAPEZE MEMBER SIZES
MIN 3/4x1 1/2x1 1/2 ASTM A36 STRUT WASHER, (TYP AT OPEN SIDE OF STRUT) 
T&B NUT (SNUG TIGHT), TYP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
670 LBS

L3x3x3/8, 3” LG. (ASTM A36, Fy = 36 KSI) & MW-SSN-1/2
W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF 
(REF. PAGE X4.0), TYP FOR ALTERNATE CONNECTION OPTIONS BELOW

OPTION 1: SINGLE STRUT TRAPEZE
(4) #10 ITW BUILDEX TEKS SCREW 1” O.C. AND 1” MIN FROM EDGE, TYP REF. (ICC-ES ESR-1976)

OPTION 2: SINGLE STRUT TRAPEZE
(4) #10 ITW BUILDEX TEKS SCREW 1” O.C. AND 1” MIN FROM EDGE, TYP REF. (ICC-ES ESR-1976)

OPTION 3: DOUBLE STRUT TRAPEZE
(4) #10 ITW BUILDEX TEKS SCREW 1” O.C. AND 1” MIN FROM EDGE, TYP REF. (ICC-ES ESR-1976)

NOTES:
1. TRAPEZE MEMBER MAY BE PROVIDED WITH ROUND HOLES SIZED FOR HANGER RODS. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.
2. SEPARATE LONGITUDINAL BRACING SHALL BE PROVIDED FOR THE CABLE TRAY RUN AS DISCUSSED IN SECTION A20.
3. ITW BUILDEX TEKS SCREW ATTACHMENT TO CABLE TRAY MAY BE STAGGERED PROVIDED THAT THE 1” EDGE DISTANCE AND 1” SPACING IS SATISFIED.

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PAGE E4.30

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377 of 846
**PIPING/CONDUIT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM**

**30 PLF MAX**

**HANGER ROD DIAMETER = 3/8”**

**CONNECTION DETAILS**

**MASON IND. N.Y.**

**SSBS-12 OR SSBS-20**

**BRACE MEMBER**

- 1 3/8 x 1 5/8 x 12 GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’D
- 1 3/8 x 1 5/8 x 12 GA DOUBLE STRUT (14’-6” MAX)

**HANGER ROD DIAMETER**

- 3/8” Ø ASTM A36 ATR, TYP

**DETAIL B**

- STRUT SPACER (REF. PAGE X8.2)

**INSULATION WHERE REQ’D**

**PIPE/CONDUIT CLAMP, TYP**

**INSULATION WHERE REQ’D**

**PIPE/CONDUIT CLAMP, TYP**

**VIEW A-A**

**Fp**

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>425 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>245 LBS</td>
</tr>
</tbody>
</table>

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18”, REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2” DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2” DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. TO INCREASE ANGLE UP TO 15°, REF. PAGE A14.1 OR A24.2. WHERE MW-SCCI PIPE CLAMP IS USED, ANGLE INCREASE SHALL BE LIMITED TO 10° MAX.
6. REF. X8.0 - X8.1.1, X8.6 - X8.6.3 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE Fp.
**HANGER ROD DIAMETER = \( \frac{3}{8}" \)**

**PIPING/CONDUIT LONGITUDINAL TRAPEZE SEISMIC SOLID BRACING SYSTEM**

**30 PLF MAX**

**KIT OPTIONS**
- TS12L
- TS1220L
- TSH312L
- TSH320L

---

**VIEW A-A**

**VIEW B-B**

---

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**DIAGRAM**

**BRACE MEMBER**
- 1\(\frac{1}{2}\)x1\(\frac{1}{2}\)x12 GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 
- 1\(\frac{1}{2}\)x1\(\frac{1}{2}\)x12 GA DOUBLE STRUT (9'-6" MAX)

**STRUT WASHER, TYP**

**HANGER ROD**

**DIAMETER = \( \frac{3}{8}" \)**

**REF. T2 PAGES FOR TRAPEZE MEMBER SIZES (DOUBLE STRUT SHOWN BUT MAY NOT BE NECESSARY)**

**T&B NUT (SNUG TIGHT), TYP**

**MASON IND. N.Y.**

**SHB-3/8 AS SHOWN OR SSBS-12 OPTION**

**MIN \( \frac{3}{8}\)x1\(\frac{1}{2}\)x1\(\frac{1}{2}\) ASTM A36 STRUT WASHER, TYP**

**REF. M PAGES FOR CONNECTION DETAILS**

**\( \frac{3}{8}\)"Ø ASTM A36 ATR, TYP**

**MASON IND. N.Y.**

**SSBS-12 OR SSBS-20**

**TORQUE TO 10 FT-LBS**

**1" MIN T&B, TYP**

**T&B, TYP**

**L=158" MAX**

**28" O.C. MAX**

**1" MIN T&B, TYP**

**STRUT SPACER**

**REF. T2 PAGES FOR TRAPEZE MEMBER SIZES (DOUBLE STRUT SHOWN BUT MAY NOT BE NECESSARY)**

---

**INSULATION WHERE REQ'D**

---

**PIPE/CONDUIT CLAMP, TYP**

**STRUT SPACER**

**INSULATION WHERE REQ'D**

---

**BRACE ANGLE RANGE**

- 30° - 45° 425 LBS
- 46° - 60° 245 LBS

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \)**

**SSBS OPTION**

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \( F_p \) VALUE USED IN DESIGN.

6. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE \( F_p \).
HANGER ROD
DIAMETER = 3/8"

PIPING/CONDUIT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM
30 PLF MAX

KIT OPTIONS
TS12A
TS1220A
TSH312A
TSH320A

KIT OPTIONS
TS12A
TS1220A
TSH312A
TSH320A

REF. M PAGES FOR CONNECTION DETAILS
3/8" Ø ASTM A36 ATR, TYP - MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS, TYP
13/16x13/16x12 GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D 1, 2

DETAIL B
STRUT SPACER (REF. PAGE X8.2)

6" MAX T&B, TYP
28" O.C. MAX

1" MIN
L=158" MAX

BRACE MEMBER 1
13/16x13/16x12GA SINGLE STRUT (14'-6" MAX)

1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

LONGITUDINAL BRACE CAN BE MASON IND. N.Y. SHB-3/8 AS SHOWN OR SSBS-12 OPTION, TYP 1, 3, 5

ATTACHMENT POINTS (REF. PAGE X8.2)

MIN 3/16x3/16x1/2 ASTM A36 STRUT WASHER, TYP
T&B NUT (SNUG TIGHT), TYP

REF. T2 PAGES FOR TRAPEZE MEMBER SIZES (DOUBLE STRUT SHOWN BUT MAY NOT BE NECESSARY) 1

15° MAX
ACTUAL PIPE/CONDUIT QUANTITY MAY VARY

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. MW-KY-50 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD. REF X2.4.
6. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
7. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE Fp.

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PAGE
F1.12
**Piping/Conduit Transverse Trapeze Seismic Solid Bracing System**

**60 PLF Max**

**Kit Options**
- TS12T
- TS1220T
- TSH412T
- TSH420T

**Hanger Rod Diameter** = ½”

**Insulation Where Req’d**

**Pipe/Conduit Clamp, Typ**

**T&B Nut (Snug Tight), Typ**

**Mason Ind. N.Y.**

**SSBS-12 OR SSBS-20**

**Refer to Table for Allowable Brace Angle Range**

**Brace Angle Range**

<table>
<thead>
<tr>
<th>Brace</th>
<th>Max Allowable Force per Seismic Brace Assembly, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>580 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>410 LBS</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Ref. Section A10 or A20 for General Notes.

2. Provide rod stiffening only where seismic brackets are attached to the rod and rod length (L) exceeds 25”. Ref. appropriate M10 pages for detail.


4. Provide (1) 1/2” dia. connection in center hole when strut brace is installed inside the bracket and (2) 1/2” dia. connections in (2) outer holes when the brace is installed outside of the bracket. Ref. X2.3 for connection details.

5. To increase angle up to 15°, ref. page A14.1 or A24.2. Where MW-SCCI pipe clamp is used, angle increase shall be limited to 10° max.

**PIPES/CONDUIT LONGITUDINAL TRAPEZE SEISMIC SOLID BRACING SYSTEM**

60 PLF MAX

**HANGER ROD DIAMETER = ½”**

**BRACE MEMBER**

1) 1½x1½x12 GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’D 1, 2

38" O.C. MAX

L=158” MAX

1½x1½x12 GA DOUBLE STRUT (14’-6” MAX)

**HANGER ROD**

DIAMETER = 1 ¼" Ø ASTM A36 ATR, TYP

**MASON IND. N.Y. SHB-1/2 AS SHOWN OR**

SSBS-12 OPTION 1, 3

**MIN ½x1½x1½" ASTM A36 STRUT WASHER, TYP**

**T&B NUT (SNUG TIGHT), TYP**

**PIECE/CONDUIT CLAMP, TYP 6**

**STRUT SPACER** (REF. PAGE X8.2)

**INSULATION WHERE REQ’D**

**VIEW B-B**

**VIEW A-A**

---

**SSBS OPTION**

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. PROVIDE (1) 1/2" DIAM. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIAM. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

6. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE Fp.
HANGER ROD DIAMETER = ½"

PIPING/CONDUIT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM
60 PLF MAX

KIT OPTIONS
TS12A
TS1220A
TSH412A
TSH420A

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OPM-0043-13
10/09/2020

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P A G E  F1.22


1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. MW-KY-50 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD. REF X2.4.
6. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
7. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE Fp.
**PIPING/CONDUIT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM**

**100 PLF MAX**

---

**HANGER ROD**

Diameter $= \frac{5}{8}''$

---

**INSULATION**

Where Req'd

**PIPE/CONDUIT CLAMP,** TYP $^6$

---

**DETAIL B**

STRUT SPACER

(Ref. Page X8.2)

---

**BRACE MEMBER**

$\frac{5}{8}'' \times \frac{1}{2}'' \times 12$ GA SINGLE STRUT, ROD STIFFENER, WHERE Req'D $^1, 2$

---

**VIEW A-A**

---

**REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, $F_p$ $^5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$30^\circ - 45^\circ$</td>
<td>$635$ LBS</td>
</tr>
<tr>
<td>$46^\circ - 60^\circ$</td>
<td>$575$ LBS</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Refer Section A10 or A20 for general notes. Max allowable force, $F_p$, may be limited by anchorage capacity.

2. Provide rod stiffening only where seismic brackets are attached to the rod and rod length ($L$) exceeds 31'', ref. appropriate M10 pages for detail.


4. Provide (1) 1/2" dia. connection in center hole when strut brace is installed inside the bracket and (2) 1/2" dia. connections in (2) outer holes when the brace is installed outside of the bracket. Ref. X2.3 for connection details.

5. To increase angle up to 15', ref. Page A14.1 or A24.2. Where MW-SCCI pipe clamp is used, angle increase shall be limited to 10' max.


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10/09/2020

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PIPING/CONDUIT LONGITUDINAL TRAPEZE SEISMIC SOLID BRACING SYSTEM
100 PLF MAX

KIT OPTIONS
- TS2012L
- TS20L
- TSH512L
- TSH520L

HANGER ROD DIAMETER = \( \frac{5}{8}'' \)

1. REF. M PAGES FOR CONNECTION DETAILS
2. 3/8'' ASTM A36 ATR, TYP
3. MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS
4. 1(1/2)x1(1/2)x12 GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D
5. 1.5'' MIN T&B, TYP
6. 48'' O.C. MAX
7. L=158'' MAX

BRACE MEMBER
1. 1(1/2)x1(1/2)x12 GA SINGLE STRUT,  ROD STIFFENER, WHERE REQ'D
2. 1(1/2)x1(1/2)x12 GA DOUBLE STRUT (14'-6'' MAX)

HANGER ROD DIAMETER = \( \frac{5}{8}'' \)

DIAMETER = \( \frac{5}{8}'' \)

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF
(REF. PAGE X4.0) 4

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, ( F_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>635 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>575 LBS</td>
</tr>
</tbody>
</table>

MASON IND. N.Y.
SHB-5/8 AS SHOWN OR
SSBS-20 OPTION 1, 3
MIN 3/8x1(1/2)x1(1/2) ASTM A36
STRUT WASHER, TYP

T&B NUT (SNUG TIGHT), TYP

PIPE/CONDUIT CLAMP, TYP 6

STRUT SPACER
(REF. PAGE X8.2)

INSULATION WHERE REQ'D

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, \( F_p \), MAY BE LIMITED BY ANCHORAGE CAPACITY.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2'' DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2'' DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \( F_p \) VALUE USED IN DESIGN.
6. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE \( F_p \).
HANGER ROD
DIAMETER = $\frac{5}{8}''$

PIPING/CONDUIT ALL-DIRECTIONAL
TRAPEZE SEISMIC SOLID BRACING SYSTEM
100 PLF MAX

KIT OPTIONS
TS2012A
TS20A
TSH512A
TSH520A

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PAGE
F1.32

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
387 of 846
**HANGER ROD DIAMETER = \( \frac{5}{8}'' \)**

**PIPING/CONDUIT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM 100 PLF MAX**

**KIT OPTIONS**

- TSH54T
- TSH5T

**Blake Member**

- \( \frac{5}{8} \times \frac{3}{16} \times 12 \) GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D
- \( \frac{5}{8} \times \frac{3}{16} \times 12 \) GA DOUBLE STRUT (9'-6" MAX)
- L3x3x\( \frac{3}{4} \) (14'-6" MAX)

**MASON IND. N.Y. SHB-1/2 OR SHB-5/8**

- 2 MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)
- 2 REG. NUT FOR L3x3x\( \frac{3}{4} \) BRACE, SNUG TIGHT

**INSULATION WHERE REQ'D**

**PIPE/CONDUIT CLAMP, TYP**

**MASON IND. N.Y.**

- SHB-1/2 OR SHB-5/8

**INSULATION WHERE REQ'D**

**PIPE/CONDUIT CLAMP, TYP**

**NOTES:**

1. FOR SEISMIC BRACE, SNUG TIGHT

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL

3. REF. SECTION A10 OR A20 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, \( F_p \), MAY BE LIMITED BY ANCHORAGE CAPACITY.

4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

5. TO INCREASE ANGLE UP TO 15°, REF. PAGE A14.1 OR A24.2. WHERE MW-SCCI PIPE CLAMP IS USED, ANGLE INCREASE SHALL BE LIMITED TO 10° MAX.

6. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
HANGER ROD
DIAMETER = \frac{5}{8}"

Piping/Conduit Longitudinal
Trapeze Seismic Solid Bracing System
100 PLF Max

Kit Options
TSH54L
TSH5L

Mason Ind. N.Y. SHB-1/2 or SHB-5/8
(2) MW-SSN-1/2 with MW-BON-1/2 torqued until nut breaks off
(Ref. Page X4.0) (2) Reg. Nut for L3x3x\frac{3}{4} Brace, snug tight

Refer to Table for Allowable Brace Angle Range

Max Allowable Force per Seismic Brace Assembly, \(F_p\)

<table>
<thead>
<tr>
<th>Brace Angle Range</th>
<th>Max Allowable Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>1050 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>645 LBS</td>
</tr>
</tbody>
</table>

Notes:
1. Ref. Section A10 or A20 for general notes. Max allowable force, \(F_p\), may be limited by anchorage capacity.
2. Provide rod stiffening only where seismic brackets are attached to the rod and rod length \((L)\) exceeds 31". Ref. appropriate M10 pages for detail.
4. Provide (1) 1/2" dia. connection in center hole when strut brace is installed inside the bracket and (2) 1/2" dia. connections in (2) outer holes when the brace is installed outside of the bracket. Ref. X2.3 for connection details.
5. Design professional shall consider eccentric load distribution when determining the \(F_p\) value used in design.
6. Ref. X8.0 - X8.1 for pipe/conduit clamp options. Clamp ratings may reduce max allowable \(F_p\).
HANGER ROD DIAMETER = \( \frac{5}{8} \)"

**PIPING/CONDUIT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM**

100 PLF MAX

**KIT OPTIONS**

TSH54A
TSH5A

---

**DETAIL B**

- 1" MIN T&B, TYP
- INSULATION WHERE REQ'D
- PIPE/CONDUIT CLAMP, TYP

**ACTUAL PIPE/CONDUIT QUANTITY MAY VARY**

**MASON IND. N.Y.**

SHB-5/8, TYP 1, 3, 5

**MIN \( \frac{3}{8} \times \frac{3}{8} \times \frac{1}{4} \)** ASTM A36 STRUT WASHER, TYP

**T&B NUT (SNUG TIGHT), TYP**

REF. T2 PAGES FOR TRAPEZE MEMBER SIZES (DOUBLE STRUT SHOWN BUT MAY NOT BE NECESSARY) 1

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, \( F_p \), MAY BE LIMITED BY ANCHORAGE CAPACITY.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

5. MW-KY-63 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD. REF. X2.4.

6. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \( F_p \) VALUE USED IN DESIGN.

7. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE \( F_p \).

**BRACE MEMBER**

- 1/2\( \times \frac{3}{8} \times \frac{1}{2} \) DOUBLE STRUT (14'-6" MAX)

**MAX ALLOWABLE BRACE ANGLE RANGE**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, ( F_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>745 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>455 LBS</td>
</tr>
</tbody>
</table>

**Fp**

**VIEW A-A**

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**PAGE**

F1.35
1. Refer to Section A10 or A20 for general notes.
2. Provide rod stiffening only where seismic brackets are attached to the rod and rod length \( L \) exceeds 37". Ref. appropriate M10 pages for detail.
3. Refer to Section A15 or A25 for alternate arrangements of seismic braces.
4. Provide (1) 1/2" dia. connection in center hole when strut brace is installed inside the bracket and (2) 1/2" dia. connections in (2) outer holes when the brace is installed outside of the bracket. Ref. X2.3 for connection details.
5. Refer to Section A16 or A26 for pipe/conduit attachment options.
PIPING/CONDUIT LONGITUDINAL TRAPEZE SEISMIC SOLID BRACING SYSTEM
150 PLF MAX

HANGER ROD DIAMETER = 3/4"

BRACE MEMBER
1 1/8 x 1 1/2 x 12 GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D
1 1/4 x 1 1/2 x 12 GA DOUBLE STRUT (14'-6" MAX)

HANGER ROD DIAMETER = 3/4"

DIAMETER = 3/4"

MASON IND. N.Y. UCC ROD STIFFENER CLAMP,
TORQUE TO 10 FT-LBS

1" MIN T&B, TYP

MASON IND. N.Y. SSBS-20

(1) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF
(REF. PAGE X4.0)

T&B NUT (SNUG TIGHT), TYP

REF. M PAGES FOR CONNECTION DETAILS
1/2" Ø ASTM A36 ATR, TYP

MASON IND. N.Y. SSBS-20

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
6. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
6. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
HANGER ROD DIAMETER = 3/4"

PIPING/CONDUIT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM
150 PLF MAX

KIT OPTIONS
TS20A
TSH620A

MASON IND. N.Y.
SSBS-20 ¹
(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) ⁴
REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE MEMBER ¹
13/8 x 13/8 x 12GA SINGLE STRUT (5'-0" MAX)
13/8 x 13/8 x 12GA DOUBLE STRUT (14'-6" MAX)

(1) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0) ⁴

INSULATION WHERE REQ’D

LONGITUDINAL BRACE CAN BE MASON IND. N.Y. SHB-3/4 AS SHOWN OR SSBS-20 OPTION ¹, ³, ⁵

ACTUAL PIPE/CONDUIT QUANTITY MAY VARY

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. MW-KY-75 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD. REF X2.4.
6. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
7. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
**PIPING/CONDUIT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM**

150 PLF MAX

**KIT OPTIONS**

- TSH64T
- TSH65T
- TSH6T

**HANGER ROD**

Diameter = 3/4"

**BRACE MEMBER**

- 1\(\frac{1}{8}\)\times 1\(\frac{1}{8}\)\times 12 GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D

**INSULATION**

WHERE REQ'D

**DETAIL B**

- 1" MIN T&B, TYP

**Fp**

- MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

5. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.

**VIEW A-A**

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FA.143

P A G E 394 of 846
PIPING/CONDUIT LONGITUDINAL TRAPEZE SEISMIC SOLID BRACING SYSTEM
150 PLF MAX

HANGER ROD DIAMETER = $\frac{3}{4}''$

KIT OPTIONS
TSH64L
TSH65L
TSH6L

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California SE No. S5270

NOTES:

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, $F_p$, MAY BE LIMITED BY ANCHORAGE CAPACITY.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH ($L$) EXCEEDS 37''. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. PROVIDE (1) 1/2'' DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2'' DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.

5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE $F_p$ VALUE USED IN DESIGN.

6. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
**HANGER ROD**

**DIAMETER = 3/4"**

**PIPING/CONDUIT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM**

**150 PLF MAX**

**KIT OPTIONS**

- TSH64A
- TSH65A
- TSH6A

---

**REF. M PAGES FOR**: 

- Connection Details
- 3/8" ASTM A36 ATR, TYP
- Mason Ind. N.Y. UCC Rod Stiffener Clamp, Torque to 10 FT-LBS
- 11/16x1/2x12 GA Single Strut, Rod Stiffener, WHERE REQ'D

**6" MAX**

T&B, TYP

**57" O.C. MAX**

**L=158" MAX**

**1" MIN**

**TYP**

---

**DETAIL B**

**MAISON IND. N.Y. SHB-3/4, TYP**

**1, 3, 5**

**REF. T2 PAGES FOR TRAPEZE MEMBER SIZES (HSS SHOWN BUT MAY NOT BE NECESSARY)**

**ACTUAL PIPE/CONDUIT QUANTITY MAY VARY**

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**VIEW A-A**

**BRACE MEMBER**

- 11/32x1/2x12GA Single Strut (5'-0" MAX)
- 11/32x1/2x12GA Double Strut (9'-6" MAX)
- L3x3x3/4 (14'-6" MAX)

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

**MAISON IND. N.Y. SHB-1/2, SHB-5/8 OR SHB-3/4**

**TORQUED UNTIL NUT BREAKS OFF**

(REF. PAGE X4.0) **(2) REG. NUT FOR L3x3x3/4 BRACE, SNUG TIGHT**

**REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE**

**NOTES:**

1. **REF. SECTION A10 OR A20 FOR GENERAL NOTES:** MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37".**REF. APPROPRIATE M10 PAGES FOR DETAIL.**

3. **REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.**

4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. **REF. X2.3 FOR CONNECTION DETAILS.**

5. **MW-KY-75 MUST BE USED ON TOP OF BOTTOM SHB WHEN STACKING (2) SHB ON THE SAME ROD.** **REF. X2.4.**

6. **DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.**

7. **REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.**

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**PAGE**

**F1.45**
HANGER ROD DIAMETER = 3/4"

PIPE/CORDリントオーストヴァーストラペーズシズミックソリッドブラッシングシステム
300 PLF MAX

KIT OPTIONS
TS3T

NOTE:
1. REF. SECTION A10 OR A20 FOR GENERAL
NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 27”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.

DETAIL B

INSULATION WHERE REQ'D

ACTUAL PIPE/CONDUIT QUANTITY MAY VARY

NOTES:

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PAGE
F1.50

1/8" ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD STIFFENER CLAMP,
TORQUE TO 10 FT-LBS, TYP
1\(\frac{1}{2}\times\frac{3}{4}\times12\) GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D

1/8" MIN T&B, TYP

1/8" MIN T&B, TYP

6" MAX T&B, TYP

1/8" MAX T&B, TYP

42" O.C. MAX

L=86" MAX

REFERENCES M PAGES FOR BRACKET CONNECTION DETAILS

MASON IND. N.Y. SSB-3 1, 3

(2) 3/8" Ø BOLT AND NUT, SNUG TIGHT

MASON IND. N.Y. SSB-3 1, 3

T&B NUT (SNUG TIGHT), TYP

PER T2 PAGES FOR TRAPEZE MEMBER SIZES

REFERENCES M PAGES FOR CONNECTION DETAILS

TS3T

REFERENCES M PAGES FOR CONNECTION DETAILS

MASON IND. N.Y. SSB-3 1

(2) 3/8" Ø BOLT AND NUT, SNUG TIGHT

REFERENCES N PAGES FOR BRACKET CONNECTION DETAILS

MASON IND. N.Y. SSB-3 1

(2) 3/8" Ø BOLT AND NUT, SNUG TIGHT

REFERENCES T2 PAGES FOR TRAPEZE MEMBER SIZES

INSULATION WHERE REQ'D

ACTUAL PIPE/CONDUIT QUANTITY MAY VARY

NOTES:

1. REF. SECTION A10 OR A20 FOR GENERAL
NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 27”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.

NOTES:

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3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
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NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 27". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
HANGER ROD DIAMETER = \( \frac{3}{4}'' \)

PIPING/CONDUIT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM

300 PLF MAX

KIT OPTIONS

TS3A

MASON IND. N.Y. SSB-3

TS3A

MASON IND. N.Y. SSB-3

MASON IND. N.Y. SSB-3

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 27". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
HANGER ROD DIAMETER = 3/4"

PIPE/CONDUIT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM
300 PLF MAX

PIPE/CONDUIT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM
300 PLF MAX

KIT OPTIONS
TS3T

3/4" Ø BOLT AND NUT, SNUG TIGHT

(2) 3/4" BOLT AND NUT, SNUG TIGHT

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE MEMBER
L3x3½" (9'-6" MAX)
L4x4½" (14'-6" MAX)
(ASTM A36, Fy = 36 KSI)

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

30° - 45° 3670 LBS
46° - 60° 2100 LBS

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
3. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.

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PAGE F1.53

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

10/09/2020
**HANGER ROD**
Diameter = \( \frac{3}{8}'' \)

**PIPING/CONDUIT LONGITUDINAL TRAPEZE SEISMIC SOLID BRACING SYSTEM**
300 PLF MAX

**KIT OPTIONS**
TS3L

---

**Notes:**

1. **BRACE MEMBER**
   - MASON IND. N.Y. SSB-3
   - L3x3\(\frac{3}{4}\) (9'-6" MAX)
   - L4x4\(\frac{3}{4}\) (14'-6" MAX)
   - (ASTM A36, Fy = 36 KSI)

2. **T&B NUT (SNUG TIGHT), TYP**
   - 2"Ø ASTM A53 GR B SCH. 40 PIPE

3. **INSULATION WHERE REQ'D**

4. **MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \)**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, ( F_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>3670 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>2100 LBS</td>
</tr>
</tbody>
</table>

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**References:**

- M PAGES FOR CONNECTION DETAILS
- N PAGES FOR BRACKET CONNECTION DETAILS
- T2 PAGES FOR TRAPEZE MEMBER SIZES
- T&B NUT (SNUG TIGHT), TYP
- PAGES FOR ALLOWABLE BRACE ANGLE RANGE

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California SE No. S5270

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10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

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401 of 846
**VIEW A-A**

**MASON WEST, INC.**
1601 E. Miraloma Ave, Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

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**HANGER ROD DIAMETER = 3/4”**

**PIPING/CONDUIT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM 300 PLF MAX**

**KIT OPTIONS**

| TS3A |

**INSULATION WHERE REQ'D**

**1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.**

**2. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.**

**3. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.**

**4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE FP VALUE USED IN DESIGN.**

---

**JEFFREY Y. KIKUMOTO**
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020

**PAGE**

F1.55
HANGER ROD DIAMETER = 1"

PIPING/CONDUIT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM 500 PLF MAX

KIT OPTIONS
TS4T

MASON IND. N.Y. SRC-2
1 ROD
STIFFENER CLAMP, TIGHTEN BY TURN OF NUT METHOD. SNUG TIGHT AND ADD ½ TURN
L2X2X}% ROD STIFFENER, (ASTM A36, Fy = 36 KSI) WHERE REQ'D

MASON IND. N.Y. SSB-4
1 ROD STIFFENER (ASTM A36, Fy = 36 KSI)

1"Ø ASTM A36 ATR, TYP
6" MAX T&B, TYP
66" O.C. MAX
L=134" MAX

1" MIN T&B, TYP
(2) ½" Ø BOLT AND NUT, SNUG TIGHT

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE MEMBER
L3x3x½ (9'-6" MAX)
L4x4x½ (14'-6" MAX)
(ASTM A36, Fy = 36 KSI)

MASON IND. N.Y. SSB-4
1 ROD STIFFENER W/ 1½" ID RING
1, 3 (2)
5/8" Ø BOLT AND NUT, SNUG TIGHT

T&B NUT (SNUG TIGHT), TYP

INSULATION WHERE REQ'D

DETAIL B

ACTUAL PIPE/CONDUIT QUANTITY MAY VARY

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 43". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.

VIEW A-A

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10/09/2020

PAGE F1.60
**PIPING/CONDUIT LONGITUDINAL TRAPEZE SEISMIC SOLID BRACING SYSTEM**

**500 PLF MAX**

**KIT OPTIONS**

**TS4L**

**HANGER ROD DIAMETER = 1”**

**REF. M PAGES FOR CONNECTION DETAILS**

1”Ø ASTM A36 ATR, TYP

LI2X2X1/2 ROD STIFFENER, (ASTM A36, Fy = 36 KSI) WHERE REQ’D

**MASON IND. N.Y. SRC-2 1 ROD STIFFENER CLAMP, TIGHTEN BY TURN OF NUT METHOD, SNUG TIGHT AND ADD 1/4 TURN**

L=134” MAX

**T&B NUT (SNUG TIGHT), TYP**

**INSULATION WHERE REQ’D**

**VIEW A-A**

**VIEW B-B**

**T&B NUT (SNUG TIGHT), TYP**

**MASON IND. N.Y. SSB-4 W/ 1/16” ID RING**

**REF. T2 PAGES FOR TRAPEZE MEMBER SIZES**

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

**MASON IND. N.Y. SSB-4 1**

(2) 3/8” BOLT AND NUT, SNUG TIGHT

**REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE**

**BRACE MEMBER**

L3x3x1/2 (9’-6” MAX)

L4x4x1/2 (14’-6” MAX)

(ASTM A36, Fy = 36 KSI)

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>3850 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>2220 LBS</td>
</tr>
</tbody>
</table>

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 43”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.

5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

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Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020

404 of 846

PAGE F1.61
**HANGER ROD DIAMETER = 1”**

**PIPING/CONDUIT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM 500 PLF MAX**

**KIT OPTIONS**

**TS4A**

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**REFERENCES**

1. REF. M PAGES FOR CONNECTION DETAILS
2. 1”Ø ASTM A36 ATR, TYP
3. MASON IND. N.Y. SRC-2
4. ROD STIFFENER CLAMP, TIGHTEN BY TURN OF NUT METHOD, SNUG TIGHT AND ADD ½ TURN, TYP
5. L2x2½” ROD STIFFENER, (ASTM A36, Fy = 36 KSI) WHERE REQ’D, TYP

---

**INSULATION WHERE REQ’D**

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**DETAIL B**

---

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 43”, REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
HANGER ROD
DIAMETER = 1 1/4"

MASON IND. N.Y. SRC-2 1 ROD STIFFENER CLAMP, TIGHTEN BY TURN OF NUT METHOD, SNUG TIGHT AND ADD 1/2 TURN

L2X2X9/16 ROD STIFFENER, (ASTM A36, Fy = 36 KSI) WHERE REQ'D

2" MAX T&B, TYP

MASON IND. N.Y. SSB-4 1, 3 (2) 9/16" BOLT AND NUT, SNUG TIGHT

T&B NUT (SNUG TIGHT), TYP

Brace Member
L3x3x9/16 (9'-6" MAX)
L4x4x9/16 (14'-6" MAX)
(ASTM A36, Fy = 36 KSI)

Actual pipe/conduit quantity may vary 4

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 62". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.

ION BY: Jeffrey Y. Kikumoto
DATE: 10/09/2020

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PAGE F1.70

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**HANGER ROD**
DIAMETER = 1 ¼”

**PIPING/CONDUIT LONGITUDINAL**
**TRAPEZE SEISMIC SOLID BRACING SYSTEM**
500 PLF MAX

**KIT OPTIONS**
TS4L

---

**VIEW A-A**

**VIEW B-B**

---

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---

**JEFFREY Y. KIKUMOTO**
California SE No. S5270

---

**NOTES:**
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD stiffening only where seismic brackets are attached to the rod and rod length (L) exceeds 62”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
**HANGER ROD**
Diameter = 1 1/4"  
**PIPING/CONDUIT ALL-DIRECTIONAL**
**TRAPEZE SEISMIC SOLID BRACING SYSTEM**
500 PLF MAX

**KIT OPTIONS**
TS4A

---

**INSULATION WHERE REQ'D**

---

**DETAIL B**

---

**VIEW A-A**

---

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---

**NOTES:**
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 62". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
**HANGER ROD**

DIAMETER = 1¼”

**PIPING/CONDUIT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM**

500 PLF MAX

**KIT OPTIONS**

TS4T

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**DETAIL B**

- **MASON IND. N.Y. SRC-2 1 ROD STIFFENER CLAMP, TIGHTEN BY TURN OF NUT METHOD, SNUG TIGHT AND ADD ½ TURN**
- **L2X2X ⅜ ROD STIFFENER, (ASTM A36, Fy = 36 KSI) WHERE REQ’D**
- **T&B NUT (SNUG TIGHT), TYP**
- **INSULATION WHERE REQ’D**
- **NOTE:**
  1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
  2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 46”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
  3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
  4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.

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**VIEW A-A**

**INSULATION**

WHERE REQ’D

**REF. M PAGES FOR CONNECTION DETAILS**

1¼”Ø ASTM A36 ATR, TYP

**REF. N PAGES FOR BRACKET CONNECTION DETAILS**

MASON IND. N.Y. SSB-4 1

(2) ¾”Ø BOLT AND NUT, SNUG TIGHT

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

**BRACE MEMBER**

L3x3x⅜ (5'-0" MAX)

L4x4x⅝ (9'-6" MAX)

L5x5x⅞ (14'-6" MAX)

(ASTM A36, Fy = 36 KSI)

**MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp**

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>6190 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>4130 LBS</td>
</tr>
</tbody>
</table>

---

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California SE No. S5270

---

**PAGE**

F1.73
HANGER ROD
DIAMETER = 1\(\frac{1}{4}\)"

PIPING/CONDUIT LONGITUDINAL
TRAPEZE SEISMIC SOLID BRACING SYSTEM
500 PLF MAX

KIT OPTIONS
TS4L

MASON IND. N.Y. SRC-2
1 ROD STIFFENER
CLAMP, TIGHTEN BY TURN OF NUT
METHOD, SNUG TIGHT AND ADD \(\frac{1}{2}\) TURN

L2x2x\(\frac{1}{4}\) ROD STIFFENER, (ASTM A36
Fy = 36 KSI) WHERE REQ'D

T&B, TYP 1" MIN

71" O.C. MAX

L=86" MAX

1" MIN T&B, TYP

MASON IND. N.Y. SSB-4
1, 3

REF. T2 PAGES FOR
TRAPEZE MEMBER SIZES

T&B NUT (SNUG TIGHT), TYP

7" MAX T&B, TYP

6" MAX T&B, TYP

REF. M PAGES FOR
CONNECTION DETAILS

1\(\frac{1}{4}\)"Ø ASTM A36 ATR, TYP

REF. N PAGES FOR BRACKET
CONNECTION DETAILS

MASON IND. N.Y. SSB-4
1

(2) \(\frac{3}{8}\)"Ø BOLT AND
NUT, SNUG TIGHT

REFER TO TABLE FOR
ALLOWABLE BRACE ANGLE RANGE

BRACE MEMBER
L3x3x\(\frac{1}{4}\) (5'-0" MAX)
L4x4x\(\frac{1}{4}\) (9'-6" MAX)
L5x5x\(\frac{1}{2}\) (14'-6" MAX)
(ASTM A36, Fy = 36 KSI)

MAX ALLOWABLE
FORCE PER SEISMIC BRACE
ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>Brace Angle Range</th>
<th>Fp Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(30^\circ - 45^\circ)</td>
<td>6190 LBS</td>
</tr>
<tr>
<td>(46^\circ - 60^\circ)</td>
<td>4130 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 46". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
HANGER ROD DIAMETER = 1¼"

PIPING/CONDUIT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM 500 PLF MAX

KIT OPTIONS TS4A

MASON IND. N.Y. SSB-4

L2X2X3/4 ROD STIFFENER, (ASTM A36, Fy = 36 KSI) WHERE REQ'D, TYP

1½"Ø ASTM A36 ATR, TYP

MASON IND. N.Y. SRC-2

ROD STIFFENER CLAMP, TIGHTEN BY TURN OF NUT METHOD, SNUG TIGHT AND ADD 1/2 TURN, TYP

L=86" MAX

6" MAX T&B, TYP

71" O.C. MAX

(2) 3/8" Ø BOLT AND NUT, SNUG TIGHT

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE MEMBER

L3x3x3/4 (5'-0" MAX)
L4x4x3/4 (9'-6" MAX)
L5x5x3/4 (14'-6" MAX)
(ASM A36, Fy = 36 KSI)

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>5770 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>3330 LBS</td>
</tr>
</tbody>
</table>

NOTES:

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 46". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.

5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

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PAGE F1.75

HANGER ROD DIAMETER = 3/8"

PIPING/CONDUIT TRANSVERSE TRAPEZE SEISMIC CABLE BRACING SYSTEM
30 PLF MAX

VIEW A-A

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. TO INCREASE ANGLE UP TO 15°, REF. PAGE A14.1 OR A24.2. WHERE MW-SCCI PIPE CLAMP IS USED, ANGLE INCREASE SHALL BE LIMITED TO 10° MAX.
5. REF. X8.0 - X8.1.1, X8.6 - X8.6.3 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE Fp.

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PAGE
F2.10

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10/09/2020

412 of 846
**Hanger Rod Diameter** = \( \frac{3}{8} " \)

**Piping/Conduit Longitudinal Trapeze Seismic Cable Bracing System**

30 PLF MAX

**Kit Options**

TC0L

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**Ref. M Pages for Connection Details**

\( \frac{3}{8} " \) ASTM A36 ATR, TYP

Mason Ind. N.Y. UCC Rod Stiffener Clamp, Torque to 10 FT-LBS \(^1\), TYP

\( \frac{1}{2} \times \frac{1}{2} \times 12 " \) GA Single Strut, Rod Stiffener, Where Req'd \(^1,2\)

---

**Ref. N Pages for Bracket Connection Details**

Mason Ind. N.Y. SCB-0 \(^1\)

(1) \( \frac{3}{8} " \) Bolt and Nut Torque to 30 FT-LBS or Use 30 FT-LBS Min Break Away Nut (Ref. Page X4.0)

Refer to Table for Allowable Brace Angle Ratios

\( \frac{3}{8} " \) Prestretched Galvanized Aircraft Cable 7X19 Strand Core \(^1\)

---

**Ref. T2 Pages for Trapeze Member Sizes**

(Double Strut Shown But May Not Be Necessary) \(^3\)

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**Notes:**

1. Ref. Section A10 or A20 for General Notes.

2. Provide Rod Stiffening Only Where Seismic Brackets Are Attached to the Rod and Rod Length (L) Exceeds 18". Ref. Appropriate M10 Pages for Detail.

3. Ref. Section A15 or A25 for Alternate Arrangements of Seismic Braces.

4. Design Professional Shall Consider Eccentric Load Distribution When Determining the Fp Value Used in Design.


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---

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---

**F2.11**
HANGER ROD
DIAMETER = 3/8"

PIPING/CONDUIT ALL-DIRECTIONAL
TRAPEZE SEISMIC CABLE BRACING SYSTEM
30 PLF MAX

KIT OPTIONS
TC0A

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 18". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. ROD STIFFENER MAY BE PROVIDED WITH ROUND OR SLOTTED HOLES.
4. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.
5. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
6. CONTRACTOR MAY SUBSTITUTE A BREAK-OFF BOLT SET TO MINIMUM 10 FT-LBS. REF. X3.0.
7. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
8. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE Fp.

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VIEW A-A

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HANGER ROD
DIAMETER = ½"

PIPING/CONDUIT TRANSVERSE
TRAPEZE SEISMIC CABLE BRACING SYSTEM
60 PLF MAX

KIT OPTIONS
TC1T

VIEW A-A

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PAGE
F2.20

1. REF. SECTION A10 OR A20 FOR GENERAL
NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 25". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.
4. TO INCREASE ANGLE UP TO 15°, REF. PAGE
A14.1 OR A24.2. WHERE MW-SCCI PIPE CLAMP
IS USED, ANGLE INCREASE SHALL BE LIMITED
TO 10° MAX.
5. REF. X8.0 - X8.1.1, X8.6 - X8.6.3 FOR
PIPE/CONDUIT CLAMP OPTIONS. CLAMP
RATINGS MAY REDUCE MAX ALLOWABLE Fp.
HANGER ROD DIAMETER = 1/2"

PIPING/CONDUIT LONGITUDINAL TRAPEZE SEISMIC CABLE BRACING SYSTEM 60 PLF MAX

KIT OPTIONS
TC1L

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NOTES:
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4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE Fp.
HANGER ROD
DIAMETER = ½"

PIPING/CONDUIT ALL-DIRECTIONAL
TRAPEZE SEISMIC CABLE BRACING SYSTEM
60 PLF MAX

KIT OPTIONS
TC1A

INSULATION
WHERE REQ'D
PIECE/CONDUIT
CLAMP, TYP

VIEW A-A

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL
NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 25". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. ROD STIFFENER MAY BE PROVIDED WITH
ROUND OR SLOTTED HOLES.
4. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.
5. REF. SECTION A15 OR A25 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.
6. CONTRACTOR MAY SUBSTITUTE A BREAK-OFF
BOLT SET TO MINIMUM 10 FT-LBS. REF. X3.0.
7. DESIGN PROFESSIONAL SHALL CONSIDER
ECCENTRIC LOAD DISTRIBUTION WHEN
DETERMINING THE Fp VALUE USED IN DESIGN.
8. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP
OPTIONS. CLAMP RATINGS MAY REDUCE MAX
ALLOWABLE Fp.
HANGER ROD
DIAMETER = 5/8"

PIPING/CONDUIT TRANSVERSE
TRAPEZE SEISMIC CABLE BRACING SYSTEM
100 PLF MAX

KIT OPTIONS
TC1T

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**VIEW A-A**

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**NOTES:**
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. TO INCREASE ANGLE UP TO 15°, REF. PAGE A14.1 OR A24.2. WHERE MW-SCCI PIPE CLAMP IS USED, ANGLE INCREASE SHALL BE LIMITED TO 10° MAX.
5. REF. X8.0 - X8.1.1, X8.6 - X8.6.3 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE \( F_p \).

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OPM-0043-13
10/09/2020

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418 of 846
**PIPING/CONDUIT LONGITUDINAL TRAPEZE SEISMIC CABLE BRACING SYSTEM**

100 PLF MAX

**HANGER ROD DIAMETER = 5/8"**

**KIT OPTIONS**

TC1L

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31”. REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.

5. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE Fp.

---

**REFERENCE PAGES:**

- M PAGES FOR CONNECTION DETAILS
- N PAGES FOR BRACKET CONNECTION DETAILS
- T2 PAGES FOR TRAPEZE MEMBER SIZES (DOUBLE STRUT SHOWN BUT MAY NOT BE NECESSARY)
- T1 PAGES FOR PIPE/CONDUIT Clamp OPTIONS. Clamp RATINGS MAY REDUCE MAX ALLOWABLE Fp.
**KIT OPTIONS**

TC1A

**HANGER ROD**

Diameter = \(\frac{5}{8}''\)

**PIPING/CONDUIT ALL-DIRECTIONAL**

TRAPEZE SEISMIC CABLE BRACING SYSTEM

100 PLF MAX

**INSULATION WHERE REQ'D**

**PIPE/CONDUIT CLAMP, TYP**

**REFERENCES:**

MASON IND. N.Y. SCBH-1

1, 5

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. ROD STIFFENER MAY BE PROVIDED WITH ROUND OR SLOTTED HOLES.

4. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.

5. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

6. CONTRACTOR MAY SUBSTITUTE A BREAK-OFF BOLT SET TO MINIMUM 10 FT-LBS. REF. X.3.0.

7. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \(F_p\) VALUE USED IN DESIGN.

8. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE \(F_p\).

---

**NOTES:**

1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. ROD STIFFENER MAY BE PROVIDED WITH ROUND OR SLOTTED HOLES.

4. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.

5. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

6. CONTRACTOR MAY SUBSTITUTE A BREAK-OFF BOLT SET TO MINIMUM 10 FT-LBS. REF. X.3.0.

7. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \(F_p\) VALUE USED IN DESIGN.

8. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE \(F_p\).

---

**REFERENCES:**

MASON IND. N.Y. SCBH-1

1, 5

2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.

3. ROD STIFFENER MAY BE PROVIDED WITH ROUND OR SLOTTED HOLES.

4. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.

5. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.

6. CONTRACTOR MAY SUBSTITUTE A BREAK-OFF BOLT SET TO MINIMUM 10 FT-LBS. REF. X.3.0.

7. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \(F_p\) VALUE USED IN DESIGN.

8. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE \(F_p\).
PIPING/CONDUIT TRANSVERSE TRAPEZE SEISMIC CABLE BRACING SYSTEM
150 PLF MAX

HANGER ROD DIAMETER = \( \frac{3}{4}'' \)

KIT OPTIONS
TC2T

VIEW A-A

REF. M PAGES FOR CONNECTION DETAILS
\( \frac{3}{4}'' \) Ø ASTM A36 ATR, TYP

MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS \(^1\), TYP

1\( \frac{1}{2}'' \times 1\frac{1}{2}'' \times 12'' \) GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D \(^1, 2\)

6'' MAX T&B, TYP

57'' O.C. MAX

L=158'' MAX

(2) \( \frac{3}{8}'' \) Ø BOLT AND NUT TORQUE TO 45 FT-LBS OR USE 45 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)

REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

\( \frac{3}{8}'' \) Ø PRESTRETCHED GALVANIZED AIRCRAFT CABLE 7X19 STRAND CORE \(^1\)

INSULATION WHERE REQ'D

1'' MAX T&B, TYP

T&B NUT (SNUG TIGHT), TYP

REF. T2 PAGES FOR TRAPEZE MEMBER SIZES (HSS SHOWN BUT MAY NOT BE NECESSARY)

2.5'' MAX TYP \(^4\)

STANDARD WASHER, MIN OD=2.5xROD DIA., TYP

ACTUAL PIPE/CONDUIT QUANTITY MAY VARY \(^5\)

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \)

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>990 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>460 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37''. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. TO INCREASE ANGLE UP TO 15°, REF. PAGE A14.1 OR A24.2.
5. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
HANGER ROD DIAMETER = \( \frac{3}{4}" \)

PIPING/CONDUIT LONGITUDINAL TRAPEZE SEISMIC CABLE BRACING SYSTEM 150 PLF MAX

KIT OPTIONS TC2L

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \( F_p \) VALUE USED IN DESIGN.
5. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS.
HANGER ROD DIAMETER = 3/8"

PIPING/CONDUIT X-PATTERN TRAPEZE SEISMIC CABLE BRACING SYSTEM
30 PLF MAX

KIT OPTIONS
TC0X

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P A G E
F3.10

INSULATION WHERE REQ'D
PIPE/CONDUIT CLAMP, TYP

1/8" ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD STIFFENER CLAMP,
TORQUE TO 10 FT-LBS 1, TYP
1/8"x1/8"x12 GA SINGLE STRUT,
ROD STIFFENER, WHERE
REQ'D 1,2
MIN 1/8"x1/8"x1/8" ASTM A36 STRUT WASHER, TYP

6" MAX T&B, TYP
28" O.C. MAX
L=158" MAX

(1) 3/8" Ø BOLT AND NUT TORQUE TO
30 FT-LBS OR USE 30 FT-LBS MIN
BREAK AWAY NUT (REF. PAGE X4.0)

REF. N PAGES FOR BRACKET
CONNECTION DETAILS
MASON IND. N.Y. SCB-0 1

REFER TO TABLE FOR ALLOWABLE
BRACE ANGLE RANGE
3/8" Ø PRESTRETCHED GALVANIZED
AIRCRAFT CABLE 7X19 STRAND
CORE 1

REF. M PAGES FOR CONNECTION DETAILS
3/8" Ø ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD STIFFENER CLAMP,
TORQUE TO 10 FT-LBS 1, TYP
1/8"x1/8"x12 GA SINGLE STRUT,
ROD STIFFENER, WHERE
REQ'D 1,2
MIN 1/8"x1/8"x1/8" ASTM A36 STRUT WASHER, TYP

(1) 3/8" Ø BOLT AND NUT TORQUE TO
30 FT-LBS OR USE 30 FT-LBS MIN
BREAK AWAY NUT (REF. PAGE X4.0)

STRUT SPACER (REF. PAGE X8.2)

1" MIN T&B, TYP

T&B NUT (SNUG TIGHT), TYP

1" MIN T&B, TYP

1" MIN T&B, TYP

ACTUAL PIPE/CONDUIT QUANTITY MAY VARY

15° MAX TYP
15° MAX TYP
15° MAX TYP
15° MAX TYP
45° TYP
45° TYP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

BRACE ANGLE RANGE
Fp
30° - 45° 270 LBS
46° - 60° 190 LBS

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL
NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 18". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.
4. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY
HORIZONTAL DIRECTION. MULTIPLE ARROWS
DO NOT SIGNIFY SIMULTANEOUS Fp LOADS
ACTING AT ONE TIME. DESIGN PROFESSIONAL
SHALL CONSIDER ECCENTRIC LOAD
DISTRIBUTION WHEN DETERMINING THE Fp
VALUE USED IN DESIGN.
5. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP
OPTIONS. CLAMP RATINGS MAY REDUCE MAX
ALLOWABLE Fp.

MASON IND. N.Y. SCBH-0 1, 3

T&B NUT (SNUG TIGHT), TYP

STRUT SPACER (REF. PAGE X8.2)

1" MIN T&B, TYP

1" MIN T&B, TYP

1" MIN T&B, TYP

1" MIN T&B, TYP

1" MIN T&B, TYP

1" MIN T&B, TYP

1" MIN T&B, TYP

1" MIN T&B, TYP

1" MIN T&B, TYP

1" MIN T&B, TYP

1° MAX TYP
1° MAX TYP
1° MAX TYP
1° MAX TYP
45° TYP
45° TYP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

BRACE ANGLE RANGE
Fp
30° - 45° 270 LBS
46° - 60° 190 LBS

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL
NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 18". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.
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VALUE USED IN DESIGN.
5. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP
OPTIONS. CLAMP RATINGS MAY REDUCE MAX
ALLOWABLE Fp.

MASON IND. N.Y. SCB-0 1

7/8" Ø PRESTRETCHED GALVANIZED
AIRCRAFT CABLE 7X19 STRAND
CORE 1

1" MIN T&B, TYP

1° MAX TYP
1° MAX TYP
1° MAX TYP
1° MAX TYP
45° TYP
45° TYP

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

BRACE ANGLE RANGE
Fp
30° - 45° 270 LBS
46° - 60° 190 LBS

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL
NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 18". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
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SHALL CONSIDER ECCENTRIC LOAD
DISTRIBUTION WHEN DETERMINING THE Fp
VALUE USED IN DESIGN.
5. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP
OPTIONS. CLAMP RATINGS MAY REDUCE MAX
ALLOWABLE Fp.
HANGER ROD DIAMETER = ½”

PIPING/CONDUIT X-PATTERN TRAPEZE SEISMIC CABLE BRACING SYSTEM 60 PLF MAX

KIT OPTIONS TC1X

VIEW A-A

REF. M PAGES FOR CONNECTION DETAILS
3⁄4” Ø ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP
13⁄8 x 13⁄8 x 12 GA SINGLE STRUT, ROD STIFFENER, WHERE REQ’D 1, 2
MIN 3⁄8 x 3⁄8 x 13⁄8 ASTM A36 STRUT WASHER, TYP

INSULATION WHERE REQ’D
PIPE/CONDUIT CLAMP, TYP 5

6” MAX T&B, TYP
38” O.C. MAX
L=158” MAX
1” MIN T&B, TYP

(2) 5⁄8” BOLTS AND NUTS TORQUE TO 25 FT-LBS OR USE 30 FT-LBS MIN BREAK AWAY NUT (REF. PAGE X4.0)
REFER TO TABLE FOR ALLOWABLE BRACE ANGLE RANGE

BRACE ANGLE RANGE MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp 5
30° - 45° 540 LBS
45° - 60° 380 LBS

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25”. REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE Fp.
HANGER ROD DIAMETER = \( \frac{5}{8} '' \)

**PIPING/CONDUIT X-PATTERN TRAPEZE SEISMIC CABLE BRACING SYSTEM**

100 PLF MAX

**KIT OPTIONS**

TC1X

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**DIAGRAM**

- **REF. M PAGES FOR**
  - CONNECTION DETAILS
  - **\( \frac{3}{4} '' \) Ø ASTM A36 ATR, TYP**
  - **MASON IND. N.Y. UCC ROD STIFFENER CLAMP**
  - **TORQUE TO 10 FT-LBS**
  - **\( \frac{1}{2} x \frac{1}{2} x 12 \) GA SINGLE STRUT, ROD STIFFENER, WHERE REQ'D**
  - **MIN \( \frac{3}{4} x \frac{1}{4} x \frac{3}{4} \) ASTM A36 STRUT WASHER, TYP**

- **INSULATION WHERE REQ'D**
  - **PIPE/CONDUIT CLAMP, TYP**

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**NOTES:**

1. **REF. SECTION A10 OR A20 FOR GENERAL NOTES.**
2. **PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31''. REF. APPROPRIATE M10 PAGES FOR DETAIL.**
3. **REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.**
4. **Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.**
5. **REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE Fp.**

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California SE No. S5270

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**PAGE**

F3.12
HANGER ROD
DIAMETER = 3/4"

PIPING/CONDUIT X-PATTERN
TRAPEZE SEISMIC CABLE BRACING SYSTEM
150 PLF MAX

KIT OPTIONS
TC2X

REF. M PAGES FOR CONNECTION DETAILS
3/4" Ø ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD STIFFENER CLAMP,
TORQUE TO 10 FT-LBS 1, TYP
1 1/2 x 1 1/2 x 12 GA SINGLE STRUT,
ROD STIFFENER, WHERE
REQ'D 1, 2

57" O.C. MAX
L=158" MAX

1" MIN
T&B, TYP

6" MAX
T&B, TYP

MASON IND. N.Y. SCB-2 1

(2) 3/4" Ø BOLT AND NUT TORQUE TO
45 FT-LBS OR USE 45 FT-LBS MIN
BREAK AWAY NUT (REF. PAGE X4.0)
REFER TO TABLE FOR ALLOWABLE
BRACE ANGLE RANGE

3/4" Ø PRESTRETCHED GALVANIZED
AIRCRAFT CABLE 7X19 STRAND
CORE 1

REF. N PAGES FOR BRACKET
CONNECTION DETAILS

MASON IND. N.Y. UCC ROD
STIFFENER CLAMP,
TORQUE TO 10 FT-LBS 1, TYP

T&B NUT (SNUG TIGHT), TYP

REF. T2 PAGES
FOR TRAPEZE
MEMBER SIZES
(HSS SHOWN
BUT MAY NOT
BE NECESSARY)

STANDARD
 WASHER, MIN
 OD=2.5xROD
 DIA., TYP

ACTUAL
 PIPE/CONDUIT
 QUANTITY MAY
 VARY 3

15° MAX TYP

45° TYP

15° TYP

45° TYP

1" MIN
T&B, TYP

MASON IND. N.Y. UCC ROD
STIFFENER CLAMP,
TORQUE TO 10 FT-LBS 1, TYP

INSULATION
WHERE REQ'D

MAX ALLOWABLE
FORCE PER
SEISMIC BRACE
ASSEMBLY, Fp

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>990 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>460 LBS</td>
</tr>
</tbody>
</table>

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 37". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. Fp SHALL BE A SINGLE LOAD APPLIED IN ANY HORIZONTAL DIRECTION. MULTIPLE ARROWS DO NOT SIGNIFY SIMULTANEOUS Fp LOADS ACTING AT ONE TIME. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
5. REF. SECTION A16 OR A26 FOR PIPE/CONDUIT ATTACHMENT OPTIONS

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P A G E
F3.13

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California SE No. S5270

HANGER ROD DIAMETER = 3/8"

PIPING/CONDUIT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM
30 PLF MAX

REF. M PAGES FOR CONNECTION DETAILS
3/8" Ø ASTM A36 ATR, TYP
PIPE/CONDUIT CLAMP, TYP 2
ACTUAL PIPE/CONDUIT QUANTITY MAY VARY
INSULATION WHERE REQ'D
STRUT Spacer (REF. PAGE X8.2)

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp
670 LBS

NOTES:
1. TRAPEZE MEMBER MAY BE PROVIDED WITH ROUND HOLES SIZED FOR HANGER RODS. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.
2. REF. X8.0 - X8.1.1, X8.6 - X8.6.3 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE Fp.
3. DOUBLE STRUT TRAPEZE OPTION SHOWN MAY NOT BE NECESSARY.
4. SEPARATE LONGITUDINAL BRACING SHALL BE PROVIDED FOR THE PIPE/CONDUIT RUN AS DISCUSSED IN SECTION A10.

OPTION 1: SINGLE STRUT TRAPEZE
(4) #10 ITW BUILDEX TEKS SCREW
1" O.C. AND 1" MIN FROM EDGE, TYP REF. ICC-ES ESR-1976

OPTION 2: SINGLE STRUT TRAPEZE
(4) #10 ITW BUILDEX TEKS SCREW
1" O.C. AND 1" MIN FROM EDGE, TYP REF. ICC-ES ESR-1976

OPTION 3: DOUBLE STRUT TRAPEZE
(4) #10 ITW BUILDEX TEKS SCREW
1" O.C. AND 1" MIN FROM EDGE, TYP REF. ICC-ES ESR-1976

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F4.10
HANGER ROD
DIAMETER = 3/8"

PIPING/CONDUIT ALL-DIRECTIONAL
TRAPEZE SEISMIC SOLID BRACING SYSTEM
30 PLF MAX

REF. M PAGES FOR
CONNECTION DETAILS
3/8" ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD
STIFFENER CLAMP, TORQUE TO 10 FT-LBS 1, TYP
1½x1½x12 GA SINGLE STRUT, ROD
STIFFENER, WHERE REQ'D 1, 2

MASON IND. N.Y.
SHB-3/8 AS SHOWN OR
SSBS-12 OPTION 1, 3
MIN ¾x1½x1½ ASTM A36
STRUT WASHER AT OPEN
FACE OF STRUT, TYP

REF. T2 PAGES FOR TRAPEZE
MEMBER SIZES (DOUBLE
STRUT SHOWN BUT MAY NOT
BE NECESSARY) 1
T&B NUT (SNUG TIGHT), TYP 6
PIPE/CONDUIT CLAMP, TYP 6
ACTUAL PIPE/CONDUIT
QUANTITY MAY VARY

OPTION 1: SINGLE STRUT TRAPEZE

(4) #10 ITW BUILDEX
TEKS SCREW 1" O.C.
AND 1" MIN FROM
EDGE, TYP. (REF.
ICC-ES ESR-1976)
1½x1½x12GA
SINGLE STRUT

OPTION 2: SINGLE STRUT TRAPEZE

(4) #10 ITW BUILDEX
TEKS SCREW 1" O.C.
AND 1" MIN FROM
EDGE, TYP. (REF.
ICC-ES ESR-1976)
1½x1½x12GA
SINGLE STRUT

OPTION 3: DOUBLE STRUT TRAPEZE

VIEW A-A

28" O.C.
L=158" MAX

1½x1½x12GA SINGLE STRUT (14'-6" MAX)

OPTIONAL HEAT INSULATION
WHERE REQ'D

INSULATION
WHERE REQ'D

15° MAX
15° MAX

15° MAX
15° MAX

Fp5
Fp5
1" MIN
1" MIN

5" MIN
5" MIN

6" MAX
T&B, TYP

5" MAX

Max Allowable
Force per Seismic Brace Assembly, Fp
Transverse
Longitudinal

30° - 45°
670 lbs
300 lbs

46° - 60°
670 lbs
170 lbs

NOTES:

1. REF. SECTION A10 OR A20 FOR GENERAL
NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE
SEISMIC BRACKETS ARE ATTACHED TO THE
ROD AND ROD LENGTH (L) EXCEEDS 18". REF.
APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE
ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER
HOLE WHEN STRUT BRACE IS INSTALLED INSIDE
THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN
(2) OUTER HOLES WHEN THE BRACE IS
INSTALLED OUTSIDE OF THE BRACKET. REF.
X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER
 ECCENTRIC LOAD DISTRIBUTION WHEN
 DETERMINING THE Fp VALUE USED IN DESIGN.
6. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP
OPTIONS. CLAMP RATINGS MAY REDUCE MAX
ALLOWABLE Fp.

PEACE

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PAGE
429 of 846

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
HANGER ROD DIAMETER = ½"

PIPING/CONDUIT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM
60 PLF MAX

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, Fp

DATE: 10/09/2020

OPTION 1: SINGLE STRUT TRAPEZE
(4) #10 ITW BUILDEX TEKS SCREW
1" O.C. AND 1" MIN FROM EDGE,
TYP REF. ICC-ES ESR-1976

OPTION 2: SINGLE STRUT TRAPEZE
(4) #10 ITW BUILDEX TEKS SCREW
1" O.C. AND 1" MIN FROM EDGE,
TYP REF. ICC-ES ESR-1976

OPTION 3: DOUBLE STRUT TRAPEZE

NOTES:
1. TRAPEZE MEMBER MAY BE PROVIDED WITH
ROUND HOLES SIZED FOR HANGER RODS. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.
2. REF. X8.0 - X8.1.1, X8.6 - X8.6.3 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP
RATINGS MAY REDUCE MAX ALLOWABLE Fp.
3. DOUBLE STRUT TRAPEZE OPTION SHOWN MAY
NOT BE NECESSARY.
4. SEPARATE LONGITUDINAL BRACING SHALL BE
PROVIDED FOR THE PIPE/CONDUIT RUN AS
DISCUSSED IN SECTION A10.

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10/09/2020

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430 of 846
HANGER ROD
DIAMETER = \( \frac{1}{2}'' \)

PIPING/CONDUIT ALL DIRECTIONAL
TRAPEZE SEISMIC SOLID BRACING SYSTEM
60 PLF MAX

KIT OPTIONS
TS12L
TS1220L
TSH412L
TSH420L

OPTION 1: SINGLE STRUT TRAPEZE

(4) #10 ITW BUILDEX
TEKS SCREW 1" O.C.
AND 1" MIN FROM
EDGE, TYP. (REF.
ICC-ES ESR-1976)

OPTION 2: SINGLE STRUT TRAPEZE

(4) #10 ITW BUILDEX
TEKS SCREW 1" O.C.
AND 1" MIN FROM
EDGE, TYP. (REF.
ICC-ES ESR-1976)

OPTION 3: DOUBLE STRUT TRAPEZE

(4) #10 ITW BUILDEX
TEKS SCREW 1" O.C.
AND 1" MIN FROM
EDGE, TYP. (REF.
ICC-ES ESR-1976)

MASON IND. N.Y.
SHB-1/2 AS SHOWN OR
SSBS-12 OPTION 1, 3
MIN \( \frac{3}{16}'' \times 1'' \times 1'' \) ASTM A36
STRUT WASHER AT OPEN
FACE OF STRUT, TYP

REF. M PAGES FOR
CONNECTION DETAILS

\( \frac{3}{16}'' \)Ø ASTM A36 ATR, TYP
MASON IND. N.Y. UCC ROD
STIFFENER CLAMP,
TORQUE TO 10 FT-LBS 1, TYP

1\( \frac{1}{2}'' \)x1\( \frac{1}{2}'' \)x12 GA SINGLE STRUT, ROD
STIFFENER, WHERE REQ'D 1, 2

1\( \frac{1}{2}'' \)x1\( \frac{1}{2}'' \)x12 GA SINGLE STRUT (9'-6" MAX)
1\( \frac{1}{2}'' \)x1\( \frac{1}{2}'' \)x12 GA DOUBLE STRUT (14'-6" MAX)

MAX ALLOWABLE FORCE PER
SEISMIC BRACE ASSEMBLY, \( F_p \)

<table>
<thead>
<tr>
<th>BRACE ANGLE RANGE</th>
<th>TRAN.</th>
<th>LONG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° - 45°</td>
<td>670 LBS</td>
<td>500 LBS</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>670 LBS</td>
<td>290 LBS</td>
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</tbody>
</table>

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 25". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE \( F_p \) VALUE USED IN DESIGN.
6. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE \( F_p \).

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PAGE F4.22

10/09/2020
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431 of 846
HANGER ROD DIAMETER = \( \frac{5}{8}'' \)

PIPING/CONDUIT TRANSVERSE TRAPEZE SEISMIC SOLID BRACING SYSTEM
100 PLF MAX

REF. M PAGES FOR CONNECTION DETAILS
\( \frac{5}{8}'' \)Ø ASTM A36 ATR, TYP
PIPE/CONDUIT CLAMP, TYP
ACTUAL PIPE/CONDUIT QUANTITY MAY VARY
INSULATION WHERE REQ’D
STRUT SPACER (REF. PAGE X8.2)

MAX ALLOWABLE FORCE PER SEISMIC BRACE ASSEMBLY, \( F_p \)

OPTION 1: SINGLE STRUT TRAPEZE
(4) #10 ITW BUILDEX TEKS SCREW
1" O.C. AND 1" MIN FROM EDGE,
TYP REF. ICC-ES ESR-1976)

OPTION 2: SINGLE STRUT TRAPEZE
(4) #10 ITW BUILDEX TEKS SCREW
1" O.C. AND 1" MIN FROM EDGE,
TYP REF. ICC-ES ESR-1976)

OPTION 3: DOUBLE STRUT TRAPEZE

NOTES:
1. TRAPEZE MEMBER MAY BE PROVIDED WITH ROUND HOLES SIZED FOR HANGER RODS. REF. X7.0 & X7.1 FOR STRUT MEMBER DATA.
2. REF. X8.0 - X8.1.1, X8.6 - X8.6.3 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATINGS MAY REDUCE MAX ALLOWABLE \( F_p \).
3. DOUBLE STRUT TRAPEZE OPTION SHOWN MAY NOT BE NECESSARY.
4. SEPARATE LONGITUDINAL BRACING SHALL BE PROVIDED FOR THE PIPE/CONDUIT RUN AS DISCUSSED IN SECTION A10.
HANGER ROD DIAMETER = 5/8"

PIPING/CONDUIT ALL-DIRECTIONAL TRAPEZE SEISMIC SOLID BRACING SYSTEM
100 PLF MAX

OPTION 1: SINGLE STRUT TRAPEZE

(4) #10 ITW BUILDEX TEKS SCREW 1" O.C. AND 1" MIN FROM EDGE, TYP. (REF. ICC-ES ESR-1976)

1⅛x1⅛x12GA SINGLE STRUT

OPTION 2: SINGLE STRUT TRAPEZE

(4) #10 ITW BUILDEX TEKS SCREW 1" O.C. AND 1" MIN FROM EDGE, TYP. (REF. ICC-ES ESR-1976)

1⅛x1⅛x12GA SINGLE STRUT

OPTION 3: DOUBLE STRUT TRAPEZE

(4) #10 ITW BUILDEX TEKS SCREW 1" O.C. AND 1" MIN FROM EDGE, TYP. (REF. ICC-ES ESR-1976)

1⅛x1⅛x12GA SINGLE STRUT

VIEW A-A

NOTES:
1. REF. SECTION A10 OR A20 FOR GENERAL NOTES. MAX ALLOWABLE FORCE, Fp, MAY BE LIMITED BY ANCHORAGE CAPACITY.
2. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD AND ROD LENGTH (L) EXCEEDS 31". REF. APPROPRIATE M10 PAGES FOR DETAIL.
3. REF. SECTION A15 OR A25 FOR ALTERNATE ARRANGEMENTS OF SEISMIC BRACES.
4. PROVIDE (1) 1/2" DIA. CONNECTION IN CENTER HOLE WHEN STRUT BRACE IS INSTALLED INSIDE THE BRACKET AND (2) 1/2" DIA. CONNECTIONS IN (2) OUTER HOLES WHEN THE BRACE IS INSTALLED OUTSIDE OF THE BRACKET. REF. X2.3 FOR CONNECTION DETAILS.
5. DESIGN PROFESSIONAL SHALL CONSIDER ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE Fp VALUE USED IN DESIGN.
6. REF. X8.0 - X8.1.1 FOR PIPE/CONDUIT CLAMP OPTIONS. CLAMP RATING MAY REDUCE MAX ALLOWABLE Fp.

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PAGE F4.32

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020
433 of 846
NOTES:

1 - "M" SERIES PAGES ARE COMPRISED OF HANGER ANCHORAGE CAPACITIES FOR VARIOUS TYPES OF ANCHORAGE CONDITIONS AT SEISMIC BRACE LOCATIONS ONLY. EACH HANGER ATTACHMENT TYPE IS DESIGNATED BY A SET OF NUMBERS AND A LETTER. THE NUMBERS REPRESENTS THE HANGER ROD SIZE (FOUND IN THE HANGER ROD SIZE TABLE) AND THE LETTER REPRESENTS THE MAXIMUM ALLOWABLE LOAD (FOUND IN THE VERTICAL LOAD RATING TABLE).

EXAMPLE: 38H REPRESENTS HANGER ROD SIZE OF $\frac{3}{8}$" WITH A MAXIMUM ALLOWABLE VERTICAL LOAD RATING OF 700 LBS.

2 - HANGER ANCHORAGE ATTACHMENTS TO STRUCTURE MAY BE USED WITH ANY ONE OF "M" SERIES PAGES, PROVIDED HANGER ATTACHMENT SIZE IS APPROPRIATE FOR THE APPLICATION AND THE ALLOWABLE VERTICAL LOAD CAPACITY IS MET.

3 - STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF THE STRUCTURE FROM LOADING IMPOSED BY VERTICAL HANGER ATTACHMENT.

4 - WHERE ROD STIFFENER IS REQUIRED, SEE M10.12.


6 - HANGER ROD MAY BE INSTALLED UP TO 6 DEGREES FROM PERPENDICULAR TO CONCRETE SURFACE.

7 - WHEN CONCRETE ANCHORS ARE INSTALLED AT THE BOTTOM OF THE CONCRETE FILLED METAL DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS ARE ALONG FLUTE LENGTH ONLY.

8 - SEE X7.0 AND X7.1 FOR STRUT MEMBER DATA. FOR CONDITIONS WHERE HOLES THROUGH STRUT MEMBERS ARE REQ'D, HOLES SHALL BE STD SIZE HOLES, TYP, U.N.O. WHERE PUNCHED STRUT OR HOLES ARE REQ'D, MIN. SPACING, EDGE, AND END DISTANCES SHALL BE MAINTAINED AS REQ'D PER DETAIL.

9 - ALL-THREAD RODS MUST BE MADE OF A36, A307 (GRADE A OR B), OR F1554 GR36 STEEL. ROD COUPLERS MUST CONFORM TO ASTM A563 STEEL WITH A MINIMUM OF 58 KSI TENSILE STRENGTH. MINIMUM ENGAGEMENT INTO ROD COUPLER MUST BE EQUAL TO THE ATR DIAMETER. ATR HANGER IS PERMITTED FOR COMPRESSION AND TENSION LOADING CONDITIONS ONLY; NO SHEAR LOADING.

10 - ALL CONCRETE FLAT SLABS, WALLS, AND BEAMS MUST HAVE A MINIMUM OF #4 BAR OR GREATER BETWEEN THE ANCHOR AND THE EDGE OF CONCRETE.

11 - DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.

12 - POST-INSTALLED ANCHORS MAY BE INSTALLED A MINIMUM OF 3 BOLT DIAMETERS AWAY FROM ABANDONED HOLES, AND A MINIMUM OF 1.5 BOLT DIAMETERS AWAY FROM DRYPACK MORTAR FILLED HOLES. DRYPACK MORTAR SHALL HAVE A COMpressive STRENGTH EQUAL OR GREATER THAN THE CONCRETE STRENGTH IN WHICH IT IS BEING USED.

13 - THE HANGER ROD AT SEISMIC BRACE LOCATIONS IS SUBJECTED TO GRAVITY LOADS AS WELL AS LATERAL AND VERTICAL SEISMIC LOADS AND HAS BEEN DESIGNED FOR SUCH COMBINED LOADING IN COMPLIANCE WITH THE CALIFORNIA BUILDING CODE, CALIFORNIA OSHPD AND STANDARD STRUCTURAL STEEL PRACTICES AND ARE NOT SUBJECT TO THE HANGER ROD DIAMETERS DESIGNED FOR GRAVITY LOADS ONLY THAT MAY BE OUTLINED IN PROJECT SPECIFICATIONS, CODE DOCUMENTS, TRADE GUIDELINES, ETC. IN ORDER TO ENSURE THE DELIVERY OF SEISMIC BRACE COMPONENTS THAT MATCH FIELD ERRECTED HANGERS, ALL HANGER RODS FOR INDIVIDUAL PIPES AND TRAPEZED SYSTEMS AT SEISMIC BRACE LOCATIONS SHOULD ADHERE TO THE TABLES ABOVE.

14 - PER CBC SECTION 1905A.1.9, CONCRETE COMpressive STRENGTH, $f_c$, SHALL BE LIMITED TO 8,000 PSI MAX, BUT MAY BE INCREASED SUBJECT TO OSHPD REVIEW AND APPROVAL ON A PROJECT BY PROJECT BASIS.
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (1) MASON WEST MW-PAL-A-CS CONCRETE INSERT

MASON WEST MW-PAL-A-CS CONCRETE INSERT, TYP
ASTM A36 ATR EXTENSION, FOR AXIAL LOAD ONLY
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

MASON WEST MW-PAL-A-CS CONCRETE INSERT
(REFER TO PAGES X5.0.CS & X5.2.1)

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD $T_a$</th>
<th>HANGER DIA. $d_a$</th>
<th>MIN EFF. EMBED. $h_e$</th>
<th>MIN BASE TH. $h_a$</th>
<th>MIN EDGE Cmin</th>
<th>MIN SPACING Smin</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38N</td>
<td>2210</td>
<td>5/8</td>
<td>3</td>
<td>4 1/2</td>
<td>4 1/2</td>
<td>9</td>
</tr>
<tr>
<td>50A TO 50P</td>
<td>3020</td>
<td>7/8</td>
<td>3</td>
<td>4 1/2</td>
<td>4 1/2</td>
<td>9</td>
</tr>
<tr>
<td>63A TO 63P</td>
<td>3020</td>
<td>7/8</td>
<td>3</td>
<td>4 1/2</td>
<td>4 1/2</td>
<td>9</td>
</tr>
</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES:
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, $Q_o$, PER ASCE 7-10 SEC. 12.4.3.3.
2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (2) MASON WEST MW-PAL-A-CS CONCRETE INSERTS

CONCRETE SLAB
CONCRETE BEAM

MASON WEST MW-PAL-A-CS
CONCRETE INSERT, TYP
½" DIA. ATR, MIN ¾x1⅛x1⅛
ASTM A36 STRUT WASHER AND
REG. NUT (SNUG TIGHT), TYP

REG. NUT T&B, TYP
(SNUG TIGHT)

MIN ¾x1⅛x1⅛
ASTM A36
STRUT WASHER
¼" TO ⅛" DIA.
ATR HANGER

ALTERNATE INSTALL

NOTE:
CONCRETE STRENGTH SHALL
BE BETWEEN 3000 PSI TO
10,000 PSI NWC. SEE NOTE 2
FOR ATTACHMENT TO SLWC

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-½ BY ⅛" MIN AND ATR
BY DIMENSION OF ATR, MIN)

¾" TO ⅛" DIA. ATR HANGER
SEE ALTERNATE INSTALL
FOR LARGER DIA. ATR.

MIN ¾x1⅛x1⅛
ASTM A36
STRUT WASHER
3⅛" TO 5⅛" DIA.
ATR HANGER

HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (2) MASON WEST MW-PAL-A-CS CONCRETE INSERTS

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta (LBS)</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac (LBS)</th>
<th>ATR HANGER Dia. (INCH)</th>
<th>MIN EFF. EMBED. ha INCH</th>
<th>MIN BASE TH. ha INCH</th>
<th>MIN EDGE Cmin (INCH)</th>
<th>MIN SPACING Smin (INCH)</th>
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<tbody>
<tr>
<td>38A TO 38N</td>
<td>2400</td>
<td>38A TO 38R</td>
<td>5030</td>
<td>⅛</td>
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<td>6</td>
<td>4⅝</td>
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<tr>
<td>50A TO 50P</td>
<td>2620</td>
<td>50A TO 50R</td>
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<td>3</td>
<td>6</td>
<td>4⅝</td>
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<tr>
<td>63A TO 63P</td>
<td>2620</td>
<td>63A TO 63R</td>
<td>5030</td>
<td>⅛</td>
<td>3</td>
<td>6</td>
<td>4⅝</td>
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<td>75A TO 75P</td>
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<td>75A TO 75R</td>
<td>5030</td>
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<td>3</td>
<td>6</td>
<td>4⅝</td>
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<tr>
<td>88A TO 88P</td>
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<td>88A TO 88R</td>
<td>5030</td>
<td>⅛</td>
<td>3</td>
<td>6</td>
<td>4⅝</td>
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</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER
ASCE 7-10 SEC. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE INSERT ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A
FACTOR OF 0.85.

3 ATR HANGER PERMITTED FOR COMPRESSION AND TENSION LOADING CONDITIONS ONLY. NO SHEAR LOADING.
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) MASON WEST MW-PAL-A-CS CONCRETE INSERTS

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta (LBS)</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac/1.2 (LBS)</th>
<th>ATR HANGER DIA. (INCH)</th>
<th>MIN EFF. EMBED. ha (INCH)</th>
<th>MIN BASE TH. ha (INCH)</th>
<th>MIN EDGE Cmin (INCH)</th>
<th>MIN SPACING Smin (INCH)</th>
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<tr>
<td>38A TO 38H</td>
<td>720</td>
<td>38A TO 38Q</td>
<td>4030</td>
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<td>4 1/2</td>
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<td>1080</td>
<td>50A TO 50Q</td>
<td>4030</td>
<td>7/8</td>
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<td>6</td>
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<tr>
<td>63A TO 63M</td>
<td>1930</td>
<td>63A TO 63Q</td>
<td>4030</td>
<td>7/8</td>
<td>3</td>
<td>6</td>
<td>4 1/2</td>
<td>9</td>
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<td>75A TO 75M</td>
<td>1930</td>
<td>75A TO 75Q</td>
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<td>7/8</td>
<td>3</td>
<td>6</td>
<td>4 1/2</td>
<td>9</td>
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</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1. ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.

2. FOR SLWC SLAB AND BEAM, REDUCE CONCRETE INSERT ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (4) MASON WEST MW-PAL-A-CS CONCRETE INSERTS

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

NOTE:
OFFSET MAY OCCUR IN ONE DIRECTION, NOT BOTH.

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac 1.2 LBS</th>
<th>ATR HANGER DIA. (INCH)</th>
<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN BASE TH. ha INCH</th>
<th>MIN EDGE Cmin (INCH)</th>
<th>MIN SPACING Smin (INCH)</th>
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<tbody>
<tr>
<td>50A TO 50L</td>
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<td>63A TO 63S</td>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qₜₚ, PER ASCE 7-10 SEC. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE INSERT ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (1) HILTI KB-TZ CONCRETE ANCHOR

HILTI KB-TZ CONCRETE ANCHOR
(ICC ESR-1917)
SPECIAL INSPECTION REQ'D

HANGER ATTACHMENT TYPE

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<th>MIN BASE TH., ha INCH</th>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERTRENGTH, Qω, PER ASCE 7-10 SEC. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
# Hanger Attachment to Concrete Slab and Beam with (2) Hilti KB-TZ Concrete Anchors

**Hanger Attachment Type**

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<th>Hanger Attachment Type</th>
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<th>Concrete Anchor Allowable Vertical Load (Tac)</th>
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<th>MIN Hole Depth (ho)</th>
<th>MIN Base Th. (ha)</th>
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<th>MIN Spacing Smin</th>
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**Notes:**

1. Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, $\Omega_p$, per ASCE 7-10 Sec. 12.4.3.3.

2. For SLWC slab and beam, reduce concrete anchor allowable vertical load by multiplying allowable load by a factor of 0.6.

3. ATR hanger permitted for compression and tension loading conditions only. No shear loading.

---

**MASON WEST, INC.**

1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

440 of 846
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) HILTI KB-TZ CONCRETE ANCHORS

HILTI KB-TZ CONCRETE ANCHOR, TYP

1" MIN FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT
1½×1½×12GA DOUBLE STRUT OR 1½×3½×12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN 3½×1½×1½ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
¾" TO ½" DIA. ATR HANGER. SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

MIN 3½×3½×1½ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

HILTI KB-TZ CONCRETE ANCHOR (ICC ESR-1917)
SPECIAL INSPECTION REQ'D

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<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN BASE TH. ha INCH</th>
<th>MIN EDGE Cmin INCH</th>
<th>MIN SPACING Smin INCH</th>
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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.
2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) HILTI KB-TZ CONCRETE ANCHORS

HILTI KB-TZ CONCRETE ANCHOR, TYP
MW-SAP-200-A FOR ATR ≤ ½”Ø
MW-SAP-200-B FOR ATR > ½”Ø
SEE PAGE X6.0

Both Sides of Lug
¾” FOR WPL-38
¾” FOR WPL-50 & 63
¾” FOR WPL-75
MW-WPL, SEE PAGE X8.4

3/8” TO 3/4” DIA. ATR HANGER, TYP

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NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

HILTI KB-TZ CONCRETE ANCHOR (ICC ESR-1917) SPECIAL INSPECTION REQ’D

ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.

FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.

MASON WEST, INC.
1601 E. Miraloma Ave, Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jiefu "Jeff" Zhang, SE
California SE No. S5270

M1.22
### Hanger Attachment to Concrete Slab and Beam with (4) Hilti KB-TZ Concrete Anchors

#### Hanger Attachment Type

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<th>Hanger Attachment Type</th>
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<th>Min Base Th. (ha) INCH</th>
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### Special Inspection Req’d

- Concrete Slab
- Concrete Beam

### Note:
- Concretes strength shall be between 3000 psi to 8,500 psi NWC. See note 2 for attachment to SLWC.
- Offset may occur in one direction, not both.

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**P A G E**

M1.23

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Jeffrey Y. Kikumoto  
OPM-0043-13  
10/09/2020
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (1) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP
REGULAR OR REDUCING ROD COUPLER, TYP
ATR HANGER, TYP

CONCRETE SLAB
CONCRETE BEAM

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

### DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR

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<th>ALLOWABLE VERTICAL LOAD Ta LBS</th>
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<th>MIN. EFF. Emb. hef INCH</th>
<th>MIN. HOLE Depth ho INCH</th>
<th>MIN. BASE Th. ha INCH</th>
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<th>MIN. SPACING Smin INCH</th>
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See detail M0.00 for section notes

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega \), PER ASCE 7-10 SEC. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM
WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP

1" MIN FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT
1½x1½x12GA DOUBLE STRUT OR 1½x3½x12GA SINGLE STRUT (SOLID OR PUNCHED ONLY).
STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN ¾x1½x1½ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
¾" TO ¾" DIA. ATR HANGER. SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

CONCRETE SLAB

CONCRETE BEAM

38A TO 38N 38A TO 38L 38A TO 38M 38A TO 38P 1520 2620 1870 2620 1520 2620 1870 2620 1520 2620 1870 2620 1520 2620 1870

50A TO 50P 50A TO 50L 50A TO 50M 50A TO 50P 1520 2620 1870 2620 1520 2620 1870 2620 1520 2620 1870 2620 1520 2620 1870

63A TO 63P 63A TO 63L 63A TO 63M 63A TO 63P 1520 2620 1870 2620 1520 2620 1870 2620 1520 2620 1870 2620 1520 2620 1870

75A TO 75P 75A TO 75L 75A TO 75M 75A TO 75P 1520 2620 1870 2620 1520 2620 1870 2620 1520 2620 1870 2620 1520 2620 1870

88A TO 88P 88A TO 88L 88A TO 88M 88A TO 88P 1520 2620 1870 2620 1520 2620 1870 2620 1520 2620 1870 2620 1520 2620 1870

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega \), PER ASCE 7-10 SEC. 12.4.3.3.
2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
3 ATR HANGER PERMITTED FOR COMPRESSION AND TENSION LOADING CONDITIONS ONLY. NO SHEAR LOADING.

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PAGE M1.31
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC.

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP

1" MIN FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT
1\(\frac{5}{8}\) x 1\(\frac{5}{8}\) x 12GA DOUBLE STRUT OR 1\(\frac{5}{8}\) x 3\(\frac{3}{4}\) x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY).
STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN \(\frac{3}{8}\) x 1\(\frac{1}{2}\) x 1\(\frac{1}{2}\) ASTM A36 STRUT WASHER AND MW-SSN-\(\frac{1}{2}\) WITH MW-BON-\(\frac{1}{2}\) TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
\(\frac{3}{8}\) TO \(\frac{7}{8}\) DIA. ATR HANGER. SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

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<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>ATR HANGER DIAM INCH</th>
<th>DIA. da INCH</th>
<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN BASE TH. ha INCH</th>
<th>MIN EDGE Cmin INCH</th>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \(\Omega_o\), PER ASCE 7-10 SEC. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.

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California SE No. S5270
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP
MW-SAP-200-A FOR ATR ≤ 3/8 Ø
MW-SAP-200-B FOR ATR > 3/8 Ø
SEE PAGE X6.0

BOTH SIDES OF LUG
3/8" FOR WPL-38
5/16" FOR WPL-50 & 63
5/8" FOR WPL-75
MW-WPL, SEE PAGE X8.4

3/8" TO 3/4" DIA. ATR HANGER, TYP

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<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN BASE TH. ha INCH</th>
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<th>MIN SPACING Smin INCH</th>
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NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, O_p, PER ASCE 7-10 SEC. 12.4.3.3.
2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.

See DETAIL M0.00 FOR SECTION NOTES
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (4) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

### DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP

**MW-SAP-400-B, SEE PAGE X6.0**

**MW-WPL, SEE PAGE X8.4**

### BOTH SIDES OF LUG

- 3/6” FOR WPL-50 & 63
- 3/8” FOR WPL-75
- 5/6” FOR WPL-88, 100, & 125

### HANGER ATTACHMENT TYPE

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<th>HANGER ATTACHMENT TYPE</th>
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<th>HANGER ATTACHMENT TYPE</th>
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<th>MIN Base Th. ha Inch</th>
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<td>50A TO 50Q</td>
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**NOTE:**
- **CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC**
- **OFFSET MAY OCCUR IN ONE DIRECTION, NOT BOTH.**
- **CONCRETE SLAB & BEAM**

**MAX OFFSET SEE PLAN VIEW**

**NOTE:**
- **ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω0, PER ASCE 7-10 SEC. 12.4.3.3.**
- **FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.**

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California SE No. S5270

---

**SECTION NOTES**

1. **ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω0, PER ASCE 7-10 SEC. 12.4.3.3.**
2. **FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.**

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**OPM-0043-13**

**FILE REVIEWED FOR CODE COMPLIANCE**

**Jeffrey Y. Kikumoto**

**10/09/2020**

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**PAGE M1.33**

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**10/09/2020**

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**OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto**

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448 of 846
## Hanger Attachment to Concrete Slab and Beam

**With (1) Mason Ind. N.Y. SAS(E) Concrete Anchor**

**Mason Ind. N.Y. SAS(E) Concrete Anchor**

(ICC ESR-3037)

SPECIAL INSPECTION REQ'D

**Note:**

Concrete strength shall be between 3000 PSI to 8,500 PSI NWC. See Note 2 for attachment to SLWC.

### Allowable Vertical Load

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</table>

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### Notes:

1. Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, \( Q_o \), per ASCE 7-10 Sec. 12.4.3.3.
2. For SLWC slab and beam, reduce allowable vertical load by multiplying allowable load by a factor of 0.6.
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR, TYP
12" MAX 10" MIN

Cmin TYP

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR
10" MIN

CONCRETE BEAM

REG. NUT T&B, TYP (SNUG TIGHT)

MIN 3/8 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT

3/8" TO 7/8" DIA. ATR HANGER

ALTERNATE INSTALL CONCRETE SLAB

MIN 3/8 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER AND NUT, SEE TABLE FOR TORQUE REQUIREMENT, TYP

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 3/8" MIN AND ATR BY DIMENSION OF ATR, MIN)

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

1" MIN FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT

1/2 x 1 1/2 x 12GA DOUBLE STRUT OR 1/2 x 3/4 x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

MIN 3/8 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

3/8" TO 7/8" DIA. ATR HANGER. SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

SAS(E) IDENTIFICATION

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<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo PER ASCE 7-10 SEC. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.

3 ATR HANGER PERMITTED FOR COMPRESSION AND TENSION LOADING CONDITIONS ONLY. NO SHEAR LOADING.

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jiefu "Jeff" Zhang, SE
California SE No. S5270

PAGE M1.41
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR, TYP

1" MIN FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT

13/4"x13/4"x12GA DOUBLE STRUT OR 13/8"x3/8"x12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN 3/8x13/8x13/8 ASTM A36 STRUT WASHER AND MW-SSN-3/8 WITH MW-BON-3/8 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
3/8" TO 3/8" DIA. ATR HANGER, SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

LETTER DESIGNATING ANCHOR LENGTH
SAS(E) IDENTIFICATION

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1 BY 12 MIN AND ATR BY DIMENSION OF ATR, MIN)

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR (ICC ESR-3037)
SPECIAL INSPECTION REQ'D

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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qp, PER ASCE 7-10 SEC. 12.4.3.3.
2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR, TYP
MW-SAP-200-A FOR ATR ≤ ½"Ø
MW-SAP-200-B FOR ATR > ½"Ø
SEE PAGE X6.0

STEEL COMPONENT ALLOWABLE VERTICAL LOAD
Ta LBS

CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD
Tac 1/2 LBS

HANGER ATTACHMENT TYPE

HANGER ATTACHMENT TYPE

ATR HANGER DIA. INCH

MIN EFF. EMBED. hef INCH

MIN HOLE DEPTH ho INCH

MIN BASE TH. ha INCH

MIN EDGE Cmin INCH

MIN SPACING Smin INCH

TORQUE REQ'D FT-LBS

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<th>HANGER ATTACHMENT TYPE</th>
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<th>MIN HOLE DEPTH ho INCH</th>
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<td>5⅜</td>
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NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR, TYP
3⅛" TO 3⅞" DIA. ATR HANGER, TYP

MW-WPL, SEE PAGE X8.4

1/8" FOR WPL-38
3/8" FOR WPL-50 & 63
7/8" FOR WPL-75

BOTH SIDES OF LUG

SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_0 \) PER ASCE 7-10 SEC. 12.4.3.3.
2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (4) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

| HANGER ATTACHMENT TYPE | STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS | HANGER ATTACHMENT TYPE | CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS | ATR HANGER DIA. INCH | DIA. da INCH | MIN EFF. EMBED. hef INCH | MIN HOLE Depth ho INCH | MIN BASE TH. ha INCH | MIN EDGE Cmin INCH | MIN SPACING Smin INCH | TORQUE REQ'D FT-LBS |
|------------------------|-----------------------------------------------|------------------------|-----------------------------------------------|-----------------------|--------------|--------------------------|-----------------------|-------------------|-----------------|----------------|----------------|------------------|
| 50A TO 50L             | 1320                                          | 50A TO 50S             | 8240                                          | 5                       | 4½           | 5½                       | 8                     | 7                 | 13½             | 90             |                   |
| 63A TO 63P             | 2880                                          | 63A TO 63S             | 8240                                          | 5½                      | 4½           | 5½                       | 8                     | 7                 | 13½             | 90             |                   |
| 75A TO 75Q             | 3600                                          | 75A TO 75S             | 8240                                          | 5½                      | 4½           | 5½                       | 8                     | 7                 | 13½             | 90             |                   |
| 88A TO 88Q             | 3600                                          | 88A TO 88S             | 8240                                          | 5½                      | 4½           | 5½                       | 8                     | 7                 | 13½             | 90             |                   |
| 100A TO 100Q           | 3600                                          | 100A TO 100S           | 8240                                          | 5½                      | 4½           | 5½                       | 8                     | 7                 | 13½             | 90             |                   |
| 125A TO 125Q           | 3600                                          | 125A TO 125S           | 8240                                          | 5½                      | 4½           | 5½                       | 8                     | 7                 | 13½             | 90             |                   |

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC.

ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Δp, PER ASCE 7-10
SEC. 12.4.3.3.

FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR
OF 0.6.
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (1) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_0 \), PER ASCE 7-10 SEC. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM
WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC.

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP

1" MIN FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT

1\(\frac{3}{8}\)\times\frac{1}{2}\times\frac{1}{4}\)GA DOUBLE STRUT OR 
\(\frac{1}{4}\)\times\frac{1}{2}\times\frac{1}{4}\GA SINGLE STRUT
(SOLID OR PUNCHED ONLY).

STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN \(\frac{1}{4}\)\times\frac{1}{2}\times\frac{1}{4}\ ASTM A36 STRUT WASHER AND MW-SSN-\(\frac{1}{4}\) WITH MW-BON-\(\frac{1}{4}\) TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

\(\frac{3}{8}\)" TO \(\frac{5}{8}\) DIA. ATR HANGER. SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac 1,2 LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>DIA. (INCH)</th>
<th>EFF. EMBED. (INCH)</th>
<th>MIN HOLE DEPTH (INCH)</th>
<th>MEAN BASE TH. (INCH)</th>
<th>MIN EDGE (INCH)</th>
<th>MIN SPACING (INCH)</th>
<th>TORQUE REQ'D FT-LBS</th>
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<tr>
<td>38A TO 38N</td>
<td>2400</td>
<td>1620</td>
<td>(\frac{3}{8})</td>
<td>2</td>
<td>2(\frac{1}{4})</td>
<td>4</td>
<td>4(\frac{1}{2})</td>
<td>6</td>
<td>9(\frac{1}{2})</td>
<td>20</td>
</tr>
<tr>
<td>50A TO 50P</td>
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<td>1620</td>
<td>(\frac{1}{2})</td>
<td>2(\frac{1}{4})</td>
<td>4</td>
<td>6</td>
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<td>9(\frac{1}{2})</td>
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<tr>
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<td>2620</td>
<td>1620</td>
<td>(\frac{3}{8})</td>
<td>4(\frac{1}{2})</td>
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<td>6</td>
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<td>9(\frac{1}{2})</td>
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<tr>
<td>75A TO 75P</td>
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<td>1620</td>
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<td>6</td>
<td>9(\frac{1}{2})</td>
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<td>9(\frac{1}{2})</td>
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</table>

SEE DETAIL M.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qs, PER ASCE 7-10 SEC. 12.4.3.3.
2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
3 ATR HANGER PERMITTED FOR COMPRESSION AND TENSION LOADING CONDITIONS ONLY. NO SHEAR LOADING.

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Jiefu “Jeff” Zhang, SE
California SE No. S5270

PAGE M.161
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

1” MIN FOR NUT INSIDE STRUT
5” MIN FOR NUT OUTSIDE STRUT

1½×1½×12GA DOUBLE STRUT OR
1½×3½×12GA SINGLE STRUT
(SOLID OR PUNCHED ONLY).
STRUT MAY BE ROTATED TO ANY
ANGLE IN PLAN, TYP

MIN ¾×1½×1½ ASTM A36 STRUT
 WASHER AND MW-SSN-½ WITH
 MW-BON-½ TORQUED UNTIL THE
 NUT BREAKS OFF (REF. PAGE X4.0)

¾” TO ¾” DIA. ATR HANGER. SEE
ALTERNATE INSTALL FOR LARGER DIA. ATR.

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP

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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac ½ LBS</th>
<th>ATR HANGER Dia. INCH</th>
<th>MIN EFF. INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN BASE TH. ha INCH</th>
<th>MIN EDGE Cmin INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<td>38A TO 38M</td>
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<td>2½</td>
<td>4</td>
<td>4½</td>
<td>6</td>
<td>20</td>
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<tr>
<td>50A TO 50P</td>
<td>2620</td>
<td>50A TO 50M</td>
<td>1940</td>
<td>¾</td>
<td>2</td>
<td>2½</td>
<td>4</td>
<td>4½</td>
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<td>2½</td>
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<td>1940</td>
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<td>2½</td>
<td>4</td>
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<td>88A TO 88M</td>
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<td>4</td>
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<td>¾</td>
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<td>75A TO 75Q</td>
<td>3920</td>
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<td>4</td>
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<td>4</td>
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<td>6</td>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP
MW-SAP-200-A FOR ATR ≤ 1/2"Ø
MW-SAP-200-B FOR ATR > 1/2"Ø
SEE PAGE X6.0

MW-WPL, SEE PAGE X8.4

BOTH SIDES OF LUG
3/8" FOR WPL-38
3/4" FOR WPL-50 & 63
3/4" FOR WPL-75

3/8" TO 3/4" DIA. ATR HANGER, TYP

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<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac 1/2 LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>MIN EFF. EMBED. ha hE ft-LBS</th>
<th>MIN HOLE DEPTH ho hD ft-LBS</th>
<th>MIN BASE TH. ha hB ft-LBS</th>
<th>MIN EDGE Cmin ft-LBS</th>
<th>MIN SPACING Smin ft-LBS</th>
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<tr>
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<td>1080</td>
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<td>6 1/2</td>
<td>12</td>
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NOTE:
CONCRETE STRENGTH
SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE
NOTE 2 FOR ATTACHMENT TO SLWC

ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.

FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.

SEE DETAIL M0.00 FOR SECTION NOTES
## Hanger Attachment to Concrete Slab and Beam

### With 4 DEWALT/POWERS Power-Stud+ SD2 Concrete Anchors

### Diagram

![Diagram showing hanger attachment to concrete slab and beam](image)

### Table: Allowable Loads

<table>
<thead>
<tr>
<th>Hanger Attachment Type</th>
<th>Steel Component Allowable Vertical Load Ta LBS</th>
<th>Concrete Anchor Allowable Vertical Load Tac LBS</th>
<th>ATR Hanger Dia. Inch</th>
<th>Min. Embed. Depth Inch</th>
<th>Min. HOLE Depth Inch</th>
<th>Min. Edge Cmin Inch</th>
<th>Min. Base Th. ha Inch</th>
<th>Min. Spacing Smin Inch</th>
<th>Torque Req'd FT-LBS</th>
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<td>5950</td>
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<td>4/4</td>
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<td>9 3/4</td>
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<td>88A TO 88Q</td>
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<td>3/8</td>
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<td>6</td>
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<td>9 3/4</td>
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<td>5950</td>
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<td>12 3/4</td>
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### Notes:

1. Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, $\Omega$, per ASCE 7-10 Sec. 12.4.3.3.

2. For SLWC slab and beam, reduce concrete anchor allowable vertical load by multiplying allowable load by a factor of 0.68.

---

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**P A G E**  
M1.63
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (1) CONCRETE SCREW ANCHOR

CONCRETE SCREW ANCHOR, TYP
REGULAR OR REDUCING ROD COUPLER WHERE REQ'D, TYP
ATR HANGER, TYP

Cmin
TYP

ha

Cmin
TYP

CONCRETE SLAB
CONCRETE BEAM

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

DEWALT/POWERS HANGERMATE+ SCREW ANCHOR
(ICC ESR-3889)
SPECIAL INSPECTION REQ'D

MASON WEST, INC.
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TEL (714) 630 - 0701, www.masonwest.com

P A G E

Jiefu "Jeff" Zhang, SE
California SE No. S5270

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
459 of 846
# Hanger Attachment

## To Concrete Slab and Beam

**With (1) Concrete Screw Anchor**

### Mason Ind. N.Y. Sast Concrete Screw Anchor

**ICC ESR-2713**

**Special Inspection Req'd**

<table>
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<th>Hanger Attachment Type</th>
<th>Allowable Vertical Load Ta, lbs</th>
<th>ATR Hanger Dia, inch</th>
<th>Min Eff. Embed. hef, inch</th>
<th>Min Hole Depth ho, inch</th>
<th>Min Base Th. ha, inch</th>
<th>Min Edge Cmin, inch</th>
<th>Min Spacing Smin, inch</th>
<th>Max Torque FT-LBS</th>
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<td>2½</td>
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<td>27⁄₈</td>
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<td>4</td>
<td>27⁄₈</td>
<td>5⁄₈</td>
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### Hilti Kh-Ez-I Concrete Screw Anchor

**ICC ESR-3027**

**Special Inspection Req'd**

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<th>Hanger Attachment Type</th>
<th>Allowable Vertical Load Ta, lbs</th>
<th>ATR Hanger Dia, inch</th>
<th>Min Eff. Embed. hef, inch</th>
<th>Min Hole Depth ho, inch</th>
<th>Min Base Th. ha, inch</th>
<th>Min Edge Cmin, inch</th>
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<td>3</td>
<td>27⁄₈</td>
<td>5⁄₈</td>
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See detail M0.00 for section notes

1. Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, \( \Omega \), per ASCE 7-10 Sec. 12.4.3.3.
2. For SLWC slab and beam, reduce allowable vertical load by multiplying allowable load by a factor of 0.68.

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**Jeff "Jeff" Zhang, SE**

California SE No. S5270

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**Page M1.70.1**
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) CONCRETE SCREW ANCHORS

CONCRETE SLAB

CONCRETE BEAM

HANGER ATTACHMENT TYPE

STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS

HANGER ATTACHMENT TYPE

CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS

ATR HANGER DIA. da INCH

MIN EFF. EMBED. h ef INCH

MIN HOLE DEPTH ho INCH

MIN BASE TH. ha INCH

MIN EDGE Cmin INCH

MIN SPACING Smin INCH

MAX TORQUE FT-LBS

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<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
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<th>MIN EFF. EMBED. h ef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN BASE TH. ha INCH</th>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega \), PER ASCE 7-10 Sec. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.

3 SEE PAGE M1.71.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

PAGE M1.71
## Hanger Attachment

### To Concrete Slab and Beam with (2) Concrete Screw Anchors

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<tr>
<th>Hanger Attachment Type</th>
<th>Steel Component Allowable Vertical Load Ta Lbs</th>
<th>Hanger Attachment Type</th>
<th>Concrete Anchor Allowable Vertical Load Tac Lbs</th>
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<th>Dia. da Inch</th>
<th>Min. Eff. Embed. hef Inch</th>
<th>Min. Hole Depth ho Inch</th>
<th>Min. Base Th. ha Inch</th>
<th>Min. Edge Cmin Inch</th>
<th>Min. Spacing Smin Inch</th>
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### Hilti Kh-Ez Concrete Screw Anchor

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</tbody>
</table>

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HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) CONCRETE SCREW ANCHORS

**Concrete Screw Anchor, TYP**

- 1" MIN, TYP
- 1½ x 1¾ x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
- MIN ¾ x 1¼ x 1¼ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
- ⅝" TO ⅜" DIA. ATR HANGER

**Concrete Slab**

**Concrete Beam**

**Concrete Screw Anchor Allowable Vertical Load (LBS)**

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
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<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN BASE TH. ha INCH</th>
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California SE No. S5270

PAGE M1.71.2

10/09/2020
# Hanger Attachment to Concrete Slab and Beam with (2) Concrete Screw Anchors

## Hanger Attachment Type

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<th>Hanger Attachment Type</th>
<th>Steel Component Allowable Vertical Load Ta Lbs</th>
<th>Concrete Anchor Allowable Vertical Load Tac 1,2 Lbs</th>
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### Allowable Loads

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### Special Inspection

- MASON IND. N.Y. SAST Concrete Screw Anchor (ICC ESR-2713) Special Inspection Req’d
- HILTI KH-EZ Concrete Screw Anchor (ICC ESR-3027) Special Inspection Req’d

### Allowable Loads

- 38A TO 38L: 1380 lbs
- 50A TO 50L: 1380 lbs
- 63A TO 63L: 1380 lbs
- 38A TO 38P: 2740 lbs
- 50A TO 50P: 2740 lbs
- 63A TO 63P: 2740 lbs
- 38A TO 38Q: 3940 lbs
- 50A TO 50Q: 3940 lbs
- 63A TO 63Q: 3940 lbs

### Hanger Attachment Type

- Steel Component Allowable Vertical Load Ta Lbs
- Concrete Anchor Allowable Vertical Load Tac 1,2 Lbs
- ATR Hanger Dia. Inch

### MASON IND. N.Y. SAST Concrete Screw Anchor (ICC ESR-2713)

- Special Inspection Req’d

### HILTI KH-EZ Concrete Screw Anchor (ICC ESR-3027)

- Special Inspection Req’d

### Allowable Loads

- 38A TO 38L: 1380 lbs
- 50A TO 50L: 1380 lbs
- 63A TO 63L: 1380 lbs
- 38A TO 38P: 2740 lbs
- 50A TO 50P: 2740 lbs
- 63A TO 63P: 2740 lbs
- 38A TO 38Q: 3940 lbs
- 50A TO 50Q: 3940 lbs
- 63A TO 63Q: 3940 lbs

### Notes

- Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, $\Omega_p$, per ASCE 7-10 Sec. 12.4.3.3.
- For SLWC slab and beam, reduce concrete anchor allowable vertical load by multiplying allowable load by a factor of 0.68.

---

**MASON WEST, INC.**

1601 E. Miraloma Ave, Placentia, CA 92870

TEL (714) 630 - 0701, www.masonwest.com

Jiefu "Jeff" Zhang, SE

California SE No. S5270

---

464 of 846
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (2) CONCRETE SCREW ANCHORS

NOTE:
CONCRETE STRENGTH
SHALL BE BETWEEN 3000
PSI TO 8,500 PSI NWC. SEE
NOTE 2 FOR ATTACHMENT
TO SLWC

DEWALT/POWERS SCREW-BOLT+ CONCRETE SCREW ANCHOR
(ICC ESR-3899)
SPECIAL INSPECTION REQ'D

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<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>ATR HANGER DIA. da INCH</th>
<th>MIN EFF. EMBED. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN BASE TH. ha INCH</th>
<th>MIN EDGE Cmin INCH</th>
<th>MIN SPACING Smin INCH</th>
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<td>4/3</td>
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<td>8/15</td>
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<td>6</td>
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<td>8/15</td>
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<td>%</td>
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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_c \) PER ASCE 7-10 SEC. 12.4.3.3.
2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
3 SEE PAGE M1.72.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.

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Jiefu “Jeff” Zhang, SE
California SE No. S5270

PAGE M1.72

Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (2) CONCRETE SCREW ANCHORS

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<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN BASE TH. ha INCH</th>
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HILTI KH-EZ CONCRETE SCREW ANCHOR
(ICC ESR-3027)
SPECIAL INSPECTION REQ'D

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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_p \), PER ASCE 7-10
SEC. 12.4.3.3.
2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (4) CONCRETE SCREW ANCHORS

CONCRETE SLAB
CONCRETE BEAM

MAX OFFSET
SEE PLAN VIEW

CONCRETE SCREW ANCHOR, TYP
MW-SAP-400-B, SEE PAGE X6.0

3/4" MIN FOR POWERS
3/8" MIN FOR MASON
1/2" MIN FOR HILTI

1/2" TO 1 1/2" DIA. ATR HANGER, TYP

NOTE:
CONCRETE STRENGTH
SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE
NOTE 2 FOR ATTACHMENT TO SLWC

STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS

HANGER ATTACHMENT TYPE

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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qp, PER ASCE 7-10
SEC. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR
OF 0.68.

3 SEE PAGE M1.73.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.

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Jeffrey Y. Kikumoto
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

M1.73
**HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (4) CONCRETE SCREW ANCHORS**

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2 FOR SLWC SLAB AND BEAM, REDUCE CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (1) HILTI KCM-WF/PD CONCRETE INSERT

**NOTE:**
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

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SEE DETAIL M0.00 FOR SECTION NOTES

1. ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ωₚₑ, PER ASCE 7-10 SEC. 12.4.3.3.

2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.

3. ATR SHALL BE ASTM A193 GR. B7, ASTM A325, OR ASTM F1554 GR. 105.
**HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) HILTI KCM-WF/PD CONCRETE INSERT**

**HILTI KCM-WF/PD CONCRETE INSERT, TYP**

- **3/8" DIA. ATR, MIN 9/16 x 1" 1/2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP 11/16 x 12GA DOUBLE STRUT OR 9/16 x 3/4 x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP MIN 9/16 x 11/16 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)**

---

### **HANGER ATTACHMENT TYPE**

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**NOTE:** CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC 1" MAX HANGER. SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

**CEMENT SLAB**

**CONCRETE BEAM**

**MIN**

**ATR**

---

**MASON WEST, INC.**

1601 E. Miraloma Ave, Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

**Jeffrey Y. Kikumoto**
OPM-0043-13
10/09/2020

**Jeffrey Y. Kikumoto**
OPM-0043-13
10/09/2020

**OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto**

**P A G E**

**M1.81**
HANGER ATTACHMENT
TO CONCRETE SLAB AND BEAM
WITH (1) DEWALT/POWERS WOOD-KNOCKER/WOOD-KNOCKER II+ CONCRETE INSERT

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

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SEE DETAIL M0.00 FOR SECTION NOTES
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2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) DEWALT/POWERS WOOD-KNOCKER/WOOD-KNOCKER II+ CONCRETE INSERT

MIN. CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

DEWALT/POWERS WOOD-KNOCKER OR WOOD-KNOCKER II+ CONCRETE INSERT, TYP

MIN 3/16 x 1 1/8 x 1 1/8 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

1 1/2 x 1 1/2 x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

MIN 3/16 x 1 1/8 x 1 1/8 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

3/4" TO 3/4" DIA. ATR HANGER, SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

NOTE:

CONCRETE BEAM

1" MAX

CONCRETE SLAB

1" MAX

REG. NUT T&B, TYP (SNUG TIGHT)

MIN 3/16 x 1 1/8 x 1 1/8 ASTM A36 STRUT WASHER

DEWALT/POWERS WOOD-KNOCKER OR WOOD-KNOCKER II+ CONCRETE INSERT

ALTERNATE INSTALL

HANGER ATTACHMENT TYPE

STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS

CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac 1/2 LBS

MIN ATR HANGER DIA. INCH

DIA. da INCH

MIN EDGE Cmin INCH

MIN SPACING Smin INCH

38A TO 38L 1300 38A TO 38N 2230 3/8

50A TO 50L 1300 50A TO 50N 2230 3/8

63A TO 63L 1300 63A TO 63N 2230 3/8

75A TO 75L 1300 75A TO 75N 2230 3/8

88A TO 88L 1300 88A TO 88N 2230 3/8

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.

3 ATR HANGER PERMITTED FOR COMPRESSION AND TENSION LOADING CONDITIONS ONLY. NO SHEAR LOADING.
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) DEWALT/POWERS WOOD-KNOCKER/WOOD-KNOCKER II+ CONCRETE INSERT

**NOTE:**
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

**MIN** 3/16" X 1 1/8" X 1 1/8" ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

1/2" TO 3/4" DIA. ATR HANGER. SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

**ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)**

**DEWALT/POWERS WOOD-KNOCKER OR WOOD-KNOCKER II+ CONCRETE INSERT, TYP**

1/2" DIA. ATR, **MIN** 3/16" X 1 1/8" X 1 1/8" ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

1/2 x 1/2 x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

MIN 3/16" X 1 1/8" X 1 1/8" ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

1/2" TO 3/4" DIA. ATR HANGER. SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

**DEWALT/POWERS WOOD-KNOCKER OR WOOD-KNOCKER II+ CONCRETE INSERT (ICC ESR-3657)**

**SPECIAL INSPECTION REQ'D**

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<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac 1/2 LBS</th>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER ASCE 7-10 SEC. 12.4.3.3.

2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) DEWALT/POWERS WOOD-KNOCKER/WOOD-KNOCKER II+ CONCRETE INSERT

**NOTE:**
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC.
SEE NOTE 2 FOR ATTACHMENT TO SLWC

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SEE DETAIL M0.00 FOR SECTION NOTES

1. ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.
2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM
WITH (4) DEWALT/POWERS WOOD-KNOCKER/WOOD-KNOCKER II+ CONCRETE INSERT

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC.
SEE NOTE 2 FOR ATTACHMENT TO SLWC

NOTE:
OFFSET MAY OCCUR IN ONE DIRECTION, NOT BOTH.

DEWALT/POWERS WOOD-KNOCKER OR
WOOD-KNOCKER II+ CONCRETE INSERT, TYP

1/4" FOR WPL-50 & 63
5/8" FOR WPL-75
3/4" FOR WPL-88, 100, & 125

MW-WPL, SEE PAGE X8.4

1/2" TO 1 1/4" DIA. ATR HANGER, TYP

MAX OFFSET
SEE PLAN VIEW

PLAN VIEW

HANGER ATTACHMENT TYPE

STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta
LBS

HANGER ATTACHMENT TYPE

CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac1.2
LBS

MIN ATR HANGER DIAMETER
INCH

MIN EDGE SPACING
Cmin INCH

MIN SPACING
Smin INCH

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MASON WEST, INC.
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TEL (714) 630 - 0701, www.masonwest.com

Jiefu "Jeff" Zhang, SE
California SE No. 55270

PAGE M1.93
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (1) CADDY CRLW CONCRETE INSERT

CONCRETE SLAB

CONCRETE BEAM

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER ASCE 7-10 SEC. 12.4.3.3.
2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) CADDY CRLW CONCRETE INSERT

MIN 3/16 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER AND MW-SSN-1 1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

1/2" DIA. ATR, MIN 3/16 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

1 1/2 x 1 1/2 x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

MIN 3/16 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

1/2" TO 3/4" DIA. ATR HANGER, SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

CONCRETE SLAB

MIN 1/4" TO 3/4" DIA. ATR HANGER, SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

ALTERNATE INSTALL

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

1" MAX

REG. NUT T&B, TYP
(SNUG TIGHT)

1" MAX

MIN 3/16 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER

ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 1/2" MIN AND ATR BY DIMENSION OF ATR, MIN)

NOTE:

MIN ASSUMED

SPECIAL INSPECTION REQ'D FOR LARGER DIA. ATR.

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>MIN ATR HANGER DIA. INCH</th>
<th>DIA. da INCH</th>
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1. ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER ASCE 7-10 SEC. 12.4.3.3.

2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.

3. ATR HANGER PERMITTED FOR COMPRESSION AND TENSION LOADING CONDITIONS ONLY. NO SHEAR LOADING.

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California SE No. S5270

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
477 of 846
HANGER ATTACHMENT TO CONCRETE SLAB AND BEAM WITH (2) CADDY CRLW CONCRETE INSERT

**NOTE:** CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

---

**CADDY CRLW CONCRETE INSERT, TYP**

- ½" DIA. ATR, MIN ¾x1¾x1¾ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
- 1½x1½x12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
- MIN ¾x1¾x1¾ ASTM A36 STRUT WASHER AND MW-SSN-¾ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X.4.0)

- ½” TO ¾” DIA. ATR HANGER. SEE ALTERNATE INSTALL FOR LARGER DIA. ATR.

---

### HANGER ATTACHMENT TYPE

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<th>Steel Component</th>
<th>Allowable Vertical Load Ta LBS</th>
<th>Hanger Attachment Type</th>
<th>Concrete Anchor Allowable Vertical Load Tac LBS</th>
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**SEE DETAIL M0.00 FOR SECTION NOTES**

1. ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER ASCE 7-10 SEC. 12.4.3.3.

2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE VERTICAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.

---

**REGULAR OR REDUCING ROD COUPLER**

(ENGAGE MW-SSN-¾ BY ½" MIN AND ATR BY DIMENSION OF ATR, MIN)

---

**ALTERNATE INSTALL**

- MIN ¾x1¾x1¾ ASTM A36 STRUT WASHER
- 1½” TO ¾” DIA. ATR HANGER
- CONCRETE SLAB
- CONCRETE BEAM

---

**HANGER ATTACHMENT TYPE**

- 38A TO 38L
- 50A TO 50L
- 63A TO 63L
- 75A TO 75L
- 88A TO 88L

---

**OPM-0043-13**

10/09/2020

Jeffrey Y. Kikumoto

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) MASON WEST MW-PAL-A-MD CONCRETE INSERT AT LOWER FLUTE

MIN 20 GA TYPE W3 STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MASON WEST MW-PAL-A-MD CONCRETE INSERT, TYP
PLASTIC SLEEVE, TYP
¾” TO ¼” DIA. ATR HANGER

β = 6° MAX

2"x13"x16GA MIN STRAP WITH 1” DIA. HOLE (TYP)
2-#8 SMS (TYP)

½"x¼"x2" SHIM WHERE REQ’D

β = 6° MAX

MASON WEST MW-PAL-A-MD CONCRETE INSERT
(REFER TO PAGES X5.0.MD & X5.1)

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD Ta¹ LBS</th>
<th>ATR HANGER DIA. da INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
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<tbody>
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<td>38A TO 38J</td>
<td>930</td>
<td>¾</td>
<td>¾</td>
<td>5 ¼</td>
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<td>5 ¼</td>
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<tr>
<td>100A TO 100J</td>
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<td>¾</td>
<td>¾</td>
<td>5 ¼</td>
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¹ ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qₜₚ, PER ASCE 7-10 SEC. 12.4.3.3.

SEE DETAIL M0.00 FOR SECTION NOTES

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OPM-0043-13
10/09/2020

Jiefu “Jeff” Zhang, SE
California SE No. S5270

M2.10
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) MASON WEST MW-PAL-A-MD CONCRETE INSERT AT UPPER FLUTE

![Diagram of hanger attachment](image)

### MASON WEST MW-PAL-A-MD CONCRETE INSERT, TYP

**Plastic Sleeve, TYP**

*3\frac{1}{2} - 3\frac{1}{4}" MIN TYP*

**3\frac{1}{4}" TO 3\frac{7}{8}" DIA. ATR HANGER**

**M2.11**

**DIA. INCH**

**MIN 20 GA TYPE W3 STEEL DECK WITH MIN 3000 PSI NWC OR SLWC**

**MIN 20 GA TYPE W3 STEEL DECK WITH MIN 3000 PSI NWC OR SLWC**

### Table: MASON WEST MW-PAL-A-MD CONCRETE INSERT

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<th>DIA.</th>
<th>MIN SPACING S (INCH)</th>
<th>MIN END DIST. C (INCH)</th>
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<td>1/8</td>
<td>7/32</td>
<td>5/4</td>
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<tr>
<td>50A TO 50P</td>
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<td>6/4</td>
<td>5/4</td>
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<td>7/32</td>
<td>5/4</td>
</tr>
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**SEE DETAIL M0.00 FOR SECTION NOTES**

1. ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qp, PER ASCE 7-10 SEC. 12.4.3.3.

2. 7/8" NUT IS ONLY REQUIRED WHERE THE MW-PAL-A INSERT IS INSTALLED AT THE UPPER FLUTE AND THERE IS A VERTICAL UPWARD LOAD NC EXCEEDING 555 LBS IN STRENGTH DESIGN or 390 LBS IN ALLOWABLE STRESS DESIGN. NUT SHALL BE REG., JAM OR SLIP-ON TYPE.

---

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**PAGE**

M2.11

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

10/09/2020

480 of 846
**HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK**

**WITH (2) MASON WEST MW-PAL-A-MD CONCRETE INSERT AT LOWER FLUTE**

**Diagram:**
- Min 20 ga type W3 steel deck with Min 3000 psi NWC or SLWC
- Min 3/16 x 3/4 x 1-1/2 in. ASTM A36 strut washer and nut (snug tight), typ
- Max 9/4 in. and 15 in.
- 4 1/2 in. Min
- 2 1/2 in. Max typ
- 3 1/2 in. Min
- 3 in. Max 2 in. Min
- 1 1/2 in. Min

**Table:**

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>ATR HANGER DIA. da INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END LOAD Cmin INCH</th>
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<td>38A TO 38N</td>
<td>2400</td>
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<td>5 3/4</td>
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<td>1210</td>
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<td>5 3/4</td>
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<td>75A TO 75K</td>
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<td>3/8</td>
<td>6 3/4</td>
<td>5 3/4</td>
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See detail M0.00 for section notes.

1. Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, \(Q_o\), per ASCE 7-10 sec. 12.4.3.3.

2. When the bolt centerline distance exceeds 14 3/4", the strut must be rotated to comply to the detail.

---

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**PAGE**

M2.12

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HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK
WITH (2) MASON WEST MW-PAL-A-MD CONCRETE INSERT AT LOWER FLUTE

MIN 20 GA TYPE W3 STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MIN 3/8 x 13/4 x 13/4 ASTM A36 STRUT WASHER AND NUT (SNUG TIGHT) WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

1/4" TO 1/2" DIA. ATR HANGER, TYP (HANGER OPTION 2)
(REFER TO PAGES X5.0.MD & X5.1)

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 1/2" MIN AND ATR BY DIMENSION OF ATR, MIN)

STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS

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<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOADTac LBS</th>
<th>ATR HANGER DIA. da INCH</th>
<th>MIN SPACING Smin INCH</th>
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<tr>
<td>38A TO 38M</td>
<td>1810</td>
<td>38A TO 38L</td>
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<td>1810</td>
<td>50A TO 50L</td>
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<td>61/4</td>
<td>1/4</td>
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<td>1810</td>
<td>63A TO 63L</td>
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<td>1/8</td>
<td>61/4</td>
<td>1/4</td>
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<tr>
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<td>1810</td>
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<td>61/4</td>
<td>1/4</td>
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<td>1350</td>
<td>1/8</td>
<td>61/4</td>
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ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER ASCE 7-10 SEC. 12.4.3.3.

SEE DETAIL M0.00 FOR SECTION NOTES

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482 of 846
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-PAL-A-MD CONCRETE INSERT AT LOWER FLUTE

MIN 3000 PSI NWC OR SLWC

MIN 20 GA TYPE W3 STEEL DECK WITH MIN 20 GA TYPE W3 STRUT WASHER, TYP AT OPEN FACE OF STRUT

REG. NUT T&B (NUT SNUG TIGHT)

MIN ¼x1½x1½ ASTM A36 STRUT WASHER AND MW-SSN-¾ WITH MW-BON-¾ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-¾ BY ¾ MIN AND ATR BY DIMENSION OF ATR, MIN)

ALTERNATE HANGER INSTALL

MIN ¾x1½x1½ ASTM A36 STRUT WASHER AND MW-SSN-¾ WITH MW-BON-¾ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-¾ BY ¾ MIN AND ATR BY DIMENSION OF ATR, MIN)

HANGER ATTACHMENT TYPE

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<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>ATR HANGER DIA. da INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
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<td>5½</td>
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<td>2620</td>
<td>50A TO 50M</td>
<td>1860</td>
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<td>63A TO 63P</td>
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<td>63A TO 63M</td>
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<td>5½</td>
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<tr>
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<td>75A TO 75M</td>
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<td>¾</td>
<td>6½</td>
<td>5½</td>
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<td>88A TO 88M</td>
<td>1860</td>
<td>¾</td>
<td>6½</td>
<td>5½</td>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qp PER ASCE 7-10 SEC. 12.4.3.3.

2 WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 14½", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK
WITH (2) MASON WEST MW-PAL-A-MD CONCRETE INSERT AT LOWER FLUTE

MIN 20 GA TYPE W3 STEEL DECK
WITH MIN 3000 PSI NWC OR SLWC

4½" MAX, TYP

1½" MAX, TYP

GAME WEST MW-PAL-A-MD
CONCRETE INSERT, TYP

5½" DIA. ATR AND NUT
(SNUG TIGHT), TYP

MW-SAP-200-B
SEE PAGE X6.0

5½" DIA. ATR W/ REG. NUT T&B
(SNUG TIGHT)

REG. OR REDUCING COUPLING
NUT FOR LARGER OR SMALLER SIZE
THREADED RODS ARE PERMITTED

¾" TO 7¾" DIA. ATR HANGER

---

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<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD ( T_a ) LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD ( T_a ) LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>DIA. da INCH</th>
<th>MIN SPACING S( \text{min} ) INCH</th>
<th>MIN END DIST. C( \text{min} ) INCH</th>
</tr>
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<tbody>
<tr>
<td>38A TO 38M</td>
<td>1930</td>
<td>38A TO 38M</td>
<td>1860</td>
<td>¾</td>
<td>6¼</td>
<td>5¾</td>
<td></td>
</tr>
<tr>
<td>50A TO 50M</td>
<td>1930</td>
<td>50A TO 50M</td>
<td>1860</td>
<td>½</td>
<td>6¼</td>
<td>5¾</td>
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<tr>
<td>63A TO 63M</td>
<td>1930</td>
<td>63A TO 63M</td>
<td>1860</td>
<td>¾</td>
<td>6¼</td>
<td>5¾</td>
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</tr>
<tr>
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<td>1930</td>
<td>75A TO 75M</td>
<td>1860</td>
<td>¾</td>
<td>6¼</td>
<td>5¾</td>
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<tr>
<td>88A TO 88M</td>
<td>1930</td>
<td>88A TO 88M</td>
<td>1860</td>
<td>¾</td>
<td>6¼</td>
<td>5¾</td>
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</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( Q_o \), PER ASCE 7-10 SEC. 12.4.3.3.

MASON WEST, INC.
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PAGE

M2.13
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (4) MASON WEST MW-PAL-A-MD CONCRETE INSERT AT LOWER FLUTE

MIN 20 GA TYPE W3 STEEL DECK WITH MIN 3000 PSI NWC OR SLWC

MIN 4 1/2" MIN 4 1/2"

3 1/4" MIN

3" MAX 2" MIN

MAISON WEST MW-PAL-A-MD CONCRETE INSERT, TYP 3/8" DIA. ATR AND NUT (SNUG TIGHT), TYP

MW-SAP-400-B FOR 3/8" ATR MW-SAP-400-C FOR 1/2" ATR MW-SAP-400-D FOR 1" ATR

SEE PAGE X6.0, TYP ATR W/ REG. NUT T&B (SNUG TIGHT)

REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED

1/2" TO 1 1/4" DIA. ATR HANGER

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
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<td>3600</td>
<td>50A TO 50Q</td>
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<td>5 3/4</td>
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<td>5 3/4</td>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qp, PER ASCE 7-10 SEC. 12.4.3.3.

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10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
485 of 846
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) HILTI KB-TZ CONCRETE ANCHOR

2½” MIN FOR ¾”, 1”, AND ¾”x3½”
3¼” FOR ½”x4” AND ¾”x3½”
3” MAX
MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
HILTI KB-TZ CONCRETE ANCHOR, TYP
REGULAR OR REDUCING ROD COUPLER, TYP
ATR HANGER, TYP

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>MIN ATR HANGER DIA. inch</th>
<th>MIN EFF. EMBED hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
<th>TORQUE REQ’D FT-LBS</th>
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<tr>
<td>38A TO 38G</td>
<td>580</td>
<td>¾</td>
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<td>3¼</td>
<td>25</td>
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<tr>
<td>38A TO 38G</td>
<td>580</td>
<td>¾</td>
<td>2</td>
<td>2¼</td>
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<td>½</td>
<td>2</td>
<td>2¼</td>
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<td>63A TO 63G</td>
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<td>¾</td>
<td>2</td>
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<td>3¼</td>
<td>40</td>
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<tr>
<td>50A TO 50K</td>
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<td>3¼</td>
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<td>4½</td>
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<tr>
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<td>1070</td>
<td>¾</td>
<td>3¼</td>
<td>4</td>
<td>4½</td>
<td>60</td>
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<tr>
<td>50A TO 50H</td>
<td>820</td>
<td>½</td>
<td>3¼</td>
<td>4</td>
<td>4½</td>
<td>60</td>
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<tr>
<td>63A TO 63H</td>
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<td>¾</td>
<td>3¼</td>
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<td>4½</td>
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<td>75A TO 75L</td>
<td>820</td>
<td>¾</td>
<td>3¼</td>
<td>4</td>
<td>4½</td>
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<tr>
<td>50A TO 50L</td>
<td>1590</td>
<td>¾</td>
<td>4</td>
<td>4½</td>
<td>5¼</td>
<td>110</td>
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<tr>
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<td>4</td>
<td>4½</td>
<td>5¼</td>
<td>110</td>
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<tr>
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<td>¾</td>
<td>4</td>
<td>4½</td>
<td>5¼</td>
<td>110</td>
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</tbody>
</table>

MAX OF:
3’hef OR 1.5”FLUTE WIDTH

3¾ hef OR 1.5” FLUTE WIDTH

SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω0, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) HILTI KB-TZ CONCRETE ANCHORS

MIN 3/4x1 1/8x1 1/8 ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.), TYP
1 1/8x11/16x12GA DOUBLE STRUT OR 1 1/8x3/8x12GA SINGLE STRUT (SOLID OR PUNCHED ONLY).
STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN 3/4x1 1/8x1 1/8 ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

MIN 3/32 INCH MIN HOLE CLEARANCE IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED

ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK WITH MIN 3000 PSI NWC OR SLWC MIN 3/4x1 1/8x1 1/8 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0) 7/8" TO 1 1/2" DIA. ATR HANGER, TYP (HANGER OPTION 2) 1" MIN FOR NUT INSIDE STRUT 5" MIN FOR NUT OUTSIDE STRUT REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 3/8" MIN AND ATR BY DIMENSION OF ATR, MIN)

MIN 3/8" MIN, 15" MAX FOR fw = 3/4" 10" MIN, 15" MAX FOR fw = 4 1/2"

SEALANT MAY BE INSTALLED BETWEEN THE NUT WASHER AND THE CONNECTING BAR IF REQUIRED (HANGER OPTION 2)

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>ATR HANGER DIA. INCH</th>
<th>MAX OF: 3&quot;hef OR 1.5&quot;FLUTE WIDTH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<tbody>
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<td>38A TO 38N</td>
<td>2400</td>
<td>38A TO 38H</td>
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<td>2</td>
<td>2 3/8</td>
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<td>2</td>
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<td>63A TO 63H</td>
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<td>2</td>
<td>4 3/8</td>
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<td>75A TO 75P</td>
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<td>75A TO 75H</td>
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<td>4</td>
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<td>4</td>
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<td>2620</td>
<td>50A TO 50H</td>
<td>1/2</td>
<td>2</td>
<td></td>
<td></td>
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<td>2620</td>
<td>63A TO 63H</td>
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<td></td>
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<td>88A TO 88H</td>
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<th>HILTI KB-TZ CONCRETE ANCHOR (ICC ESR-1917)</th>
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<td>SPECIAL INSPECTION REQ'D</td>
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<td>MIN HOLE DEPTH ho INCH</td>
</tr>
<tr>
<td>MIN SPACING Smin INCH</td>
</tr>
<tr>
<td>MIN END DIST. Cmin INCH</td>
</tr>
</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER ASCE 7-10 SEC. 12.4.3.3.

2 WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 13/8" FOR fw = 3/4" OR 14" FOR fw = 4 1/2", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.

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PAGE M2.21

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
487 of 846
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) HILTI KB-TZ CONCRETE ANCHORS

2½" MIN FOR ¾" AND ½"

HILTI KB-TZ CONCRETE ANCHOR, TYP
MIN ⅜x⅜x⅜ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.), TYP
1⅝x1⅝x12GA DOUBLE STRUT OR 1⅝x1⅝x12GA SINGLE STRUT (SOLID OR PUNCHED ONLY).
STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN ⅜x⅜x⅜ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISfIED

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MIN ⅜x⅜x⅜ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
¾" TO ¾" DIA. ATR HANGER, TYP (HANGER OPTION 2)
1" MIN FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ½" MIN AND ATR BY DIMENSION OF ATR, MIN)

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω0, PER ASCE 7-10 SEC. 12.4.3.3.
### Hanger Attachment TO CONCRETE Filled Metal Deck WITH (2) Hilti KB-TZ Concrete Anchors

**MIN 3/4 x 1 1/2 x 1 1/2 ASTM A36 Strut**

- **Allowable Load**: Increased by a factor of 1.2 for load combinations including overstrength, Qp, per ASCE 7-10 Sec. 12.4.3.3.
- **Bolt Centerline Distance**: Exceeds 13” for fw = 3/4” or 14” for fw = 4 1/2”, the strut must be rotated to comply to the detail.

#### Alternate Hanger Install

- Regular or reducing rod coupler (engage MW-SSN-½ by 3/8” min and ATR by dimension of ATR, MIN)

#### Table: Hanger Attachment Type

<table>
<thead>
<tr>
<th>Hanger Attachment Type</th>
<th>Steel Component Allowable Vertical Load (Ta) LBS</th>
<th>Hanger Attachment Type</th>
<th>Concrete Anchor Allowable Vertical Load (Tac) LBS</th>
<th>ATR Hanger Dia.</th>
<th>Dia. (da)</th>
<th>Min Eff. Embed. (hef)</th>
<th>Min Hole Depth (ho)</th>
<th>Min Spacing (Smin)</th>
<th>Min End Dist. (Cmin)</th>
<th>Torque Req’d (FT-LBS)</th>
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<tr>
<td>38A TO 38N</td>
<td>2400</td>
<td>38A TO 38K</td>
<td>1160</td>
<td>3/8</td>
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<td>2 1/2</td>
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<td>3/8</td>
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<tr>
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<td>60</td>
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<td>4 1/2</td>
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</table>

**SEE DETAIL M0.00 FOR SECTION NOTES**

1. Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, Qp, per ASCE 7-10 Sec. 12.4.3.3.

2. When the bolt centerline distance exceeds 13 1/2” for fw = 3/4” or 14” for fw = 4 1/2”, the strut must be rotated to comply to the detail.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) HILTI KB-TZ CONCRETE ANCHOR

HILTI KB-TZ CONCRETE ANCHOR
(ICC ESR-1917)
SPECIAL INSPECTION REQ'D
MIN HOLE
DEPTH
INCH
3
2
5
8
6
1
2
2
40
5
8
3
1
8
60
3
4
9
3
85
8
3
4
4
11
16
MIN, TYP

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
HILTI KB-TZ CONCRETE ANCHOR, TYP
REGULAR OR REDUCING ROD COUPLER, TYP
ATR HANGER, TYP

<table>
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<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>MIN ATR HANGER DIA INCH</th>
<th>MIN EFF. EMBED hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ωo, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) HILTI KB-TZ CONCRETE ANCHORS

HILTI KB-TZ CONCRETE ANCHOR
(ICC ESR-1917)
SPECIAL INSPECTION REQ'D
MIN HOLE DEPTH "ho"
MIN TORQUE "FT-LBS"
MIN SPACING "Smin"
MIN END DIST. "Cmin"
TORQUE REQ'D "FT-LBS"

MIN 20 GA STEEL DECK,
MIN 3000 PSI NWC OR SLWC
MIN ¾x1½x1¾ ASTM A36 STRUT
WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE
NUT BREAKS OFF (REF. PAGE X4.0)

¾" TO ¾" DIA. ATR HANGER, TYP
(HANGER OPTION 2)
1" MIN FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT
REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-½ BY ½" MIN AND
ATR BY DIMENSION OF ATR, MIN)

HANGER ATTACHMENT
STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS
TYPE
HANGER ATTACHMENT TYPE
HANGER ATTACHMENT TYPE
CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Ta LBS
HANGER ATTACHMENT TYPE
HANGER ATTACHMENT TYPE
HILTI KB-TZ CONCRETE ANCHOR
(ICC ESR-1917)
SPECIAL INSPECTION REQ'D
MIN EFF. HANGER DIA. "Inch"
MIN HOLE DEPTH "ho" "Inch"
MIN SPACING "Smin" INCH
MIN END DIST. "Cmin" INCH
TORQUE REQ'D "FT-LBS"

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<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Ta LBS</th>
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<th>MIN SPACING &quot;Smin&quot; INCH</th>
<th>MIN END DIST. &quot;Cmin&quot; INCH</th>
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<td>2</td>
<td>2½</td>
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<td>4</td>
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<td>3¼</td>
<td>4</td>
<td>9¼</td>
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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω₀, PER
ASCE 7-10 SEC. 12.4.3.3.
2 WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 12¾", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.

MASON WEST, INC.
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California SE No. S5270

PAGE M2.24
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) HILTI KB-TZ CONCRETE ANCHORS

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

HILTI KB-TZ CONCRETE ANCHOR, TYP
MW-SAP-200-B
SEE PAGE X6.0
5/8" DIA. ATR W/ REG. NUT T&B (SNUG TIGHT)
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED
3/8" TO 7/8" DIA. ATR HANGER

HILTI KB-TZ CONCRETE ANCHOR (ICC ESR-1917)
SPECIAL INSPECTION REQ'D

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<th>HANGER ATTACHMENT TYPE</th>
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<td>1930</td>
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<td>1640</td>
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<tr>
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<td>63A TO 63M</td>
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<tr>
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<tr>
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<td>3180</td>
<td>3/4</td>
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</table>

MAX OF: 3*hef OR 1.5*FLUTE WIDTH

MIN SPACING Smin INCH

MIN END DIST. Cmin INCH

TORQUE REQ'D FT-LBS

4'/8 60

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER ASCE 7-10 SEC. 12.4.3.3.

SEE DETAIL M0.00 FOR SECTION NOTES

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California SE No. S5270

PAGE M2.25

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
492 of 846
## Hanger Attachment to Concrete Filled Metal Deck with (4) Hilti KB-TZ Concrete Anchors

**Hanger Attachment Type**

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**Hilti KB-TZ Concrete Anchor (ICC ESR-1917)**

Special Inspection Req'd

**MIN FLUTE WIDTH fw INCH** | **MAX OFFSET E INCH**
---|---
3/4 | 15/16
4 1/2 | 1

---

**MASON WEST, INC.**

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**M2.26**

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*See Detail M0.00 for Section Notes*

*Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, \( \Omega_0 \), per ASCE 7-10 Sec. 12.4.3.3.*
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK
WITH (1) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP
REGULAR OR REDUCING ROD COUPLER, TYP
ATR HANGER, TYP

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<th>ALLOWABLE VERTICAL LOAD, Ta (LBS)</th>
<th>MIN ATR HANGER DIA. (INCH)</th>
<th>MIN EFF. EMBED Depth, hef (INCH)</th>
<th>MIN HOLE Depth, ho (INCH)</th>
<th>MIN SPACING, Smin (INCH)</th>
<th>MIN END DIST. Cmin (INCH)</th>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_0 \), PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

<table>
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<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
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<th>MIN EFF. EMBED. da INCH</th>
<th>MIN HOLE DEPTH h INCH</th>
<th>MIN HOLE CLEARANCE hof INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
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<td>%</td>
<td>%</td>
<td>%</td>
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</tr>
<tr>
<td>50A TO 50P</td>
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<td>50A TO 50H</td>
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<td>%</td>
<td>%</td>
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MIN ¾x1½x1½ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.), TYP
1¼x1½x12GA DOUBLE STRUT OR 1¼x3½x12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN ¾x1½x1½ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP MIN 3⅛" TO 7⅛" DIA. ATR HANGER, TYP (HANGER OPTION 2)

ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MIN ¾x1½x1½ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

1¾" TO 2¾" DIA. ATR HANGER, TYP (HANGER OPTION 2)

1" MIN FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ½" MIN AND ATR BY DIMENSION OF ATR, MIN)

STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS
HANGER ATTACHMENT TYPE

CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS
HANGER ATTACHMENT TYPE

ATR HANGER DIA. INCH

MIN EFF. EMBED. da INCH

MIN HOLE DEPTH h INCH

MIN HOLE CLEARANCE hof INCH

MIN SPACING Smin INCH

MIN END DIST. Cmin INCH

TORQUE REQ'D FT-LBS

ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω₀, PER ASCE 7-10 SEC. 12.4.3.3.

WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 14", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.

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Jiefu “Jeff” Zhang, SE
California SE No. S5270
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR

MIN ¾x1½x1½ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.), TYP 1½x1½x12GA DOUBLE STRUT OR 1⅜x1⅞x12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP MIN ¾x1½x1½ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC MIN ¾x1½x1½ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0) ¾" TO 7/8" DIA. ATR HANGER, TYP (HANGER OPTION 2) 1" MIN FOR NUT INSIDE STRUT 5" MIN FOR NUT OUTSIDE STRUT REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ⅝" MIN AND ATR BY DIMENSION OF ATR, MIN)

### Hanger Attachment Type

<table>
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<tr>
<th>Hanger Attachment Type</th>
<th>Steel Component Allowable Vertical Load Ta LBS</th>
<th>Hanger Attachment Type</th>
<th>Concrete Anchor Allowable Vertical Load Tac LBS</th>
<th>ATR Hanger Diameter Inch</th>
<th>Min Eff. Embed. Inch</th>
<th>Min Hole Depth Inch</th>
<th>Min Spacing Smin Inch</th>
<th>Min End Dist. Cmin Inch</th>
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<td>6½</td>
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Additional Notes:
- Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, \( \Omega \), per ASCE 7-10 Sec. 12.4.3.3.
- Anchor may be installed in the upper flute of the steel deck provided the minimum hole clearance is satisfied.
- Special inspection required.
**HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS**

**STEEL COMPONENT ALLOWABLE VERTICAL LOAD**

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<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>ATR HANGER ATTACHMENT TYPE</th>
<th>SPECIAL INSPECTION REQ'D</th>
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<td>50A TO 50K</td>
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<td>63A TO 63K</td>
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<td>38A TO 38N</td>
<td>1960</td>
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<td>2620</td>
<td>88A TO 88P</td>
<td>1620</td>
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**MIN 3½ x 1½ x 1½ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.), TYP MIN 3½ x 1½ x 1½ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0) REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY 3½” MIN AND ATR BY DIMENSION OF ATR, MIN)

**MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC 1½ x 1½ x 12GA DOUBLE STRUT OR 1½ x 3½ x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY), STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP 1” MIN FOR NUT INSIDE STRUT 5” MIN FOR NUT OUTSIDE STRUT MIN 3½ x 1½ x 1½ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT ¾” TO ½” DIA. ATR HANGER. SEE LEFT FOR ALTERNATE INSTALL OPTION

**ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.

1 WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 14", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.

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**Jiefu “Jeff” Zhang, SE**
California SE No. S5270

**P A G E**

**M2.31.2**
**HANGER ATTACHMENT**

**TO CONCRETE FILLED METAL DECK**

**WITH (1) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR**

### DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818)

- **SPECIAL INSPECTION REQ'D**
- **TORQUE REQ'D**
  - **FT-LBS**
  - **3/8**
  - **5/8**
  - **1 1/2**

#### HANGER ATTACHMENT TYPE

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>MIN ATR HANGER DIA. da INCH</th>
<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN SPACING Smin INCH</th>
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<td>50A TO 50G</td>
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<td>63A TO 63G</td>
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<td>2 1/4</td>
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**SEE DETAIL M0.00 FOR SECTION NOTES**

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

<table>
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<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>ATR HANGER DIA. DIA. da h ef</th>
<th>DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818) SPECIAL INSPECTION REQ'D</th>
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<td>50A TO 50P</td>
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<td>50A TO 50G</td>
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<td>⅝</td>
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<tr>
<td>63A TO 63P</td>
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<td>63A TO 63G</td>
<td>680</td>
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<tr>
<td>75A TO 75P</td>
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<td>75A TO 75G</td>
<td>680</td>
<td>⅝</td>
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<tr>
<td>88A TO 88P</td>
<td>2620</td>
<td>88A TO 88G</td>
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<td>⅝</td>
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<tr>
<td>38A TO 38N</td>
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<tr>
<td>50A TO 50P</td>
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<td>2620</td>
<td>88A TO 88H</td>
<td>820</td>
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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.
2 WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 12¼", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.

MIN 20 GA STEEL DECK, MIN 3000 PSI NWC OR SLWC
MIN ¾"x1¼"x1¼ ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
1/4" TO ½" DIA. ATR HANGER, TYP (HANGER OPTION 2)
1" MIN FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ⅜" MIN AND ATR BY DIMENSION OF ATR, MIN)
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+
SD1 CONCRETE ANCHOR, TYP

MW-SAP-200-B
SEE PAGE X6.0

3/8" DIA. ATR W/ REG.
NUT T&B (SNUG TIGHT)

REG. OR REDUCING COUPLING
NUT FOR LARGER OR SMALLER SIZE
THREADED RODS ARE PERMITTED

3/8" TO 7/8" DIA. ATR HANGER

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<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac ¹ LBS</th>
<th>ATR HANGER DIA. da INCH</th>
<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
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<td>8 1/4</td>
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<td>50A TO 50M</td>
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SEE DETAIL M0.00 FOR SECTION NOTES

¹ ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qᵯ, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (4) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP

MW-SAP-400-B FOR 3/4” Ø ATR
MW-SAP-400-C FOR 3/4” Ø ATR
MW-SAP-400-D FOR 1” Ø ATR

ATR W/ REG. NUT & B (SNUG TIGHT)
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED

3/8” TO 1 1/2” DIA. ATR HANGER

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<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac ¹ LBS</th>
<th>ATR HANGER DIA. da INCH</th>
<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
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<th>MIN END DIST. Cmin INCH</th>
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ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Q₂₀ PER ASCE 7-10 SEC. 12.4.3.3.

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Q₂₀ PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) MASON IND. N.Y. SAS(E) CONCRETE ANCHOR

MIN 20 GA STEEL
DECK WITH MIN 3000 PSI
NWC OR SLWC

MASON IND. N.Y. SAS(E)
CONCRETE ANCHOR, TYP

REGULAR OR REDUCING
ROD COUPLER, TYP

ATR HANGER, TYP

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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω0, PER ASCE 7-10 SEC. 12.4.3.3.

MASON WEST, INC.
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Jiefu "Jeff" Zhang, SE
California SE No. S5270

PAGE M2.40
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MIN ½x1½x1½ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
¾” TO ¾” DIA. ATR HANGER, TYP (HANGER OPTION 2)
1” MIN FOR NUT INSIDE STRUT
5” MIN FOR NUT OUTSIDE STRUT
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ¾” MIN AND ATR BY DIMENSION OF ATR, MIN)
STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN ¾x1½x1½ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS

HANGER ATTACHMENT TYPE

MIN ¾x1½x1½ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.), TYP
1½x1½x12GA DOUBLE STRUT OR 1¾x3½x12GA SINGLE STRUT (SOLID OR PUNCHED ONLY).
STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN ¾x1½x1½ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR, TYP

CONCRETE COMPONENT ALLOWABLE VERTICAL LOAD Tac LBS

HANGER ATTACHMENT TYPE

ATR HANGER

DIA. INCH

MIN EFF. EMBED. hef INCH

MIN HOLE DEPTH ho INCH

MIN SPACING Smin INCH

MIN END DIST. Cmin INCH

TORQUE REQ’D FT-LBS

HANGER ATTACHMENT TYPE

38A TO 38M 1860 38A TO 38L 1570 ¾ 3 3½ 9 4½ 30
50A TO 50M 1860 50A TO 50L 1570 ½ 3 3½ 9 4½ 30
63A TO 63M 1860 63A TO 63L 1570 ¾ 3 3½ 9 4½ 30
75A TO 75M 1860 75A TO 75L 1570 ¾ 4 4¼ 12 6 60
88A TO 88M 1860 88A TO 88L 1570 ¾ 4 4¼ 12 6 60
38A TO 38M 1860 38A TO 38L 1640 ¾ 3 3½ 9 4½ 30
50A TO 50M 1860 50A TO 50L 1640 ½ 3 3½ 9 4½ 30
63A TO 63M 1860 63A TO 63L 1640 ¾ 3 3½ 9 4½ 30
75A TO 75M 1860 75A TO 75L 1640 ¾ 4 4¼ 12 6 60
88A TO 88M 1860 88A TO 88L 1640 ¾ 4 4¼ 12 6 60

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MIN ¾x1½x1½ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
¾” TO ¾” DIA. ATR HANGER, TYP (HANGER OPTION 2)
1” MIN FOR NUT INSIDE STRUT
5” MIN FOR NUT OUTSIDE STRUT
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ¾” MIN AND ATR BY DIMENSION OF ATR, MIN)
STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN ¾x1½x1½ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR

ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω0, PER ASCE 7-10 SEC. 12.4.3.3.

SEE DETAIL M0.00 FOR SECTION NOTES

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PAGE M2.41.1
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

Anchor may be installed in the upper flute of the steel deck provided the minimum hole clearance is satisfied.

MIN 3000 PSI NWC OR SLWC
1 1/2" x 1/2" x 12GA DOUBLE STRUT OR 1 1/2" x 3/4" x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY), STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

MIN 1" FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT

MIN 1/8" TO 3/8" DIA. ATR HANGER. SEE LEFT FOR ALTERNATE INSTALL OPTION

**ALTERNATE HANGER INSTALL**

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<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( Q_o \), PER ASCE 7-10 Sec. 12.4.3.3.

2 WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 14", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR (ICC ESR-3037) SPECIAL INSPECTION REQ'D

MIN 20 GA STEEL DECK WITH MIN 20 GA DECK WITH MIN 3000 PSI NWC OR SLWC

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-3/4" BY 1/2" MIN AND ATR BY DIMENSION OF ATR, MIN)

ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED.

HANGERS ATTACHED TO CONCRETE FILLED METAL DECK WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR (ICC ESR-3037)

SPECIAL INSPECTION REQ'D

38A TO 38N
50A TO 50P
63A TO 63P
75A TO 75P
88A TO 88P
38A TO 38N
50A TO 50P
63A TO 63P
75A TO 75P
88A TO 88P

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10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
505 of 846
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR, TYP
MW-SAP-200-B
SEE PAGE X6.0

1/2" DIA. ATR W/ REG. NUT T&B (SNUG TIGHT)
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE
THREADED RODS ARE PERMITTED
1/2" TO 7/8" DIA. ATR HANGER

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SPECIAL INSPECTION REQ'D

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (4) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

MASON IND. N.Y. SAS(E)
CONCRETE ANCHOR, TYP

MW-SAP-400-B FOR ½" Ø ATR
MW-SAP-400-C FOR ¾" Ø ATR
MW-SAP-400-D FOR 1" Ø ATR
SEE PAGE X6.0, TYP
ATR W/ REG. NUT T&B
(SNUG TIGHT)

REG. OR REDUCING COUPLING
NUT FOR LARGER OR SMALLER SIZE
THREADED RODS ARE PERMITTED

½" TO 1¼" DIA. ATR HANGER

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<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac 1 LBS</th>
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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) MASON WEST MW-CDI CONCRETE INSERT

MIN 20 GA STEEL DECK WITH
MIN 3000 PSI NWC OR SLWC
FOR TENSION LOADS ONLY;
NO CYCLIC OR SHEAR LOADS
MASON WEST MW-CDI
CONCRETE INSERT, TYP
REGULAR OR REDUCING
ROD COUPLER, TYP
ATR HANGER, TYP

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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD
COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega \), PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) MASON WEST MW-CDI CONCRETE INSERTS

MIN 3/4 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
1 1/2 x 1 1/2 x 12 GA DOUBLE STRUT OR 1 1/2 x 3 1/2 x 12 GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN 3/4 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
REG. NUT &B (NUT SNUG TIGHT) (HANGER OPTION 1)

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MIN 3/4 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
1/2" TO 3/4" DIA. ATR HANGER, TYP (HANGER OPTION 2)
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 1 1/2" MIN AND ATR BY DIMENSION OF ATR, MIN)

---

**MASON WEST MW-CDI CONCRETE INSERT (ICC ESR-3443)**
SPECIAL INSPECTION REQ'D

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<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Ta LBS</th>
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SEE DETAIL M0.00 FOR SECTION NOTES

ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, $\Omega_o$, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI CONCRETE INSERTS

MIN 3/16 x 1/8 x 1/8 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP 1/4 x 1/2 x 1/2 GA DOUBLE STRUT OR 1/4 x 3/8 x 1/2 GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP MIN 3/16 x 1/8 x 1/2 ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT

MIN 3/16 x 1/8 x 1/2 ASTM A36 STRUT WASHER AND MW-SSN-12 WITH MW-BON-12 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

MIN 3/16 x 1/8 x 1/2 ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

MIN 1 5/8 x 1 5/8 x 12GA DOUBLE STRUT OR 15/8 x 3 1/4 x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP MIN 3/16 x 1/8 x 1 5/8 ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC MIN 3/8 x 1/8 x 1/8 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

MIN 1/8 TO 3/4 DIA. ATR HANGER, TYP (HANGER OPTION 2)

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 1/2 MIN AND ATR BY DIMENSION OF ATR, MIN)

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<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
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<th>DIA. da INCH</th>
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<td>50A TO 50N</td>
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<td>3</td>
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See detail M0.00 for section notes

1. Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, Qb, per ASCE 7-10 Sec. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI CONCRETE INSERTS

MIN ¾ x 1¼ x 1½ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
MIN ¾ x 1½ x 1½ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ¾” MIN AND ATR BY DIMENSION OF ATR, MIN)

ALTERNATE HANGER INSTALL

ALTERNATE INSTALL

MIN ¾ x 1½ x 1½ ASTM A36 STRUT WASHER AND MW-CDI CONCRETE INSERT, TYP
MIN ¾ x 1½ x 1½ ASTM A36 STRUT WASH AND REG. NUT (SNUG TIGHT), TYP

MIN ¾ x 1½ x 1½ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ¾” MIN AND ATR BY DIMENSION OF ATR, MIN)

ALTERNATE HANGER INSTALL

MASON WEST MW-CDI CONCRETE INSERT (ICC ESR-3443) SPECIAL INSPECTION REQ'D
MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
1¾ x 1½ x 12GA DOUBLE STRUT OR 1¾ x 3½ x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
1" MIN TYP

MIN ¾ x 1½ x 1½ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT ¾” TO ¾” DIA. ATR HANGER. SEE LEFT FOR ALTERNATE INSTALL OPTION

MASON WEST MW-CDI CONCRETE INSERT (ICC ESR-3443) SPECIAL INSPECTION REQ'D
MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
1¾ x 1½ x 12GA DOUBLE STRUT OR 1¾ x 3½ x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
1" MIN TYP

MIN ¾ x 1½ x 1½ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT ¾” TO ¾” DIA. ATR HANGER. SEE LEFT FOR ALTERNATE INSTALL OPTION

HANGER ATTACHMENT TYPE

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<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tat LBS</th>
<th>ATR HANGER TYPE</th>
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<td>2780</td>
<td>¾</td>
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<tr>
<td>63A TO 63P</td>
<td>2620</td>
<td>63A TO 63P</td>
<td>2780</td>
<td>¾</td>
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<td>¾</td>
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<tr>
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<td>2780</td>
<td>¾</td>
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<td>2780</td>
<td>¾</td>
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<td>88A TO 88P</td>
<td>2620</td>
<td>88A TO 88P</td>
<td>2780</td>
<td>¾</td>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Q0, PER ASCE 7-10 SEC. 12.4.3.3.
### Hanger Attachment to Concrete Filled Metal Deck with (2) Mason West MW-CDI Concrete Inserts

**Reg. Nut (Snug Tight), Typ**

- Mason West MW-CDI Concrete Insert, Typ
- MW-SAP-200-B
- See Page X6.0

**ATR w/ Reg. Nut T&B (Snug Tight)**

- Min 20 ga Steel Deck with Min 3000 psi NWC or SLWC
- Reg. or reducing coupling nut for larger or smaller size threaded rods are permitted
- \( \frac{3}{4} \) to \( \frac{7}{8} \) dia. ATR Hanger

#### Table: Allowable Vertical Loads

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<th>Hanger Attachment Type</th>
<th>Steel Component Allowable Vertical Load Ta (lbs)</th>
<th>Concrete Insert Allowable Vertical Load Ta (lbs)</th>
<th>ATR Hanger Dia. Inch</th>
<th>Min. Spacing Smin Inch</th>
<th>Min. End Dist. Cmin Inch</th>
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<td>50A TO 50P</td>
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**Notes:**

- See Detail M0.00 for Section Notes
- **\( \Omega_p \)**: Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, \( \Omega_p \), per ASCE 7-10 Sec. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (4) MASON WEST MW-CDI CONCRETE INSERTS

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED
½" TO 1½" DIA. ATR HANGER

### MASON WEST MW-CDI CONCRETE INSERT (ICC ESR-3443)
SPECIAL INSPECTION REQ’D

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<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac 1 LBS</th>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, $\Omega$, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) MASON WEST MW-CDI-B CONCRETE INSERT

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
FOR TENSION LOADS ONLY; NO CYCLIC OR SHEAR LOADS
MASON WEST MW-CDI-B CONCRETE INSERT, TYP
REGULAR OR REDUCING ROD COUPLER, TYP
ATR HANGER, TYP

MIN 1" MIN, TYP
2½" MIN
3" MAX

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
FOR TENSION LOADS ONLY; NO CYCLIC OR SHEAR LOADS
MASON WEST MW-CDI-B CONCRETE INSERT, TYP
REGULAR OR REDUCING ROD COUPLER, TYP
ATR HANGER, TYP

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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega \), PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK
WITH (1) MASON WEST MW-CDI-B CONCRETE INSERT AT LOWER FLUTE

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MASON WEST MW-CDI-B CONCRETE INSERT, TYP
REGULAR OR REDUCING ROD COUPLER, TYP
ATR HANGER, TYP

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MASON WEST MW-CDI-B CONCRETE INSERT, TYP
REGULAR OR REDUCING ROD COUPLER, TYP
ATR HANGER, TYP

MASON WEST MW-CDI-B CONCRETE INSERT
(ICC ESR-3443)
SPECIAL INSPECTIONREQ'D

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<th>DIA. da INCH</th>
<th>MIN. SPACING Smin Inch</th>
<th>MIN. END DIST. Cmin INCH</th>
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<td>( \frac{3}{8} )</td>
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<td>4( \frac{1}{2} )</td>
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</table>

SEE DETAIL M0.00 FOR SECTION NOTES

\(^1\) ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_0 \), PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI-B CONCRETE INSERTS AT LOWER FLUTE

MASON WEST MW-CDI-B CONCRETE INSERT, TYP MIN 3/4 x 1 1/8 x 1 1/4 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
1 1/2 x 1 1/8 x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN 3/4 x 1 1/8 x 1 1/8 ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC MIN 3/4 x 1 1/8 x 1 1/2 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
3/8" TO 3/4" DIA. ATR HANGER, TYP (HANGER OPTION 2)

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 1/2" MIN AND ATR BY DIMENSION OF ATR, MIN)

HANGER ATTACHMENT TYPE | STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS | CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac LBS | HANGER ATTACHMENT TYPE | ATR HANGER TYPE | MIN. DIAM. (INCH) | MIN. SPACING Smin (INCH) | MIN. END DIST. Cmin (INCH)
--- | --- | --- | --- | --- | --- | --- | ---
38A TO 38K | 1100 | 38A TO 38K | 1120 | 1/4 | 3/8 | 9 | 4 1/2
50A TO 50K | 1100 | 50A TO 50K | 1120 | 1/2 | 3/8 | 9 | 4 1/2
63A TO 63K | 1100 | 63A TO 63K | 1120 | 1/2 | 3/8 | 9 | 4 1/2
75A TO 75K | 1100 | 75A TO 75K | 1120 | 1/4 | 3/8 | 9 | 4 1/2
88A TO 88K | 1100 | 88A TO 88K | 1120 | 1/2 | 3/8 | 9 | 4 1/2
38A TO 38K | 1100 | 38A TO 38K | 1120 | 1/4 | 3/8 | 9 | 4 1/2
50A TO 50K | 1100 | 50A TO 50K | 1120 | 1/2 | 3/8 | 9 | 4 1/2
63A TO 63K | 1100 | 63A TO 63K | 1120 | 1/2 | 3/8 | 9 | 4 1/2
75A TO 75K | 1100 | 75A TO 75K | 1120 | 1/4 | 3/8 | 9 | 4 1/2
88A TO 88K | 1100 | 88A TO 88K | 1120 | 1/2 | 3/8 | 9 | 4 1/2

SEE DETAIL M0.00 FOR SECTION NOTES

ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI-B CONCRETE INSERTS AT LOWER FLUTE

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MIN $\frac{3}{4}$x$\frac{3}{4}$x1$\frac{1}{4}$ ASTM A36 STRUT WASHER AND MW-SSN-$\frac{1}{2}$ WITH MW-BON-$\frac{1}{2}$ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
$\frac{3}{8}$" TO $\frac{7}{8}$" DIA. ATR HANGER, TYP (HANGER OPTION 2)

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-$\frac{1}{2}$ BY $\frac{3}{8}$" MIN AND ATR BY DIMENSION OF ATR, MIN)

### HANGER ATTACHMENT TYPE

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<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac 1 LBS</th>
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<td>640</td>
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**NOTE:** ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, $\Omega_o$, PER ASCE 7-10 SEC. 12.4.3.3.

SEE DETAIL M0.00 FOR SECTION NOTES

[1] ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, $\Omega_o$, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) MASON WEST MW-CDI-B CONCRETE INSERTS AT LOWER FLUTE

MIN 3/8" x 1 1/2" ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
MIN 3/8" x 1 1/2" ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 3/8" MIN AND ATR BY DIMENSION OF ATR, MIN)

ALTERNATE HANGER INSTALL

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
1/2" x 1 1/2" x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP 1" MIN TYP
MIN 3/8" x 1 1/2" x 1 1/2" ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
3/8" TO 7/8" DIA. ATR HANGER. SEE LEFT FOR ALTERNATE INSTALL OPTION

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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>ATR HANGER DIA. Inch</th>
<th>MIN. SPACING Smin Inch</th>
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<td>1680</td>
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<td>4 1/2</td>
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<td>50A TO 50K</td>
<td>1100</td>
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<td>1680</td>
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<td>4 1/2</td>
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<td>4 1/2</td>
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<td>4 1/2</td>
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<td>1680</td>
<td>3/4</td>
<td>4 1/2</td>
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SEE DETAIL M0.00 FOR SECTION NOTES
7 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qc, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI-B CONCRETE INSERTS AT LOWER FLUTE

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC

REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED

3/8" TO 7/8" DIA. ATR HANGER

MASON WEST MW-CDI-B CONCRETE INSERT (ICC ESR-3443)
SPECIAL INSPECTION REQ’D

HANGER ATTACHMENT TYPE

STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS

CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac LBS

ATR HANGER DIA. INCH

MIN. SPACING Smin INCH

MIN. END DIST. Cmin INCH

MASON WEST MW-CDI-B CONCRETE INSERT

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<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac LBS</th>
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<td>4 1/2</td>
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ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω_p, PER ASCE 7-10 SEC. 12.4.3.3.

SEE DETAIL M0.00 FOR SECTION NOTES
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (4) MASON WEST MW-CDI-B CONCRETE INSERTS AT LOWER FLUTE

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED

½” TO 1¼” DIA. ATR HANGER

---

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<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac ¹ LBS</th>
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¹ ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Õ, PER ASCE 7-10 SEC. 12.4.3.3.

SEE DETAIL M0.00 FOR SECTION NOTES

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020

520 of 846
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) MASON WEST MW-CDI-B CONCRETE INSERT

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MASON WEST MW-CDI-B CONCRETE INSERT, TYP
REGULAR OR REDUCING ROD COUPLER, TYP
ATR HANGER, TYP

MIN 2 1/4" MIN
2 1/4" MIN
1 1/2" MAX

MIN, TYP

MIN 1/8" MIN, TYP

MIN 1/8" MIN

FLANGE ATTACHMENT TYPE

ALLOWS VERTICAL LOAD TA LBS

ATR HANGER DIA. INCH

DIA. K DIA. INCH

MIN. SPACING MIN. END DIST. CMIN INCH

MIN. END DIST. CMIN INCH


ATR HANGER ATTACHMENT TYPE

ALLOWS VERTICAL LOAD TA LBS

ATR HANGER DIA. INCH

DIA. K DIA. INCH

MIN. SPACING MIN. END DIST. CMIN INCH

MIN. END DIST. CMIN INCH


38A TO 38D 320 3/8 3/8 3 1 1/2

50A TO 50D 320 5/8 5/8 3 1 1/2

63A TO 63D 320 5/8 5/8 3 1 1/2

50A TO 50D 320 5/8 5/8 3 1 1/2

63A TO 63D 320 5/8 5/8 3 1 1/2

75A TO 75D 320 5/8 5/8 3 1 1/2

63A TO 63D 320 5/8 5/8 3 1 1/2

75A TO 75D 320 5/8 5/8 3 1 1/2

88A TO 88D 320 5/8 5/8 3 1 1/2

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI-B CONCRETE INSERTS

MIN 3/16 x 7/8 x 1 1/8 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
1/4 x 1/8 x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN 3/16 x 7/8 x 1 1/8 ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MIN 3/8 x 7/8 x 1 1/8 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

1/4" TO 3/8" DIA. ATR HANGER, TYP (HANGER OPTION 2)

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 1/2" MIN AND ATR BY DIMENSION OF ATR, MIN)

SEE DETAIL M0.00 FOR SECTION NOTES

ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω₀, PER ASCE 7-10 SEC. 12.4.3.3.

MASON WEST MW-CDI-B CONCRETE INSERT (ICC ESR-3443)
SPECIAL INSPECTION REQ’D

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SEE DETAIL M0.00 FOR SECTION NOTES

ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω₀, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI-B CONCRETE INSERTS

MIN 3/16" x 1/2" x 1/2" ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

1 1/8" x 1/2" x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MIN 3/16" x 1/2" x 1/2" ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

MASON WEST MW-CDI-B CONCRETE INSERT, TYP

3 16" x 1 5/8" x 12 GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MIN 3/16" x 1/2" x 1/2" ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 3/8" MIN AND ATR BY DIMENSION OF ATR, MIN)

ALTERNATE INSTALL

HANGER ATTACHMENT TYPE

STEEL COMPONENT ALLOWABLE VERTICAL LOAD, Ta LBS

HANGER ATTACHMENT TYPE

CONCRETE INSERT ALLOWABLE VERTICAL LOAD, Tac LBS

ATR HANGER DIAM, Dia INCH

MIN. SPACING, Smin INCH

MIN. END DIST., Cmin INCH

MASON WEST MW-CDI-B CONCRETE INSERT (ICC ESR-3443)

SPECIAL INSPECTION REQ'D

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<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD, Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD, Tac LBS</th>
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<th>MIN. SPACING, Smin INCH</th>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, ω, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR

![Diagram of hanger attachment]

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<th>ALLOWABLE VERTICAL LOAD Ta ^1 LBS</th>
<th>MIN ATR HANGER DIA. in</th>
<th>MIN EFF. EMBED. hef in</th>
<th>MIN HOLE DEPTH ho in</th>
<th>MIN SPACING Smin in</th>
<th>MIN END DIST. Cmin in</th>
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FOR fw ≥ 4 1/2”

|                        | 1420                              | 3/8                    | 3 3/4                  | 5                    | 11 3/4              | 5 3/4                | 110                 |

SEE DETAIL M0.00 FOR SECTION NOTES

^1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ωₙ, PER ASCE 7-10 SEC. 12.4.3.3.
### HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

**MIN FLUTE WIDTH fw INCH** | **MIN EDGE DIST ED INCH** | **MIN CONC. COVER ha INCH** | **MIN ¼x1½x1½ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.), TYP**
--- | --- | --- | ---
3/4 | 1 | 2 | 3/8" MAX
4/1 | 1 1/4 | 3/4 | 3/8" MAX

**DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP**

- **MIN ¼x1½x1½ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.), TYP**
- **1½x1½x12GA DOUBLE STRUT OR 1½x3½x12GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP**
- **MIN ¾x1½x1½ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT REG. NUT & B (NUT SNUG TIGHT) (HANGER OPTION 1)**

**ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED**

**MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC**

**MIN ¼x1½x1½ ASTM A36 STRUT WASHER AND MW-SSN-3/2 WITH MW-BON-3/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)**

**½" TO 7/8" DIA. ATR HANGER, TYP (HANGER OPTION 2)**

**5" MIN FOR NUT INSIDE STRUT REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-3/2 BY ½" MIN AND ATR BY DIMENSION OF ATR, MIN)**

---

### STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS

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<th>HANGER ATTACHMENT TYPE</th>
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<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
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1. ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qs, PER ASCE 7-10 SEC. 12.4.3.3.

2. WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 13 3/4" FOR fw = 3/8" OR 14" FOR fw = 4/8", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.

---

**MASON WEST, INC.**

1601 E. Miraloma Ave. Placentia, CA 92870

TEL (714) 630 - 0701, www.masonwest.com

Jeffrey Y. Kikumoto  
OPM-0043-13

Jiefu "Jeff" Zhang, SE  
California SE No. S5270

P A G E  
M2.61

525 of 846
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

MIN FLUTE WIDTH fw INCH MIN EDGE DIST ED INCH MIN CONC. COVER ha INCH
3/8 1 2
4 1/2 1 1/4 3/8

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP
MIN 3/4x1 1/2x1 1/4 ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.), TYP
1 1/2x1 1/2x12GA DOUBLE STRUT OR 1 1/2x3/4x12GA SINGLE STRUT (SOLID OR PUNCHED ONLY).
STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN 3/8x1 1/2x1 1/4 ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
REG. NUT & (NUT SNUG TIGHT) (HANGER OPTION 1)

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
MIN 3/4x1 1/2x1 1/4 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
3/8" TO 7/8" DIA. ATR HANGER, TYP (HANGER OPTION 2)
1" MIN FOR NUT INSIDE STRUT
5" MIN FOR NUT OUTSIDE STRUT
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 3/8" MIN AND ATR BY DIMENSION OF ATR, MIN)

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR
ALLOWABLE VERTICAL LOAD Ta LBS
STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS
HANGER ATTACHMENT TYPE
CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Ta LBS
HANGER ATTACHMENT TYPE
ATR HANGER DIA. INCH
MIN EFF. EMBED. heft INCH
MIN HOLE DEPTH ho INCH
MIN SPACING Smin INCH
MIN END DIST. Cmin INCH
TORQUE REQ'D FT-LBS

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<td>63A TO 63M</td>
<td>1860</td>
<td>63A TO 63L</td>
<td>1550</td>
<td>7/8</td>
<td>3/4</td>
<td>4</td>
<td>MAX OF: 3&quot;hef OR 1.5&quot;FLUTE WIDTH</td>
<td>4/5</td>
<td>40</td>
</tr>
<tr>
<td>75A TO 75M</td>
<td>1860</td>
<td>75A TO 75L</td>
<td>1550</td>
<td>7/8</td>
<td>3/4</td>
<td>4</td>
<td>MAX OF: 3&quot;hef OR 1.5&quot;FLUTE WIDTH</td>
<td>4/5</td>
<td>40</td>
</tr>
<tr>
<td>88A TO 88M</td>
<td>1860</td>
<td>88A TO 88L</td>
<td>1550</td>
<td>7/8</td>
<td>3/4</td>
<td>4</td>
<td>MAX OF: 3&quot;hef OR 1.5&quot;FLUTE WIDTH</td>
<td>4/5</td>
<td>40</td>
</tr>
</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Dp, PER ASCE 7-10 SEC. 12.4.3.3.
ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_p \) PER ASCE 7-10 SEC. 12.4.3.3.

5. WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 13/8" FOR \( fw = 3\frac{3}{16}" \) OR 14" FOR \( fw = 4\frac{1}{16}" \), THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>MIN ATR HANGER DIA. da INCH</th>
<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38F</td>
<td>510</td>
<td>3/8</td>
<td>3/8</td>
<td>2</td>
<td>2 1/2</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>38A TO 38G</td>
<td>590</td>
<td>3/8</td>
<td>3/8</td>
<td>2</td>
<td>2 1/2</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>590</td>
<td>3/8</td>
<td>3/8</td>
<td>2</td>
<td>2 1/2</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>63A TO 63G</td>
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<td>3/8</td>
<td>3/8</td>
<td>2</td>
<td>2 1/2</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR (ICC ESR-2502)</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38N</td>
<td>2400</td>
<td>38A TO 38H</td>
<td>720</td>
</tr>
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<td>2620</td>
<td>50A TO 50H</td>
<td>720</td>
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<td>2620</td>
<td>63A TO 63H</td>
<td>720</td>
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<td>38A TO 38H</td>
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<td>720</td>
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<td>75A TO 75P</td>
<td>2620</td>
<td>75A TO 75H</td>
<td>720</td>
</tr>
<tr>
<td>88A TO 88P</td>
<td>2620</td>
<td>88A TO 88H</td>
<td>830</td>
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</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega _o \), PER ASCE 7-10 Sec. 12.4.3.3.

2 WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 12\( \frac{1}{4} \)", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.

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TEL (714) 630 - 0701, www.masonwest.com

Jiefu "Jeff" Zhang, SE
California SE No. S5270

PAGE
M2.63
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP
MW-SAP-200-B SEE PAGE X6.0
5/8" DIA. ATR W/ REG. NUT T&B (SNUG TIGHT)
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED
3/4" TO 7/8" DIA. ATR HANGER

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ωn, PER ASCE 7-10 SEC. 12.4.3.3.

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California SE No. S5270
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (4) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP
MW-SAP-400-B FOR 3/8" ATR
MW-SAP-400-C FOR 5/16" ATR
MW-SAP-400-D FOR 1/2" ATR
SEE PAGE X6.0, TYP
ATR w/ REG. NUT T&B (SNUG TIGHT)
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE
THREADED RODS ARE PERMITTED
3/8" TO 1/2" DIA. ATR HANGER

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac (^\dagger) LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50Q</td>
<td>3600</td>
<td>50A TO 50R</td>
<td>5200</td>
<td>3/8</td>
<td>3/4</td>
<td>4/4</td>
<td>47/6</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>63A TO 63Q</td>
<td>3600</td>
<td>63A TO 63R</td>
<td>5200</td>
<td>3/8</td>
<td>3/4</td>
<td>4/4</td>
<td>47/6</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>75A TO 75Q</td>
<td>3500</td>
<td>75A TO 75R</td>
<td>5200</td>
<td>3/8</td>
<td>3/4</td>
<td>4/4</td>
<td>47/6</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>88A TO 88Q</td>
<td>3500</td>
<td>88A TO 88R</td>
<td>5200</td>
<td>3/8</td>
<td>3/4</td>
<td>4/4</td>
<td>47/6</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>100A TO 100Q</td>
<td>3500</td>
<td>100A TO 100R</td>
<td>5200</td>
<td>3/8</td>
<td>3/4</td>
<td>4/4</td>
<td>47/6</td>
<td>60</td>
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</tr>
<tr>
<td>125A TO 125Q</td>
<td>3500</td>
<td>125A TO 125R</td>
<td>5200</td>
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<td>3/4</td>
<td>4/4</td>
<td>47/6</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

\(^\dagger\) ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \(\Omega_p\), PER ASCE 7-10 SEC. 12.4.3.3.

SEE DETAIL M0.00 FOR SECTION NOTES

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Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
531 of 846
**HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) CONCRETE SCREW ANCHOR**

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC

CONCRETE SCREW ANCHOR, TYP

REGULAR OR REDUCING ROD COUPLER, TYP

ATR HANGER, TYP

---

### Anchor Specifications

<table>
<thead>
<tr>
<th>Anchor</th>
<th>Min. Flute Width fw</th>
<th>Min. Edge Dist Ed</th>
<th>Min. Conc. Cover ha</th>
<th>Min. Min. HOLE CLEAR hc</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEWALT/POWERS</td>
<td>3/4</td>
<td>1</td>
<td>2 1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>MASON</td>
<td>4 1/2</td>
<td>1 1/4</td>
<td>1 1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>HILTI</td>
<td>3/4</td>
<td>1 1/4</td>
<td>2 1/2</td>
<td>1 1/4</td>
</tr>
</tbody>
</table>

### Allowable Vertical Load Table

<table>
<thead>
<tr>
<th>Hanger Attachment Type</th>
<th>Allowable Vertical Load Ta</th>
<th>ATR Hanger Dia. da</th>
<th>Dia. da</th>
<th>Min. Eff. Embed. hef</th>
<th>Min. Min. Hole Depth ho</th>
<th>Min. Spacing Smin</th>
<th>Min. Edge Cmin</th>
<th>Max. Torque FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38E</td>
<td>380</td>
<td>3/8</td>
<td>3/4 W/ 3/8 Ø HEAD</td>
<td>2</td>
<td>2 1/2</td>
<td>6</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>380</td>
<td>5/8</td>
<td>3/4 W/ 3/8 Ø HEAD</td>
<td>2</td>
<td>2 1/2</td>
<td>6</td>
<td>3</td>
<td>25</td>
</tr>
</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1. ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Q0, PER ASCE 7-10 SEC. 12.4.3.3.

2. SEE PAGE M2.70.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.
# Hanger Attachment to Concrete Filled Metal Deck with (1) Concrete Screw Anchor

## Mason Ind. N.Y. Sast Concrete Screw Anchor

(ICC ESR-2713)

Special Inspection Req'd

<table>
<thead>
<tr>
<th>Hanger Attachment Type</th>
<th>Allowable Vertical Load $T_a$ (LBS)</th>
<th>ATR Hanger Dia.</th>
<th>MASON IND. N.Y. SAST CONCRETE SCREW ANCHOR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dia. da INCH</td>
<td>MIN EFF. EMBED. hef INCH</td>
</tr>
<tr>
<td>38A TO 38E</td>
<td>360</td>
<td>$\frac{5}{8}$</td>
<td>$\frac{3}{6}$ W/ $\frac{5}{8}^\circ$ HEAD</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>360</td>
<td>$\frac{7}{8}$</td>
<td>$\frac{3}{6}$ W/ $\frac{7}{8}^\circ$ HEAD</td>
</tr>
</tbody>
</table>

## Hilti Kh-Ez-I Concrete Screw Anchor

(ICC ESR-3027)

Special Inspection Req'd

<table>
<thead>
<tr>
<th>Hanger Attachment Type</th>
<th>Allowable Vertical Load $T_a$ (LBS)</th>
<th>ATR Hanger Dia.</th>
<th>HILTI KH-EZ-I CONCRETE SCREW ANCHOR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dia. da INCH</td>
<td>MIN EFF. EMBED. hef INCH</td>
</tr>
<tr>
<td>38A TO 38D</td>
<td>250</td>
<td>$\frac{5}{6}$</td>
<td>$\frac{3}{4}$ W/ $\frac{5}{6}^\circ$ HEAD</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>250</td>
<td>$\frac{7}{8}$</td>
<td>$\frac{3}{4}$ W/ $\frac{7}{8}^\circ$ HEAD</td>
</tr>
</tbody>
</table>

See Detail M0.00 for Section Notes

1. Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, $\Omega_0$, per ASCE 7-10 Sec. 12.4.3.3.
**Hanger Attachment to Concrete Filled Metal Deck with (2) Concrete Screw Anchors**

Anchor may be installed in the upper flute of the steel deck provided the minimum hole clearance is satisfied.

<table>
<thead>
<tr>
<th>Anchor</th>
<th>Min Flute Width fw (Inch)</th>
<th>Min Edge Dist Ed (Inch)</th>
<th>Min Conc. Cover ha (Inch)</th>
<th>Min Hole Clear hc (Inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dewalt/Powers</td>
<td>3/4</td>
<td>1</td>
<td>2/3</td>
<td>3/4</td>
</tr>
<tr>
<td>Mason</td>
<td>4/5</td>
<td>1 1/4</td>
<td>1 1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>Hilti</td>
<td>4/5</td>
<td>1 1/4</td>
<td>3/4</td>
<td>1/4</td>
</tr>
</tbody>
</table>

**Concrete Screw Anchor, TYP**

1" x 1/8 x 1/2 GA Single Strut (Solid or punched only).

Strut may be rotated to any angle in plan, TYP.

MIN 3/4 x 1/8 x 1/8 ASTM A36 Strut Washer, TYP at open face of strut.

REG. NUT T&B (Nut snug tight) (Hanger Option 1)

**Allowable Loads have been increased by a factor of 1.2 for Load Combinations including Overstrength, Ω**

Concrete screw anchor, typical (Hanger Option 2)

MIN 20 GA Steel Deck with MIN 3000 PSI NWC or SLWC

MIN 3/4 x 1/8 x 1/8 ASTM A36 Strut Washer and MW-SSN-1/2 with MW-BON-1/2 torqued until the nut breaks off (Ref. Page X4.0)

1/4" to 1/4" Dia. ATR Hanger, TYP

(Hanger Option 2)

**Reg. or reducing rod coupler (Engage MW-SSN-1/4 by 1/4" Min and ATR by dimension of ATR, Min)**

---

**Concrete Screw Anchor (ICC ESR-3889)**

SPECIAL INSPECTION REQ'D

**Hanger Attachment Type**

<table>
<thead>
<tr>
<th>Hanger Attachment Type</th>
<th>Steel Component Allowable Vertical Load Ta (LBS)</th>
<th>Hanger Attachment Type</th>
<th>Concrete Anchor Allowable Vertical Load Tac (LBS)</th>
<th>Hanger Diameter Dia. (Inch)</th>
<th>Min Eff. Embed. Da (Inch)</th>
<th>Min Hole Depth Ho (Inch)</th>
<th>Min Spacing Smin (Inch)</th>
<th>Min End Dist. Cmin (Inch)</th>
<th>Max Torque FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38K</td>
<td>1100</td>
<td>38A TO 38K</td>
<td>1110</td>
<td>3/4</td>
<td>2/3</td>
<td>3/2</td>
<td>7/2</td>
<td>3/4</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50K</td>
<td>1100</td>
<td>50A TO 50K</td>
<td>1110</td>
<td>3/2</td>
<td>2/3</td>
<td>3/2</td>
<td>7/2</td>
<td>3/2</td>
<td>40</td>
</tr>
<tr>
<td>63A TO 63K</td>
<td>1100</td>
<td>63A TO 63K</td>
<td>1110</td>
<td>3/2</td>
<td>2/3</td>
<td>3/2</td>
<td>7/2</td>
<td>3/2</td>
<td>40</td>
</tr>
<tr>
<td>75A TO 75K</td>
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<td>75A TO 75K</td>
<td>1110</td>
<td>3/2</td>
<td>2/3</td>
<td>3/2</td>
<td>7/2</td>
<td>3/2</td>
<td>40</td>
</tr>
<tr>
<td>88A TO 88K</td>
<td>1100</td>
<td>88A TO 88K</td>
<td>1110</td>
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<td>2/3</td>
<td>3/2</td>
<td>7/2</td>
<td>3/2</td>
<td>40</td>
</tr>
<tr>
<td>38A TO 38N</td>
<td>1100</td>
<td>38A TO 38N</td>
<td>2200</td>
<td>3/2</td>
<td>3/4</td>
<td>4/2</td>
<td>9/2</td>
<td>4/2</td>
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<td>50A TO 50N</td>
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<td>3/2</td>
<td>3/4</td>
<td>4/2</td>
<td>9/2</td>
<td>4/2</td>
<td>60</td>
</tr>
<tr>
<td>63A TO 63N</td>
<td>1100</td>
<td>63A TO 63N</td>
<td>2200</td>
<td>3/2</td>
<td>3/4</td>
<td>4/2</td>
<td>9/2</td>
<td>4/2</td>
<td>60</td>
</tr>
<tr>
<td>75A TO 75N</td>
<td>1100</td>
<td>75A TO 75N</td>
<td>2200</td>
<td>3/2</td>
<td>3/4</td>
<td>4/2</td>
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<td>3/4</td>
<td>4/2</td>
<td>9/2</td>
<td>4/2</td>
<td>60</td>
</tr>
</tbody>
</table>

See Detail M0.00 for Section Notes

1 Allowable Loads have been increased by a factor of 1.2 for Load Combinations including overstrength, Q_p, per ASCE 7-10 Sec. 12.4.3.3.

2 When the bolt centerline distance exceeds 13 3/4" for fw = 3 3/4" or 14" for fw = 4 1/2", the strut must be rotated to comply to the detail.

3 See Page M2.71 for additional allowable load tables.
### Hanger Attachment to Concrete Filled Metal Deck with (2) Concrete Screw Anchors

<table>
<thead>
<tr>
<th>Hanger Attachment Type</th>
<th>Steel Component Allowable Vertical Load Ta Lbs</th>
<th>Concrete Anchor Allowable Vertical Load Tac Lbs</th>
<th>ATR Hanger Dia.</th>
<th>Min Eff. Embed.</th>
<th>Min Hole Depth ho Inch</th>
<th>Min Spacing Smin Inch</th>
<th>Min End Dist. Cmin Inch</th>
<th>Max Torque Ft-Lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38K</td>
<td>1100</td>
<td>200</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
<td>2$\frac{3}{4}$</td>
<td>6$\frac{1}{4}$</td>
<td>3$\frac{3}{4}$</td>
<td>50</td>
</tr>
<tr>
<td>50A TO 50K</td>
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<td>200</td>
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### Hilti K-H-EZ Concrete Screw Anchor (ICC ESR-3027) Special Inspection Req’d

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<th>Concrete Anchor Allowable Vertical Load Tac Lbs</th>
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<th>Min Hole Depth ho Inch</th>
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**See detail M0.00 for section notes**

1. Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, $\Omega_0$, per ASCE 7-10 SEC. 12.4.3.3.

2. When the bolt centerline distance exceeds 13$\frac{3}{4}$" for $w_f = 3\frac{3}{4}$" or 14" for $w_f = 4\frac{1}{2}$", the strut must be rotated to comply to the detail.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CONCRETE SCREW ANCHORS

CONCRETE SCREW ANCHOR, TYP
1½ x 1¼ x 12 GA SINGLE STRUT (SOLID OR PUNCHED ONLY).
STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
MIN ¾ x 1½ x 1¾ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
REG. NUT T&B (NUT SNUG TIGHT)
(HANGER OPTION 1)

ANCHOR | MIN FLUTE WIDTH fw INCH | MIN EDGE DIST ha INCH | MIN CONC. COVER ha INCH | MIN HOLE CLEAR hc INCH
--------|------------------------|----------------------|------------------------|---------------------
DEWALT/POWERS | ¾ | 1 | 2½ | ¾
MASON | 4½ | 1¾ | 1½ | ¾
HILTI | 4½ | 1¾ | 3½ | 1¾

HANGER ATTACHMENT TYPE | STEEL COMPONENT ALLOWABLE VERTICAL LOAD Tc LBS | CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS | ATR HANGER ALLOWABLE DIAM da INCH | MIN EFF. EMBED. hef INCH | MIN HOLE DEPTH he INCH | MIN SPACING Smin INCH | MIN END DIST. Cmin INCH | MAX TORQUE FT-LBS
---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------
38A TO 38G | 640 | 38A TO 38K | 1200 | ¾ | 2½ | 3½ | 7½ | ¾ | 40
50A TO 50G | 640 | 50A TO 50K | 1200 | ½ | ¾ | 7½ | ¾ | 40
63A TO 63G | 640 | 63A TO 63K | 1200 | ¾ | ¾ | 7½ | ¾ | 40
75A TO 75G | 640 | 75A TO 75K | 1200 | ¾ | ¾ | 7½ | ¾ | 40
88A TO 88G | 640 | 88A TO 88K | 1200 | ¾ | ¾ | 7½ | ¾ | 40
38A TO 38G | 640 | 38A TO 38N | 2420 | ¾ | ¾ | 9½ | ¾ | 60
50A TO 50G | 640 | 50A TO 50N | 2420 | ½ | ¾ | 9½ | ¾ | 60
63A TO 63G | 640 | 63A TO 63N | 2420 | ¾ | ¾ | 9½ | ¾ | 60
75A TO 75G | 640 | 75A TO 75N | 2420 | ¾ | ¾ | 9½ | ¾ | 60
88A TO 88G | 640 | 88A TO 88N | 2420 | ¾ | ¾ | 9½ | ¾ | 60

SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qo, PER ASCE 7-10 SEC. 12.4.3.3.
2 SEE PAGE M2.71.3 FOR ADDITIONAL ALLOWABLE LOAD TABLES.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CONCRETE SCREW ANCHORS

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<td>½ 1½  2½  6½  3½  65</td>
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<td>640</td>
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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Q0, PER ASCE 7-10 SEC. 12.4.3.3.
**HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CONCRETE SCREW ANCHORS**

ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED

**HANGER ATTACHMENT TYPE** | **STEEL COMPONENT ALLOWABLE VERTICAL LOAD, Ta LBS** | **HANGER ATTACHMENT TYPE** | **CONCRETE SCREW ANCHOR ALLOWABLE VERTICAL LOAD, Ta LBS** | **CONCRETE SCREW ANCHOR, TYP**
---|---|---|---|---
38A TO 38K | 1100 | 38A TO 38M | 1660 | MIN 3/8x1 1/2x1 1/2 ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
50A TO 50K | 1100 | 50A TO 50M | 1660 | REG. NUT T&B (NUT SNUG TIGHT)
63A TO 63K | 1100 | 63A TO 63M | 1660 | MIN 5/16x1 1/2x1 1/2 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
75A TO 75K | 1100 | 75A TO 75M | 1660 | ALTERNATE HANGER INSTALL
88A TO 88K | 1100 | 88A TO 88M | 1660 | REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 1/4 MIN AND ATR BY DIMENSION OF ATR, MIN)
38A TO 38K | 1100 | 38A TO 38P | 3300 | SPECIAL INSPECTION REQ'D
50A TO 50K | 1100 | 50A TO 50P | 3300 | DEWALT/POWERS 3/8 1 1/2 1/2 1/4
63A TO 63K | 1100 | 63A TO 63P | 3300 | MASON 4 1/2 1/4 1 1/2 3/4
75A TO 75K | 1100 | 75A TO 75P | 3300 | HILTI 4 1/2 1/4 1 1/2 3/4
88A TO 88K | 1100 | 88A TO 88P | 3300 | DEWALT/POWERS SCREW-BOLT+ CONCRETE SCREW ANCHOR (ICC ESR-3889)

**MIN FLUTE WIDTH, fw INCH** | **MIN EDGE DIST, ha INCH** | **MIN CONC. COVER, ha INCH** | **MIN HOLE CLEAR, hc INCH**
---|---|---|---
3/8 | 1 | 1/2 | 1/4
3/8 | 1 | 1/2 | 1/4
3/8 | 1 | 1/2 | 1/4
3/8 | 1 | 1/2 | 1/4
3/8 | 1 | 1/2 | 1/4
3/8 | 1 | 1/2 | 1/4
3/8 | 1 | 1/2 | 1/4
3/8 | 1 | 1/2 | 1/4

**MIN EFF. EMBED. DIA., da INCH** | **MIN HOLE DEPTH, ho INCH** | **MIN SPACING, Smin INCH** | **MIN END DIST, Cmin INCH** | **MAX TORQUE FT-LBS**
---|---|---|---|---
1/8 | 3/8 | 9/4 | 4 | 60
1/8 | 3/8 | 9/4 | 4 | 60
1/8 | 3/8 | 9/4 | 4 | 60
1/8 | 3/8 | 9/4 | 4 | 60
1/8 | 3/8 | 9/4 | 4 | 60
1/8 | 3/8 | 9/4 | 4 | 60
1/8 | 3/8 | 9/4 | 4 | 60
1/8 | 3/8 | 9/4 | 4 | 60

SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Q_o, PER ASCE 7-10 SEC. 12.4.3.3.
2 WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 13 1/8" FOR fw = 3 7/8" OR 14" FOR fw = 4 1/2", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.
3 SEE PAGE M2.71.5 FOR ADDITIONAL ALLOWABLE LOAD TABLES.

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

P A G E

M2.71.4

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
538 of 846
## Hanger Attachment to Concrete Filled Metal Deck With (2) Concrete Screw Anchors

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<th>Concrete Anchor Allowable Vertical Load Tac LBS</th>
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### Type Hanger Attachment

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**See Detail M0.00 for Section Notes**

1. Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, D<sub>v</sub>, per ASCE 7-10 Sec. 12.4.3.3.
2. When the bolt centerline distance exceeds 13¼" for f<sub>W</sub> = 3½" or 14" for f<sub>W</sub> = 4½", the strut must be rotated to comply to the detail.

---

**MASON WEST, INC.**
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Jiefu "Jeff" Zhang, SE
California SE No. S5270

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**PAGE**
M2.71.5
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) CONCRETE SCREW ANCHOR

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
CONCRETE SCREW ANCHOR, TYP
REGULAR OR REDUCING ROD COUPLER, TYP
ATR HANGER, TYP

DEWALT/POWERS HANGERMATE+ CONCRETE SCREW ANCHOR
(ICC ESR-3889)
SPECIAL INSPECTION REQ'D

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<th>ALLOWABLE VERTICAL LOAD Ta 1.2 LBS</th>
<th>ATR HANGER DIA. da INCH</th>
<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN EDGE Cmin INCH</th>
<th>MAX TORQUE FT-LBS</th>
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<tbody>
<tr>
<td>38A TO 38D</td>
<td>310</td>
<td>7/8</td>
<td>2</td>
<td>2 1/2</td>
<td>6</td>
<td>3</td>
<td>25</td>
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<td>50A TO 50D</td>
<td>310</td>
<td>1/2</td>
<td>2/3</td>
<td>2</td>
<td>3</td>
<td>1/2</td>
<td></td>
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</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega \), PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CONCRETE SCREW ANCHORS

**CONCRETE SCREW ANCHOR, TYP**

- 1½ x 1½ x 12GA SINGLE STRUT (SOLID OR PUNCHED ONLY), STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP
- MIN 3½ x 1½ x 1½ ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT
- REG. NUT & B (NUT SNUG TIGHT) (HANGER OPTION 1)

**DEWALT/POWERS SCREW-BOLT+ CONCRETE SCREW ANCHOR (ICC ESR-3889) SPECIAL INSPECTION REQ'D**

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>ATR HANGER DIA. inCH</th>
<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
<th>MAX TORQUE FT-LBS</th>
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<tbody>
<tr>
<td>38A TO 38L</td>
<td>1380</td>
<td>38A TO 38K</td>
<td>1140</td>
<td>½</td>
<td>3½</td>
<td>7½</td>
<td>3¾</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50L</td>
<td>1380</td>
<td>50A TO 50K</td>
<td>1140</td>
<td>½</td>
<td>3½</td>
<td>7½</td>
<td>3¾</td>
<td>40</td>
</tr>
<tr>
<td>63A TO 63L</td>
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<td>63A TO 63K</td>
<td>1140</td>
<td>½</td>
<td>3½</td>
<td>7½</td>
<td>3¾</td>
<td>40</td>
</tr>
<tr>
<td>75A TO 75L</td>
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<td>75A TO 75K</td>
<td>1140</td>
<td>¾</td>
<td>3½</td>
<td>7½</td>
<td>3¾</td>
<td>40</td>
</tr>
<tr>
<td>88A TO 88L</td>
<td>1380</td>
<td>88A TO 88K</td>
<td>1140</td>
<td>¾</td>
<td>3½</td>
<td>7½</td>
<td>3¾</td>
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<td>50A TO 50H</td>
<td>730</td>
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<td>2½</td>
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<td>63A TO 63L</td>
<td>1380</td>
<td>63A TO 63H</td>
<td>730</td>
<td>¾</td>
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<td>7½</td>
<td>3¾</td>
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<tr>
<td>75A TO 75L</td>
<td>1380</td>
<td>75A TO 75H</td>
<td>730</td>
<td>¾</td>
<td>3½</td>
<td>7½</td>
<td>3¾</td>
<td>45</td>
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<tr>
<td>88A TO 88L</td>
<td>1380</td>
<td>88A TO 88H</td>
<td>730</td>
<td>¼</td>
<td>2½</td>
<td>3½</td>
<td>7½</td>
<td>2½</td>
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</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega \), PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CONCRETE SCREW ANCHORS

CONCRETE SCREW ANCHOR, TYP
MW-SAP-200-B
SEE PAGE X6.0

3/8" DIA. ATR W/ REG. NUT T&B (SNUG TIGHT)
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED

3/8" TO 7/8" DIA. ATR HANGER

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>DIA. da INCH</th>
<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
<th>MAX TORQUE FT-LBS</th>
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</thead>
<tbody>
<tr>
<td>38A TO 38M</td>
<td>1930</td>
<td>38A TO 38L</td>
<td>1420</td>
<td>3/8</td>
<td>2/7</td>
<td>4/9</td>
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<td>4/6</td>
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<td>50A TO 50M</td>
<td>1930</td>
<td>50A TO 50L</td>
<td>1420</td>
<td>7/8</td>
<td>3/4</td>
<td>5/5</td>
<td>11/4</td>
<td>5/5</td>
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<td>1420</td>
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<td>3/4</td>
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<td>11/4</td>
<td>5/5</td>
<td>60</td>
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<td>75A TO 75L</td>
<td>1420</td>
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<td>5/5</td>
<td>11/4</td>
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<td>88A TO 88L</td>
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</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega \), PER ASCE 7-10 SEC. 12.4.3.3.

2 SEE PAGE M2.74.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) CONCRETE SCREW ANCHORS

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>HILTI KH-EZ CONCRETE SCREW ANCHOR (ICC ESR-3027) SPECIAL INSPECTION REQ'D</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MIN EFF. EMBED. hef INCH</td>
<td>MIN HOLE DEPTH to INCH</td>
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<td>1930</td>
<td>38A TO 38Q</td>
<td>2160</td>
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<td>50A TO 50M</td>
<td>1930</td>
<td>50A TO 50Q</td>
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<td>63A TO 63Q</td>
<td>2160</td>
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<td>2 1/2</td>
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<td>88A TO 88Q</td>
<td>2160</td>
<td>7/8</td>
<td>2 1/2</td>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, $\Omega_0$, PER ASCE 7-10 SEC. 12.4.3.3.

BY: Jeffrey Y. Kikumoto

DATE: 10/09/2020

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TEL (714) 630 - 0701, www.masonwest.com

Jiefu “Jeff” Zhang, SE
California SE No. S5270

P A G E
M2.74.1
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (4) CONCRETE SCREW ANCHORS

CONCRETE SCREW ANCHOR, TYP
MW-SAP-400-B FOR ⅜" Ø ATR
MW-SAP-400-C FOR ⅝" Ø ATR
MW-SAP-400-D FOR 1" Ø ATR
SEE PAGE X6.0, TYP

ATR W/ REG. NUT & B
(SNUG TIGHT)
REG. OR REDUCING COUPLING
NUT FOR LARGER OR SMALLER SIZE
THREADED RODS ARE PERMITTED

½” TO 1¼” DIA. ATR HANGER

MIN. 20 GA STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>ATR HANGER Dia. da INCH</th>
<th>MIN EFF. EMBED. hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
<th>MAX TORQUE FT-LBS</th>
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</thead>
<tbody>
<tr>
<td>50A TO 50Q</td>
<td>3600</td>
<td>50A TO 50P</td>
<td>2840</td>
<td>⅞</td>
<td>3/32</td>
<td>⅝</td>
<td>8/6</td>
<td>4/6</td>
<td>60.</td>
</tr>
<tr>
<td>63A TO 63Q</td>
<td>3600</td>
<td>63A TO 63P</td>
<td>2840</td>
<td>⅞</td>
<td>3/32</td>
<td>⅝</td>
<td>8/6</td>
<td>4/6</td>
<td>60.</td>
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<tr>
<td>75A TO 75Q</td>
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<td>75A TO 75P</td>
<td>2840</td>
<td>⅞</td>
<td>3/32</td>
<td>⅝</td>
<td>8/6</td>
<td>4/6</td>
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<tr>
<td>88A TO 88Q</td>
<td>3500</td>
<td>88A TO 88P</td>
<td>2840</td>
<td>⅞</td>
<td>3/32</td>
<td>⅝</td>
<td>8/6</td>
<td>4/6</td>
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<td>100A TO 100P</td>
<td>2840</td>
<td>1</td>
<td>3/32</td>
<td>⅝</td>
<td>8/6</td>
<td>4/6</td>
<td>60.</td>
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<tr>
<td>125A TO 125Q</td>
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<td>125A TO 125P</td>
<td>2840</td>
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<td>⅝</td>
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<td>⅝</td>
<td>11/6</td>
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<tr>
<td>63A TO 63Q</td>
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<td>63A TO 63Q</td>
<td>3960</td>
<td>⅞</td>
<td>3/32</td>
<td>⅝</td>
<td>11/6</td>
<td>5/6</td>
<td>60.</td>
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<tr>
<td>75A TO 75Q</td>
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<td>75A TO 75Q</td>
<td>3960</td>
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<td>3/32</td>
<td>⅝</td>
<td>11/6</td>
<td>5/6</td>
<td>60.</td>
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<tr>
<td>88A TO 88Q</td>
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<td>88A TO 88Q</td>
<td>3960</td>
<td>⅞</td>
<td>3/32</td>
<td>⅝</td>
<td>11/6</td>
<td>5/6</td>
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<tr>
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<td>100A TO 100Q</td>
<td>3960</td>
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<td>3/32</td>
<td>⅝</td>
<td>11/6</td>
<td>5/6</td>
<td>60.</td>
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<tr>
<td>125A TO 125Q</td>
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<td>125A TO 125Q</td>
<td>3960</td>
<td>1⅛</td>
<td>3/32</td>
<td>⅝</td>
<td>11/6</td>
<td>5/6</td>
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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qd, PER
ASCE 7-10 SEC. 12.4.3.3.
2 SEE PAGE M2.75.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.

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Jeffrey Y. Kikumoto  
OPM-0043-13  
10/09/2020

Jiefu "Jeff" Zhang, SE
California SE No. S5270

P A G E

M2.75
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (4) CONCRETE SCREW ANCHORS

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>ATR HANGER DIA. da INCH</th>
<th>HILTI KH-EZ CONCRETE SCREW ANCHOR (ICC ESR-3027) SPECIAL INSPECTION REQ'D</th>
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<tr>
<td>50A TO 50Q</td>
<td>3600</td>
<td>50A TO 50R</td>
<td>4320</td>
<td>1/2</td>
<td>% 2 3/4 7 3/4 85</td>
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<td>63A TO 63R</td>
<td>4320</td>
<td>1/2</td>
<td>% 2 3/4 7 3/4 85</td>
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<tr>
<td>75A TO 75Q</td>
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<td>75A TO 75R</td>
<td>4320</td>
<td>1/2</td>
<td>% 2 3/4 7 3/4 85</td>
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<td>88A TO 88Q</td>
<td>3500</td>
<td>88A TO 88R</td>
<td>4320</td>
<td>1/2</td>
<td>% 2 3/4 7 3/4 85</td>
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<tr>
<td>100A TO 100Q</td>
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<td>100A TO 100R</td>
<td>4320</td>
<td>1/2</td>
<td>% 2 3/4 7 3/4 85</td>
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<td>125A TO 125R</td>
<td>4320</td>
<td>1/2</td>
<td>% 2 3/4 7 3/4 85</td>
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</table>

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1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Q₀, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) HILTI KCM-MD-SP/LP CONCRETE INSERT

INSERT SIZE | MIN. COVER ha \(\text{INCH}\) | HILTI KCM-MD-SP/LP CONCRETE INSERT
--- | --- | ---
\(\frac{3}{8}\)"-\(\frac{5}{8}\)" | 2\(\frac{1}{2}\) | CONCRETE INSERT, TYP
\(\frac{2}{3}\)"-\(\frac{7}{8}\)" | 2\(\frac{1}{2}\) | MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC
\(\frac{7}{8}\)"-\(\frac{15}{16}\)" | SP \text{ @ LOWER FLUTE } = 2\(\frac{1}{2}\) \text{ SP \text{ @ UPPER FLUTE } = 3\(\frac{1}{4}\)} | HILTI KCM-MD-SP CONCRETE INSERT, TYP
\(\frac{15}{16}\)"-\(1\)" | SP \text{ @ LOWER FLUTE } = 2\(\frac{1}{2}\) \text{ SP \text{ @ UPPER FLUTE } = 3\(\frac{1}{4}\)} | INSERT SLEEVE MAY BE TRIMMED AS REQ'D, TYP
\(\frac{5}{16}\)"-\(\frac{7}{8}\)" | SP \text{ @ LOWER FLUTE } = 2\(\frac{1}{2}\) \text{ SP \text{ @ UPPER FLUTE } = 3\(\frac{1}{4}\)} \text{ LP \text{ @ EITHER FLUTE } = 3\(\frac{1}{4}\)} | REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED, TYP

HANGER ATTACHMENT TYPE | ALLOWABLE VERTICAL LOAD Ta \(^1\) LBS | Jeffery Y. Kikumoto  
OPM-0043-13  
10/09/2020
| MIN. EFF. EMBED hef \text{INCH} | MIN. SPACING Smin \text{INCH} | MIN. END DIST. Cmin \text{INCH}
--- | --- | --- | --- | --- | ---
38A TO 38G | 660 | \(\frac{7}{8}\) | \(\frac{3}{4}\)"-\(\frac{3}{4}\)" | 1\(\frac{1}{4}\)" | 6 | 3
38A TO 38J | 870 | \(\frac{7}{8}\) | \(\frac{3}{4}\)"-\(\frac{3}{4}\)" | 1\(\frac{1}{4}\)" | 6 | 3
50A TO 50J | 870 | \(\frac{7}{8}\) | \(\frac{3}{4}\)"-\(\frac{3}{4}\)" | 2\(\frac{1}{2}\)" | 7\(\frac{1}{2}\) | 3\(\frac{3}{4}\)
63A TO 63J | 990 | \(\frac{7}{8}\) | \(\frac{5}{8}\)"-\(\frac{5}{8}\)" | 2\(\frac{1}{2}\)" | 7\(\frac{1}{2}\) | 3\(\frac{3}{4}\)
75A TO 75J | 990 | \(\frac{7}{8}\) | \(\frac{5}{8}\)"-\(\frac{5}{8}\)" | 2\(\frac{1}{2}\)" | 7\(\frac{1}{2}\) | 3\(\frac{3}{4}\)
50A TO 50J | 990 | \(\frac{7}{8}\) | \(\frac{5}{8}\)"-\(\frac{5}{8}\)" | 2\(\frac{1}{2}\)" | 7\(\frac{1}{2}\) | 3\(\frac{3}{4}\)
63A TO 63J | 990 | \(\frac{7}{8}\) | \(\frac{5}{8}\)"-\(\frac{5}{8}\)" | 2\(\frac{1}{2}\)" | 7\(\frac{1}{2}\) | 3\(\frac{3}{4}\)
75A TO 75J | 990 | \(\frac{7}{8}\) | \(\frac{5}{8}\)"-\(\frac{5}{8}\)" | 2\(\frac{1}{2}\)" | 7\(\frac{1}{2}\) | 3\(\frac{3}{4}\)
50A TO 50J | 990 | \(\frac{7}{8}\) | \(\frac{5}{8}\)"-\(\frac{5}{8}\)" | 2\(\frac{1}{2}\)" | 7\(\frac{1}{2}\) | 3\(\frac{3}{4}\)
63A TO 63J | 990 | \(\frac{7}{8}\) | \(\frac{5}{8}\)"-\(\frac{5}{8}\)" | 2\(\frac{1}{2}\)" | 7\(\frac{1}{2}\) | 3\(\frac{3}{4}\)

SEE DETAIL M0.00 FOR SECTION NOTES

---

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Jiefu "Jeff" Zhang, SE  
California SE No. S5270

M2.80

546 of 846
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) HILTI KCM-MD-SP/LP CONCRETE INSERT AT UPPER FLUTE

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC
HILTI KCM-MD-LP CONCRETE INSERT
INSERT SLEEVE MAY BE TRIMMED AS REQ'D, TYP
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED
ATR HANGER, TYP

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD Ta (^1) LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>MIN. EFF. EMBED hef INCH</th>
<th>MIN. COVER ha INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38L</td>
<td>1360</td>
<td>3/8</td>
<td>3/4</td>
<td>2 2/3</td>
<td>5 1/2</td>
<td>2 3/4</td>
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<tr>
<td>38A TO 38M</td>
<td>1690</td>
<td>3/8</td>
<td>3/4</td>
<td>2 2/3</td>
<td>6</td>
<td>3</td>
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<tr>
<td>50A TO 50M</td>
<td>1690</td>
<td>3/8</td>
<td>3/4</td>
<td>2 2/3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>63A TO 63M</td>
<td>1690</td>
<td>3/8</td>
<td>3/4</td>
<td>2 2/3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>38A TO 38N</td>
<td>2140</td>
<td>3/8</td>
<td>3/4</td>
<td>2 2/3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>63A TO 63N</td>
<td>2140</td>
<td>3/8</td>
<td>3/4</td>
<td>2 2/3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>75A TO 75N</td>
<td>2140</td>
<td>3/8</td>
<td>3/4</td>
<td>2 2/3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>50A TO 50N</td>
<td>2140</td>
<td>3/8</td>
<td>3/4</td>
<td>2 2/3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>63A TO 63N</td>
<td>2140</td>
<td>3/8</td>
<td>3/4</td>
<td>2 2/3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>75A TO 75N</td>
<td>2140</td>
<td>3/8</td>
<td>3/4</td>
<td>2 2/3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>88A TO 88N</td>
<td>2140</td>
<td>3/8</td>
<td>3/4</td>
<td>2 2/3</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES

\(^1\) ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_0 \), PER ASCE 7-10 SEC. 12.14.3.2.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) DEWALT/POWERS BANG-IT+ CONCRETE INSERT

1½" MIN. INSTALLED IN LOWER FLUTE OR 3" MIN. INSTALLED IN UPPER FLUTE

MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

INSERT PLACEMENT STRAP, TYP

DEWALT/POWERS BANG-IT+ CONCRETE INSERT, TYP

REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED

ATR HANGER, TYP

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD Ta¹</th>
<th>ATR HANGER DIA.</th>
<th>MIN. SPACING Smin</th>
<th>MIN. END DIST. Cmin</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38G</td>
<td>580</td>
<td>5/8</td>
<td>5/4</td>
<td>2 5/8</td>
</tr>
<tr>
<td>38A TO 38G</td>
<td>580</td>
<td>5/8</td>
<td>5/4</td>
<td>2 5/8</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>580</td>
<td>5/8</td>
<td>5/4</td>
<td>2 5/8</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>580</td>
<td>5/8</td>
<td>5/4</td>
<td>2 5/8</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>580</td>
<td>5/8</td>
<td>5/4</td>
<td>2 5/8</td>
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<tr>
<td>63A TO 63G</td>
<td>580</td>
<td>5/8</td>
<td>5/4</td>
<td>2 5/8</td>
</tr>
<tr>
<td>75A TO 75G</td>
<td>580</td>
<td>5/8</td>
<td>5/4</td>
<td>2 5/8</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>580</td>
<td>5/8</td>
<td>5/4</td>
<td>2 5/8</td>
</tr>
<tr>
<td>75A TO 75G</td>
<td>580</td>
<td>5/8</td>
<td>5/4</td>
<td>2 5/8</td>
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<tr>
<td>88A TO 88G</td>
<td>580</td>
<td>5/8</td>
<td>5/4</td>
<td>2 5/8</td>
</tr>
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</table>

SEE DETAIL M0.00 FOR SECTION NOTES

¹ ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_p \) PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC
MIN ¾x1½x1⅛ ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

¾" TO ¾" DIA. ATR HANGER, TYP (HANGER OPTION 2)
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ¾" MIN AND ATR BY DIMENSION OF ATR, MIN)

MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC
MIN ¾x1½x1⅛ ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

¾" TO ¾" DIA. ATR HANGER, TYP (HANGER OPTION 2)
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ¾" MIN AND ATR BY DIMENSION OF ATR, MIN)

MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC
MIN ¾x1½x1⅛ ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

¾" TO ¾" DIA. ATR HANGER, TYP (HANGER OPTION 2)
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ¾" MIN AND ATR BY DIMENSION OF ATR, MIN)
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

**Table:**

<table>
<thead>
<tr>
<th>DEWALT/POWERS BANG-IT+ CONCRETE INSERT, TYP</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; DIA. ATR WITH MIN 3/16&quot;x1/2&quot;x1/2&quot; ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP</td>
<td>850</td>
<td>38A TO 38G</td>
<td>38A TO 38J</td>
<td>640</td>
</tr>
<tr>
<td>1/2&quot;x1/2&quot;x12GA SINGLE STRUT (SOLID OR PUNCHED ONLY), STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP</td>
<td>850</td>
<td>50A TO 50G</td>
<td>50A TO 50J</td>
<td>640</td>
</tr>
<tr>
<td>MIN 3/8&quot;x1/2&quot;x1/2&quot; ASTM A36 STRUT WASHER REG. NUT T&amp;B (NUT SNUG TIGHT) (HANGER OPTION 1)</td>
<td>850</td>
<td>63A TO 63G</td>
<td>63A TO 63J</td>
<td>640</td>
</tr>
<tr>
<td>REG. NUT T&amp;B (NUT SNUG TIGHT) (HANGER OPTION 2)</td>
<td>850</td>
<td>75A TO 75G</td>
<td>75A TO 75J</td>
<td>640</td>
</tr>
<tr>
<td>MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC</td>
<td>850</td>
<td>88A TO 88G</td>
<td>88A TO 88J</td>
<td>640</td>
</tr>
</tbody>
</table>

MIN 3/16"x1/2"x1/2" ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0). 1/2" TO 1/2" DIA. ATR HANGER, TYP (HANGER OPTION 2)

MIN 3/8"x1/2"x1/2" ASTM A36 STRUT WASHER AND REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

DEWALT/POWERS BANG-IT+ CONCRETE INSERT (ICC ESR-3657) SPECIAL INSPECTION REQ'D

MIN. 3/4" MIN. END DIST. Cmin INCH

MIN. 3/4" MIN. SPACING Smin INCH

DIA. da INCH

0.7 (1/2")Ø 5/4 2/4

SEE DETAIL M0.00 FOR SECTION NOTES

\( 1^{st} \) ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_0 \), PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

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**Diagram:**
- Hanger attachment details showing typical installation.
- Alternate installation shown.
- Dimensions and markings indicating flutes, hanger types, and loading capacities.

---

### Table: Hanger Attachment Types and Loads

<table>
<thead>
<tr>
<th>Hanger Attachment Type</th>
<th>Steel Component Allowable Vertical Load (Ta) LBS</th>
<th>Concrete Insert Allowable Vertical Load (Tac) LBS</th>
<th>ATR Hanger Dia. (da) Inch</th>
<th>Dia. (Ø)</th>
<th>Min. Spacing (Smin) Inch</th>
<th>Min. End Dist. (Cmin) Inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A to 38K</td>
<td>1100</td>
<td>38A to 38K</td>
<td>1160</td>
<td>3/8</td>
<td>5/4</td>
<td>2 1/2</td>
</tr>
<tr>
<td>50A to 50K</td>
<td>1100</td>
<td>50A to 50K</td>
<td>1160</td>
<td>3/8</td>
<td>5/4</td>
<td>2 1/2</td>
</tr>
<tr>
<td>63A to 63K</td>
<td>1100</td>
<td>63A to 63K</td>
<td>1160</td>
<td>3/8</td>
<td>5/4</td>
<td>2 1/2</td>
</tr>
<tr>
<td>75A to 75K</td>
<td>1100</td>
<td>75A to 75K</td>
<td>1160</td>
<td>3/8</td>
<td>5/4</td>
<td>2 1/2</td>
</tr>
<tr>
<td>88A to 88K</td>
<td>1100</td>
<td>88A to 88K</td>
<td>1160</td>
<td>3/8</td>
<td>5/4</td>
<td>2 1/2</td>
</tr>
</tbody>
</table>

---

**Notes:**
1. Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, Qo, per ASCE 7-10 Sec. 12.4.3.3.
2. When the bolt centerline distance exceeds 14 3/8" for fw = 3 3/4" or 14 1/4" for fw = 4 1/2", the strut must be rotated to comply to the detail.

---

**MASON WEST, INC.**
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630-0701, www.masonwest.com

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**Page:**
M2.91.2

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Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020
**HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK**

**WITH (1) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE**

**MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC**

**DEWALT/POWERS BANG-IT+ CONCRETE INSERT, TYP**

**REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED**

**ATR HANGER, TYP**

\[ \beta = 6''\text{ MAX} \]

---

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD Ta (LBS)</th>
<th>ATR HANGER DIAM. (INCH)</th>
<th>MIN. SPACING S (INCH)</th>
<th>MIN. END DIST. C (INCH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38D</td>
<td>300</td>
<td>3/8</td>
<td>6 1/4</td>
<td>2 5/8</td>
</tr>
<tr>
<td>38A TO 38D</td>
<td>300</td>
<td>3/8</td>
<td>6 1/4</td>
<td>2 1/2</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>300</td>
<td>1/2</td>
<td>5 1/4</td>
<td>2 5/8</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>300</td>
<td>1/2</td>
<td>5 1/4</td>
<td>2 1/2</td>
</tr>
<tr>
<td>63A TO 63D</td>
<td>300</td>
<td>3/8</td>
<td>1.0 (5/8&quot;)</td>
<td>5 1/4</td>
</tr>
<tr>
<td>63A TO 63D</td>
<td>300</td>
<td>3/8</td>
<td>1.0 (5/8&quot;)</td>
<td>5 1/4</td>
</tr>
<tr>
<td>75A TO 75D</td>
<td>300</td>
<td>3/8</td>
<td>1.0 (5/8&quot;)</td>
<td>5 1/4</td>
</tr>
<tr>
<td>75A TO 75D</td>
<td>300</td>
<td>3/8</td>
<td>1.0 (5/8&quot;)</td>
<td>5 1/4</td>
</tr>
<tr>
<td>88A TO 88D</td>
<td>300</td>
<td>3/8</td>
<td>1.0 (5/8&quot;)</td>
<td>5 1/4</td>
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</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES

\(^1\) ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega \), PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK 
WITH (2) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

DEWALT/POWERS BANG-IT+ CONCRETE INSERT, TYP
½" DIA. ATR WITH MIN $\frac{3}{16}\times\frac{13}{16}$ ASTM A36 STRUT WASHER AND REG.
NUT (SNUG TIGHT), TYP
1½x1½x12 GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE
ROTATED TO ANY ANGLE IN PLAN
MIN $\frac{3}{10}\times\frac{13}{16}\times\frac{13}{16}$ ASTM A36 STRUT WASHER
REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 1)

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-½ BY ½" MIN AND ATR
BY DIMENSION OF ATR, MIN)
¾" TO ¾" DIA. ATR HANGER, TYP
(HANGER OPTION 2)

MIN. 22 GA STEEL DECK,
MIN. 3000 PSI NWC OR SLWC
MIN $\frac{3}{10}\times\frac{13}{16}\times\frac{13}{16}$ ASTM A36 STRUT
WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE
NUT BREAKS OFF (REF. PAGE X4.0)

ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING
OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.

WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 12½", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED

½" TO ¾" DIA. ATR HANGER

<table>
<thead>
<tr>
<th>MIN FLUTE WIDTH</th>
<th>MIN EDGE DIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>fw INCH</td>
<td>ED INCH</td>
</tr>
<tr>
<td>3½&quot; MIN</td>
<td></td>
</tr>
<tr>
<td>3&quot; MAX</td>
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</tbody>
</table>

DEWALT/POWERS BANG-IT+ CONCRETE INSERT, TYP
½" DIA. ATR W/ REG. NUT (SNUG TIGHT), TYP
MW-SAP-200-B SEE PAGE X6.0

MIN. 38A TO 38M
50A TO 50M
63A TO 63M
75A TO 75M
88A TO 88M

DEWALT/POWERS BANG-IT+ CONCRETE INSERT (ICC ESR-3657) SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
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</thead>
<tbody>
<tr>
<td>38A TO 38M</td>
<td>1930</td>
<td>38A TO 38K</td>
<td>1160</td>
<td>¾</td>
<td>1.0 (¾”Ø)</td>
<td>5¼</td>
<td>2¾</td>
</tr>
<tr>
<td>50A TO 50M</td>
<td>1930</td>
<td>50A TO 50K</td>
<td>1160</td>
<td>½</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63A TO 63M</td>
<td>1930</td>
<td>63A TO 63K</td>
<td>1160</td>
<td>½</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75A TO 75M</td>
<td>1930</td>
<td>75A TO 75K</td>
<td>1160</td>
<td>¾</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>88A TO 88M</td>
<td>1930</td>
<td>88A TO 88K</td>
<td>1160</td>
<td>¾</td>
<td></td>
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</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, $Ω$, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (4) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC
REG. OR REDUCING COUPLING
NUT FOR LARGER OR SMALLER SIZE
THREADED RODS ARE PERMITTED
½" TO 1¼" DIA. ATR HANGER

<table>
<thead>
<tr>
<th>MIN FLUTE WIDTH fw INCH</th>
<th>MIN EDGE DIST ED INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>3½</td>
<td>¾</td>
</tr>
<tr>
<td>4½</td>
<td>1½</td>
</tr>
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<table>
<thead>
<tr>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac LBS</th>
<th>ATR HANGER DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
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<tbody>
<tr>
<td>50A TO 50Q</td>
<td>3600</td>
<td>50A TO 50N</td>
<td>2320</td>
<td>½</td>
</tr>
<tr>
<td>63A TO 63Q</td>
<td>3600</td>
<td>63A TO 63N</td>
<td>2320</td>
<td>¾</td>
</tr>
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<td>75A TO 75Q</td>
<td>3500</td>
<td>75A TO 75N</td>
<td>2320</td>
<td>¾</td>
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<td>88A TO 88Q</td>
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<td>¾</td>
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<td>125A TO 125N</td>
<td>2320</td>
<td>1¼</td>
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1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω0, PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) DEWALT DDI+ CONCRETE INSERT

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC

DEWALT DDI+ CONCRETE INSERT, TYP

REGULAR OR REDUCING ROD COUPLER, TYP

ATR HANGER, TYP

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<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD, Ta LBS</th>
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<th>MIN. EFF. EMBED hef</th>
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<td>5 1⁄4</td>
<td>2 1⁄2</td>
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</table>

SEE DETAIL M0.00 FOR SECTION NOTES

† ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Dυ, PER ASCE 7-10 SEC. 12.4.3.3.

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California SE No. S5270

PAGE M2.100
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) CADDY CRLM CONCRETE INSERT AT LOWER FLUTE

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC
CADDY CRLM CONCRETE INSERT, TYP
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER
SIZE THREADED RODS ARE PERMITTED
ATR HANGER, TYP

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD Ta 1 LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin 2 INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
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<tr>
<td>38A TO 38H</td>
<td>830</td>
<td>$\frac{3}{6}$</td>
<td>0.61 ($\frac{3}{6}$Ø)</td>
<td>6</td>
<td>3</td>
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<tr>
<td>38A TO 38H</td>
<td>830</td>
<td>$\frac{3}{6}$</td>
<td>0.71 ($\frac{7}{6}$Ø)</td>
<td>6</td>
<td>3</td>
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</table>

SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, $\Omega$, PER ASCE 7-10 SEC. 12.4.3.3.
2 AXIAL SPACING PARALLEL TO FLUTE DIRECTION
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) CADDY CRLM CONCRETE INSERT AT UPPER FLUTE

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC
INSERT PLACEMENT STRAP, TYP
CADDY CRLM CONCRETE INSERT, TYP
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED
ATR HANGER, TYP

1½"x13"x¾" THK. MIN STRAP
HOLE TO BE ¾" LARGER THAN HOLE SIZE REQUIRED IN DECK
¾"
HANGER ATTACHMENT TYPE
ALLOWABLE VERTICAL LOAD Ta LBS
ATR HANGER DIAMETER da INCH
MIN. SPACING Smin INCH
MIN. END DIST. Cmin INCH
38A TO 38L 1420 ½ 0.61 (⅞") 6 3
38A TO 38L 1420 ½
50A TO 50L 1420 ⅜ 0.71 (⅞") 6 3
63A TO 63L 1420 ½

SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \(\Delta_b\) PER ASCE 7-10 SEC. 12.4.3.3.
2 AXIAL SPACING PARALLEL TO FLUTE DIRECTION

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PAGE M2.110.1
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CADDY CRLM CONCRETE INSERT AT LOWER FLUTE

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC
MIN 3⁄4x1 1⁄8x1 1⁄2 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

3⁄4" TO 7⁄8" DIA. ATR HANGER, TYP (HANGER OPTION 2)

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1⁄2 BY 3⁄8" MIN AND ATR BY DIMENSION OF ATR, MIN)

CADDY CRLM CONCRETE INSERT, TYP
1⁄2" DIA. ATR WITH MIN 3⁄4x1 1⁄8x1 1⁄2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
1 1⁄8x1 1⁄8x12 GA SINGLE STRUT (SOLID OR PUNCHED ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN

MIN 3⁄4x1 1⁄8x1 1⁄2 ASTM A36 STRUT WASHER REG. NUT T&B (SNUG TIGHT) (HANGER OPTION 1)

MIN. 3" MAX
CADDY CRLM CONCRETE INSERT, TYP

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P A G E

M2.111

560 of 846
HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CRLM CONCRETE INSERT AT LOWER FLUTE

HANGER ATTACHMENT TYPE | STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS | CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac 1 LBS | ATR HANGER TYPE | DIAM. da INCH | MIN. SPACING Smin 2 INCH | MIN. END DIST. Cmin INCH
--- | --- | --- | --- | --- | --- | ---
38A TO 38G | 630 | 38A TO 38K | 1210 | 3/8 | 6 | 3
50A TO 50G | 630 | 50A TO 50K | 1210 | 3/8 | 6 | 3
63A TO 63G | 630 | 63A TO 63K | 1210 | 3/8 | 6 | 3
75A TO 75G | 630 | 75A TO 75K | 1210 | 3/8 | 6 | 3
88A TO 88G | 630 | 88A TO 88K | 1210 | 3/8 | 6 | 3

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.

2 AXIAL SPACING PARALLEL TO FLUTE DIRECTION

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HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) CADDY CRLM CONCRETE INSERT AT LOWER FLUTE

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

1½"x1½"x12 GA SINGLE STRUT (SOLID OR PUNCHED ONLY),
STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN

MIN. 3" MAX
CADDY CRLM CONCRETE INSERT, TYP
1½" MAX

3" MAX

MIN. 3 16 x1 5 8 x1 5 8 ASTM A36 STRUT WASHER, TYP AT OPEN FACE OF STRUT

ALTERNATE HANGER INSTALL

CADDY CRLM CONCRETE INSERT, TYP

¾" DIA. ATR WITH MIN ¾x1 1 8 x1 1 8 " MIN, 15" MAX
ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

MIN ¾x1 ½ x 1 ½ ASTM A36 STRUT WASHER TYP AT OPEN FACE OF STRUT

¾" TO ¾" DIA. ATR HANGER, SEE BELOW FOR ALTERNATE INSTALL OPTION

MIN ¾x1 1 8 x1 1 8 ASTM A36 STRUT WASHER AND MW-SSN-½ WITH
MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-½ BY ¾" MIN AND
ATR BY DIMENSION OF ATR, MIN)

ALTERNATE HANGER INSTALL

STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS
HANGER ATTACHMENT TYPE

38A TO 38K 1100
50A TO 50K 1100
63A TO 63K 1100
75A TO 75K 1100
88A TO 88K 1100

CONCRETE INSERT ALLOWABLE VERTICAL LOAD Ta LBS
HANGER ATTACHMENT TYPE

38A TO 38M 1600
50A TO 50M 1600
63A TO 63M 1600
75A TO 75M 1600
88A TO 88M 1600

ATR HANGER DIA. INCH

¾
¾
¾
¾
¾

CADDY CRLM CONCRETE INSERT (ICC ESR-3864)
SPECIAL INSPECTION REQ'D

DIA. da INCH
MIN. SPACING Smin3 INCH
MIN. END DIST. Cmin INCH

0.71 (½")Ø 6 3

SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING
OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.
2 WHEN THE BOLT CENTERLINE DISTANCE EXCEEDS 14¼", THE STRUT MUST BE ROTATED TO COMPLY TO THE DETAIL.
3 AXIAL SPACING PARALLEL TO FLUTE DIRECTION
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) BADGER INDUSTRIES MDH NO-DRILL™ HANGER

FOR PROPER INSTALLATION, FLAT SURFACE SHALL FACE DOWN
BADGER INDUSTRIES MDH NO-DRILL™ HANGER. SEE DETAIL B

MIN. 20 GA VERCO W3 OR PLW3 STEEL DECK
W/ MIN. 3000 PSI NWC OR SLWC. FOR USE IN
VERCO W2 OR PLW2 DECK, SEE NOTE 4

FOR LOCATIONS WHERE MRL CANNOT BE SATISFIED, SEE DETAIL
M2.121 FOR OPTION WITH (2) MDH HANGERS AND STRUT SPANNER
PROJECT APPROVED HANGER, TRAPEZE, OR SEISMIC SUPPORT

![Diagram of hanger attachment]

<table>
<thead>
<tr>
<th>GRAVITY ONLY</th>
<th>GRAVITY &amp; SEISMIC</th>
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<tbody>
<tr>
<td>HANGER CONNECTION TYPE</td>
<td>ALLOWABLE VERTICAL LOAD</td>
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<tr>
<td>38A TO 38C</td>
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<td>50A TO 50C</td>
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<td>50A TO 50D</td>
<td>300</td>
</tr>
<tr>
<td>63A TO 63D</td>
<td>300</td>
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</tbody>
</table>

1 SEE DETAIL M0.00 FOR SECTION NOTES
2 WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
3 PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE MDH DOES NOT IMPACT THE LISTED MDH CAPACITIES.
4 ONLY THE MDH3812 MAY BE USED IN VERCO W2 OR PLW2 DECK AND SHALL BE USED FOR GRAVITY ONLY LOADS.
5 INSTALLATION: CLEAN METAL DECKING GROOVES TO EXPOSE PLATED DECKING METAL PRIOR TO PLACEMENT OF THE MDH HANGER. ACCURATELY PLACE MDH HANGER CHISEL POINT ENDS INTO METAL DECKING GROOVES WITH FLAT SURFACE FACING DOWNWARDS AND WITH THE LENGTH OF THE MDH BODY BEING PERPENDICULAR TO THE DECKING GROOVES. WHILE HOLDING THE BODY CHISEL POINT END TIGHT INTO METAL DECKING GROOVE, TIGHTEN TORQUE-OFF HEX NUT UNTIL BOTH CHISEL POINT ENDS ARE TIGHT AND SECURELY WEDGED INTO THE OPPOSING METAL DECKING GROOVES. WHILE HOLDING THE MDH HANGER BODY IN PLACE, TIGHTEN THE TORQUE-OFF HEX NUT WITH AN OPEN END WRENCH UNTIL THE HEX NUT HAS BROKEN AWAY FROM THE THREADED BARREL, LEAVING THE LOCK WASHER COMPRESSED AND THE HEX NUT LOOSE ON THE THREADED SHAFT. FOR REFERENCE, A MINIMUM OF 15 FT-LBS OF TORQUE IS REQUIRED FOR THE MDH3812 AND A MINIMUM OF 20 FT-LBS OF TORQUE IS REQUIRED FOR THE MDH1258.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) BADGER INDUSTRIES MDH NO-DRILL™ HANGER

BOLT SHALL BE EXPOSED AT TOP, BUT SHALL NOT CONTACT METAL DECKING
L1x1x12GA, 1" LG. ANGLE MAY BE
ROTATED TO ANY ANGLE IN PLAN
½" Ø BOLT W/ ROUND WASHER TO PROPER HOLE. ONLY ONE BOLT
SHALL BE INSTALLED PER HANGER

MIN. 12GA ASTM A641 WIRE OR AIRCRAFT
CABLE TIED W/ MIN. (4) TWISTS WITHIN
¾", TYP. WIRE OR CABLE HANGER
SHALL BE FOR TENSION LOADS ONLY

MIN. 20 GA VERCO W2, W3,
PLW2 OR PLW3 STEEL DECK W/
MIN. 3000 PSI NWC OR SLWC
FOR PROPER INSTALLATION, FLAT
SURFACE SHALL FACE DOWN
BADGER INDUSTRIES MDH NO-DRILL™
HANGER. SEE DETAIL B

<p>| GRAVITY ONLY |</p>
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<tr>
<th>HANGER CONNECTION TYPE</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>MDH SIZE</th>
<th>MIN END SPACING Smin INCH</th>
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<td>MDH3812</td>
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1 SEE DETAIL M0.00 FOR SECTION NOTES
2 PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE
INSERTS OR DRILLED HOLE ANCHORS TO THE MDH DOES NOT
IMPACT THE LISTED MDH CAPACITIES.
3 INSTALLATION: CLEAN METAL DECKING GROOVES TO EXPOSE
PLATED DECKING METAL PRIOR TO PLACEMENT OF THE MDH
HANGER. ACCURATELY PLACE MDH HANGER CHISEL POINT
ENDS INTO METAL DECKING GROOVES WITH FLAT SURFACE
FACING DOWNWARDS AND WITH THE LENGTH OF THE MDH
BODY BEING PERPENDICULAR TO THE DECKING GROOVES.
WHILE HOLDING THE BODY CHISEL POINT END TIGHT INTO
METAL DECKING GROOVE, TIGHTEN TORQUE-OFF HEX NUT
UNTIL BOTH CHISEL POINT ENDS ARE TIGHT AND SECURELY
WEDEDGED INTO THE OPPOSING METAL DECKING GROOVES.
WHILE HOLDING THE MDH HANGER BODY IN PLACE, TIGHTEN
THE TORQUE-OFF HEX NUT WITH AN OPEN END WRENCH
UNTIL THE HEX NUT HAS BROKEN AWAY FROM THE
THREADED BARREL, LEAVING THE LOCK WASHER
COMPRESSED AND THE HEX NUT LOOSE ON THE THREADED
SHAFT. FOR REFERENCE, A MINIMUM OF 15 FT-LBS OF
TORQUE IS REQUIRED FOR THE MDH3812.
HANGER ATTACHMENT  
TO CONCRETE FILLED METAL DECK  
WITH (2) BADGER INDUSTRIES MDH NO-DRILL™ HANGERS  

![Diagram of hanger attachment](image)

**Table: Allowable Vertical Load**

<table>
<thead>
<tr>
<th>HANGER CONNECTION TYPE</th>
<th>GRAVITY ONLY</th>
<th>GRAVITY &amp; SEISMIC</th>
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<td>HANGER CONNECTION TYPE</td>
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<td>75A TO 75F</td>
<td>450</td>
<td>75A TO 75H</td>
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1. SEE DETAIL M0.00 FOR SECTION NOTES
2. WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
3. PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE MDH DOES NOT IMPACT THE LISTED MDH CAPACITIES.
HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) BADGER INDUSTRIES MDH NO-DRILL™ HANGERS

MIN. 20 GA VERCO W2, W3, PLW2 OR PLW3 STEEL DECK W/ MIN. 3000 PSI NWC OR SLWC
FOR PROPER INSTALLATION, FLAT SURFACE SHALL FACE DOWN, TYP

BADGER INDUSTRIES
MDH3812 NO-DRILL™ HANGER, TYP. SEE DETAIL B

BOLT SHALL BE EXPOSED AT TOP, BUT SHALL NOT CONTACT METAL DECKING, TYP
REG. NUT, TYP
MIN \( \frac{3}{8} \times 1\frac{1}{4} \times 1\frac{1}{2} \) ASTM A36 STRUT WASHER, TYP

\( \frac{3}{8} \)” O Blind TO PROPER HOLE, TYP.
SNUG TIGHTEN EVENLY UNTIL STRUT MEMBER IS IN CONTACT FLAT TO PLATE WITH STEEL DECKING
1\( \frac{1}{2} \) x1\( \frac{1}{2} \) x12 GA SINGLE STRUT (SOLID, PUNCHED, OR SLOTTED) MAY BE ROATED TO ANY ANGLE IN PLAN

B-LINE BN200 STRUT NUT

MIN \( \frac{3}{8} \times 1\frac{1}{4} \times 1\frac{1}{2} \) ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ)

\( \frac{3}{8} \)” TO \( \frac{3}{4} \)” DIA. ATR HANGER

THREAD BARREL W/ LOCK WASHER

FULLY TAPPED THROUGH HOLE

VIEW A-A:
INSTALLATION OF MULTIPLE INDEPENDENT SUPPORTS

<table>
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<td>50A TO 50E</td>
<td>400</td>
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<tr>
<td>63A TO 63E</td>
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1 SEEN DETAIL M0.00 FOR SECTION NOTES
2 WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
3 PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE MDH DOES NOT IMPACT THE LISTED MDH CAPACITIES.
4 INSTALLATION: CLEAN METAL DECKING GROOVES TO EXPOSE PLATED DECKING METAL PRIOR TO PLACEMENT OF THE MDH HANGER. ACCURATELY PLACE MDH HANGER CHISEL POINT ENDS INTO METAL DECKING GROOVES WITH FLAT SURFACE FACING DOWNWARDS AND WITH THE LENGTH OF THE MDH BODY BEING PERPENDICULAR TO THE DECKING GROOVES. WHILE HOLDING THE BODY CHISEL POINT END TIGHT INTO METAL DECKING GROOVE, TIGHTEN TORQUE-OFF HEX NUT UNTIL BOTH CHISEL POINT ENDS ARE TIGHT AND SECURELY WEDGED INTO THE OPPOSING METAL DECKING GROOVES. WHILE HOLDING THE MDH HANGER BODY IN PLACE, TIGHTEN THE TORQUE-OFF HEX NUT WITH AN OPEN END WRENCH UNTIL THE HEX NUT HAS BROKEN AWAY FROM THE THREADED BARREL, LEAVING THE LOCK WASHER COMPRESSED AND THE HEX NUT LOOSE ON THE THREADED SHAFT. FOR REFERENCE, A MINIMUM OF 15 FT-LBS OF TORQUE IS REQUIRED FOR THE MDH3812.
HANGER ATTACHMENT
TO STEEL BEAM OR OPEN WEB STEEL TRUSS
WITH SELF-DRILLING SELF-TAPPING METAL SCREWS

ITW BUILDEX SELF-DRILLING SELF TAPPING
METAL SCREW (REF. ICC-ES ESR-1976)
1/4-28 x 3" HWH TEKS/5 FOR ¾" TO ½" BEAM
FLANGE, 2 PER SIDE, TYP

MIN 1½x1½x12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)

MIN ¾x1½x1½ ASTM A36 STRUT
WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE
NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 1/2" MIN AND
ATR BY DIMENSION OF ATR, MIN)

¾" TO ½" DIA. ATR HANGER

<table>
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<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>ATR HANGER DIA. INCH</th>
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<td>510</td>
<td>¾</td>
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<td>½</td>
</tr>
<tr>
<td>75A TO 75F</td>
<td>510</td>
<td>¾</td>
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</table>

1/4-28 x 3" HWH TEKS/5 FOR ¾" TO ½" BEAM
FLANGE, 2 PER SIDE, TYP

MIN 1½x1½x12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)

MIN ¾x1½x1½ ASTM A36 STRUT
WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE
NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 1/2" MIN AND
ATR BY DIMENSION OF ATR, MIN)

¾" TO ½" DIA. ATR HANGER

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>ATR HANGER DIA. INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38F</td>
<td>510</td>
<td>¾</td>
</tr>
<tr>
<td>50A TO 50F</td>
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<td>½</td>
</tr>
<tr>
<td>63A TO 63F</td>
<td>510</td>
<td>½</td>
</tr>
<tr>
<td>75A TO 75F</td>
<td>510</td>
<td>¾</td>
</tr>
</tbody>
</table>

1/4-28 x 3" HWH TEKS/5 FOR ¾" TO ½" BEAM
FLANGE, 2 PER SIDE, TYP

MIN 1½x1½x12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)

MIN ¾x1½x1½ ASTM A36 STRUT
WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE
NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 1/2" MIN AND
ATR BY DIMENSION OF ATR, MIN)

¾" TO ½" DIA. ATR HANGER

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1/4-28 x 3" HWH TEKS/5 FOR ¾" TO ½" BEAM
FLANGE, 2 PER SIDE, TYP

MIN 1½x1½x12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)

MIN ¾x1½x1½ ASTM A36 STRUT
WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE
NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 1/2" MIN AND
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1/4-28 x 3" HWH TEKS/5 FOR ¾" TO ½" BEAM
FLANGE, 2 PER SIDE, TYP

MIN 1½x1½x12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)

MIN ¾x1½x1½ ASTM A36 STRUT
WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE
NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 1/2" MIN AND
ATR BY DIMENSION OF ATR, MIN)

¾" TO ½" DIA. ATR HANGER

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1/4-28 x 3" HWH TEKS/5 FOR ¾" TO ½" BEAM
FLANGE, 2 PER SIDE, TYP

MIN 1½x1½x12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)

MIN ¾x1½x1½ ASTM A36 STRUT
WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE
NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 1/2" MIN AND
ATR BY DIMENSION OF ATR, MIN)

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1/4-28 x 3" HWH TEKS/5 FOR ¾" TO ½" BEAM
FLANGE, 2 PER SIDE, TYP

MIN 1½x1½x12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)

MIN ¾x1½x1½ ASTM A36 STRUT
WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE
NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 1/2" MIN AND
ATR BY DIMENSION OF ATR, MIN)

¾" TO ½" DIA. ATR HANGER

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1/4-28 x 3" HWH TEKS/5 FOR ¾" TO ½" BEAM
FLANGE, 2 PER SIDE, TYP

MIN 1½x1½x12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)

MIN ¾x1½x1½ ASTM A36 STRUT
WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE
NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 1/2" MIN AND
ATR BY DIMENSION OF ATR, MIN)

¾" TO ½" DIA. ATR HANGER

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<td>½</td>
</tr>
<tr>
<td>75A TO 75F</td>
<td>510</td>
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</tr>
</tbody>
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1/4-28 x 3" HWH TEKS/5 FOR ¾" TO ½" BEAM
FLANGE, 2 PER SIDE, TYP

MIN 1½x1½x12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)

MIN ¾x1½x1½ ASTM A36 STRUT
WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE
NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 1/2" MIN AND
ATR BY DIMENSION OF ATR, MIN)

¾" TO ½" DIA. ATR HANGER

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<tr>
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<td>510</td>
<td>½</td>
</tr>
<tr>
<td>75A TO 75F</td>
<td>510</td>
<td>¾</td>
</tr>
</tbody>
</table>
HANGER ATTACHMENT
TO STEEL BEAM OR OPEN WEB STEEL TRUSS
WITH SELF-DRILLING SELF-TAPPING METAL SCREWS

STRUCTURAL STEEL BEAM OR STEEL TRUSS (MIN $F_y=58$ KSI, TYP)

SEE DETAIL C FOR WELDING OPTION

ITW BUILDEX SELF-DRILLING
SELF TAPPING METAL SCREW
(REF. ICC-ES ESR-1976)

#12-24 x 1 1/2" HWH TEKS/5
FOR 3/8" TO 5/8" BEAM FLANGE, 2 PER EACH SIDE, TYP

1 1/2 x 1 1/2 x 12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)

MIN 3/16 x 1 1/2 x 1 1/2" ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

3/8" TO 5/8" DIA. ATR HANGER

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 3/8" MIN AND
ATR BY DIMENSION OF ATR, MIN)

1 1/2" MIN

3" MIN

1/2" MIN

DETAIL A

DETAIL B

DETAIL C

WELDING OPTION

NOTE: ALL WELDS TO BE MINIMUM
70xx ELECTRODE WELDS

HANGER ATTACHMENT TYPE | ALLOWABLE VERTICAL LOAD LBS | ATR HANGER DIA. INCH
---|---|---
38A TO 38M | 1700 | 3/8"
50A TO 50M | 1700 | 1/2"
63A TO 63M | 1700 | 3/8"
75A TO 75M | 1700 | 3/4"

1 SEE DETAIL M0.00 FOR SECTION NOTES
ATTACHMENT TO STEEL BEAM SHALL
NOT BE PLACED WITHIN THE PROTECTED
ZONE AS DEFINED IN AISC 341.

2 MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

568 of 846
ATR HANGER ATTACHMENT TO STEEL BEAM WITH WELDED BEAM ATTACHMENT

Both sides of lug

MW-WPL, WELD BEAM ATTACHMENT (REF. X8.4)
MW-WPL MAY BE ROTATED TO ANY ANGLE IN PLAN
REG. NUT TOP AND BOTTOM, (SNUG TIGHT)
¾” TO 1½” DIA. ATR HANGER

Structural Beam

Detail A

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>MW-WPL LUG</th>
<th>W, WELD SIZE INCH</th>
<th>NELSON HBL STUD DIA. INCH</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>ATR HANGER DIA. INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38H</td>
<td>MW-WPL-38</td>
<td>⅛</td>
<td>¾</td>
<td>720</td>
<td>¾</td>
</tr>
<tr>
<td>50A TO 50L</td>
<td>MW-WPL-50</td>
<td>¼</td>
<td>⅜</td>
<td>1320</td>
<td>½</td>
</tr>
<tr>
<td>63A TO 63P</td>
<td>MW-WPL-63</td>
<td>⅛</td>
<td>⅝</td>
<td>2880</td>
<td>⅜</td>
</tr>
<tr>
<td>75A TO 75Q</td>
<td>MW-WPL-75</td>
<td>⅜</td>
<td>⅞</td>
<td>4800</td>
<td>¾</td>
</tr>
<tr>
<td>75A TO 75S</td>
<td>MW-WPL-75A</td>
<td>½</td>
<td>–</td>
<td>8000</td>
<td>⅞</td>
</tr>
<tr>
<td>88A TO 88R</td>
<td>MW-WPL-88</td>
<td>⅛</td>
<td>⅝</td>
<td>6900</td>
<td>¾</td>
</tr>
<tr>
<td>100A TO 100S</td>
<td>MW-WPL-100</td>
<td>⅛</td>
<td>1</td>
<td>8660</td>
<td>1</td>
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<tr>
<td>125A TO 125T</td>
<td>MW-WPL-125</td>
<td>⅛</td>
<td>N/A</td>
<td>11400</td>
<td>1¼</td>
</tr>
</tbody>
</table>

1. SEE DETAIL M0.00 FOR SECTION NOTES
2. WELDED ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
3. AUTOMATIC MACHINE WELDING OF NELSON HBL STUD SHALL COMPLY WITH AWS D1.1, SECTION 6: STUD WELDING.
4. NELSON HBL STUD TO BE MINIMUM 61KSI TENSILE STRENGTH MILD STEEL CONFORMING TO ASTM A108.

NOTES: ALL WELDS TO BE MINIMUM 70xx ELECTRODE WELDS

By: [Signature]

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

PAGE M3.12
ATR HANGER ATTACHMENT TO OPEN WEB STEEL TRUSS

**ELEVATION VIEW**

- **UPPER CHORD**
- **LOWER CHORD**
- **PL 3x3x\(\frac{3}{8}\) (T&B), TYP**
- **NUT (T&B, SNUG TIGHT), TYP**
- **\(\frac{3}{8}''\) TO \(\frac{3}{4}''\) DIA. ATR HANGER**

**VIEW A-A**

- **MW-WPL, WELD BEAM ATTACHMENT (REF. X8.4)**
- **REG. NUT TOP AND BOTTOM, (SNUG TIGHT)**
- **\(\frac{3}{8}''\) TO 1\(\frac{1}{4}''\) DIA. ATR HANGER**
- **BOTH SIDES OF LUG**

**VIEW B-B**

<table>
<thead>
<tr>
<th>OPTION 1</th>
<th>OPTION 2</th>
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<tr>
<td><strong>HANGER ATTACHMENT TYPE</strong></td>
<td><strong>PLATES</strong></td>
</tr>
<tr>
<td>38A TO 38H</td>
<td>(2) PL 3x3x(\frac{3}{8})</td>
</tr>
<tr>
<td>50A TO 50L</td>
<td>MW-WPL-50</td>
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<td>63A TO 63P</td>
<td>MW-WPL-63</td>
</tr>
<tr>
<td>75A TO 75Q</td>
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<tr>
<td>75A TO 75S</td>
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</tr>
<tr>
<td>88A TO 88R</td>
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</tr>
<tr>
<td>100A TO 100S</td>
<td>N/A</td>
</tr>
<tr>
<td>125A TO 125T</td>
<td>N/A</td>
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1. SEE DETAIL M0.00 FOR SECTION NOTES
2. WELDED ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
ATR HANGER ATTACHMENT
TO STEEL BEAM
WITH STEEL BEAM CLAMPS

1" MIN.
TYP.

¾"Ø NUT (TORQUED
TO 19 FT-LBS), TYP.

UNISTRUT P2785 OR WESANCO
W-5709 BEAM CLAMP, TYP.

¾" MAX

1½"x1½"x12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)

MIN ¾"x1½"x1½" ASTM A36 STRUT WASHER AND
MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL
THE NUT BREAKS OFF (REF. PAGE X4.0)

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-½ BY ½" MIN AND ATR BY
DIMENSION OF ATR, MIN)

¾" TO ¾" DIA. ATR HANGER

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<th>HANGER CONNECTION TYPE</th>
<th>ALLOWABLE VERTICAL LOAD, LBS</th>
<th>ATR HANGER DIA., INCH</th>
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<tbody>
<tr>
<td>38A TO 38N</td>
<td>2000</td>
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<td>¾&quot;</td>
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<td>2000</td>
<td>¾&quot;</td>
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1 SEE DETAIL M0.00 FOR SECTION NOTES
2 ATTACHMENT TO STEEL BEAM SHALL NOT
BE PLACED WITHIN THE PROTECTED ZONE
AS DEFINED IN AISC 341.
ATR HANGER ATTACHMENT TO STEEL BEAM WITH (2) BADGER INDUSTRIES SBC158 SERIES STEEL BEAM CLAMPS

### Allowable Vertical Load

**HANGER CONNECTION TYPE** | **ALLOWABLE VERTICAL LOAD LBS** | **HANGER CONNECTION TYPE** | **ALLOWABLE VERTICAL LOAD LBS** | **ATR HANGER DIA. INCH**
--- | --- | --- | --- | ---
| 38A TO 38H | 730 | 38A TO 38M | 1840 | 3/8 |
| 50A TO 50J | 920 | 50A TO 50M | 1840 | 1/2 |
| 63A TO 63J | 920 | 63A TO 63M | 1840 | 5/8 |
| 75A TO 75J | 920 | 75A TO 75M | 1840 | 3/4 |

1. SEE DETAIL M0.00 FOR SECTION NOTES
2. ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
3. WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
4. BEAM CLAMPS SHALL NOT BE USED ON SHAPES WITH SLOPED FLANGES.
ATR HANGER ATTACHMENT TO STEEL BEAM
WITH (1) BADGER INDUSTRIES SBC158 SERIES STEEL BEAM CLAMP

BEAM CLAMP MAY BE INSTALLED TO UPPER OR LOWER FLANGE

BEAM CLAMP BOLT SHALL BE IN FULL CONTACT W/ UNDERSIDE OF BEAM FLANGE

BADGER INDUSTRIES SBC158 FOR $\frac{3}{8}'' \leq t \leq \frac{1}{4}''$
BADGER INDUSTRIES SBC158L-C FOR $\frac{1}{2}'' < t \leq 3''$

B-LINE BN200 STRUT NUT SIZED TO FIT ATR, T&B (SNUG TIGHT)
$\frac{3}{4}'' - \frac{7}{8}''$ DIA. ATR HANGER
$\frac{5}{8}''$ BREAK OFF BOLT. TORQUE UNTIL HEAD BREAKS OFF (MIN. 12 FT-LBS)

<table>
<thead>
<tr>
<th>GRAVITY ONLY</th>
<th>GRAVITY &amp; SEISMIC</th>
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<tr>
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</tr>
<tr>
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<td>730</td>
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<tr>
<td>50A TO 50J</td>
<td>970</td>
</tr>
<tr>
<td>63A TO 63J</td>
<td>970</td>
</tr>
<tr>
<td>75A TO 75J</td>
<td>970</td>
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3. WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
4. BEAM CLAMPS SHALL NOT BE USED ON SHAPES WITH SLOPED FLANGES.
# ATR Hanger Attachment to Steel Beam

## With (2) Badger Industries SBC158 Series Steel Beam Clamps

**Beam Clamp Bolt**
- Shall be in full contact with strut, typ.
- Badger Industries SBC158 for $\frac{3}{16} \leq t \leq \frac{1}{4}$
- Badger Industries SBC158L-C for $\frac{1}{4} < t \leq 3$

$\frac{1}{2}\times \frac{3}{4} \times 12$ Ga single strut (solid only). End of strut shall be flush or extend beyond beam clamp, typ.

**B-Line BN200 Strut Nut**
- Min. $\frac{3}{4} \times \frac{3}{4} \times \frac{3}{8}$ ASTM A36 strut washer and reg. nut (see table for torque req).

**6" to $\frac{3}{4}"$ dia. ATR hanger**

**Notes**
1. See detail M0.00 for section notes.
2. Attachment to steel beam shall not be placed within the protected zone as defined in AISC 341.
3. When used for "Gravity & Seismic" loading, the gravity demand shall not exceed the "Gravity Only" allowable load.
4. Beam clamps shall not be used on shapes with sloped flanges.

---

### Fastener with Strut Nut

<table>
<thead>
<tr>
<th>Dia. Inch</th>
<th>Torque Req'd FT-LBS</th>
<th>Gravity Only</th>
<th>Gravity &amp; Seismic</th>
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<tr>
<td>$\frac{3}{8}$</td>
<td>19</td>
<td>680</td>
<td>1350</td>
</tr>
<tr>
<td>$\frac{1}{2} - \frac{3}{4}$</td>
<td>50</td>
<td>680</td>
<td>1350</td>
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</table>

**Allowable Vertical Load Lbs**
- 38A to 38L: 1350
- 50A to 50L: 1350
- 63A to 63L: 1350
- 75A to 75L: 1350

---

![Diagram](image-url)
ATR HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) BADGER INDUSTRIES NDH38FV-W3 NO-DRILL™ HANGER

MIN. 20 GA VERCO W3 OR PLW3 STEEL DECK W/ MIN. 3000 PSI NWC OR SLWC
BADGER INDUSTRIES NDH38FV-W3 NO-DRILL™ HANGER, TYP
¾" DIA. ATR, TYP. ATR TO BE VISIBLE IN SWIVEL NUT INSPECTION HOLE. JAM OR HEX NUT NOT REQ'D
REG. OR REDUCING COUPLING NUT FOR LARGER SIZE THREADED RODS ARE PERMITTED
¾" TO ⅛" DIA. ATR HANGER

MIN. SPACING Smin INCH
1 1 2
2 1
3 1
1 2

MIN. END DIST. Cmin INCH
1 1 2
2 1
3 1
1 2

GRAVITY ONLY
HANGER CONNECTION TYPE ALLOWABLE VERTICAL LOAD LBS
38A TO 38A 70
50A TO 50A 70

GRAVITY & SEISMIC
HANGER CONNECTION TYPE ALLOWABLE VERTICAL LOAD LBS ATR HANGER DIA. INCH MIN SPACING Smin INCH MIN END DIST. Cmin INCH
38A TO 38D 170 ¾ 2½ 1½
50A TO 50D 170 ½ 2½ 1½

1 SEE DETAIL M0.00 FOR SECTION NOTES
2 WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
3 PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.
ATR HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) BADGER INDUSTRIES NDH38FV-W3 NO-DRILL™ HANGERS

WHEN INSTALLED PARALLEL TO FLUTE, STRUT SHALL BE INSTALLED OVER SWIVEL NUTS AND SNUG TIGHT TO BOTH HANGERS

BADGER INDUSTRIES NDH38FV-W3 NO-DRILL™ HANGER, TYP
¾” DIA. ATR, TYP. ATR TO BE VISIBLE IN SWIVEL NUT INSPECTION HOLE.

SOLID, PUNCHED, OR SLOTTED STRUT MEMBER
MIN ¾” x 1½” x 1½” ASTM A36 STRUT WASHER AND REG. NUT, T&B, TYP. SNUG TIGHTEN NUTS EVENLY UNTIL STRUT MEMBER IS IN CONTACT FLAT TO FLAT WITH STEEL DECKING

MIN. 20 GA VERCO W3 OR PLW3 STEEL DECK W/ MIN. 3000 PSI NWC OR SLWC

B-LINE BN200 STRUT NUT
MIN ¾” x 1½” x 1½” ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ)

¾” TO ½” DIA. ATR HANGER

NO GAP WHEN SPACED AT "Smin"
END OF CONCRETE FILLED METAL DECK

VIEW A-A: INSTALLATION OF MULTIPLE INDEPENDENT SUPPORTS

<table>
<thead>
<tr>
<th>STRUT MEMBER SIZE</th>
<th>GRAVITY ONLY</th>
<th>GRAVITY &amp; SEISMIC</th>
<th>ATR HANGER</th>
<th>MIN SPACING</th>
<th>MIN END DIST.</th>
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<tbody>
<tr>
<td></td>
<td>HANGER CONNECTION TYPE</td>
<td>ALLOWABLE VERTICAL LOAD LBS</td>
<td>HANGER CONNECTION TYPE</td>
<td>ALLOWABLE VERTICAL LOAD LBS</td>
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<tr>
<td>¾” x 1½” x 12GA SINGLE STRUT</td>
<td>38A TO 38A</td>
<td>110</td>
<td>38A TO 38C</td>
<td>220</td>
<td>¾”</td>
</tr>
<tr>
<td></td>
<td>50A TO 50A</td>
<td>110</td>
<td>50A TO 50C</td>
<td>220</td>
<td>¾”</td>
</tr>
<tr>
<td></td>
<td>63A TO 63A</td>
<td>110</td>
<td>63A TO 63C</td>
<td>220</td>
<td>¾”</td>
</tr>
<tr>
<td>½” x 1½” x 12GA SINGLE STRUT</td>
<td>38A TO 38A</td>
<td>110</td>
<td>38A TO 38D</td>
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<td>50A TO 50A</td>
<td>110</td>
<td>50A TO 50D</td>
<td>300</td>
<td>¾”</td>
</tr>
<tr>
<td></td>
<td>63A TO 63A</td>
<td>110</td>
<td>63A TO 63D</td>
<td>300</td>
<td>¾”</td>
</tr>
</tbody>
</table>

1. SEE DETAIL M0.00 FOR SECTION NOTES
2. WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
3. MINIMUM SPACING REQUIREMENT DOES NOT APPLY WHEN STRUT IS INSTALLED PARALLEL TO FLUTE.
4. PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

PAGE M3.21
### ATR HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGER

**MIN. 20 GA VERCO W3 OR PLW3 STEEL DECK W/ MIN. 3000 PSI NWC OR SLWC**

**TIGHTEN SET BOLTS AS STATED IN NOTE 4 BELOW**

**BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGER**

$\frac{3}{8}$" TO $\frac{5}{8}$" DIA. ATR HANGER IN CORRESPONDING HOLE W/ $\frac{1}{2}$" MIN ENGAGEMENT. ATR CONTACT WITH STEEL DECKING SHALL NOT EXCEED SNUG TIGHT. JAM OR HEX NUT NOT REQ'D

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<tr>
<th>GRAVITY ONLY</th>
<th>GRAVITY &amp; SEISMIC</th>
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<tbody>
<tr>
<td><strong>HANGER CONNECTION TYPE</strong></td>
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<td>38A TO 38F</td>
<td>570</td>
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<td>50A TO 50F</td>
<td>570</td>
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<td>38A TO 38G</td>
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<td>63A TO 63G</td>
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<td>730</td>
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<td>63A TO 63H</td>
<td>730</td>
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</table>

1. SEE DETAIL M0.00 FOR SECTION NOTES
2. WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
3. PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.

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**ATR HANGER ATTACHMENT**

**TO CONCRETE FILLED METAL DECK**

**WITH (2) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGERS**

**ALLOWABLE VERTICAL LOAD LBS**

<table>
<thead>
<tr>
<th>STRUT MEMBER SIZE</th>
<th>GRAVITY ONLY</th>
<th>GRAVITY &amp; SEISMIC</th>
<th>ATR HANGER</th>
<th>MIN END DIST.</th>
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<tbody>
<tr>
<td>HANGER CONNECTION TYPE</td>
<td>ALLOWABLE VERTICAL LOAD</td>
<td>HANGER CONNECTION TYPE</td>
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<td>38A TO 38E</td>
<td>380</td>
<td>38A TO 38E</td>
<td>380</td>
<td>3/8</td>
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<td>50A TO 50E</td>
<td>380</td>
<td>50A TO 50E</td>
<td>380</td>
<td>1/4</td>
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<tr>
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<td>63A TO 63E</td>
<td>380</td>
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<tr>
<td>38A TO 38H</td>
<td>730</td>
<td>38A TO 38K</td>
<td>1180</td>
<td>3/8</td>
</tr>
<tr>
<td>50A TO 50J</td>
<td>900</td>
<td>50A TO 50K</td>
<td>1180</td>
<td>1/4</td>
</tr>
<tr>
<td>63A TO 63J</td>
<td>900</td>
<td>63A TO 63K</td>
<td>1180</td>
<td>3/8</td>
</tr>
<tr>
<td>75A TO 75J</td>
<td>900</td>
<td>75A TO 75N</td>
<td>2400</td>
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**FASTENER WITH STRUT NUT**

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<thead>
<tr>
<th>DIA. INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<tr>
<td>3/8</td>
<td>19</td>
</tr>
<tr>
<td>1/2 - 3/4</td>
<td>50</td>
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</table>

1. **See Detail M0.00 for Section Notes**
2. **When used for "Gravity & Seismic" loading, the gravity demand shall not exceed the "Gravity Only" allowable load.**
3. **Proximity or spacing of new or existing concrete inserts or drilled hole anchors to the NDH does not impact the listed NDH capacities.**
4. **NDH Hanger Assembly shall be spaced 10" min. from any adjacent NDH hangers. Refer to detail M3.30 for spacing detail.**
5. **Installation: Align the length of the NDH4S-W3 to be perpendicular to the length of the steel decking grooves. While holding the NDH4S-W3 in place, hand tighten each of the (4) set bolts equally and alternatively making sure that the pointed end of each set bolt is engaged into the steel decking groove. Once each of the (4) set bolts are hand tight and proper placement of the NDH4S-W3 has been checked, continue tightening (using a box end wrench) each of the (4) set bolts equally and alternatively until the hex head of each set bolt breaks away. Proper installation requires the hex heads of all set bolts to have broken away. For reference, a minimum of 10 FT-LBS of torque is required.**

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Jeffrey Y. Kikumoto

**M3.31**

10/09/2020  
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto  
578 of 846
ATR HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGERS

MIN. 20 GA VERCO W3 OR PLW3 STEEL DECK W/ MIN. 3000 PSI NWC OR SLWC

TIGHTEN SET BOLTS AS STATED IN NOTE 5 BELOW, TYP
REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED
¾” TO ¾” DIA. ATR HANGER

**TABLE**

<table>
<thead>
<tr>
<th>GRAVITY ONLY CONNECTION TYPE</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>GRAVITY &amp; SEISMIC CONNECTION TYPE</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>MIN END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38H</td>
<td>730</td>
<td>38A TO 38M</td>
<td>1930</td>
<td>¾”</td>
<td>6</td>
</tr>
<tr>
<td>50A TO 50L</td>
<td>1260</td>
<td>50A TO 50M</td>
<td>1930</td>
<td>½”</td>
<td>6</td>
</tr>
<tr>
<td>63A TO 63L</td>
<td>1260</td>
<td>63A TO 63M</td>
<td>1930</td>
<td>¾”</td>
<td>6</td>
</tr>
<tr>
<td>75A TO 75L</td>
<td>1260</td>
<td>75A TO 75M</td>
<td>1930</td>
<td>¾”</td>
<td>6</td>
</tr>
<tr>
<td>88A TO 88A</td>
<td>1260</td>
<td>88A TO 88M</td>
<td>1930</td>
<td>¾”</td>
<td>6</td>
</tr>
</tbody>
</table>

1 SEE DETAIL M0.00 FOR SECTION NOTES
2 WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
3 PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.
4 NDH HANGER ASSEMBLY SHALL BE SPACED 10” MIN. FROM ANY ADJACENT NDH HANGERS. REFER TO DETAIL M3.30 FOR SPACING DETAIL.
ATR HANGER ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (4) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGERS

BADGER INDUSTRIES NDH4S-W3
NO-DRILL™ HANGER, TYP
REG. NUT (SNUG TIGHT), TYP

\( \frac{3}{4} \)" DIA. ATR IN CORRESPONDING
HOLE W/ \( \frac{3}{4} \)" MIN ENGAGEMENT, TYP.

ATR CONTACT WITH STEEL DECKING
SHALL NOT EXCEED SNUG TIGHT

MW-SAP-400-B FOR \( \frac{5}{8} \)"Ø ATR
MW-SAP-400-C FOR \( \frac{3}{4} \)"Ø ATR
MW-SAP-400-D FOR 1"Ø ATR
SEE PAGE X6.0

ATR W/ REG. NUT, T&B
(SNUG TIGHT)

1. SEE DETAIL M0.00 FOR SECTION NOTES
2. WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL
   NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
3. PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED
   HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.
4. NDH HANGER ASSEMBLY SHALL BE SPACED 10" MIN. FROM ANY ADJACENT NDH
   HANGERS. REFER TO DETAIL M3.30 FOR SPACING DETAIL.
5. INSTALLATION: ALIGN THE LENGTH OF THE NDH4S-W3 TO BE PERPENDICULAR
   TO THE LENGTH OF THE STEEL DECKING GROOVES. WHILE HOLDING THE
   NDH4S-W3 IN PLACE, HAND TIGHTEN EACH OF THE (4) SET BOLTS EQUALLY AND
   ALTERNATIVELY MAKING SURE THAT THE POINTED END OF EACH SET BOLT IS
   ENGAGED INTO THE STEEL DECKING GROOVE. ONCE EACH OF THE (4) SET
   BOLTS ARE HAND TIGHT AND PROPER PLACEMENT OF THE NDH4S-W3 HAS BEEN
   CHECKED, CONTINUE TIGHTENING (USING A BOX END WRENCH) EACH OF THE (4)
   SET BOLTS EQUALLY AND ALTERNATIVELY UNTIL THE HEX HEAD OF EACH SET
   BOLT BREAKS AWAY. PROPER INSTALLATION REQUIRES THE HEX HEADS OF
   ALL SET BOLTS TO HAVE BROKEN AWAY. FOR REFERENCE, A MINIMUM OF 10
   FT-LBS OF TORQUE IS REQUIRED.
**HANGER ATTACHMENT TO WOOD JOIST**

- **MIN 2x MEMBER, TYP (MIN SPECIES SPECIFIC GRAVITY G = 0.42 AND GRADE NO.2)**
- **2 1/2" DIA. ASTM A307 BOLT OR ASTM A36 THREADED ROD THROUGH 5/8" DIA. HOLE, WITH STANDARD WASHER ON BACK SIDE OF JOIST, TYP**
- **L3x3x1/4, 5" LG.**
- **1/2" TO 3/4" DIA. ATR HANGER**

**VIEW A-A**

**AT JOIST**

**IN-BETWEEN JOISTS**

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>ATR HANGER DIA. INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38E</td>
<td>420</td>
<td>7/8</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>420</td>
<td>1/2</td>
</tr>
<tr>
<td>63A TO 63E</td>
<td>420</td>
<td>5/8</td>
</tr>
<tr>
<td>75A TO 75E</td>
<td>420</td>
<td>3/4</td>
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</table>

**ADDITIONAL BLOCKING OF WOOD JOIST TO BE DESIGNED BY THE STRUCTURAL ENGINEER OF RECORD.**

**SEE DETAIL M0.00 FOR SECTION NOTES**
HANGER ATTACHMENT TO WOOD I-JOISTS

2x6x1'-0" (MIN SPECIES SPECIFIC GRAVITY G=0.42 AND GRADE NO. 2)

12-10d (3" LG.) COMMON NAIL, CLINCH NAILS AT I-JOIST WEB TYP

2-1/2" DIA. ASTM A307 BOLT OR ASTM A36 THREADED ROD THROUGH 1/8" DIA. HOLE, WITH STANDARD WASHER ON BACK SIDE OF JOIST, TYP

L3x3x1/2, 5" LG.

1/8" TO 1/2" DIA. ATR HANGER

MIN 1/8", MAX 1/4" WEB THICKNESS (MIN SPECIES SPECIFIC GRAVITY G=0.42), TYP

NAIL THROUGH JOIST TO END OF 4x8 WITH 8-10d COMMON NAILS, TYP

4x8 (MIN SPECIES SPECIFIC GRAVITY G=0.42 AND GRADE NO. 2)

ADDITIONAL BLOCKING OF WOOD JOIST TO BE DESIGNED BY THE STRUCTURAL ENGINEER OF RECORD.

AT JOIST

IN-BETWEEN JOISTS

VIEW A-A

DATE: 10/09/2020

HANGER ATTACHMENT TYPE | ALLOWABLE VERTICAL LOAD LBS | ATR HANGER DIA. INCH
--- | --- | ---
38A TO 38E | 360 | 3/8
50A TO 50E | 360 | 1/2
63A TO 63E | 360 | 5/8
75A TO 75E | 360 | 3/4

SEE DETAIL M0.00 FOR SECTION NOTES
HANGER ATTACHMENT TO WOOD I-JOISTS

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>ATR HANGER DIA. INCH</th>
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<tbody>
<tr>
<td>38A TO 38H</td>
<td>710</td>
<td>3/8</td>
</tr>
<tr>
<td>50A TO 50H</td>
<td>710</td>
<td>5/8</td>
</tr>
<tr>
<td>63A TO 63H</td>
<td>710</td>
<td>3/4</td>
</tr>
<tr>
<td>75A TO 75H</td>
<td>710</td>
<td>3/4</td>
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MIN 1/2", MAX 3/4" WEB THICKNESS (MIN SPECIES SPECIFIC GRAVITY G=0.42), TYP

ADDITIONAL BLOCKING OF WOOD JOIST TO BE DESIGNED BY THE STRUCTURAL ENGINEER OF RECORD.

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-1/2 BY 1/2" MIN AND ATR BY DIMENSION OF ATR, MIN) 3/4" TO 1/2" DIA. ATR HANGER

2x2x1/2 PLATE WASHER & NUT, TYP

MW-SSN-1/2 W/ MW-BON-1/2 THREADED UNTIL NUT BREAKS OFF, TYP (REF X4.0)

1-1/4 x 1-1/4 x 1/2 GA SINGLE STRUT (SOLID, PUNCHED, OR SLOTTED)

MIN 3/8 x 1-1/4 x 1/2 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

4-1/2" Ø BOLT AND NUT, TYP

UNISTRUT P2072 SQ

MIN 1/2", MAX 3/4" WEB

THICKNESS (MIN SPECIES SPECIFIC GRAVITY G=0.42), TYP
HANGER ATTACHMENT TO FULLY GROUTED CMU WALL WITH HILTI KB-3 CONCRETE ANCHOR

FULLY GROUTED CMU WALL (f’m = 1500 PSI)
1½x1½x12 GA SINGLE STRUT (SOLID ONLY)
MIN 3½x1½x1½ ASTM A36 STRUT WASHER, TYP
HILTI KB-3 CONCRETE ANCHOR BOLT, TYP
MW-SSN-½ W/ MW-BON-½ TORQUED UNTIL NUT BREAKS OFF, TYP (REF X4.0)
MIN PL ¾x2x6½
1½x1½x12GA DOUBLE STRUT, SEE X7.0 FOR MORE INFO.

8" MIN 16" MAX

FULLY GROUTED CMU WALL (f’m = 1500 PSI)
1½x1½x12 GA SINGLE STRUT (SOLID ONLY)
MIN ¾x1½x1½ ASTM A36 STRUT WASHER, TYP
HILTI KB-3 CONCRETE ANCHOR BOLT, TYP
MW-SSN-½ W/ MW-BON-½ TORQUED UNTIL NUT BREAKS OFF, TYP (REF X4.0)
MIN PL ¾x2x6½
1½x1½x12GA DOUBLE STRUT, SEE X7.0 FOR MORE INFO.

MIN ¾x1½x1½ ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

MIN ¼" TO ½" DIA. ATR HANGER
REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY ¾" MIN AND ATR BY DIMENSION OF ATR, MIN)

NOTE:
WHEN USING HILTI KB-3 CONCRETE ANCHOR ATTACHMENT TO CMU WALL, THE STRUCTURAL ENGINEER OF RECORD (SEOR) SHALL VERIFY:

(1) MASONRY IS NOT CRACKED AS DEFINED IN ICC-ES AC01 SECTION 2.3; CALCULATION REQUIRED TO SHOW MASONRY WALL WOULD NOT CRACK UNDER THE DESIGN EARTHQUAKE LOADS UNDER ALL SERVICE LOAD CONDITIONS; WALL HAS TO REMAIN ELASTIC.

(2) MASONRY WALL SHALL BE FULLY GROUTED IN ACCORDANCE WITH ESR-1385 SECTION 3.2.

(3) CONDITION OF USE REQUIREMENTS IN ACCORDANCE WITH ESR-1385 SECTION 5.0 IS SATISFIED.

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>ATR HANGER DIA. Inch</th>
<th>DIA. da Inch</th>
<th>MIN EFF. EMBED. ha Inch</th>
<th>MIN HOLE DEPTH ho Inch</th>
<th>MIN BASE TH. ha Inch</th>
<th>MIN EDGE ha Inch</th>
<th>MIN SPACING Smin Inch</th>
<th>TORQUE REQ'D FT-LBS</th>
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<td>38A TO 38G</td>
<td>640</td>
<td>½</td>
<td>¾</td>
<td>3½</td>
<td>4½</td>
<td>8</td>
<td>12</td>
<td>8</td>
<td>25</td>
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<tr>
<td>50A TO 50E</td>
<td>370</td>
<td>50A TO 50G</td>
<td>640</td>
<td>½</td>
<td>¾</td>
<td>3½</td>
<td>4½</td>
<td>8</td>
<td>12</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>63A TO 63E</td>
<td>370</td>
<td>63A TO 63G</td>
<td>640</td>
<td>½</td>
<td>¾</td>
<td>3½</td>
<td>4½</td>
<td>8</td>
<td>12</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>75A TO 75E</td>
<td>370</td>
<td>75A TO 75G</td>
<td>640</td>
<td>½</td>
<td>¾</td>
<td>3½</td>
<td>4½</td>
<td>8</td>
<td>12</td>
<td>8</td>
<td>25</td>
</tr>
</tbody>
</table>

1 SEE M0.00 FOR SECTION NOTES
2 HILTI KB-3 MASONRY ANCHOR MUST BE INSTALLED IN THE FACE OF CMU SHELLS A MINIMUM OF 1½" FROM ANY VERTICAL MORTAR JOINT AND LIMITED TO ONE ANCHOR PER CELL.
3 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.

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P A G E

M5.10
**ANGLE CLIP ATTACHMENT TO FULLY GROUTED CMU WALL WITH HILTI KB-3 CONCRETE ANCHOR**

**FULLY GROUTED CMU WALL (f’m = 1500 PSI)**

- HOLE DIA. TO BE \( \frac{3}{16} \)" GREATER THAN ANCHOR DIA.
- HILTI KB-3 CONCRETE ANCHOR BOLT CENTERED ON ANGLE
- MW-SSN-1/2 WITH MW-BON-1/2 CENTERED ON ANGLE AND TORQUED UNTIL NUT BREAKS OFF (REF. PAGE X4.0)

**HOLE DIA.**

\[ \text{DIA.} \quad \frac{3}{16} \quad \text{"} \quad \text{GREATER THAN ANCHOR DIA.} \]

**MINIMUM SPACING**

\[ \text{MIN. SPACING} \quad \text{MIN. EMBED.} \quad \text{MIN. HOLE DEPTH} \quad \text{MIN. BASE TH.} \]

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE TENSION LOAD</th>
<th>CONCRETE ANCHOR ALLOWABLE TENSION LOAD</th>
<th>HILTI KB-3 CONCRETE ANCHOR (ICC ESR-1385) SPECIAL INSPECTION REQ'D</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>670</td>
<td>870</td>
<td>Ta [ \text{LBS} ]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[ \text{DIA. da INCH} ] 3 ½ [ \text{MIN. EFF. EMBED. hef INCH} ] 4 ( \frac{1}{16} ) [ \text{MIN. HOLE DEPTH ho INCH} ] 8 [ \text{MIN. BASE TH. ha INCH} ] 12 [ \text{MIN. EDGE Cmin INCH} ] 8 [ \text{MIN. SPACING Smin INCH} ] 25 [ \text{TORQUE REQ'D FT-LBS} ]</td>
</tr>
</tbody>
</table>

1. SEE M0.00 FOR SECTION NOTES
2. HILTI KB-3 MASONRY ANCHOR MUST BE INSTALLED IN THE FACE OF CMU SHELLS A MINIMUM OF \( \frac{1}{4} \)" FROM ANY VERTICAL MORTAR JOINT AND LIMITED TO ONE ANCHOR PER CELL.
3. ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_o \), PER ASCE 7-10 SEC. 12.4.3.3.

**NOTE:**

WHEN USING HILTI KB-3 CONCRETE ANCHOR ATTACHMENT TO CMU WALL, THE STRUCTURAL ENGINEER OF RECORD (SEOR) SHALL VERIFY:

1. MASONRY IS NOT CRACKED AS DEFINED IN ICC-ES AC01 SECTION 2.3; CALCULATION REQUIRED TO SHOW MASONRY WALL WOULD NOT CRACK UNDER THE DESIGN EARTHQUAKE LOADS UNDER ALL SERVICE LOAD CONDITIONS; WALL HAS TO REMAIN ELASTIC.
2. MASONRY WALL SHALL BE FULLY GROUTED IN ACCORDANCE WITH ESR-1385 SECTION 3.2.
3. CONDITION OF USE REQUIREMENTS IN ACCORDANCE WITH ESR-1385 SECTION 5.0 IS SATISFIED.
ANGLE CLIP ATTACHMENT
TO FULLY GROUTED CMU WALL
WITH HILTI KB-3 CONCRETE ANCHOR

FULLY GROUTED CMU WALL (f'm = 1500 PSI)
L3x3x3/4, 3" LG, TYP
HOLE DIA. TO BE 3/6" GREATER THAN ANCHOR DIA.
HILTI KB-3 CONCRETE ANCHOR
BOLT CENTERED ON ANGLE, TYP
MW-SSN-1/2 WITH MW-BON-1/2 CENTERED ON ANGLE AND
TORQUED UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.0)
3/6"Ø HOLE, TYP
DOUBLE STRUT. REF. APPROPRIATE BRACING
SYSTEM PAGES FOR REQ'D STRUT SIZE

NOTE:
WHEN USING HILTI KB-3 CONCRETE ANCHOR ATTACHMENT TO CMU WALL, THE STRUCTURAL ENGINEER OF RECORD (SEOR) SHALL VERIFY:

(1) MASONRY IS NOT CRACKED AS DEFINED IN ICC-ES AC01 SECTION 2.3; CALCULATION REQUIRED TO SHOW MASONRY WALL WOULD NOT CRACK UNDER THE DESIGN EARTHQUAKE LOADS UNDER ALL SERVICE LOAD CONDITIONS; WALL HAS TO REMAIN ELASTIC.

(2) MASONRY WALL SHALL BE FULLY GROUTED IN ACCORDANCE WITH ESR-1385 SECTION 3.2.

(3) CONDITION OF USE REQUIREMENTS IN ACCORDANCE WITH ESR-1385 SECTION 5.0 IS SATISFIED.

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE TENSION LOAD Ta</th>
<th>CONCRETE ANCHOR ALLOWABLE TENSION LOAD Tac</th>
<th>HILTI KB-3 CONCRETE ANCHOR (ICC ESR-1385) SPECIAL INSPECTION REQ'D</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Ta LBS</td>
<td>Ta LBS</td>
<td></td>
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<tr>
<td>50A TO 50L</td>
<td>1350</td>
<td>1740</td>
<td></td>
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</tbody>
</table>

1. SEE M0.00 FOR SECTION NOTES
2. HILTI KB-3 MASONRY ANCHOR MUST BE INSTALLED IN THE FACE OF CMU SHELLS A MINIMUM OF 1 1/2" FROM ANY VERTICAL MORTAR JOINT AND LIMITED TO ONE ANCHOR PER CELL.
3. ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_o \), PER ASCE 7-10 SEC. 12.4.3.3.
HANGER ATTACHMENT TO FULL HEIGHT METAL STUD WALL

MIN 18 GAxFy=33KSI FULL HEIGHT METAL STUD WALL. MAXIMUM 2 LAYERS GWB
1½x1½x12 GA SINGLE STRUT (SOLID ONLY); PRE-DRILL FOR SMS
#10 SMS 1" FROM EDGE OF STRUT AND 2" OC THEREAFTER, TYP

MW-SSN-½ W/ MW-BON-½ TORQUED UNTIL NUT BREAKS OFF, TYP (REF X4.0)

MIN PL 3½x2x6½
1½x1½x12GA DOUBLE STRUT, SEE X7.0 FOR MORE INFO.

MIN 3¼x1½x1½ ASTM A36 STRUT WASHER AND MW-SSN-½ WITH MW-BON-½ TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)

4½" TO ¾" DIA. ATR HANGER

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-½ BY 2½ MIN AND ATR BY DIMENSION OF ATR, MIN)

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>ATR HANGER DIA. INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38C</td>
<td>200</td>
<td>¾</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>200</td>
<td>½</td>
</tr>
<tr>
<td>63A TO 63C</td>
<td>200</td>
<td>¾</td>
</tr>
<tr>
<td>75A TO 75C</td>
<td>200</td>
<td>¾</td>
</tr>
</tbody>
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SEE DETAIL M0.00 FOR SECTION NOTES
ANGLE CLIP ATTACHMENT TO FULL HEIGHT METAL STUD WALL

MIN 18 GAxFy=33KSI FULL HEIGHT METAL STUD WALL. MAXIMUM 2 LAYERS GWB

#10 SMS 1" FROM EDGE OF STRUT AND 2" OC THEREAFTER, TYP

1½x1½x12GA SINGLE STRUT (SOLID ONLY): PRE-DRILL FOR SMS

MW-SSN-1/2 WITH MW-BON-1/2 CENTERED ON ANGLE AND TORQUED UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.0)

¾"Ø HOLE, TYP

L3x3x½, 3" LG

REF. APPROPRIATE BRACING SYSTEM PAGES FOR REQ'D STRUT SIZE

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE TENSION LOAD LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>580</td>
</tr>
</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES

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P A G E

M6.11

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

588 of 846
HANGER ATTACHMENT
TO NON-CONCRETE FILLED METAL DECK

MIN 20 GA STEEL DECK

#10 ITW BUILDEX TEKS SCREW, 4-TYP
(REF. ICC-ES ESR-1976)

1 5/8 x 12 GA SINGLE STRUT
(SOLID, PUNCHED, OR SLOTTED)
STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

MIN 3/8 x 1 5/8 x 1 5/8 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
(HANGER OPTION 1)

MIN 1/2" TO 3/4" DIA. ATR HANGER, TYP

3/8" MIN

24" MAX

MIN 3/8" EDGE TYP

6" MIN

REG. NUT T&B (NUT SNUG TIGHT)
(HANGER OPTION 2)

HANGER ATTACHMENT TYPE
38A TO 38E
50A TO 50E
63A TO 63E
75A TO 75E

ALLOWABLE VERTICAL LOAD LBS
350
350
350
350

ATR HANGER DIA. INCH
3/8
1/2
3/8
1/2

1 - SEE DETAIL M0.00 FOR SECTION NOTES
2 - THE DISTANCE FROM THE CENTER OF ANY SHEET METAL SCREW TO ANY STEEL EDGE SHALL BE 3/8" MIN, INCLUDING PUNCHED AND SLOTTED HOLE EDGES.

MIN 3/8 x 1 5/8 x 1 5/8 ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0)
(HANGER OPTION 1)

SEE DETAIL A FOR HANGER OPTION 2

REGULAR OR REDUCING ROD COUPLER
(ENGAGE MW-SSN-1/2 BY 1/2" MIN AND ATR BY DIMENSION OF ATR, MIN)

3/8" TO 3/4" DIA. ATR HANGER, TYP

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589 of 846
HANGER ATTACHMENT TO NON-CONCRETE FILLED METAL DECK

MIN 20 GA STEEL DECK

$\frac{3}{8}"$ MIN EDGE TYP

$\frac{7}{8}"$ MIN AND 24" MAX $\frac{3}{8}"$ MIN TYP

$\frac{1}{2}$" MIN

$\frac{3}{4}$" MIN

#10 ITW BUILDEX TEKS SCREW, 4-TYP

(REF. ICC-ES ESR-1976)

1\%\times1\%\times12$ GA SINGLE STRUT (SOLID, PUNCHED, OR SLOTTED) STRUT MAY BE ROTATED TO ANY ANGLE, TYP

MIN $\frac{3}{8}$x$\frac{1}{2}$x$\frac{1}{2}$ ASTM A36 STRUT WASHER

REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 2)

MIN $\frac{3}{8}$x$\frac{1}{2}$x$\frac{1}{2}$ ASTM A36 STRUT WASHER AND MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL THE NUT BREAKS OFF (REF. PAGE X4.0) (HANGER OPTION 1)

REGULAR OR REDUCING ROD COUPLER (ENGAGE MW-SSN-$\frac{1}{2}$ BY $\frac{1}{2}$" MIN AND ATR BY DIMENSION OF ATR, MIN)

REG. NUT T&B (NUT SNUG TIGHT) (HANGER OPTION 2)

STRUT CONNECTING THE ATR HANGER MAY BE INSTALLED IN-LINE WITH THE UPPER OR LOWER FLUTES.

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>ATR HANGER DIA. INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38B</td>
<td>170</td>
<td>$\frac{3}{8}$</td>
</tr>
<tr>
<td>50A TO 50B</td>
<td>170</td>
<td>$\frac{1}{2}$</td>
</tr>
<tr>
<td>63A TO 63B</td>
<td>170</td>
<td>$\frac{5}{8}$</td>
</tr>
<tr>
<td>75A TO 75B</td>
<td>170</td>
<td>$\frac{3}{4}$</td>
</tr>
</tbody>
</table>

1 - SEE DETAIL M0.00 FOR SECTION NOTES
2 - THE DISTANCE FROM THE CENTER OF ANY SHEET METAL SCREW TO ANY STEEL EDGE SHALL BE $\frac{3}{8}$" MIN, INCLUDING PUNCHED AND SLOTTED HOLE EDGES.

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PAGE M7.11
HANGER ATTACHMENT TO NON-CONCRETE FILLED METAL DECK

4" MIN AND 24" MAX
3½" MIN EDGE TYP

½" MIN FOR ATR ONLY

¾" MIN, TYP

¾" MIN

#10 ITW BUILDEX TEKS SCREW, 2-TYP (REF. ICC-ES ESR-1976)

1½x½x12 GA SINGLE STRUT OR 1½x½x12 GA SINGLE STRUT (SOLID, PUNCHED, OR SLOTTED) STRUT MAY BE ROTATED TO ANY ANGLE, TYP

MIN ¾"x½x1½ ASTM A36 STRUT WASHER, TYP

MIN 20 GA STEEL DECK

STRUT NUT, TYP (SMS NOT SHOWN FOR CLARITY)

¾" TO ¾" DIA. ATR OR ASTM A307 MACHINE BOLT, TYP

WHERE REQ'D, REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED, TYP

STANDARD WASHER, TYP

STANDARD NUT, TYP

MIN ¾" DIA. ATR OR ASTM A307 MACHINE BOLT, TYP

MIN ¾" DIA.

MIN ¾" MIN

4" MIN AND 24" MAX

1½" MIN

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10/09/2020

1 - CONNECTION OF STANDARD NUTS AND COUPLING NUTS ARE NOT REQUIRED TO BE TORQUED, SNUG TIGHT ONLY.

2 - THE DISTANCE FROM THE CENTER OF ANY SHEET METAL SCREW TO ANY STEEL EDGE SHALL BE ¾" MIN, INCLUDING PUNCHED AND SLOTTED HOLE EDGES.

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>ATR HANGER DIA. INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38D</td>
<td>250</td>
<td>¾</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>250</td>
<td>½</td>
</tr>
<tr>
<td>63A TO 63D</td>
<td>250</td>
<td>¾</td>
</tr>
<tr>
<td>75A TO 75D</td>
<td>250</td>
<td>¾</td>
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<thead>
<tr>
<th>FASTENER WITH STRUT NUT</th>
<th>DIA. INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>½</td>
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</tr>
<tr>
<td>¾</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>¼</td>
<td>125</td>
<td></td>
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</tbody>
</table>
HANGER ATTACHMENT
TO NON-CONCRETE FILLED METAL DECK

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>HANGER ATTACHMENT</th>
<th>ALLOWABLE VERTICAL LOAD LBS</th>
<th>ATR HANGER DIA. INCH</th>
<th>INSERT SIZE</th>
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<tr>
<td>38A TO 38D</td>
<td>300</td>
<td>3/8</td>
<td>38A TO 38A</td>
<td>100</td>
<td>3/8</td>
<td>MW-MDI-38</td>
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<tr>
<td>50A TO 50D</td>
<td>300</td>
<td>3/4</td>
<td>50A TO 50A</td>
<td>100</td>
<td>3/4</td>
<td>MW-MDI-50</td>
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<tr>
<td>38A TO 38D</td>
<td>300</td>
<td>3/8</td>
<td>38A TO 38A</td>
<td>100</td>
<td>3/8</td>
<td>MW-MDI-38</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>300</td>
<td>3/4</td>
<td>50A TO 50A</td>
<td>100</td>
<td>3/4</td>
<td>MW-MDI-50</td>
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<td>300</td>
<td>3/8</td>
<td>63A TO 63A</td>
<td>100</td>
<td>3/8</td>
<td>MW-MDI-63</td>
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<tr>
<td>50A TO 50D</td>
<td>300</td>
<td>3/4</td>
<td>50A TO 50A</td>
<td>100</td>
<td>3/4</td>
<td>MW-MDI-50</td>
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<td>63A TO 63D</td>
<td>300</td>
<td>3/8</td>
<td>63A TO 63A</td>
<td>100</td>
<td>3/8</td>
<td>MW-MDI-63</td>
</tr>
<tr>
<td>75A TO 75D</td>
<td>300</td>
<td>3/4</td>
<td>75A TO 75A</td>
<td>100</td>
<td>3/4</td>
<td>MW-MDI-63</td>
</tr>
</tbody>
</table>

1 - SEE DETAIL M0.00 FOR SECTION NOTES
2 - MW-MDI INSERT MAY BE INSTALLED ANYWHERE ON THE DECK.
3 - THE 6° ALLOWABLE INSTALLED ANGLE IS PERMITTED FOR ALL INSTALLATIONS.
4 - WHERE SPANNER PLATE OPTION IS USED, THE VERTICAL UPWARD LOAD, IF ANY, SHALL NOT EXCEED 90 LBS.
ANGLE CLIP ATTACHMENT
TO CONCRETE SLAB, BEAM OR WALL
WITH (1) MW-PAL-A-CS CONCRETE INSERT

CONCRETE SLAB

CONCRETE BEAM OR WALL

MW-PAL-A-CS

CONCRETE INSERT, TYP

MIN 3/8" Ø ASTM A36 ATR

AND NUT (SNUG TIGHT), TYP

NOTE:

CONCRETE STRENGTH SHALL
BE BETWEEN 3000 PSI TO
10,000 PSI NWC OR SLWC

HANGER ATTACHMENT TYPE

MW-SSN-1/2 WITH MW-BON-1/2
CENTERED ON ANGLE AND
TORQUED UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.0)

STRUT MEMBER, TYP

L3x3x3/4, 3" LG. FOR
ALTERNATE INSTALLATION,
REF. APPROPRIATE
BRACING SYSTEM PAGES
FOR REQ'D STRUT SIZE

(1) MW-SSN-1/2 WITH MW-BON-1/2
CENTERED ON ANGLE AND
TORQUED UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.0)

SECTION A-A

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE TENSION LOAD</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE TENSION LOAD</th>
<th>ANGLE SIZE</th>
<th>MW-PAL-A-CS CONCRETE INSERT (REFER TO PAGES X5.0.CS &amp; X5.2.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>670</td>
<td>50A TO 50P</td>
<td>3020</td>
<td>L3x3x3/4</td>
<td>Ta</td>
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<tr>
<td>50A TO 50K</td>
<td>1140</td>
<td>50A TO 50P</td>
<td>3020</td>
<td>L6x4x3/4</td>
<td>Ta</td>
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</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, $Q_o$ PER ASCE 7-10 SEC. 12.4.3.3.

2 ASTM A36, Fy = 36 KSI

3 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE TENSION LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.

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10/09/2020

593 of 846
ANGLE CLIP ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) MW-PAL-A-MD CONCRETE INSERT AT LOWER FLUTE

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega \), PER ASCE 7-10 SEC. 12.4.3.3.

2 ASTM A36, \( F_y = 36 \) KSI

MIN. 20 GA TYPE W3 STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

FOR L6x4x\( \frac{3}{8} \) OR L3x3x\( \frac{3}{8} \), USE (1) MW-SSN-1/2 WITH
MW-BON-1/2 OR FOR L6x4x\( \frac{3}{8} \),
USE (2) MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.0)

HOLE DIA. TO BE \( \frac{1}{16}" \) GREATER THAN ATR DIA.
(STRUT MEMBER NOT SHOWN FOR CLARITY)

SECTION A-A

<table>
<thead>
<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Tac1 LBS</th>
<th>ANGLE SIZE 2</th>
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<tr>
<td>50A TO 50G</td>
<td>670</td>
<td>50A TO 50J</td>
<td>930</td>
<td>( \frac{7}{8} )</td>
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<td>50A TO 50K</td>
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<td>930</td>
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MIN. 20 GA TYPE W3 STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

MW-PAL-A-MD CONCRETE INSERT WITH MIN \( \frac{3}{4}" \)Ø
ATR AND REG. NUT (SNUG TIGHT), TYP

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PAGE M8.11
ANGLE CLIP ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) MW-PAL-A-MD CONCRETE INSERT AT UPPER FLUTE

1/4" NUT IS REQUIRED WHEN MW-PAL-A-MD IS INSTALLED AT UPPER FLUTE OF METAL DECK WITH ANGLE CLIP ATTACHING TO TIP OF MW-PAL-A-MD

3 1/2" MIN
3" MAX

L6x4 3/8, 3" LG.

MW-PAL-A-MD CONCRETE INSERT WITH MIN 3/4" DIA. ATR AND REG. NUT (SNUG TIGHT), TYP

HOLE DIA. TO BE 1/16" GREATER THAN ATR DIA. (STRUT MEMBER NOT SHOWN FOR CLARITY)

FOR L4x3x3/8 OR L3x3x3/8, USE (1) MW-SSN-1/2 WITH MW-BON-1/2 OR FOR L6x4x3/8, USE (2) MW-SSN-1/2 WITH MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.0)

BEVEL WASHER IS REQUIRED BETWEEN NUT AND DECKING WHEN MW-PAL-A-MD IS INSTALLED WITH AN ANGLE EXCEEDING 3° OFF VERTICAL

MIN. 20 GA TYPE W3 STEEL DECK, MIN. 3000 PSI NWC OR SLWC

SECTION A-A

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE INSERT ALLOWABLE VERTICAL LOAD Ta 1 LBS</th>
<th>ANGLE SIZE 2</th>
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<tr>
<td>50A TO 50G</td>
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<td>50A TO 50P</td>
<td>2590</td>
<td>L3x3x3/8 / L4x3x3/8</td>
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<td>50A TO 50K</td>
<td>1140</td>
<td>50A TO 50P</td>
<td>2590</td>
<td>L6x4x3/8</td>
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SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ωp, PER ASCE 7-10 SEC. 12.4.3.3.

2 ASTM A36, Fy = 36 KSI

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PAGE M8.11.1
ANGLE CLIP ATTACHMENT
TO CONCRETE SLAB, BEAM OR WALL
WITH (1) HILTI KB-TZ CONCRETE ANCHOR

CONCRETE SLAB
CONCRETE BEAM OR WALL
HILTI KB-TZ CONCRETE ANCHOR, TYP

NOTE:
CONCRETE STRENGTH SHALL
BE BETWEEN 3000 PSI TO
8,500 PSI NWC. SEE NOTE 3
FOR ATTACHMENT TO SLWC

STRUT MEMBER, TYP

L3x3x¾, 3” LG. FOR ALTERNATE
INSTALLATION, REF. APPROPRIATE
BRACING SYSTEM PAGES FOR
REQ’D STRUT SIZE

(1) MW-SSN-1/2 WITH MW-BON-1/2
CENTERED ON ANGLE AND
TORQUED UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.0)

SECTION A-A

HOLE DIA. TO BE ¾”
GREATER THAN ANCHOR DIA.
(STRUT MEMBER NOT
SHOWN FOR CLARITY)

HILTI KB-TZ CONCRETE ANCHOR
(ICC ESR-1917)
SPECIAL INSPECTION REQ’D

FOR L6x4x¾ OR L3x3x¾, USE
(1) MW-SSN-1/2 WITH
MW-BON-1/2 OR FOR L6x4x¾,
USE (2) MW-SSN-1/2 WITH
MW-BON-1/2 TORQUED UNTIL
NUT BREAKS OFF, TYP (REF.
PAGE X4.0)

L6x4x¾, 3” LG. SEE TABLE BELOW FOR
APPROPRIATE ANCHOR SIZE

FOR L3x3x¾ OR L3x3x¾, 3”
LG. SEE TABLE BELOW FOR
APPROPRIATE ANCHOR SIZE

See Detail M0.00 for Section Notes

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \( \Omega_o \) PER ASCE 7-10
SEC. 12.4.3.3.

2 ASTM A36, \( F_y = 36 \) KSI

3 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE TENSION LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
ANGLE CLIP ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) HILTI KB-TZ CONCRETE ANCHOR

HOLE DIA. TO BE 1 1/16 INCH GREATER THAN ANCHOR DIA. (STRUT MEMBER NOT SHOWN FOR CLARITY)

FOR L4x3x3/8 OR L3x3x3/4, USE (1) MW-SSN-1/2 WITH MW-BON-1/2
OR FOR L6x4x1/2, USE (2) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.0)

L6x4x3/8, 3" LG. SEE TABLE BELOW FOR APPROPRIATE ANCHOR SIZE

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
HILTI KB-TZ CONCRETE ANCHOR, TYP
L4x3x3/8 OR L3x3x3/4, 3" LG. SEE TABLE BELOW FOR APPROPRIATE ANCHOR SIZE
STRUT MEMBER, TYP

SECTION A-A

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac 1 LBS</th>
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<th>DIA. da INCH</th>
<th>MIN EFF. EMBED hef INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
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<td>6 ½</td>
<td>3 ½</td>
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<td>2</td>
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<td>6 ½</td>
<td>3 ½</td>
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<td>50A TO 50K</td>
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<td>50A TO 50K</td>
<td>1070</td>
<td>L6x4x3/8</td>
<td>½</td>
<td>3 ½</td>
<td>4</td>
<td>9 ½</td>
<td>4 ½</td>
<td>40</td>
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<td>63A TO 63K</td>
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<td>63A TO 63L</td>
<td>1590</td>
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<td>4</td>
<td>4 ½</td>
<td>12</td>
<td>6</td>
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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qv, PER ASCE 7-10 SEC. 12.4.3.3.
2 ASTM A36, Fy = 36 KSI
ANGLE CLIP ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) HILTI KB-TZ CONCRETE ANCHOR

FOR L4x3x3/4 OR L3x3x3/4, USE (1) MW-SSN-M/2 WITH MW-BON-1/2
OR FOR L6x4x3/4, USE (2) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.0)

1/2" MIN, MAX
1" MIN
2" MIN

HOLE DIA. TO BE 3/4" GREATER THAN ANCHOR DIA.
(Strut Member Not Shown for Clarity)

SECTION A-A

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac 1 LBS</th>
<th>ANGLE SIZE 2</th>
<th>DIA. da INCH</th>
<th>MIN EFF. EMBED hfe INCH</th>
<th>MIN HOLE DEPTH ho INCH</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<td>38A TO 38G</td>
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<td>3</td>
<td>25</td>
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<td>6</td>
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<td>1180</td>
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<td>3/4</td>
<td>4</td>
<td>9/4</td>
<td>4/4</td>
<td>60</td>
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SEE DETAIL M0.00 FOR SECTION NOTES

- ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Qp, PER
  ASCE 7-10 SEC. 12.4.3.3.
- ASTM A36, Fy = 36 KSI

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PAGE M8.22
## ANGLE CLIP ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (1) POWER-STUD+ SD1 CONCRETE ANCHOR

### CONCRETE SLAB
### CONCRETE BEAM OR WALL
### POWER-STUD+ SD1 CONCRETE ANCHOR, TYP

**NOTE:** CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 3 FOR ATTACHMENT TO SLWC

---

### SECTION A-A

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE TENSION LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE TENSION LOAD Tac LBS</th>
<th>ANGLE SIZE</th>
<th>POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818) SPECIAL INSPECTION REQ'D</th>
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<tbody>
<tr>
<td>38A TO 38G</td>
<td>670</td>
<td>38A TO 38J</td>
<td>910</td>
<td>L3x3x⅛ / L4x4⅛</td>
<td>½ 2 2½ 4 4½ 6 20</td>
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<td>50A TO 50K</td>
<td>1140</td>
<td>50A TO 50J</td>
<td>1120</td>
<td>L6x4⅛</td>
<td>½ 3½ 4 6 4½ 9½ 40</td>
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<td>63A TO 63K</td>
<td>1140</td>
<td>63A TO 63M</td>
<td>1740</td>
<td>L8x4⅜</td>
<td>½ 2½ 3½ 6 6 8½ 80</td>
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SEE DETAIL M0.00 FOR SECTION NOTES

1. ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Ω, PER ASCE 7-10 SEC. 12.4.3.3.
2. ASTM A36, Fy = 36 KSI
3. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE TENSION LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.

---

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OPM-0043-13
10/09/2020

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599 of 846
ANGLE CLIP ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) POWER-STUD+ SD1 CONCRETE ANCHOR

HANGER ATTACHMENT TYPE | STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS | HANGER ATTACHMENT TYPE | CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac LBS | ANGLE SIZE | POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818) SPECIAL INSPECTION REQ'D
--- | --- | --- | --- | --- | ---
38A TO 38G | 670 | 38A TO 38G | 560 | L3x3x⅜ / L4x3x⅜ | ⅛ | 2 | 2½ | 6½ | 3½ | 20
50A TO 50G | 670 | 50A TO 50G | 980 | L3x3x⅜ / L4x3x⅜ | ⅛ | 2 | 2½ | 6½ | 3½ | 40
63A TO 63K | 1140 | 63A TO 63K | 810 | L6x4x⅜ | ⅛ | 2¼ | 3¼ | 8¼ | 4½ | 80

See detail M0.00 for section notes.

1 Allowable loads have been increased by a factor of 1.2 for load combinations including overstrength, \( \Omega \), per ASCE 7-10 Sec. 12.4.3.3.

2 ASTM A36, \( F_y = 36 \) KSI

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OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020
ANGLE CLIP ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) POWER-STUD+ SD1 CONCRETE ANCHOR

MIN 20 GA STEEL DECK WITH MIN 3000 PSI NWC OR SLWC
POWER-STUD+ SD1 CONCRETE ANCHOR, TYP
L4x3x⅜ OR L3x3x⅜, 3" LG., TYP
MW-SSN-1/2 WITH MW-BON-1/2 TORQUED
UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.0)
STRUT MEMBER, TYP

HOLE DIA. TO BE 3/16" GREATER THAN ANCHOR DIA. (STRUT MEMBER NOT SHOWN FOR CLARITY)

SECTION A-A

<table>
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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD Ta LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD Tac 1 LBS</th>
<th>ANGLE SIZE 2</th>
<th>POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818) SPECIAL INSPECTION REQ’D</th>
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<tbody>
<tr>
<td>38A TO 38G</td>
<td>670</td>
<td>38A TO 38F</td>
<td>480</td>
<td>⅜</td>
<td>2</td>
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<tr>
<td>50A TO 50G</td>
<td>670</td>
<td>50A TO 50G</td>
<td>580</td>
<td>⅜</td>
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SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, Oe, PER ASCE 7-10 SEC. 12.4.3.3.
2 ASTM A36, Fy = 36 KSI
ANGLE CLIP ATTACHMENT
TO CONCRETE SLAB, BEAM OR WALL
WITH (1) MASON IND. N.Y. SAS(E) CONCRETE ANCHOR

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR, TYP

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 3 FOR ATTACHMENT TO SLWC

CONCRETE SLAB
CONCRETE BEAM OR WALL

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR, TYP

SPECIAL INSPECTION REQ'D

HANGER ATTACHMENT TYPE

STEEL COMPONENT
ALLOWABLE TENSION LOAD Ta LBS

HANGER ATTACHMENT TYPE

CONCRETE ANCHOR
ALLOWABLE TENSION LOAD Tac LBS

ANGLE SIZE

MASON IND. N.Y. SAS(E) CONCRETE ANCHORS
(ICC ESR-3037)
SPECIAL INSPECTION REQ'D

| HANGER ATTACHMENT TYPE | STEEL COMPONENT ALLOWABLE TENSION LOAD Ta LBS | HANGER ATTACHMENT TYPE | CONCRETE ANCHOR ALLOWABLE TENSION LOAD Tac LBS | ANGLE SIZE | DIA. da INCH | MIN EFF. Embed. hef INCH | MIN HOLE Depth ho INCH | MIN BASE TH. ha INCH | MIN EDGE Cmin INCH | MIN SPACING Smin INCH | TORQUE REQ'D FT-LBS |
|------------------------|---------------------------------------------|------------------------|------------------------------------------------|-----------|--------------|--------------------------|----------------------|----------------------|-------------------|----------------------|----------------------|---------------------|
| 38A TO 38G             | 670                                         | 38A TO 38K             | 1240                                           | L3x3x3/4  | 3/16         | 2 1/2                    | 3                    | 4 1/4                | 6                 | 7 1/2                | 30                   |
| 50A TO 50G             | 670                                         | 50A TO 50L             | 1290                                           | L3x3x3/4  | 3/16         | 2 1/2                    | 3                    | 4 1/4                | 7                 | 6 1/2                | 60                   |
| 50A TO 50K             | 1140                                        | 50A TO 50M             | 1680                                           | L6x4x3/4  | 3/16         | 3 1/2                    | 4                    | 6                    | 7                 | 10 1/2               | 60                   |
| 63A TO 63K             | 1140                                        | 63A TO 63P             | 3090                                           | L6x4x3/4  | 3/16         | 4 1/2                    | 5                    | 8                    | 7                 | 13 1/2               | 90                   |

SEE DETAIL M0.00 FOR SECTION NOTES

1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, $\Omega$, PER ASCE 7-10 SEC. 12.4.3.3.
2 ASTM A36, $F_y = 36$ KSI
3 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE TENSION LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.

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PAGE M8.40
ANGLE CLIP ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) MASON IND. N.Y. SAS(E) CONCRETE ANCHOR

FOR L4x3x\(\frac{3}{4}\) OR L3x3x\(\frac{3}{4}\), USE (1) MW-SSN-1/2 WITH MW-BON-1/2
OR FOR L6x4x\(\frac{3}{4}\), USE (2) MW-SSN-1/2 WITH MW-BON-1/2
TORQUED UNTIL NUT BREAKS OFF, TYP (REF. PAGE X4.0)

L6x4x\(\frac{3}{4}\), 3" LG. SEE TABLE BELOW FOR APPROPRIATE ANCHOR SIZE

HOLE DIA. TO BE \(\frac{3}{4}\)" GREATER THAN ANCHOR DIA. (STRUT MEMBER NOT SHOWN FOR CLARITY)

SECTION A-A

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<tr>
<th>HANGER ATTACHMENT TYPE</th>
<th>STEEL COMPONENT ALLOWABLE VERTICAL LOAD (Ta) LBS</th>
<th>HANGER ATTACHMENT TYPE</th>
<th>CONCRETE ANCHOR ALLOWABLE VERTICAL LOAD (Tac) LBS</th>
<th>ANGLE SIZE 2</th>
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<td>38A TO 38G</td>
<td>670</td>
<td>38A TO 38E</td>
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<td>38A TO 38G</td>
<td>670</td>
<td>38A TO 38K</td>
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<td>L3x3x(\frac{3}{4}) / L4x3x(\frac{3}{4})</td>
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<td>50A TO 50H</td>
<td>840</td>
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<td>50A TO 50K</td>
<td>1120</td>
<td>L6x4x(\frac{3}{4})</td>
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<tr>
<td>63A TO 63K</td>
<td>1140</td>
<td>63A TO 63K</td>
<td>1070</td>
<td>L6x4x(\frac{3}{4})</td>
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<td>1140</td>
<td>63A TO 63N</td>
<td>2040</td>
<td>L6x4x(\frac{3}{4})</td>
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<th>DIA. (da)</th>
<th>MIN. EFFECT. EMBED (hef) (\text{INCH})</th>
<th>MIN. HOLE DEPTH (ho) (\text{INCH})</th>
<th>MIN. SPACING (Sm) (\text{INCH})</th>
<th>MIN. END DIST. (Cm) (\text{INCH})</th>
<th>TORQUE REQ'D (\text{FT-LBS})</th>
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<td>(\frac{3}{3})</td>
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<td>(\frac{7}{3})</td>
<td>90</td>
</tr>
</tbody>
</table>

SEE DETAIL M0.00 FOR SECTION NOTES
1 ALLOWABLE LOADS HAVE BEEN INCREASED BY A FACTOR OF 1.2 FOR LOAD COMBINATIONS INCLUDING OVERSTRENGTH, \(O_0\) PER ASCE 7-10 SEC. 12.4.3.3.
2 ASTM A36, \(F_y = 36\) KSI

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OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020
603 of 846
ALTERNATE ATTACHMENT OF ALL THREAD ROD (ATR) TO STRUT SPANNER

STRUT SPANNER
B-LINE BN200 STRUT NUT
MIN 3/8 x 1½ x 1½ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ)
¾" TO ¾" DIA. ATR HANGER REG. OR REDUCING COUPLING NUT FOR LARGER OR SMALLER SIZE THREADED RODS ARE PERMITTED

FASTENER WITH STRUT NUT

<table>
<thead>
<tr>
<th>DIA. INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>19</td>
</tr>
<tr>
<td>½ - ¾</td>
<td>50</td>
</tr>
</tbody>
</table>

1. SEE DETAIL M0.00 FOR SECTION NOTES
2. THIS DETAIL MAY BE USED AS AN ALTERNATE ATTACHMENT OF ALL THREAD ROD (ATR) TO A STRUT SPANNER INDICATED IN SECTION M.
HANGER INSTALLATION DETAILS WITH ROD STIFFENER
FOR MW-PAL-A-CS CONCRETE INSERT IN CONCRETE SLAB OR BEAM

MW-PAL-A-CS CONCRETE INSERT INSTALLED IN CONCRETE SLAB OR BEAM

MW-PAL-A-MD CONCRETE INSERT INSTALLED IN CONCRETE FILLED METAL DECK

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PAGE M10.10

605 of 846
HANGER INSTALLATION DETAILS WITH ROD STIFFENER
FOR EXPANSION ANCHOR

6" MAX

1" MIN

3/4" - 5/8" DIA. ATR

6" MAX

7/8" MIN

5/8" - 3/4" DIA. ATR

EXPANSION ANCHOR INSTALLED AT THE CONCRETE FILLED METAL DECK

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HANGER INSTALLATION DETAILS WITH ROD STIFFENER
FOR STEEL OR WOOD ATTACHMENTS

BOTTOM OF STEEL, BEAM CLAMP OR WOOD ATTACHMENT

6" MAX

MIN

ATR HANGER

ROD STIFFENER

MAISON IND. N.Y. UCC ROD STIFFENER CLAMP, TYP

WASHER & NUT AS REQUIRED.

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DATE: 10/09/2020

PAGE M10.12
NOTES:

1 - "N" SERIES PAGES ARE COMPRISSED OF SEISMIC BRACE BRACKET ANCHORAGE CAPACITIES FOR VARIOUS TYPES OF ANCHORAGE CONDITIONS. EACH BRACE BRACKET ATTACHMENT TYPE IS DESIGNATED BY A SET OF NUMBERS AND A LETTER. THE NUMBERS REPRESENT THE BRACE BRACKET ATTACHMENT SIZE (FOUND IN THE BRACE ANCHOR SIZE TABLE) AND THE LETTER REPRESENTS THE MAXIMUM ALLOWABLE HORIZONTAL LOAD CAPACITY (FOUND IN THE HORIZONTAL LOAD RATING TABLE).

EXAMPLE: 63L REPRESENTS BRACE BRACKET ANCHOR SIZE OF \(\frac{5}{8}\) " Ø WITH A MAXIMUM HORIZONTAL LOAD RATING OF 1,250 LBS.

2 - BRACE BRACKET ANCHORAGE ATTACHMENTS TO STRUCTURE MAY BE USED WITH ANY ONE OF "N" SERIES PAGES, PROVIDED BRACE BRACKET ATTACHMENT SIZE IS APPROPRIATE FOR THE APPLICATION AND THE ALLOWABLE HORIZONTAL LOAD CAPACITY IS MET.

3 - STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED LOADS.


5 - WHEN CONCRETE ANCHORS ARE INSTALLED AT THE BOTTOM OF THE CONCRETE FILLED METAL DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS ARE ALONG FLUTE LENGTH ONLY.

6 - SEE X7.0 AND X7.1 FOR STRUT MEMBER DATA.

7 - ALL CONCRETE FLAT SLABS, WALLS, AND BEAMS MUST HAVE A MINIMUM OF #4 BAR OR GREATER BETWEEN THE ANCHOR AND THE EDGE OF CONCRETE.

8 - ON PAGES N1.XX AND N2.XX, THE DESIGN PROFESSIONAL SHALL USE THE ALLOWABLE LATERAL LOADS UNDER OVERSTRENGTH FACTOR \(\Omega = 2.0\) UNLESS THE LATERAL SUPPORT COMPLIES WITH ONE OF THE CONDITIONS LISTED IN ACI 318-14 CHAPTER 17, SECTION 17.2.3.4.3.

9 - POST-INSTALLED ANCHORS MAY BE INSTALLED A MINIMUM OF 3 BOLT DIAMETERS AWAY FROM ABANDONED HOLES, AND A MINIMUM OF 1.5 BOLT DIAMETERS FROM DRYPACK MORTAR FILLED HOLES. DRYPACK MORTAR SHALL HAVE A COMPRESSIVE STRENGTH EQUAL TO OR GREATER THAN THE CONCRETE STRENGTH IN WHICH IT IS BEING USED.

10 - ALL-THREAD RODS MUST BE MADE OF A36, A307 (GRADE A OR B), OF F1554 GR36 STEEL. ROD COUPLERS MUST CONFORM TO ASTM A563 STEEL WITH A MINIMUM OF 58 KSI TENSILE STRENGTH. MINIMUM ENGAGEMENT IN ROD COUPLER MUST BE EQUAL TO THE ATR DIAMETER.

11 - PER CBC SECTION 1905A.1.9, CONCRETE COMPRESSIVE STRENGTH, \(f_c\), SHALL BE LIMITED TO 8,000 PSI MAX, BUT MAY BE INCREASED SUBJECT TO OSHPD REVIEW AND APPROVAL ON A PROJECT BY PROJECT BASIS.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (1) MASON WEST MW-PAL-A-CS CONCRETE INSERT

MASON WEST MW-PAL-A-CS CONCRETE INSERT (TYP)
ASTM A36 ATR AND NUT (SNUG TIGHT), TYP
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE INSERT, TYP

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p$ LBS</th>
<th>$\Omega = 2.0$</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p$ LBS</th>
<th>MAX BRACE RANGE</th>
<th>ATR DIA. INCH</th>
<th>MIN. EDGE Cmin (INCH)</th>
<th>MIN. SPACING Smin (INCH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38J</td>
<td>910</td>
<td></td>
<td>38A TO 38F</td>
<td>540</td>
<td>30°-45°</td>
<td>$\frac{3}{8}$</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>38A TO 38H</td>
<td>700</td>
<td></td>
<td>38A TO 38E</td>
<td>420</td>
<td>46°-60°</td>
<td>$\frac{3}{8}$</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>50A TO 50L</td>
<td>1360</td>
<td></td>
<td>50A TO 50E</td>
<td>810</td>
<td>30°-45°</td>
<td>$\frac{1}{2}$</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>50A TO 50K</td>
<td>1020</td>
<td></td>
<td>50A TO 50G</td>
<td>610</td>
<td>46°-60°</td>
<td>$\frac{1}{2}$</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>63A TO 63L</td>
<td>1410</td>
<td></td>
<td>63A TO 63J</td>
<td>850</td>
<td>30°-45°</td>
<td>$\frac{3}{8}$</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>63A TO 63K</td>
<td>1050</td>
<td></td>
<td>63A TO 63G</td>
<td>630</td>
<td>46°-60°</td>
<td>$\frac{3}{8}$</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>63A TO 63M</td>
<td>1710</td>
<td></td>
<td>63A TO 63K</td>
<td>1030</td>
<td>30°-45°</td>
<td>$\frac{3}{8}$</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>63A TO 63H</td>
<td>1210</td>
<td></td>
<td>63A TO 63H</td>
<td>730</td>
<td>46°-60°</td>
<td>$\frac{3}{8}$</td>
<td>9</td>
<td>12</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) MASON WEST MW-PAL-A-CS CONCRETE INSERTS

MASON WEST MW-PAL-A-CS CONCRETE INSERT, TYP

MIN. 3/8" DIA. ATR, MIN. 3/8"x11/4"x11/2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT) TYP

1/2"x11/2x12GA SINGLE STRUT (SOLID ONLY) MAY BE ROTATED TO ANY ANGLE, TYP

Fp = Allowable Lateral Load

REG. NUT (SNUG TIGHT), TYP

MIN. 3/8"x11/4"x11/2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

MASON IND. N.Y. SEISMIC BRACKET FOR CABLE OR SOLID BRACING.

BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

CONCRETE SLAB

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC OR SLWC.

ALT. INSTALL

REG. NUT (SNUG TIGHT), TYP

MIN. 3/8"x11/4"x11/2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

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Ωₜ = 2.0¹

ALTERNATE INSTALL

MIN. ALLOWABLE LATERAL LOAD

BRACE BRACKET ATTACHMENT TYPE

Fp (LBS)

50A TO 50G

620

50A TO 50G

620

30°-45°

50A TO 50F

530

50A TO 50F

530

46°-60°

MIN. ALLOWABLE LATERAL LOAD

BRACE BRACKET ATTACHMENT TYPE

Fp (LBS)

50A TO 50G

620

50A TO 50G

620

30°-45°

50A TO 50F

530

50A TO 50F

530

46°-60°

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

CONCRETE WALL

CONCRETE BEAM

MIN. EDGE Cmin (INCH)

MIN. SPACING Smin (INCH)

DIA. da (INCH)

6

12

SEE DETAIL NO.00 FOR SECTION NOTES

MASON WEST MW-PAL-A-CS CONCRETE INSERT

(REFER TO PAGES X5.0.CS & X5.2.1)

MAX BRACE RANGE δ

3/8"
SEISMIC BRACKET ATTACHMENT
TO CONCRETE SLAB, BEAM OR WALL
WITH (2) MASON WEST MW-PAL-A-CS CONCRETE INSERTS

MASSON WEST MW-PAL-A-CS
CONCRETE INSERT (2-TYP)

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp^2 LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp^2 LBS</th>
<th>MAX BRACE RANGE °</th>
<th>DIA. da (INCH)</th>
<th>MIN. EDGE Cmin (INCH)</th>
<th>MIN. SPACING Smin (INCH)</th>
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</thead>
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<tr>
<td>63A TO 63M</td>
<td>1930</td>
<td>63A TO 63M</td>
<td>1930</td>
<td>30°- 45°</td>
<td>7/8</td>
<td>9</td>
<td>12</td>
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<tr>
<td>63A TO 63K</td>
<td>1110</td>
<td>63A TO 63K</td>
<td>1110</td>
<td>45°- 60°</td>
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<td></td>
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SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

2 FOR BRACE BRACKET ATTACHMENTS WITH OVERSTRENGTH FACTOR TO SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (4) MASON WEST MW-PAL-A-CS CONCRETE INSERTS

MASON WEST MW-PAL-A-CS CONCRETE INSERT (4-TYP)
SHIM WITH ASTM F436 WASHERS AS REQ'D, TYP
¾" DIA. ATR AND NUT T&B (SNUG TIGHT), TYP

MW-SAP-400-B FOR ½" Ø BOLT
MW-SAP-400-C FOR ¾" Ø BOLT
MW-SAP-400-D FOR 1" Ø BOLT
SEE PAGE X6.0, TYP

ASTM A307 BOLT AND NUT, SNUG TIGHT, TYP

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

CONCRETE SLAB

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC OR SLWC

CONCRETE WALL

CONCRETE BEAM

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp^2 LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp^2 LBS</th>
<th>MAX BRACE RANGE °</th>
<th>BOLT DIA. da (INCH)</th>
<th>MIN. EDGE Cmin (INCH)</th>
<th>MIN. SPACING Smin (INCH)</th>
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</thead>
<tbody>
<tr>
<td>63A TO 63P</td>
<td>3080</td>
<td>63A TO 63P</td>
<td>3080</td>
<td>30°- 45°</td>
<td>5/6</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>63A TO 63N</td>
<td>2080</td>
<td>63A TO 63N</td>
<td>2080</td>
<td>46°- 60°</td>
<td>5/6</td>
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<tr>
<td>75A TO 75Q</td>
<td>3500</td>
<td>75A TO 75P</td>
<td>3490</td>
<td>30°- 45°</td>
<td>5/6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75A TO 75N</td>
<td>2020</td>
<td>75A TO 75N</td>
<td>2020</td>
<td>46°- 60°</td>
<td>5/6</td>
<td></td>
<td></td>
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<tr>
<td>100A TO 100Q</td>
<td>3500</td>
<td>100A TO 100P</td>
<td>3490</td>
<td>30°- 45°</td>
<td>5/6</td>
<td></td>
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<tr>
<td>100A TO 100N</td>
<td>2020</td>
<td>100A TO 100N</td>
<td>2020</td>
<td>46°- 60°</td>
<td>5/6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SEE DETAIL N0.00 FOR SECTION NOTES

* OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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PAGE N1.14

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

612 of 846
## Seismic Bracket Attachment to Concrete Slab, Beam or Wall with (1) Hilti KB-TZ Concrete Anchor

**Hilti KB-TZ Concrete Anchor, Typ**

Mason Ind. N.Y. Seismic Bracket for Solid or Cable Bracing. Brace Bracket may be rotated to any angle around concrete anchor, Typ.

### Special Inspection Req’d

- 1
- 2
- 3

### Edge Distance Perpendicular to Cmin

Edge distance perpendicular to Cmin shall be 1.5*Cmin, minimum.

### NOTE:

Concrete strength shall be between 3000 PSI to 8,500 PSI NWC. See Note 2 for attachment to SLWC.

### Table: Bracket Attachment Requirements

<table>
<thead>
<tr>
<th>Brace Bracket Attachment Type</th>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load ( F_p^2 ) LBS</th>
<th>Allowable Lateral Load ( F_p^2 ) LBS</th>
<th>Max Brace Range ( q )</th>
<th>Dia. da inch</th>
<th>Eff. Embed. hef inch</th>
<th>Hole Depth ho inch</th>
<th>Base Th. ha inch</th>
<th>Edge Cmin Inch</th>
<th>Spacing Smin Inch</th>
<th>Torque Req’d FT-LBS</th>
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<tbody>
<tr>
<td>38A TO 38D</td>
<td>38A TO 38D</td>
<td>330</td>
<td>30°-45°</td>
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<td>2</td>
<td>2⁄3</td>
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<td>4 1⁄2</td>
<td>6</td>
<td>25</td>
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<tr>
<td>38A TO 38C</td>
<td>38A TO 38C</td>
<td>200</td>
<td>30°-45°</td>
<td>3⁄4</td>
<td>2</td>
<td>2⁄3</td>
<td>4</td>
<td>4 1⁄2</td>
<td>6</td>
<td>40</td>
<td></td>
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<tr>
<td>50A TO 50E</td>
<td>50A TO 50E</td>
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<td>30°-45°</td>
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<td>2⁄3</td>
<td>4</td>
<td>4 1⁄2</td>
<td>6</td>
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<td>6</td>
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<td>2⁄3</td>
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<td>6</td>
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<td>30°-45°</td>
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<td>2</td>
<td>2⁄3</td>
<td>4</td>
<td>4 1⁄2</td>
<td>6</td>
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<tr>
<td>63A TO 63G</td>
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<td>620</td>
<td>30°-45°</td>
<td>3⁄4</td>
<td>2</td>
<td>2⁄3</td>
<td>4</td>
<td>4 1⁄2</td>
<td>6</td>
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<td>75A TO 75K</td>
<td>1050</td>
<td>30°-45°</td>
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<td>2</td>
<td>2⁄3</td>
<td>4</td>
<td>4 1⁄2</td>
<td>6</td>
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<tr>
<td>75A TO 75G</td>
<td>75A TO 75G</td>
<td>600</td>
<td>30°-45°</td>
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<td>2</td>
<td>2⁄3</td>
<td>4</td>
<td>4 1⁄2</td>
<td>6</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

### Additional Notes:

1. Overstrength factor as required for anchorage to concrete.
2. For SLWC Slab and Beam, reduce allowable lateral load by multiplying allowable load by a factor of 0.6.
3. Edge distance perpendicular to Cmin shall be 1.5*Cmin, minimum.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) HILTI KB-TZ CONCRETE ANCHORS

HILTI KB-TZ CONCRETE ANCHOR WITH MIN. $\frac{3}{4}\times\frac{1}{2}\times\frac{3}{8}$ ASTM A36 STRUT WASHER AND REG. NUT, TYP

1½x1½x1½ ASTMT A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

1½x1½x12 GA SINGLE STRUT [SOLID ONLY] MAY BE ROTATED TO ANY ANGLE, TYP

CONCRETE SLAB

CONCRETE WALL

CONCRETE BEAM

MIN. $\frac{3}{4}\times\frac{1}{2}\times\frac{3}{8}$ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

HOLE $\frac{3}{8}''$ DIA. LARGER THAN ANCHOR DIA, TYP

HILTI KB-TZ CONCRETE ANCHOR WITH MIN. $\frac{3}{4}\times\frac{1}{2}\times\frac{3}{8}$ ASTM A36 STRUT WASHER AND REG. NUT, TYP

MASON IND. N.Y. SEISMIC BRACKET FOR CABLE OR SOLID BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

ALTERNATE INSTALL

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)

CONCRETE SLAB

CONCRETE WALL

CONCRETE BEAM

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.

3 EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.

MASON WEST, INC.
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Jiefu "Jeff" Zhang, SE
California SE No. S5270

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.

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2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.

3 EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) HILTI KB-TZ CONCRETE ANCHORS

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp ( \text{lbs} )</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp ( \text{lbs} )</th>
<th>MAX BRACE RANGE ( \theta )</th>
<th>DIA. da ( \text{inch} )</th>
<th>MIN. EFF. EMBED. hef ( \text{inch} )</th>
<th>MIN. HOLE DEPTH ho ( \text{inch} )</th>
<th>MIN. BASE TH. ha ( \text{inch} )</th>
<th>MIN. EDGE Cmin ( \text{inch} )</th>
<th>MIN. SPACING Smin ( \text{inch} )</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A TO 63M</td>
<td>1930</td>
<td>63A TO 63L</td>
<td>1530</td>
<td>30°-60°</td>
<td>( \frac{3}{8} )</td>
<td>( \frac{1}{4} )</td>
<td>5</td>
<td>6</td>
<td>9( \frac{1}{6} )</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td>63A TO 63K</td>
<td>1110</td>
<td>63A TO 63K</td>
<td>1060</td>
<td>30°-60°</td>
<td>( \frac{1}{4} )</td>
<td>( \frac{1}{2} )</td>
<td>6</td>
<td>12</td>
<td>12</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

\( \Omega = 2.0 \)

HILTI KB-TZ CONCRETE ANCHOR (ICC ESR-1917)
SPECIAL INSPECTION REQ'D

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

SEE DETAIL NO.00 FOR SECTION NOTES
1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
3 EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (4) HILTI KB-TZ CONCRETE ANCHORS

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP ASTM A307 BOLT AND NUT, SNUG TIGHT, TYP MW-SAP-400-B FOR 5/8" Ø BOLT MW-SAP-400-C FOR 3/4" Ø BOLT MW-SAP-400-D FOR 1" Ø BOLT SEE PAGE X6.0, TYP

CONCRETE SLAB

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

SHIM WITH ASTM F436 WASHERS AS REQ'D, TYP 1/8 IN. DIA. NUT, TYP

HILTI KB-TZ CONCRETE ANCHOR, TYP

Cmin TYP

dha ho hef

CONCRETE WALL

CONCRETE BEAM

| BRACE BRACKET ATTACHMENT TYPE | ALLOWABLE LATERAL LOAD Fp² LBS | BRACE BRACKET ATTACHMENT TYPE | ALLOWABLE LATERAL LOAD Fp³ LBS | MAX BRACE RANGE ° | BOLT DIA. INCH | DIA. da INCH | MIN. EFF. EMBED. hef INCH | MIN. HOLE DEPTH ho INCH | MIN. BASE TH. ha INCH | MIN. EDGE SPACING Smin INCH | TORQUE REQ'D FT-LBS |
|-----------------------------|-------------------------------|-----------------------------|-------------------------------|------------------|--------------|-------------|-----------------|-----------------|----------------|-------------------|-----------------|----------------|
| 63A TO 63P                  | 3060                          | 63A TO 63P                  | 3060                          | 30° - 45°        | 3/8          | 3/8         | 5               | 6               | 9/16           | 60                |                 |
| 63A TO 63N                  | 2080                          | 63A TO 63N                  | 2080                          | 46° - 60°        | 3/4          | 3/4         | 6               | 7               | 11/16          | 60                |                 |
| 63A TO 63P                  | 3080                          | 63A TO 63P                  | 3080                          | 30° - 45°        | 3/8          | 3/8         | 5               | 6               | 9/16           | 60                |                 |
| 63A TO 63N                  | 2080                          | 63A TO 63N                  | 2080                          | 46° - 60°        | 3/4          | 3/4         | 6               | 7               | 11/16          | 60                |                 |
| 75A TO 75Q                  | 3500                          | 75A TO 75Q                  | 3500                          | 30° - 45°        | 3/8          | 3/8         | 5               | 6               | 9/16           | 60                |                 |
| 75A TO 75N                  | 2020                          | 75A TO 75N                  | 2020                          | 46° - 60°        | 3/4          | 3/4         | 6               | 12              | 12             | 60                |                 |
| 100A TO 100Q                | 3500                          | 100A TO 100Q                | 3500                          | 30° - 45°        | 1/2          | 1/2         | 6               | 12              | 12             | 60                |                 |
| 100A TO 100N                | 2020                          | 100A TO 100N                | 2020                          | 46° - 60°        | 1/2          | 1/2         | 6               | 12              | 12             | 60                |                 |

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 FOR BRACE BRACKET ATTACHMENTS WITH OVERSTRENGTH FACTOR TO SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
3 FOR BRACE BRACKET ATTACHMENTS WITH 5/8" Ø X 4" MIN. EFF. EMBED. ANCHOR AND OVERSTRENGTH FACTOR TO SLWC SLAB AND BEAM, THE ALLOWABLE LATERAL LOAD SHALL BE TAKEN AS 2530 LBS FOR 30°-45° MAX BRACE RANGE AND 1780 LBS FOR 45°-60° MAX BRACE RANGE.
4 EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (1) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE ANCHOR, TYP

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP

CONCRETE SLAB
CONCRETE WALL

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC.

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp^2 LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp^2 LBS</th>
<th>MAX BRACE RANGE °</th>
<th>MIN. EFF. EMBED. Cmin INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE Cmin ha INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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</thead>
<tbody>
<tr>
<td>38A TO 38D</td>
<td>300</td>
<td>38A TO 38D</td>
<td>300</td>
<td>30°- 45°</td>
<td>2</td>
<td>2/3</td>
<td>4</td>
<td>41/2</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>38A TO 38C</td>
<td>180</td>
<td>38A TO 38C</td>
<td>180</td>
<td>46°- 60°</td>
<td>21/2</td>
<td>4/3</td>
<td>6</td>
<td>42/2</td>
<td>91/4</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>400</td>
<td>50A TO 50E</td>
<td>400</td>
<td>30°- 45°</td>
<td>21/2</td>
<td>4/3</td>
<td>6</td>
<td>42/2</td>
<td>91/4</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>240</td>
<td>50A TO 50C</td>
<td>240</td>
<td>46°- 60°</td>
<td>21/2</td>
<td>4/3</td>
<td>6</td>
<td>42/2</td>
<td>91/4</td>
<td>40</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>610</td>
<td>63A TO 63G</td>
<td>610</td>
<td>30°- 45°</td>
<td>21/2</td>
<td>4/3</td>
<td>6</td>
<td>42/2</td>
<td>91/4</td>
<td>40</td>
</tr>
<tr>
<td>63A TO 63E</td>
<td>360</td>
<td>63A TO 63E</td>
<td>360</td>
<td>46°- 60°</td>
<td>21/2</td>
<td>4/3</td>
<td>6</td>
<td>42/2</td>
<td>91/4</td>
<td>40</td>
</tr>
</tbody>
</table>

\( \Omega_0 = 2.0^1 \)

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818)
SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>( \Omega_0 = 2.0^1 )</th>
<th>DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818)</th>
<th>SPECIAL INSPECTION REQ'D</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \Omega_0 = 2.0^1 )</td>
<td>( \Omega_0 = 2.0^1 )</td>
<td>( \Omega_0 = 2.0^1 )</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
3. EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR

SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp² LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp² LBS</th>
<th>MAX BRACE RANGE °</th>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE Cmin INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50F</td>
<td>470</td>
<td>30°- 45°</td>
<td>½</td>
<td>2</td>
<td>2½</td>
<td>4</td>
<td>4½</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50E</td>
<td>360</td>
<td>46°- 60°</td>
<td>½</td>
<td>3¼</td>
<td>4</td>
<td>6</td>
<td>4½</td>
<td>9½</td>
<td>40</td>
</tr>
</tbody>
</table>

MIN. 3⁄8x13⁄8x1½ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

MIN. 1/4x13⁄8x1½ ASTM A36 STRUT WASHER AND REG. NUT, TYP

MIN. ¼x13⁄8x1½ ASTM A36 STRUT WASHER AND REG. NUT, TYP

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

ALTERNATE INSTALL

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)

NOTE:

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2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
3. EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.

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P A G E N1.31
SEISMIC BRACKET ATTACHMENT
TO CONCRETE SLAB, BEAM OR WALL
WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

- DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP
- MW-SAP-200-B SEE PAGE X6.0, TYP
- 7/8" Ø A307 BOLT AND NUT, SNUG TIGHT, TYP

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR

- Fp
- Cmin TYP
- 12" TYP
- ha
- hef
- ho
- da

BRACE BRACKET ATTACHMENT TYPE

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD</th>
<th>MAX BRACE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A TO 63M</td>
<td>1930 lbs</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>63A TO 63K</td>
<td>1110 lbs</td>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ω0 = 2.0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
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<tbody>
<tr>
<td>30° - 45°</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>46° - 60°</td>
<td>1</td>
<td>2</td>
<td>3</td>
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</table>

- FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
- EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.

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California SE No. 55270

PAGE N1.32
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (4) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP
SHIM WITH ASTM F436 WASHERS AS REQ'D, TYP
5/8" DIA. NUT, TYP

CONCRETE SLAB

CONCRETE WALL

CONCRETE BEAM

MW-SAP-400-B FOR 5/8" Ø BOLT
MW-SAP-400-C FOR 3/4" Ø BOLT
MW-SAP-400-D FOR 1" Ø BOLT
SEE PAGE X6.0, TYP
ASTM A307 BOLT AND NUT, SNUG TIGHT, TYP
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC.
SEE NOTES 2 & 3 FOR ATTACHMENT TO SLWC

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp² LBS</th>
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<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE Cmin INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<tbody>
<tr>
<td>63A TO 63P</td>
<td>3080</td>
<td>63A TO 63P</td>
<td>2530</td>
<td>30° - 45°</td>
<td>5/8</td>
<td>2</td>
<td>3/4</td>
<td>2</td>
<td>8/4</td>
<td>80</td>
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<tr>
<td>63A TO 63N</td>
<td>2080</td>
<td>63A TO 63N</td>
<td>1750</td>
<td>45° - 60°</td>
<td>3/4</td>
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SEE DETAIL N0.00 FOR SECTION NOTES

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2. FOR BRACE BRACKET ATTACHMENTS WITHOUT OVERSTRENGTH FACTOR TO SLWC SLAB AND BEAM, THE ALLOWABLE LATERAL LOAD SHALL BE TAKEN AS 2530 LBS FOR 30°-45° MAX BRACE RANGE AND 1750 LBS FOR 46°-60° MAX BRACE RANGE.
3. FOR BRACE BRACKET ATTACHMENTS WITH OVERSTRENGTH FACTOR TO SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
4. EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE SLAB, BEAM OR WALL
WITH (1) MASON IND. N.Y. SAS(E) CONCRETE ANCHOR

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<th>ALLOWABLE LATERAL LOAD Fp² LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
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<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE Cmin INCH</th>
<th>MIN. SPACING Smin INCH</th>
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<td>6</td>
<td>9</td>
<td>15</td>
<td>150</td>
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NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

\[ \Omega_0 = 2.0^{1} \]

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.
3. EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.

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SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR WITH STRUT WASHER AND REG. NUT, TYP

MW-SSN-½ W/ MW-BON-½ TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)

MASON IND. N.Y. SEISMIC BRACKET FOR CABLE OR SOLID BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)

MIN. ¾ x 1" x 1½ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

CONCRETE SLAB

CONCRETE WALL

CONCRETE BEAM

LETTER DESIGNATING ANCHOR LENGTH

SAS(E) IDENTIFICATION

MASON IND. N.Y. SAS(E) CONCRETE ANCHORS
(ICC ESR-3037)

SPECIAL INSPECTION REQ'D

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

STRUT WASHER, TYP ASTM A36

NOTE:
CONCRETE STRENGTH
SHALL BE BETWEEN 3000
PSI TO 8,500 PSI NWC.
SEE NOTE 2 FOR ATTACHMENT
TO SLWC

ALTERNATE INSTALL

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

2 FOR BRACE BRACKET ATTACHMENTS WITH OVERTRENGTH FACTOR TO SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.6.

3 EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE SLAB, BEAM OR WALL
WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

<table>
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<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p^2$ LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p^2$ LBS</th>
<th>MAX BRACE RANGE $\theta$</th>
<th>DIA. ha INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE Cmin INCH</th>
<th>MIN. SPACING Smin INCH</th>
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<td>1930</td>
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<td>$5\frac{1}{8}$</td>
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<tr>
<td>63A TO 63K</td>
<td>1110</td>
<td>63A TO 63K</td>
<td>1110</td>
<td>46° - 60°</td>
<td>$\frac{5}{8}$</td>
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<td>13$\frac{1}{2}$</td>
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NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC.
**Seismic Bracket Attachment to Concrete Slab, Beam or Wall**

WITH (4) MASON IND. N.Y. SAS(E) Concrete Anchors

---

**Diagram:**

- MASON IND. N.Y. SAS(E) Concrete Anchor, Typ
- Shim with ASTM F436 Washers as REQ'D, Typ
- 5/8" Dia. Nut, Typ
- MW-SAP-400-B for 5/8"Ø Bolt
- MW-SAP-400-C for 3/4"Ø Bolt
- MW-SAP-400-D for 1"Ø Bolt
- See Page X6.0, Typ
- ASTM A307 Bolt and Nut, Snug Tight, Typ
- MASON IND. N.Y. Seismic Bracket for Solid or Cable Bracing. Bracket may be rotated to any angle around bolt, Typ

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**Allowable Lateral Load (Fp)**

<table>
<thead>
<tr>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load (Fp) LBS</th>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load (Fp) LBS</th>
<th>Max Brace Range</th>
<th>Bolt Dia. Inch</th>
<th>Min. Eff. Embed. (hef) Inch</th>
<th>Min. Hole Depth (ho) Inch</th>
<th>Min. Base Th. (ha) Inch</th>
<th>Min. Edge Cmin Inch</th>
<th>Min. Spacing Smin Inch</th>
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<td>5½</td>
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<td>7</td>
<td>13½</td>
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<td>30°-45°</td>
<td>7/16</td>
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<td>5½</td>
<td>8</td>
<td>7</td>
<td>13½</td>
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<td>5½</td>
<td>8</td>
<td>7</td>
<td>13½</td>
<td>90</td>
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See Detail No.00 for Section Notes

1. Overstrength Factor as required for anchorage to concrete.
2. For brace bracket attachments with overstrength factor to SLWC slab and beam, the allowable lateral load shall be taken as 2780 LBS for 30°-45° Max Brace Range and 1910 LBS for 46°-60° Max Brace Range.
3. Edge distance perpendicular to Cmin shall be 1.5*Cmin, minimum.

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**Jiefu "Jeff" Zhang, SE**

California SE No. S5270

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**Page N1.43**

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California SE No. S5270

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**Page N1.43**
**SEISMIC BRACKET ATTACHMENT**
TO CONCRETE SLAB, BEAM OR WALL
WITH (1) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR

---

**Diagram**

- **Concrete Slab**
- **Concrete Wall**
- **Concrete Beam**

---

**Table:**

<table>
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<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p^2$ LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p^2$ LBS</th>
<th>MAX BRACE RANGE</th>
<th>DIA. $da$ INCH</th>
<th>MIN. EFF. EMBED. $hef$ INCH</th>
<th>MIN. HOLE DEPTH $ho$ INCH</th>
<th>MIN. BASE TH. $ha$ INCH</th>
<th>MIN. EDGE $Cmin$ INCH</th>
<th>MIN. SPACING $Smin$ INCH</th>
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**Note:**
- **Concrete Wall Strength:** Shall be between 3000 PSI to 8,500 PSI NWC. See Note 2 for attachment to SLWC.
- **Overstrength Factor:** As required for anchorage to concrete.
- **For SLWC Slab and Beam:** Reduce allowable lateral load by multiplying allowable load by a factor of 0.68.
- **Edge Distance Perpendicular to $Cmin$:** Shall be 1.5\(Cmin\), minimum.

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**Page 1 of 2**

**Jeffrey Y. Kikumoto**
OPM-0043-13
10/09/2020

**OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto**
625 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

<table>
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<th>ALLOWABLE LATERAL LOAD Fp² LBS</th>
<th>MAX. BRACE RANGE °</th>
<th>DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR (ICC ESR-2502) SPECIAL INSPECTION REQ'D</th>
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<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE Cmin INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<td>520</td>
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NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC.

1 OVERTENSION FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
3 EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.

MASON WEST, INC.
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Jeffrey Y. Kikumoto  OPM-0043-13  10/09/2020

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
3 EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.
### SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

#### SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p$ LBS</th>
<th>MAX BRACE RANGE $\phi$</th>
<th>MIN. BASE TH. $ha$ INCH</th>
<th>MIN. HOLE DEPTH $hef$ INCH</th>
<th>MIN. HOLE EMB. $he$ INCH</th>
<th>MIN. EFF. EMBED. $ha$ INCH</th>
<th>MAX. DIA. $da$ INCH</th>
<th>MIN. SPACING $S_{min}$ INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<td>63A TO 63M</td>
<td>1930</td>
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<td>3/4</td>
<td>4/4</td>
<td>6</td>
<td>6</td>
<td>9/4</td>
</tr>
<tr>
<td>63A TO 63K</td>
<td>1110</td>
<td>$46^\circ-60^\circ$</td>
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<td>6</td>
<td>3/4</td>
<td>4/4</td>
<td>6</td>
<td>6</td>
<td>9/4</td>
</tr>
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#### NOTE:

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2. FOR BRACE BRACKET ATTACHMENTS WITHOUT OVERSTRENGTH FACTOR TO SLWC SLAB AND BEAM, THE ALLOWABLE LATERAL LOAD SHALL BE TAKEN AS 1870 LBS FOR $30^\circ-45^\circ$ MAX BRACE RANGE.
3. FOR BRACE BRACKET ATTACHMENTS WITH OVERSTRENGTH FACTOR TO SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
4. EDGE DISTANCE PERPENDICULAR TO $C_{min}$ SHALL BE 1.5"$C_{min}$, MINIMUM.

---

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---

**Jiefu "Jeff" Zhang, SE**
California SE No. S5270
SEISMIC BRACKET ATTACHMENT
TO CONCRETE SLAB, BEAM OR WALL
WITH (4) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

**CONCRETE WALL**

**CONCRETE BEAM**

**CONCRETE SLAB**

### Table of Allowable Lateral Load

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<tr>
<td>63A TO 63P</td>
<td>3080</td>
<td>63A TO 63P</td>
<td>3080</td>
<td>30° - 45°</td>
<td>5/8</td>
<td>3/4</td>
<td>9/4</td>
<td>6</td>
<td>9/4</td>
<td>6</td>
<td>60</td>
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<td>3/4</td>
<td>9/4</td>
<td>6</td>
<td>9/4</td>
<td>6</td>
<td>60</td>
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<td>3500</td>
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<td>3/4</td>
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<td>9/4</td>
<td>6</td>
<td>60</td>
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<td>3/4</td>
<td>9/4</td>
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<td>9/4</td>
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<td>6</td>
<td>9/4</td>
<td>6</td>
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</table>

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2. FOR BRACE BRACKET ATTACHMENTS WITH OVERSTRENGTH FACTOR TO SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
3. EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.

**NOTE:**
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (1) CONCRETE SCREW ANCHOR

CONCRETE SCREW ANCHOR, TYP

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE ANCHOR, TYP

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

CONCRETE SLAB

CONCRETE WALL

DEWALT/POWERS SCREW-BOLT+ CONCRETE SCREW ANCHOR

(SPECIFICATION ESR-3889)

SPECIAL INSPECTION REQ'D

CONCRETE BEAM

\[ \Omega_0 = 2.0^{1/3} \]

Max Allowable Lateral Load, LBS

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD, Fp^2</th>
<th>MAX BRACE RANGE, °</th>
<th>DIA. da</th>
<th>MIN. EFF. EMBED. hef</th>
<th>MIN. HOLE DEPTH ho</th>
<th>MIN. BASE TH. ha</th>
<th>MIN. EDGE Cmin</th>
<th>MIN. SPACING smin</th>
<th>Max Torque FT-LBS</th>
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<tbody>
<tr>
<td>38A TO 38E</td>
<td>410</td>
<td>30° - 45°</td>
<td>%</td>
<td>3/8</td>
<td>3/32</td>
<td>3/32</td>
<td>3/32</td>
<td>7/32</td>
<td>4</td>
</tr>
<tr>
<td>38A TO 38D</td>
<td>250</td>
<td>30° - 45°</td>
<td>%</td>
<td>1/4</td>
<td>3/32</td>
<td>3/32</td>
<td>3/32</td>
<td>7/32</td>
<td>8</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>380</td>
<td>30° - 45°</td>
<td>%</td>
<td>1/4</td>
<td>3/32</td>
<td>3/32</td>
<td>3/32</td>
<td>7/32</td>
<td>8</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>230</td>
<td>30° - 45°</td>
<td>%</td>
<td>2/9</td>
<td>4/32</td>
<td>6/32</td>
<td>4/32</td>
<td>9/32</td>
<td>12</td>
</tr>
<tr>
<td>50A TO 50H</td>
<td>720</td>
<td>30° - 45°</td>
<td>%</td>
<td>3/8</td>
<td>4/32</td>
<td>6/32</td>
<td>4/32</td>
<td>9/32</td>
<td>12</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>430</td>
<td>30° - 45°</td>
<td>%</td>
<td>3/8</td>
<td>4/32</td>
<td>6/32</td>
<td>6/32</td>
<td>9/32</td>
<td>12</td>
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<td>63A TO 63E</td>
<td>420</td>
<td>30° - 45°</td>
<td>%</td>
<td>2/9</td>
<td>4/32</td>
<td>6/32</td>
<td>4/32</td>
<td>8/32</td>
<td>10</td>
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<td>%</td>
<td>3/8</td>
<td>5/32</td>
<td>7/32</td>
<td>5/32</td>
<td>11/32</td>
<td>14</td>
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<td>%</td>
<td>3/8</td>
<td>5/32</td>
<td>7/32</td>
<td>5/32</td>
<td>11/32</td>
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<td>%</td>
<td>3/8</td>
<td>4/32</td>
<td>6/32</td>
<td>4/32</td>
<td>9/32</td>
<td>10</td>
</tr>
</tbody>
</table>

SEE DETAIL NO. 00 FOR SECTION NOTES

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
3. EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.
4. SEE PAGE N1.70.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.

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Jiefu “Jeff” Zhang, SE
California SE No. S5270

PAGE
N1.70

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

629 of 846
SEISMIC BRACKET ATTACHMENT 
TO CONCRETE SLAB, BEAM OR WALL 
WITH (1) CONCRETE SCREW ANCHOR

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp² LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp² LBS</th>
<th>MAX BRACE RANGE</th>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE Cmin INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MAX TORQUE FT-LBS</th>
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<td>38A TO 38C</td>
<td>200</td>
<td>38A TO 38C</td>
<td>200</td>
<td>30°- 45°</td>
<td>½</td>
<td>1¾</td>
<td>2¾</td>
<td>4</td>
<td>2⅛ ⅛ ⅛ ⅛</td>
<td>5½</td>
<td>50</td>
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<td>120</td>
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<td>46°- 60°</td>
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<td>2⅛</td>
<td>3¾</td>
<td>5</td>
<td>3½ ⅛ ⅛ ⅛</td>
<td>7½</td>
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<td>3</td>
<td>4½</td>
<td>6</td>
<td>4½ ⅛ ⅛ ⅛</td>
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<td>50A TO 50D</td>
<td>280</td>
<td>46°- 60°</td>
<td>⅛</td>
<td>⅛</td>
<td>⅛</td>
<td>⅛</td>
<td>⅛ ⅛ ⅛ ⅛</td>
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<td>⅛</td>
<td>⅛</td>
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<td>⅛ ⅛ ⅛ ⅛</td>
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<td>⅛</td>
<td>⅛</td>
<td>⅛</td>
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<td>⅛</td>
<td>⅛</td>
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<td>100</td>
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<td>290</td>
<td>63A TO 63D</td>
<td>290</td>
<td>46°- 60°</td>
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<td>⅛</td>
<td>⅛</td>
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<td>⅛ ⅛ ⅛ ⅛</td>
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<td>890</td>
<td>63A TO 63J</td>
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<td>⅛</td>
<td>⅛</td>
<td>⅛</td>
<td>⅛ ⅛ ⅛ ⅛</td>
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<td>63A TO 63F</td>
<td>520</td>
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<td>⅛</td>
<td>⅛</td>
<td>⅛</td>
<td>⅛ ⅛ ⅛ ⅛</td>
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<td>75A TO 75J</td>
<td>980</td>
<td>30°- 45°</td>
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<td>⅛</td>
<td>⅛</td>
<td>⅛ ⅛ ⅛ ⅛</td>
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<td>75A TO 75F</td>
<td>570</td>
<td>46°- 60°</td>
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<td>⅛</td>
<td>⅛</td>
<td>⅛</td>
<td>⅛ ⅛ ⅛ ⅛</td>
<td>⅛</td>
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See Detail No. 00 for Section Notes

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
3. EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.

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OPM-0043-13
10/09/2020
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) CONCRETE SCREW ANCHOR

MIN. 3/8" x 1 1/2" ASTM A36 STRUT WASHER, TYP
HOLE 3/8" DIA. LARGER THAN ANCHOR DIA, TYP

MASON IND. N.Y. SEISMIC BRACKET FOR CABLE OR SOLID BRACING.
BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

CONCRETE SLAB
CONCRETE WALL
CONCRETE BEAM

1/4" MIN FOR POWERS
3/8" MIN FOR MASON
1/2" MIN FOR HILTI

CONCRETE SCREW ANCHOR, TYP
1 1/2" x 1 1/2" x 12 GA SINGLE STRUT (SOLID ONLY) MAY BE ROTATED TO ANY ANGLE, TYP

1" MIN, TYP
EQ
10"

OVERSIZED NUT, TYP

ALTERNATE INSTALL

STRUT WASHER, TYP

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

1 SEE PAGE N1.71.1 FOR ALLOWABLE LOAD TABLES.
# Seismic Bracket Attachment

## To Concrete Slab, Beam or Wall

### With (2) Concrete Screw Anchor

#### O\(_0\) = 2.0\(^1\)

<table>
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<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD (F_p^2) LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD (F_p^2) LBS</th>
<th>MAX BRACE RANGE</th>
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<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30(^\circ) - 45(^\circ)</td>
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<tr>
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<td>530</td>
<td>50A TO 50F</td>
<td>490</td>
<td>46(^\circ) - 60(^\circ)</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>600</td>
<td>30(^\circ) - 45(^\circ)</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>450</td>
<td>46(^\circ) - 60(^\circ)</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30(^\circ) - 45(^\circ)</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>530</td>
<td>46(^\circ) - 60(^\circ)</td>
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#### O\(_0\) = 2.0\(^1\)

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<th>BRACE BRACKET ATTACHMENT TYPE</th>
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<th>BRACE BRACKET ATTACHMENT TYPE</th>
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<td>50A TO 50D</td>
<td>320</td>
<td>30(^\circ) - 45(^\circ)</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>390</td>
<td>50A TO 50C</td>
<td>230</td>
<td>46(^\circ) - 60(^\circ)</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30(^\circ) - 45(^\circ)</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>530</td>
<td>46(^\circ) - 60(^\circ)</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30(^\circ) - 45(^\circ)</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>530</td>
<td>46(^\circ) - 60(^\circ)</td>
</tr>
</tbody>
</table>

#### O\(_0\) = 2.0\(^1\)

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<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD (F_p^2) LBS</th>
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#### Special Inspection Req’d

**DEWALT/POWERS Screw-Bolt+**

**Concrete Screw Anchor**

(ICC ESR-3889)

- **MIN. EFF. EMBED.**
- **MIN. HOLE DEPTH**
- **MIN. BASE TH.**
- **MIN. EDGE**
- **MIN. SPACING**
- **MAX SPACING**
- **MAX TORQUE**

---

**MASON IND. N.Y. SAST Concrete Screw Anchor**

(ICC ESR-2713)

**HILTI KH-EZ Concrete Screw Anchor**

(ICC ESR-3027)

---

SEE DETAIL No. 00 FOR SECTION NOTES

1. **OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.**
2. **FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.**
3. **EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.**

---

**MASON WEST, INC.**

1601 E. Miraloma Ave. Placentia, CA 92870

TEL (714) 630 - 0701, www.masonwest.com

---

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

632 of 846
SEISMIC BRACKET ATTACHMENT
TO CONCRETE SLAB, BEAM OR WALL
WITH (2) CONCRETE SCREW ANCHORS

\( \Omega_0^2 = 2.0^1 \)

| BRACE BRACKET ATTACHMENT TYPE | ALLOWABLE LATERAL LOAD \( F_p \) LBS | BRACE BRACKET ATTACHMENT TYPE | ALLOWABLE LATERAL LOAD \( F_p \) LBS | MAX BRACE RANGE \( \phi \) | DIA. \( \text{ha} \) \( \text{INCH} \) | MIN. EFF. EMBED. \( \text{hef} \) \( \text{INCH} \) | MIN. HOLE DEPTH \( \text{ho} \) \( \text{INCH} \) | MIN. BASE TH. \( \text{ha} \) \( \text{INCH} \) | MIN. EDGE Cmin \( \text{INCH} \) | MIN. SPACING Smin \( \text{INCH} \) | MAX TORQUE FT-LBS |
|------------------------------|----------------------------------|------------------------------|----------------------------------|-----------------|--------|------------------|--------|------------------|--------|------------------|--------|------------------|
| 63A TO 63L                   | 1530                             | 63A TO 63J                   | 920                              | 30°-45°          | %      | 2/4              | 4/4    | 6                | 4/6    | 8                | 4/6    | 60               |
| 63A TO 63K                   | 1010                             | 63A TO 63G                   | 610                              | 46°-60°          | %      | 3/4              | 5/4    | 7                | 5/4    | 11/4             | 5/4    | 60               |
| 63A TO 63M                   | 1930                             | 63A TO 63L                   | 1290                             | 30°-45°          | %      | 3/4              | 5/4    | 7                | 5/4    | 11/4             | 5/4    | 60               |
| 63A TO 63K                   | 1110                             | 63A TO 63J                   | 850                              | 46°-60°          | %      | 3/4              | 5/4    | 7                | 5/4    | 11/4             | 5/4    | 60               |

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 8,500 PSI NWC.
SEE NOTE 2 FOR ATTACHMENT TO SLWC

SEE DETAIL N0.00 FOR SECTION NOTES
1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
3 EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5\( Cmin \) MINIMUM.
4 SEE PAGE N1.72.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.

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Jeffrey Y. Kikumoto  
OPM-0043-13  
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
633 of 846
### SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) CONCRETE SCREW ANCHORS

Ω₀ = 2.0

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<th>BRACE BRACKET ATTACHMENT TYPE</th>
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<th>MAX BRACE RANGE °</th>
<th>DIA. da INCH</th>
<th>MIN. EFF. hEF hEF INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE CMIN INCH</th>
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<td>4 1/2</td>
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<td>8 1/2</td>
<td>6 1/4</td>
<td>12 1/4</td>
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### MASON IND. N.Y. SAST CONCRETE SCREW ANCHOR (ICC ESR-2713) SPECIAL INSPECTION REQ'D

Ω₀ = 2.0

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<th>BRACE BRACKET ATTACHMENT TYPE</th>
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<th>MIN. EFF. hEF hEF INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE CMIN INCH</th>
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<td>1110</td>
<td>46° - 60°</td>
<td>3/4</td>
<td>5</td>
<td>7</td>
<td>5 1/4</td>
<td>11 1/4</td>
<td>85</td>
<td></td>
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See detail no.00 for section notes

1. Overstrength factor as required for anchorage to concrete.
2. For SLWC slab and beam, reduce allowable lateral load by multiplying allowable load by a factor of 0.68.
3. Edge distance perpendicular to Cmin shall be 1.5°Cmin, minimum.

Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020  
634 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (4) CONCRETE SCREW ANCHORS

CONCRETE SCREW ANCHOR, TYP
SHIM WITH ASTM F436 WASHERS AS REQ'D, TYP
OVERSIZED NUT, TYP

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

CONCRETE SLAB
CONCRETE WALL
CONCRETE BEAM

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<th>BRACE BRACKET ATTACHMENT TYPE</th>
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<th>MIN. EFF. EMBED. DIA. INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE Cmin INCH</th>
<th>MIN. SPACING Smin INCH</th>
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<td>6</td>
<td>4¼</td>
<td>8½</td>
<td>60</td>
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<td>4½</td>
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<td>4¾</td>
<td>8½</td>
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<td>5½</td>
<td>7</td>
<td>5¼</td>
<td>11½</td>
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SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
3 EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.
4 SEE PAGE N1.73.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.

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Jiefu “Jeff” Zhang, SE
California SE No. S5270

PAGE N1.73

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
635 of 846
# SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (4) CONCRETE SCREW ANCHORS

## MASON IND. N.Y. SAST CONCRETE SCREW ANCHOR (ICC ESR-2713) SPECIAL INSPECTION REQ'D

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<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp² LBS</th>
<th>MAX BRACE RANGE Ø</th>
<th>BOLT DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE Cmin INCH</th>
<th>MIN. SPACING Smin INCH</th>
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## HILTI KH-EZ CONCRETE SCREW ANCHOR (ICC ESR-3027) SPECIAL INSPECTION REQ'D

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<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp² LBS</th>
<th>MAX BRACE RANGE Ø</th>
<th>BOLT DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. BASE TH. ha INCH</th>
<th>MIN. EDGE Cmin INCH</th>
<th>MIN. SPACING Smin INCH</th>
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<td>8 1/2</td>
<td>12 1/2</td>
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SEE DETAIL NO.00 FOR SECTION NOTES

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.68.
3. EDGE DISTANCE PERPENDICULAR TO Cmin SHALL BE 1.5*Cmin, MINIMUM.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (1) HILTI KCM-WF/PD CONCRETE INSERT

HILTI KCM-WF/PD CONCRETE INSERT, TYP

MEMBER ATTACHMENT

HILTI KCM-WF/PD CONCRETE INSERT, TYP

ATR² AND NUT (SNUG TIGHT), TYP.

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE INSERT, TYP.

HILTI KCM-WF/PD CONCRETE INSERT (ICC ESR-4145) SPECIAL INSPECTION REQ'D

MIN. EDGE Cmin (INCH)

MIN. SPACING Smin (INCH)

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

Allowable Lateral Load Fp² LBS

MIN. EFF. EMBED. hef INCH

MIN. BASE TH. ha INCH

MIN. EDGE Cmin (INCH)

MIN. SPACING Smin (INCH)

**See Detail No.00 for Section Notes**

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
3. ATR SHALL BE ASTM A93 GR. B7, ASTM A325, OR ASTM F1554 GR. 105.

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N1.80

637 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) HILTI KCM-WF/PD CONCRETE INSERT

MASON IND. N.Y. SEISMIC BRACKET FOR CABLE OR SOLID BRACING.

BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

HILTI KCM-WF/PD CONCRETE INSERT, TYP

MIN. 3/8×1"×1 1/2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT) TYP

1½x1½x12GA SINGLE STRUT (SOLID ONLY) MAY BE ROTATED TO ANY ANGLE, TYP

ALTERNATE INSTALL

SEISMIC BRACKET ATTACHMENT TYPE | ALLOWABLE LATERAL LOAD Fp² LBS | BRACE BRACKET ATTACHMENT TYPE | ALLOWABLE LATERAL LOAD Fp² LBS | MAX BRACE RANGE ° | BOLT DIA. INCH | INSERT COLOR | DIA. da (INCH) | MIN. EFF. EMBED. hef INCH | MIN. BASE TH. ha INCH | MIN. EDGE Cmin (INCH) | MIN. SPACING Smin (INCH)
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
50A TO 50G | 620 | 50A TO 50F | 570 | 30° - 45° | 1/2 | RED | 0.87 | 2 | 3 | 3 1/2 | 6 1/2
50A TO 50F | 530 | 50A TO 50E | 400 | 46° - 60° | 1/2 | RED | 1.02 | 3 | 4 | 4 1/2 | 9
63A TO 63G | 620 | 63A TO 63F | 490 | 30° - 45° | 5/8 | GREY | 0.87 | 2 | 3 | 3 1/4 | 6 1/2
63A TO 63F | 530 | 63A TO 63E | 400 | 46° - 60° | 5/8 | GREY | 1.02 | 3 | 4 | 4 1/2 | 9
63A TO 63G | 620 | 63A TO 63F | 530 | 30° - 45° | 5/8 | GREY | 0.87 | 2 | 3 | 3 1/4 | 6 1/2
63A TO 63F | 530 | 63A TO 63E | 620 | 46° - 60° | 5/8

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2. FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
3. ATR SHALL BE ASTM A93 GR. B7, ASTM A325, OR ASTM F1554 GR. 105.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (1) DEWALT/POWERS WOOD-KNOCKER/WOOD-KNOCKER II+ CONCRETE INSERT

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

DEWALT/POWERS WOOD-KNOCKER OR WOOD-KNOCKER II+ CONCRETE INSERT, TYP
ASTM A36 ATR AND NUT (SNUG TIGHT), TYP
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE INSERT, TYP

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

ALLOWABLE LATERAL LOAD
Fp² LBS

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp² LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp² LBS</th>
<th>MAX BRACE RANGE</th>
<th>ATR DIA. INCH</th>
<th>DIA. da (INCH)</th>
<th>MIN EDGE Cmin (INCH)</th>
<th>MIN SPACING Smin (INCH)</th>
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<tr>
<td>38A TO 38E</td>
<td>410</td>
<td>38A TO 38D</td>
<td>250</td>
<td>30°-45°</td>
<td>½</td>
<td>0.7 (3/4&quot;Ø)</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>38A TO 38D</td>
<td>330</td>
<td>38A TO 38C</td>
<td>200</td>
<td>46°-60°</td>
<td>½</td>
<td>0.7 (3/4&quot;Ø)</td>
<td>3</td>
<td>6</td>
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<tr>
<td>50A TO 50E</td>
<td>410</td>
<td>50A TO 50D</td>
<td>250</td>
<td>30°-45°</td>
<td>3/2</td>
<td>1.0 (3/4&quot;Ø)</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>330</td>
<td>50A TO 50C</td>
<td>200</td>
<td>46°-60°</td>
<td>3/2</td>
<td>1.0 (3/4&quot;Ø)</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>63A TO 63E</td>
<td>440</td>
<td>63A TO 63D</td>
<td>270</td>
<td>30°-45°</td>
<td>¾</td>
<td>1.0 (3/4&quot;Ø)</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>63A TO 63D</td>
<td>360</td>
<td>63A TO 63C</td>
<td>210</td>
<td>46°-60°</td>
<td>¾</td>
<td>1.0 (3/4&quot;Ø)</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>75A TO 75E</td>
<td>440</td>
<td>75A TO 75D</td>
<td>270</td>
<td>30°-45°</td>
<td>¾</td>
<td>1.0 (3/4&quot;Ø)</td>
<td>3</td>
<td>6</td>
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<tr>
<td>75A TO 75D</td>
<td>360</td>
<td>75A TO 75C</td>
<td>210</td>
<td>46°-60°</td>
<td>¾</td>
<td>1.0 (3/4&quot;Ø)</td>
<td>3</td>
<td>6</td>
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See Detail No. 00 for Section Notes

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) DEWALT/POWERS WOOD-KNOCKER/WOOD-KNOCKER II+ CONCRETE INSERT

MIN. 3/4x1 1/2x1 1/2 ASTM A36 STRUT WASHER, TYP
HOLE 3/8" DIA. LARGER THAN ANCHOR DIA, TYP

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC OR SLWC.

ALTERNATE INSTALL

DEWALT/POWERS WOOD-KNOCKER OR WOOD-KNOCKER II+ CONCRETE INSERT, TYP
ASTM A36 ATR, MIN. 3/4x1 1/2x1 1/2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT) TYP
1 1/4x1 1/2x12GA SINGLE STRUT (SOLID ONLY) MAY BE ROTATED TO ANY ANGLE, TYP

MASON IND. N.Y. SEISMIC BRACKET FOR CABLE OR SOLID BRACING.
BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

BRACE BRACKET ATTACHMENT TYPE | ALLOWABLE LATERAL LOAD Fp² LBS | ALLOWABLE LATERAL LOAD Fp² LBS | MAX BRACE RANGE ATR DIA. INCH | MAX BRACE RANGE Cmin INCH | MIN. EDGE Spacing Smin INCH
--- | --- | --- | --- | --- | ---
50A TO 50G | 620 | 50A TO 50F | 530 | 50A TO 50E | 400 | 620 | 50A TO 50G | 490 | 30°-45° | 5/8 | 0.7 (1/2") | 3 | 6
50A TO 50F | 530 | 50A TO 50E | 400 | 46°-60° | 5/8 | 0.7 (1/2") | 3 | 6
50A TO 50G | 620 | 50A TO 50F | 530 | 50A TO 50E | 430 | 30°-45° | 3/8 | 1.0 (3/8") | 3 | 6

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC OR SLWC.

SEE DETAIL NO.00 FOR SECTION NOTES
1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE SLAB, BEAM OR WALL
WITH (2) DEWALT/POWERS WOOD-KNOCKER/WOOD-KNOCKER II+ CONCRETE INSERT

NOTE:
CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC. SEE NOTE 2 FOR ATTACHMENT TO SLWC

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

MAX ALLOWABLE LATERAL LOAD
Fp ≥ 1.0 (5/8"Ø)

MIN. SPACING Smin (INCH)
6

MIN. EDGE Cmin (INCH)
3

DEWALT/POWERS WOOD-KNOCKER OR WOOD-KNOCKER II+ CONCRETE INSERT (ICC ESR-3657)
SPECIAL INSPECTION REQ’D

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SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.
# Seismic Bracket Attachment to Concrete Slab, Beam or Wall

With (4) Dewalt/Powers Wood-Knocker/Wood-Knocker II+ Concrete Insert

## Technical Details

### Bracket Attachment Types

<table>
<thead>
<tr>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load $F_p$ (LBS)</th>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load $F_p$ (LBS)</th>
<th>Max Brace Range $\theta$</th>
<th>Bolt Dia. $da$ (INCH)</th>
<th>Min. Edge Cmin (INCH)</th>
<th>Min. Spacing Smin (INCH)</th>
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</thead>
<tbody>
<tr>
<td>63A TO 63M</td>
<td>1770</td>
<td>63A TO 63K</td>
<td>1060</td>
<td>30° - 45°</td>
<td>5/8</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>63A TO 63L</td>
<td>1420</td>
<td>63A TO 63J</td>
<td>850</td>
<td>46° - 60°</td>
<td>3/4</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>75A TO 75M</td>
<td>1770</td>
<td>75A TO 75K</td>
<td>1060</td>
<td>30° - 45°</td>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>75A TO 75L</td>
<td>1420</td>
<td>75A TO 75J</td>
<td>850</td>
<td>46° - 60°</td>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>100A TO 100M</td>
<td>1770</td>
<td>100A TO 100K</td>
<td>1060</td>
<td>30° - 45°</td>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>100A TO 100L</td>
<td>1420</td>
<td>100A TO 100J</td>
<td>850</td>
<td>46° - 60°</td>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

### Notes

1. Overstrength factor as required for anchorage to concrete.
2. For SLWC Slab and Beam, reduce allowable lateral load by multiplying allowable load by a factor of 0.85.

---

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Jeffrey Y. Kikumoto

OPM-0043-13

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

642 of 846
### Seismic Bracket Attachment

**To Concrete Slab, Beam or Wall**

With (1) CADDY CRLW Concrete Insert

**CADDY CRLW Concrete Insert, TYP**

ASTM A36 ATR and Nut (Snug Tight), TYP

MASON IND. N.Y. Seismic Bracket for Solid or Cable Bracing. Bracket may be rotated to any angle around concrete insert, TYP

**Concrete Slab**

**Concrete Wall**

**Concrete Beam**

---

**Note:**

Concrete strength shall be between 3000 PSI to 10,000 PSI NWC. See Note 2 for attachment to SLWC.

---

### Allowable Lateral Load Table

<table>
<thead>
<tr>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load Fp LBS</th>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load Fp LBS</th>
<th>Max Brace Range °</th>
<th>ATR Dia. Inch</th>
<th>Dia. da (INCH)</th>
<th>Min. Edge Cmin (INCH)</th>
<th>Min. Spacing Smin (INCH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A to 38G</td>
<td>590</td>
<td>38A to 38E</td>
<td>350</td>
<td>30°-45°</td>
<td>$\frac{3}{8}$</td>
<td>0.61 (0.75&quot;Ø)</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>38A to 38F</td>
<td>460</td>
<td>38A to 38D</td>
<td>270</td>
<td>46°-60°</td>
<td>$\frac{3}{8}$</td>
<td>0.71 (0.75&quot;Ø)</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>50A to 50G</td>
<td>600</td>
<td>50A to 50E</td>
<td>360</td>
<td>30°-45°</td>
<td>$\frac{1}{2}$</td>
<td>0.61 (0.75&quot;Ø)</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>50A to 50F</td>
<td>460</td>
<td>50A to 50D</td>
<td>280</td>
<td>46°-60°</td>
<td>$\frac{1}{2}$</td>
<td>0.71 (0.75&quot;Ø)</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

---

**Allowable Lateral Load (Fp)**

- 30°-45°: 590 LBS
- 46°-60°: 460 LBS

**Max Brace Range**

- 30°-45°: $\frac{3}{8}$ Inch
- 46°-60°: $\frac{1}{2}$ Inch

**Overstrength Factor**

As required for anchorage to concrete.

1. For SLWC slab and beam, reduce allowable lateral load by multiplying allowable load by a factor of 0.85.

---

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**PAGE N1.110**
SEISMIC BRACKET ATTACHMENT TO CONCRETE SLAB, BEAM OR WALL WITH (2) CADDY CRLW CONCRETE INSERT

ASTM A36 ATR, MIN. 3/16 x 1 1/2 x 3/16 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT) TYP

1 1/2 x 1 1/2 x 12GA SINGLE STRUT (SOLID ONLY) MAY BE ROTATED TO ANY ANGLE, TYP

ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

ALTERNATE INSTALL

CADDY CRLW CONCRETE INSERT, TYP

NOTE: CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC OR SLWC.

CONCRETE SLAB

CONCRETE BEAM

CONCRETE WALL

MIN. 3/16 x 1 1/2 x 3/16 ASTM A36 STRUT WASHER, TYP

HOLE 3/8" DIA. LARGER THAN ANCHOR DIA, TYP

NOTE: OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

1 FOR SLWC SLAB AND BEAM, REDUCE ALLOWABLE LATERAL LOAD BY MULTIPLYING ALLOWABLE LOAD BY A FACTOR OF 0.85.

2 SEE DETAIL NO.00 FOR SECTION NOTES

<table>
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<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p$ LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p$ LBS</th>
<th>MAX BRACE RANGE $\delta$</th>
<th>ATR DIA. da (INCH)</th>
<th>MIN. EDGE Cmin (INCH)</th>
<th>MIN. SPACING Smin (INCH)</th>
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<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30°-45°</td>
<td>3/16</td>
<td>0.61 ($\frac{3}{8}$&quot;)</td>
<td>6</td>
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<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>530</td>
<td>46°-60°</td>
<td>3/16</td>
<td>0.71 ($\frac{1}{2}$&quot;)</td>
<td>6</td>
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CADDY CRLW CONCRETE INSERT (ICC ESR-3864) SPECIAL INSPECTION REQ'D

NOTE:

CONCRETE STRENGTH SHALL BE BETWEEN 3000 PSI TO 10,000 PSI NWC OR SLWC.

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PAGE N1.111
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) MASON WEST MW-PAL-A-MD CONCRETE INSERT

MIN. 20 GA TYPE W3 STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MASON WEST MW-PAL-A-MD CONCRETE INSERT WITH 
7/8” TO 5/8” DIA. ATR AND REG. NUT (SNUG TIGHT)

MASON WEST MW-PAL-A-MD CONCRETE INSERT
AND 7/8” DIA. REG. NUT (SNUG TIGHT)

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING; BRACE
BRACKET MAY BE ROTATED TO ANY
ANGLE AROUND CONCRETE INSERT

\[ \Omega = 20 \]

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<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE ( \beta )</th>
<th>ATR DIA. INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
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<tr>
<td>38A TO 38G</td>
<td>580</td>
<td>38A TO 38E</td>
<td>350</td>
<td>30°-45°</td>
<td>7/8</td>
<td>6 1/4</td>
<td>5 1/4</td>
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<tr>
<td>38A TO 38E</td>
<td>390</td>
<td>38A TO 38C</td>
<td>240</td>
<td>46°-60°</td>
<td>7/8</td>
<td>6 1/4</td>
<td>5 1/4</td>
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<td>50A TO 50F</td>
<td>480</td>
<td>50A TO 50D</td>
<td>290</td>
<td>30°-45°</td>
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<td>6 1/4</td>
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<td>50A TO 50D</td>
<td>330</td>
<td>50A TO 50C</td>
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<td>63A TO 63E</td>
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<td>63A TO 63C</td>
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<td>46°-60°</td>
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<td>6 1/4</td>
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<td>88A TO 88E</td>
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<td>6 1/4</td>
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SEE DETAIL NO.00 FOR SECTION NOTES

\^ OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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Jiefu "Jeff" Zhang, SE
California SE No. 55270

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

10/09/2020
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) MASON WEST MW-PAL-A-MD CONCRETE INSERT INTO UPPER FLUTE ONLY

MASON WEST MW-PAL-A-MD CONCRETE INSERT AND ¾" DIA. REG. NUT (SNUG TIGHT)

MIN. 20 GA TYPE W3 STEEL DECK, MIN. 3000 PSI NWC OR SLWC
1¾"x1¾"x12 GA DOUBLE STRUT SPACER (SOLID ONLY) MUST BE INSTALLED SNUG TO FIT TIGHT WITHIN FLUTES ATTACH TO MW-PAL-A WITH ½" DIA. ATR & REG. NUT THRU ¾" DIA. HOLE (SNUG TIGHT)

MASON WEST MW-PAL-A-MD CENTERED ON UPPER FLUTE

MASON WEST MW-PAL-A-MD CONCRETE INSERT WITH ¾" TO 5/8" DIA. ATR AND REG. NUT (SNUG TIGHT)

SEISMIC BRACE BRACKET WITHOUT DOUBLE STRUT SPACER

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE  d</th>
<th>ATR DIA. da INCH</th>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38K</td>
<td>1210</td>
<td>38A TO 38H</td>
<td>730</td>
<td>30°-45°</td>
<td>⅛</td>
<td>⅛</td>
<td>⅞</td>
<td>⅞</td>
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<tr>
<td>38A TO 38H</td>
<td>830</td>
<td>38A TO 38F</td>
<td>500</td>
<td>46°-60°</td>
<td>⅝</td>
<td>⅝</td>
<td>⅞</td>
<td>⅞</td>
</tr>
<tr>
<td>50A TO 50L</td>
<td>1480</td>
<td>50A TO 50J</td>
<td>890</td>
<td>30°-45°</td>
<td>⅝</td>
<td>⅝</td>
<td>⅞</td>
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<tr>
<td>50A TO 50K</td>
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<td>1910</td>
<td>63A TO 63K</td>
<td>1150</td>
<td>30°-45°</td>
<td>⅞</td>
<td>⅞</td>
<td>⅞</td>
<td>⅞</td>
</tr>
<tr>
<td>63A TO 63K</td>
<td>1180</td>
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<td>710</td>
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<td>⅞</td>
<td>⅞</td>
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<td>88A TO 88L</td>
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<td>30°-45°</td>
<td>N/A</td>
<td>⅞</td>
<td>⅞</td>
<td>⅞</td>
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<tr>
<td>88A TO 88K</td>
<td>1170</td>
<td>88A TO 88H</td>
<td>700</td>
<td>46°-60°</td>
<td>N/A</td>
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<td>⅞</td>
<td>⅞</td>
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</tbody>
</table>

SEISMIC BRACE BRACKET WITH DOUBLE STRUT SPACER

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE  d</th>
<th>ATR DIA. da INCH</th>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30°-45°</td>
<td>⅝</td>
<td>⅝</td>
<td>⅞</td>
<td>⅞</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>530</td>
<td>46°-60°</td>
<td>⅞</td>
<td>⅞</td>
<td>⅞</td>
<td>⅞</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MASON WEST, INC.
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PAGE

646 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-PAL-A-MD CONCRETE INSERTS

![Diagram of bracket attachment]

MIN. 20 GA TYPE W3 STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MASON WEST MW-PAL-A-MD CONCRETE INSERT

15/16” DIA. HOLE, TYP

MIN. 3/4 x 3/4 x 1 3/4 ASTM A36 STRUT WASHER

MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF X4.0)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE FROM THE CENTERLINE OF THE CHANNEL STRUT

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50F</td>
<td>470</td>
<td>30° - 45°</td>
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<tr>
<td>50A TO 50F</td>
<td>510</td>
<td>50A TO 50D</td>
<td>310</td>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

Ω₀ = 2.0

MIN. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

SEEN DETAIL NO.00 FOR SECTION NOTES

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PAGE N2.12
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-PAL-A-MD CONCRETE INSERTS

MIN. 3000 PSI NWC OR SLWC

MIN. 20 GA TYPE W3 STEEL DECK

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE FROM THE CENTERLINE OF THE CHANNEL STRUT

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE ( \delta )</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30° - 45°</td>
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<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>530</td>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

\( \Omega_\delta = 2.0 \) \footnote{OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.}

SEE DETAIL NO.00 FOR SECTION NOTES

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PAGE N2.12.1
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) MASON WEST MW-PAL-A-MD CONCRETE INSERTS

MIN. 20 GA TYPE W3 STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

MIN. 3000 PSI NWC OR SLWC

MASON WEST MW-PAL-A-MD
CONCRETE INSERT AND REG. NUT (SNUG TIGHT), TYP
MW-SAP-200-A
SEE PAGE X6.0

MASON WEST MW-PAL-A-MD
CONCRETE INSERT
AND REG. NUT (SNUG TIGHT), TYP
MW-SAP-200-A
SEE PAGE X6.0

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED TO ANY
ANGLE AROUND BOLT

BOLT & NUT (SNUG TIGHT), TYP

5/8" DIA. ATR AND NUT
(SNUG TIGHT), TYP

5/8" DIA. ASTM A307 BOLT & NUT (SNUG TIGHT), TYP

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED TO ANY
ANGLE AROUND BOLT

1/4" MAX, TYP

1 1/2" MAX, TYP

3 1/2" MIN

3" MAX

2" MIN
da

ALLOTTABLE LATERAL LOAD Fp

MIN. END DIST. Cmin INCH

MIN. SPACING Smin INCH

MIN. scenic SPACING Smin INCH

DIA. da INCH

MAX BRACE RANGE \( \theta \)

30° - 45°

45° - 60°

1" 1/2" MAX, TYP

4 1/2" MIN

4 1/2" MIN

MIN. 20 GA TYPE W3 STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

SAP INSTALLED PARALLEL TO FLUTE.

SEEN DETAIL NO.00 FOR SECTION NOTES

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (4) MASON WEST MW-PAL-A-MD CONCRETE INSERTS

MIN. 20 GA TYPE W3 STEEL
DECK, MIN. 3000 PSI NWC
OR SLWC

5/8" DIA. ASTM A307 BOLT & NUT (SNUG TIGHT)

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED TO ANY
ANGLE AROUND BOLT

\[ \Omega = 2.0^{\text{1}} \]

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD FpLBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD FpLBS</th>
<th>MAX BRACE RANGE ( \theta )</th>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
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<tbody>
<tr>
<td>63A TO 63L</td>
<td>1320</td>
<td>63A TO 63M</td>
<td>1600</td>
<td>30°-45°</td>
<td>7/8</td>
<td>6 1/4</td>
<td>5 1/4</td>
</tr>
<tr>
<td>63A TO 63N</td>
<td>2280</td>
<td>63A TO 63K</td>
<td>1060</td>
<td>46°-60°</td>
<td></td>
<td></td>
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\(^1\) OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MASON WEST MW-PAL-A-MD CONCRETE INSERT
(REFER TO PAGES X5.0.MD & X5.1)

SEE DETAIL NO.00 FOR SECTION NOTES

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OPM-0043-13  
10/09/2020  
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) HILTI KB-TZ CONCRETE ANCHOR

ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE ANCHOR

HILTI KB-TZ CONCRETE ANCHOR (TYP)

SPECIAL INSPECTION REQ'D

MIN FLUTE WIDTH

<table>
<thead>
<tr>
<th>MAX OFFSET E INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
</tr>
<tr>
<td>1/8</td>
</tr>
<tr>
<td>4/8</td>
</tr>
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</table>

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P A G E
N2.20
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) HILTI KB-TZ CONCRETE ANCHORS

HILTI KB-TZ CONCRETE ANCHOR, TYP
1" MIN FOR NUT INSIDE STRUT

MIN. 3/16x1 1/2x1 1/2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

ALTERNATE INSTALL

MIN. 1 1/2x1 1/2x12 GA SINGLE STRUT (SOLID ONLY)
1 1/2x1 1/2x1 1/2 ASTM A36 STRUT WASHER
REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)

HOLE 3/8" DIA. LARGER THAN ANCHOR DIA, TYP
ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED
MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MIN. 3/16x1 1/2x1 1/2 ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.)
MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

MIN FLUTE WIDTH
f
inch
MAX OFFSET
E
inch
3/8
1/16
1/2

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<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE θ</th>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOE DPH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<tbody>
<tr>
<td>50A TO 50F 620</td>
<td>50A TO 50F 470</td>
<td>30° - 45°</td>
<td>1/2</td>
<td>3/4</td>
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<td>4/4</td>
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<td>4 1/4</td>
<td>60</td>
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<td>50A TO 50D 530</td>
<td>50A TO 50D 320</td>
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<td>3/8</td>
<td>3/8</td>
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<td>41/4</td>
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<td></td>
</tr>
<tr>
<td>50A TO 50G 620</td>
<td>50A TO 50E 380</td>
<td>30° - 45°</td>
<td>5/8</td>
<td>3/8</td>
<td>3/4</td>
<td>4/4</td>
<td>40</td>
<td>60</td>
<td></td>
<td></td>
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<td>3/8</td>
<td>3/4</td>
<td>4/4</td>
<td>40</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50A TO 50G 620</td>
<td>50A TO 50G 380</td>
<td>30° - 45°</td>
<td>5/8</td>
<td>3/8</td>
<td>3/4</td>
<td>4/4</td>
<td>40</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50A TO 50G 530</td>
<td>50A TO 50G 470</td>
<td>46° - 60°</td>
<td>5/8</td>
<td>3/8</td>
<td>3/4</td>
<td>4/4</td>
<td>40</td>
<td>60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MIN. 1" MIN FOR NUT OUTSIDE STRUT

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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P A G E
N2.21

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
652 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) HILTI KB-TZ CONCRETE ANCHORS

HILTI KB-TZ CONCRETE ANCHOR, TYP 1" MIN FOR NUT INSIDE STRUT
1½x1⅛x12 GA SINGLE STRUT (SOLID ONLY)
MIN. ⅜x⅜x1⅛ ASTM A36 STRUT WASHER

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)
MIN. ⅜x⅜x⅛ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

ALTERNATE INSTALL

MIN. ⅜x⅜x⅛ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.)

HILTI KB-TZ CONCRETE ANCHOR (ICC ESR-1917)
SPECIAL INSPECTION REQ'D

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

MASON WEST, INC.
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P A G E N2.21.1

10/09/2020
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) HILTI KB-TZ CONCRETE ANCHORS

ADD NUT WHEN SAP IS INSTALLED PARALLEL TO FLUTE.

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

HILTI KB-TZ CONCRETE ANCHOR , TYP

HILTI KB-TZ CONCRETE ANCHOR (ICC ESR-1917)
SPECIAL INSPECTION REQ'D
MASON IND.: N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED TO ANY ANGLE
AROUND BOLT, TYP

MIN. FLUTE WIDTH fw INCH
MAX. OFFSET E INCH

3/8 1 1/16
4 1/2 1

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE δ</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A TO 63K</td>
<td>1080</td>
<td>63A TO 63H</td>
<td>730</td>
<td>30°- 45°</td>
<td>%</td>
<td>3%</td>
<td>3 1/4</td>
<td>4 1/6</td>
<td>4 1/6</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>620</td>
<td>63A TO 63F</td>
<td>470</td>
<td>46°- 60°</td>
<td>%</td>
<td>4</td>
<td>4 1/4</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td>63A TO 63K</td>
<td>1080</td>
<td>63A TO 63K</td>
<td>1080</td>
<td>30°- 45°</td>
<td>%</td>
<td>4</td>
<td>4 1/4</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>620</td>
<td>63A TO 63G</td>
<td>620</td>
<td>46°- 60°</td>
<td>%</td>
<td>4</td>
<td>4 1/4</td>
<td>6</td>
<td>60</td>
</tr>
</tbody>
</table>

ADD NUT WHEN SAP IS INSTALLED PARALLEL TO FLUTE.

MIN. END DIST. Cmin INCH
TORQUE REQ'D FT-LBS

MW-SAP-200-A SEE PAGE X6.0

3/4" MIN

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

HILTI KB-TZ CONCRETE ANCHOR, TYP

1/2" MIN FOR 3/8"x3/4" & 3/4" MIN FOR 3/8"x4"

SEE DETAIL NO.00 FOR SECTION NOTES

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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PAGE
N2.22

10/09/2020

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654 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (4) HILTI KB-TZ CONCRETE ANCHORS

MW-SAP-400-B FOR 5/8" Ø BOLT
MW-SAP-400-C FOR 5/8" Ø BOLT
MW-SAP-400-D FOR 1" Ø BOLT
SEE PAGE X6.0, TYP
ASTM A307 BOLT & NUT (SNUG TIGHT), TYP
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

<table>
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<tr>
<th>MIN FLUTE WIDTH fw INCH</th>
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<td>4 1/2</td>
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<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE Ø</th>
<th>BOLT DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<td>63A TO 63L</td>
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<td>4 1/4</td>
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<td>75A TO 75M</td>
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<td>30°-45°</td>
<td>1</td>
<td>4</td>
<td></td>
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<td></td>
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</tbody>
</table>

\( \Omega_0 = 2.0 \)

\( ^* \) OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

SEE DETAIL NO.00 FOR SECTION NOTES

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

P A G E

N2.23
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) HILTI KB-TZ CONCRETE ANCHOR

**HILTI KB-TZ CONCRETE ANCHOR (TYP)**

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE ANCHOR

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
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<td>38A TO 38B</td>
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<td>46°-60°</td>
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<td>50A TO 50C</td>
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<td>120</td>
<td>50A TO 50A</td>
<td>150</td>
<td>46°-60°</td>
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<tr>
<td>50A TO 50E</td>
<td>440</td>
<td>50A TO 50F</td>
<td>470</td>
<td>30°-45°</td>
</tr>
<tr>
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<td>260</td>
<td>50A TO 50D</td>
<td>320</td>
<td>46°-60°</td>
</tr>
<tr>
<td>63A TO 63E</td>
<td>440</td>
<td>63A TO 63F</td>
<td>480</td>
<td>30°-45°</td>
</tr>
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<td>63A TO 63D</td>
<td>250</td>
<td>63A TO 63D</td>
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<td>46°-60°</td>
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\[ \Omega_0 = 2.0^1 \]

\[ \text{HILTI KB-TZ CONCRETE ANCHOR (ICC ESR-1917)} \]

SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>DIAM. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<tr>
<td>3/8</td>
<td>2</td>
<td>2(\frac{1}{2})</td>
<td>6</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>1/2</td>
<td>2</td>
<td>2(\frac{1}{2})</td>
<td>6</td>
<td>3</td>
<td>40</td>
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<tr>
<td>3/8</td>
<td>2(\frac{3}{4})</td>
<td>4</td>
<td>9(\frac{1}{4})</td>
<td>4(\frac{1}{4})</td>
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<tr>
<td>3/8</td>
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<td>3(\frac{1}{4})</td>
<td>9(\frac{1}{2})</td>
<td>4(\frac{1}{4})</td>
<td>60</td>
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</tbody>
</table>

SEE DETAIL NO. 00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

**MASON WEST, INC.**
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jiefu “Jeff” Zhang, SE
California SE No. 55270

DATE: 10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

656 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) HILTI KB-TZ CONCRETE ANCHORS

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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</thead>
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<tr>
<td>50A TO 50F</td>
<td>470</td>
<td>50A TO 50D</td>
<td>280</td>
<td>30° - 45°</td>
<td>3/16</td>
<td>2</td>
<td>2/5</td>
<td>6</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>330</td>
<td>50A TO 50C</td>
<td>200</td>
<td>46° - 60°</td>
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<td>3/4</td>
<td>4</td>
<td>9/5</td>
<td>4/5</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30° - 45°</td>
<td>1/2</td>
<td>3/4</td>
<td>4</td>
<td>9/5</td>
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<td>50A TO 50F</td>
<td>490</td>
<td>46° - 60°</td>
<td>1/2</td>
<td>3/4</td>
<td>4</td>
<td>9/5</td>
<td>4/5</td>
<td>40</td>
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\[\Omega_0 = 2.0\]

HILTI KB-TZ CONCRETE ANCHOR (ICC ESR-1917) SPECIAL INSPECTION REQ'D

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

HOLE 3/8" DIA. LARGER THAN ANCHOR DIA, TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

\[\frac{3\times 620}{8} \times \frac{2}{25} \text{ MIN. EFF. EMBED. hef INCH} \]

HILT KB-TZ CONCRETE ANCHOR, TYP

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)

MIN. 3/16 x 1/1 x 1/1 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

ALTERNATE INSTALL

\[\frac{3\times 530}{8} \times \frac{1}{20} \text{ ft-lbs} \]

\[\Omega_0 = 2.0\]

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MAISON WEST, INC.
1601 E. Miraloma Ave, Placentia, CA 92870
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P A G E
N2.25

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
657 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) HILTI KB-TZ CONCRETE ANCHORS

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50F</td>
<td>480</td>
<td>30° - 45°</td>
<td>½</td>
<td>2</td>
<td>2⅜</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50D</td>
<td>340</td>
<td>46° - 60°</td>
<td>¼</td>
<td>3</td>
<td>3⅛</td>
<td>9¼</td>
<td>4⅛</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30° - 45°</td>
<td>½</td>
<td>3</td>
<td>4</td>
<td>9¼</td>
<td>4⅛</td>
</tr>
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<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>530</td>
<td>46° - 60°</td>
<td>⅛</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>25</td>
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</tbody>
</table>

\[ \Omega_e = 2.0 \]

HILTI KB-TZ CONCRETE ANCHOR (ICC ESR-1917)

SPECIAL INSPECTION REQ'D

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

HOLE ¾" DIA. LARGER THAN ANCHOR DIA, TYP

¾x1⅝x1⅝ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.)

MW-SSN-½ W/ MW-BON-½ TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

ALTERNATE INSTALL

BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP

MIN. ¾x1⅝x1⅝ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MASON WEST, INC.
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Jiefu "Jeff" Zhang, SE
California SE No. S5270

PAGE N2.25.1
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR

ANCHOR MAY BE INSTALLED IN THE
UPPER FLUTE OF THE STEEL DECK
PROVIDED THE MINIMUM HOLE
CLEARANCE IS SATISFIED

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED TO ANY
ANGLE AROUND CONCRETE ANCHOR

<table>
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<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818) SPECIAL INSPECTION REQ'D</th>
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<td>Ω₀ = 2.0</td>
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<tr>
<td>38A TO 38A</td>
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<tr>
<td>50A TO 50D</td>
<td>330</td>
<td></td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>200</td>
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<tr>
<td>75A TO 75D</td>
<td>250</td>
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</table>

MIN. 20 GA STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

MIN. HOLE DEPTH ho INCH
MIN. SPACING Smin INCH
MIN. END DIST. Cmin INCH
TORQUE REQ'D FT-LBS

See detail No.00 for section notes

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020

By: Jeffrey Y. Kikumoto

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

659 of 846
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

12" MIN, TYP
10" MIN AND 14" MAX
4½" MIN
4½" MIN
2½" MIN FOR NUT OUTSIDE STRUT
¾" MIN
HOLE ¾" DIA. LARGER THAN ANCHOR DIA, TYP
ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED
MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MIN. ½x1½x12 GA SINGLE STRUT (SOLID ONLY)
MIN. ¾x1½x1½ ASTM A36 STRUT WASHER
MIN. ¾x1½x1½ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.)
REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)
MIN. 3/16x1/8x1/2 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.)
MIN. 3/16x1/8x1/2 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
Brace Bracket may be rotated up to 15° from the centerline of the channel strut.

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP
1" MIN FOR NUT INSIDE STRUT

ΔFp

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR
(ICC ESR-2818)
SPECIAL INSPECTION REQ'D

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

Ω = 2.0

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<th>ALLOWABLE LATERAL LOAD Fp (lbs)</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp (lbs)</th>
<th>MAX BRACE RANGE (º)</th>
<th>DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818) SPECIAL INSPECTION REQ'D</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50E</td>
<td>380</td>
<td>30°-45°</td>
<td></td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>450</td>
<td>50A TO 50D</td>
<td>270</td>
<td>46°-60°</td>
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Ω = 2.0

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<tr>
<th>DIAM., da (inch)</th>
<th>MIN. EFF. EMBED. hef (inch)</th>
<th>MIN. HOLE DEPTH ho (inch)</th>
<th>MIN. SPACING Smin (inch)</th>
<th>MIN. END DIST. Cmin (inch)</th>
<th>TORQUE REQ'D (ft-lbs)</th>
</tr>
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<tr>
<td>½</td>
<td>2</td>
<td>2½</td>
<td>6½</td>
<td>3½</td>
<td>40</td>
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SEE DETAIL NO.00 FOR SECTION NOTES

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MAISON WEST, INC.
1601 E. Miraloma Ave, Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED.

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC.

MW-SSN-½ W/ MW-BON-½ TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

ALTERNATE INSTALL

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)

MIN. ½ x 1½ x 1½ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP

1" MIN FOR NUT INSIDE STRUT

1½ x 1½ x 12 GA SINGLE STRUT (SOLID ONLY)

MIN. ¾ x 1½ x 1½ ASTM A36 STRUT WASHER

MIN. ¼ x 1½ x 1½ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

NEWS-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

<table>
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<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>Ω_f = 2.0</th>
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<td>63A TO 63K</td>
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<tr>
<td>63A TO 63G</td>
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</tbody>
</table>

| DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818) SPECIAL INSPECTION REQ'D |
|-----------------------------------|---------------------------------|------------|
| MIN. DIA. da INCH                 | MIN. EFF. heman. hef INCH       | MIN. HOLE DEPTH ho INCH |
| ½                                 | 2 ¼                              | ¾          |
| ¾                                 | 4 ½                              | 8 ¼        |
| END DIST. Cmin INCH              | TORQUE REQ'D FT-LBS             |
| 4 ½                               | 80                               |            |

ADD NUT WHEN SAP IS INSTALLED PARALLEL TO FLUTE.

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

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Jiefu "Jeff" Zhang, SE
California SE No. S5270
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (4) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR, TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MW-SAP-400-B FOR 3/8" Ø BOLT
MW-SAP-400-C FOR 5/16" Ø BOLT
MW-SAP-400-D FOR 1" Ø BOLT
SEE PAGE X6.0, TYP

ASTM A307 BOLT & NUT (SNUG TIGHT), TYP

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

DEUTSCH/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818) SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE Ø</th>
<th>BOLT DIA. da INCH</th>
<th>MIN. EFF. hEEMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin inCH</th>
<th>MIN. END DIST. Cmin inCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<tbody>
<tr>
<td>63A TO 63N</td>
<td>2320</td>
<td>63A TO 63L</td>
<td>1390</td>
<td>30° - 45°</td>
<td>%</td>
<td>2¼</td>
<td>3¼</td>
<td>8½</td>
<td>4½</td>
<td>80</td>
</tr>
<tr>
<td>63A TO 63L</td>
<td>1520</td>
<td>63A TO 63J</td>
<td>910</td>
<td>46° - 60°</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>75A TO 75N</td>
<td>2320</td>
<td>75A TO 75L</td>
<td>1390</td>
<td>30° - 45°</td>
<td>%</td>
<td>2¼</td>
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<td>80</td>
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<td>75A TO 75L</td>
<td>1520</td>
<td>75A TO 75J</td>
<td>910</td>
<td>46° - 60°</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
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<tr>
<td>100A TO 100N</td>
<td>2320</td>
<td>100A TO 100L</td>
<td>1390</td>
<td>30° - 45°</td>
<td>%</td>
<td>2¼</td>
<td>3¼</td>
<td>8½</td>
<td>4½</td>
<td>80</td>
</tr>
<tr>
<td>100A TO 100L</td>
<td>1520</td>
<td>100A TO 100J</td>
<td>910</td>
<td>46° - 60°</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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P A G E

N2.33

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
663 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE (INC)</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLES DEPT. ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38C</td>
<td>180</td>
<td>38A TO 38C</td>
<td>200</td>
<td>30°-45°</td>
<td>½</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>38A TO 38A</td>
<td>110</td>
<td>38A TO 38B</td>
<td>130</td>
<td>46°-60°</td>
<td>½</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>220</td>
<td>50A TO 50D</td>
<td>250</td>
<td>30°-45°</td>
<td>½</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50B</td>
<td>130</td>
<td>50A TO 50B</td>
<td>160</td>
<td>46°-60°</td>
<td>½</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>40</td>
</tr>
</tbody>
</table>

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR (TYP)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE ANCHOR

SEE DETAIL NO.00 FOR SECTION NOTES

*OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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PAGE N2.34
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>Ø = 2.0</th>
<th>MAX BRACE RANGE °</th>
<th>DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHOR (ICC ESR-2818) SPECIAL INSPECTION REQ'D</th>
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</thead>
<tbody>
<tr>
<td>50A TO 50F</td>
<td>450</td>
<td></td>
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<tr>
<td>50A TO 50D</td>
<td>300</td>
<td></td>
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</table>

MIN. 3½ x 1⅛ x 1⅛ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

6" MIN, TYP
1½" MIN
1" MIN
2½" MIN
3½" MIN
1⅛" MIN
2½" MIN FOR NUT OUTSIDE STRUT

1½" MAX
dao
ho
hef

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

See detail N0.00 for section notes

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS POWER-STUD+ SD1 CONCRETE ANCHORS

- HOLE ¾” DIA. LARGER THAN ANCHOR DIA, TYP
- MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC
- 3½x1½x1½ ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.)
- 3½x1½x1½ ASTM A36 STRUT WASHER
- MW-SSN-½ W/MW-BON-½ TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)
- MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BErotated up to 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
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<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50F</td>
<td>500</td>
<td>30°-45°</td>
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<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50D</td>
<td>330</td>
<td>46°-60°</td>
</tr>
</tbody>
</table>

DIA. da INCH | MIN. EFF. EMBED. hef INCH | MIN. HOLE DEPTH ho INCH | MIN. SPACING Smin INCH | MIN. END DIST. Cmin INCH | TORQUE REQ'D FT-LBS |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>2</td>
<td>2½</td>
<td>6</td>
<td>3</td>
<td>40</td>
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ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP MIN.
3 16 x1 58 x1 58 ASTM A36 STRUT WASHER

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP MIN.
3 16 x1 58 x1 58 ASTM A36 STRUT WASHER

ALTERNATE INSTALL

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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Page 2.35.1

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

666 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) MASON IND. N.Y. SAS(E) CONCRETE ANCHOR

ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE ANCHOR

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>Ωh = 2.0</th>
<th>MASON IND. N.Y. SAS(E) CONCRETE ANCHOR (ICC ESR-3037) SPECIAL INSPECTION REQ'D</th>
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</thead>
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<td>160</td>
<td>38A TO 38B</td>
<td>DIA. da INCH</td>
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<td>38A TO 38A</td>
<td>160</td>
</tr>
<tr>
<td>38A TO 38E</td>
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<td>280</td>
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<td>50A TO 50B</td>
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<td>50A TO 50E</td>
<td>420</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>240</td>
<td>50A TO 50C</td>
<td>240</td>
</tr>
<tr>
<td>63A TO 63E</td>
<td>350</td>
<td>63A TO 63E</td>
<td>350</td>
</tr>
<tr>
<td>63A TO 63C</td>
<td>210</td>
<td>63A TO 63C</td>
<td>210</td>
</tr>
<tr>
<td>63A TO 63H</td>
<td>730</td>
<td>63A TO 63H</td>
<td>730</td>
</tr>
<tr>
<td>63A TO 63E</td>
<td>430</td>
<td>63A TO 63E</td>
<td>430</td>
</tr>
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<td>75A TO 75E</td>
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<td>75A TO 75E</td>
<td>410</td>
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<td>75A TO 75C</td>
<td>240</td>
<td>75A TO 75C</td>
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</table>

SEE DETAIL NO.00 FOR SECTION NOTES

* OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

- **1” MAX, TYP**
- **4"**
- **4" MIN**
- **12" MIN, TYP**
- **2½" MIN FOR NUT OUTSIDE STRUT**
- **HOLE ¾" DIA. LARGER THAN ANCHOR DIA, TYP**
- **½" MIN**
- **1” MAX FOR NUT INSIDE STRUT**
- **2½” MIN**
- **3” MAX hef**
- **da**
- **MIN. ¾x1½x1¼ ASTM A36 STRUT WASHER**
- **REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP**
- **MIN. ¾x1½x1¼ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP**
- **BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT**
- **ALTERNATE INSTALL**
- **1½x1½x12 GA SINGLE STRUT (SOLID ONLY)**
- **MIN. ¾x1½x1¼ ASTM A36 STRUT WASHER**
- **REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP**
- **BLADE WASHER AND REG. NUT (SNUG TIGHT), TYP**
- **MIN. ¾x1½x1¼ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP**
- **BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT**
- **ALTERNATE INSTALL**

**ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED**

**MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC**

**MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.**

---

**MASTON IND. N.Y. SAS(E) 2 CONCRETE ANCHOR (ICC ESR-3037)**

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE</th>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>490</td>
<td>30° - 45°</td>
<td>½</td>
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<td>4</td>
<td>4¼</td>
<td>12</td>
<td>6</td>
<td>60</td>
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SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

---

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P A G E

N2.41
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

**MASON IND. N.Y. SAS(E) CONCRETE ANCHOR, TYP**

1" MIN FOR NUT INSIDE STRUT

1½x1½x12 GA SINGLE STRUT (SOLID ONLY)

MIN. 3/16x1/4x1/2 ASTM A36 STRUT WASHER

**HOLE 3/4" DIA. LARGER THAN ANCHOR DIA, TYP**

ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MIN. 620 BRACE BRACKET ATTACHMENT TYPE

ALLOWABLE LATERAL LOAD Fp LBS

MAX BRACE RANGE Ø

MIN. 3/4x1½x1½ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

**LETTER DESIGNATING ANCHOR LENGTH**

**SAS(E) IDENTIFICATION**

**See Detail No. 00 for Section Notes**

† OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

**MASON IND. N.Y. SAS(E) 2 CONCRETE ANCHOR (ICC ESR-3037)**

**SPECIAL INSPECTION Req’d**

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<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE Ø</th>
<th>DIAM. Da Inch</th>
<th>MIN. Eff. Embed. hef Inch</th>
<th>MIN. Hole Depth h Inch</th>
<th>MIN. Spacing Smin Inch</th>
<th>MIN. End Dist. Cmin Inch</th>
<th>TORQUE Req’d FT-LBS</th>
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<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30° - 45°</td>
<td>3/4</td>
<td>4</td>
<td>4 1/4</td>
<td>12</td>
<td>6</td>
<td>60</td>
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<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>530</td>
<td>46° - 60°</td>
<td>3/4</td>
<td>4</td>
<td>4 1/4</td>
<td>12</td>
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**See Detail No. 00 for Section Notes**

**OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto**

**Jeffrey Y. Kikumoto**

**10/09/2020**

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**Jiefu "Jeff" Zhang, SE**

California SE No. S5270

**P A G E**

N2.41.1
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR, TYP.

LETTER DESIGNATING ANCHOR LENGTH

SAS(E) IDENTIFICATION

ADD NUT WHEN SAP IS INSTALLED PARALLEL TO FLUTE.

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MW-SAP-200-A
SEE PAGE X6.0

¼" DIA. ASTM A307 BOLT & NUT (SNUG TIGHT), TYP

MAISON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED TO ANY ANGLE
AROUND BOLT, TYP

Fp Ω = 2.0

| BRACE BRACKET ATTACHMENT TYPE | ALLOWABLE LATERAL LOAD Fp LBS | | ALLOWABLE LATERAL LOAD Fp LBS | MAX BRACE RANGE θ | | | MASON IND. N.Y. SAS(E) CONCRETE ANCHOR (ICC ESR-3037) SPECIAL INSPECTION REQ'D |
|-----------------------------|--------------------------------|-----------------------------|---------------------|---------------------|------------------|------------------|
| 63A TO 63K                  | 1080                          | 63A TO 63K                  | 1080                | 30° - 45°           | ⅛                | 2¼               | 3½               | 8¼                | 4½                | 90               |
| 63A TO 63G                  | 620                           | 63A TO 63G                  | 620                 | 46° - 60°           |                  |                  |                  |                   |                   |                  |

SEE DETAIL NO.00 FOR SECTION NOTES

¹ OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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PAGE N2.42
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (4) MASON IND. N.Y. SAS(E) CONCRETE ANCHORS

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

ASTM A307 BOLT & NUT (SNUG TIGHT), TYP

MW-SAP-400-B FOR 3/8" Ø BOLT
MW-SAP-400-C FOR 5/16" Ø BOLT
MW-SAP-400-D FOR 1" Ø BOLT
SEE PAGE X6.0, TYP

MASON IND. N.Y. SAS(E) CONCRETE ANCHOR FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

SAS(E) IDENTIFICATION

LETTER DESIGNATING ANCHOR LENGTH

\[ \Omega_0 = 2.0 \]

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD ( F_p ) LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD ( F_p ) LBS</th>
<th>MAX BRACE RANGE ( q )</th>
<th>BOLT DIA. INCH</th>
<th>MIN. EFF. EMBED. ( \text{hef} ) INCH</th>
<th>MIN. HOLE DEPTH ( \text{ho} ) INCH</th>
<th>MIN. SPACING ( \text{smin} ) INCH</th>
<th>MIN. END DIST. ( \text{cmin} ) INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<tbody>
<tr>
<td>63A TO 63N</td>
<td>2350</td>
<td>63A TO 63L</td>
<td>1410</td>
<td>30(^\circ)-45(^\circ)</td>
<td>( \frac{1}{8} )</td>
<td>%</td>
<td>2( % )</td>
<td>3( % )</td>
<td>6( % )</td>
<td>4( % )</td>
</tr>
<tr>
<td>63A TO 63M</td>
<td>1680</td>
<td>63A TO 63K</td>
<td>1010</td>
<td>46(^\circ)-60(^\circ)</td>
<td>( \frac{1}{8} )</td>
<td>%</td>
<td>2( % )</td>
<td>3( % )</td>
<td>6( % )</td>
<td>4( % )</td>
</tr>
<tr>
<td>75A TO 75N</td>
<td>2350</td>
<td>75A TO 75L</td>
<td>1410</td>
<td>30(^\circ)-45(^\circ)</td>
<td>( \frac{3}{8} )</td>
<td>%</td>
<td></td>
<td>3( % )</td>
<td>8( % )</td>
<td>4( % )</td>
</tr>
<tr>
<td>75A TO 75M</td>
<td>1680</td>
<td>75A TO 75K</td>
<td>1010</td>
<td>46(^\circ)-60(^\circ)</td>
<td>( \frac{3}{8} )</td>
<td>%</td>
<td></td>
<td>3( % )</td>
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<td>2350</td>
<td>100A TO 100L</td>
<td>1410</td>
<td>30(^\circ)-45(^\circ)</td>
<td>1</td>
<td>%</td>
<td></td>
<td>3( % )</td>
<td>8( % )</td>
<td>4( % )</td>
</tr>
<tr>
<td>100A TO 100M</td>
<td>1680</td>
<td>100A TO 100K</td>
<td>1010</td>
<td>46(^\circ)-60(^\circ)</td>
<td>1</td>
<td>%</td>
<td></td>
<td>3( % )</td>
<td>8( % )</td>
<td>4( % )</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

\(^{1}\) OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MASON WEST, INC.
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California SE No. S5270

PAGE N2.43

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto 671 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) MASON WEST MW-CDI CONCRETE INSERT

SEISMIC BRACE BRACKET MAY BE ROTATED TO ANY ANGLE FROM THE CENTERLINE OF THE CONCRETE INSERT, TYP

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
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<tbody>
<tr>
<td>38A TO 38F</td>
<td>530</td>
<td>38A TO 38F</td>
<td>450</td>
<td>30°-45°</td>
<td>1/8</td>
<td>6</td>
<td>3</td>
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<tr>
<td>38A TO 38D</td>
<td>330</td>
<td>38A TO 38D</td>
<td>320</td>
<td>46°-60°</td>
<td>1/2</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>50A TO 50J</td>
<td>920</td>
<td>50A TO 50F</td>
<td>550</td>
<td>30°-45°</td>
<td>1/4</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>580</td>
<td>50A TO 50E</td>
<td>370</td>
<td>46°-60°</td>
<td>1/4</td>
<td>6</td>
<td>3</td>
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<tr>
<td>63A TO 63J</td>
<td>980</td>
<td>63A TO 63G</td>
<td>590</td>
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<td>1/4</td>
<td>6</td>
<td>3</td>
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<td>63A TO 63G</td>
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<td>390</td>
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<td>75A TO 75G</td>
<td>590</td>
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<td>3/4</td>
<td>6</td>
<td>3</td>
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<tr>
<td>75A TO 75G</td>
<td>640</td>
<td>75A TO 75E</td>
<td>390</td>
<td>46°-60°</td>
<td>3/4</td>
<td>6</td>
<td>3</td>
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Ωf = 2.0

SEEM INSPECTION REQ'D

REGULAR NUT (SNUG TIGHT), TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MASON WEST MW-CDI CONCRETE INSERT, TYP

SEE DETAIL NO.00 FOR SECTION NOTES

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) MASON WEST MW-CDI CONCRETE DECK INSERTS

BRACE BRACKET ATTACHMENT TYPE | ALLOWABLE LATERAL LOAD $F_p$ LBS | ALLOWABLE LATERAL LOAD $F_p$ LBS | MAX BRACE RANGE $\delta$ | DIA. $da$ INCH | MIN. SPACING $S_{min}$ INCH | MIN. END DIST. $C_{min}$ INCH
--- | --- | --- | --- | --- | --- | ---
50A TO 50G | 620 | 50A TO 50F | 530 | 30° - 45° | $\frac{3}{4}$ | 6 | 3
50A TO 50F | 530 | 50A TO 50E | 380 | 46° - 60° | $\frac{3}{4}$ | 6 | 3
50A TO 50G | 620 | 50A TO 50G | 620 | 30° - 45° | $\frac{1}{2}$ | 6 | 3
50A TO 50F | 530 | 50A TO 50E | 430 | 46° - 60° | $\frac{3}{4}$ | 6 | 3
50A TO 50G | 620 | 50A TO 50G | 620 | 30° - 45° | $\frac{3}{4}$ | 6 | 3
50A TO 50F | 530 | 50A TO 50F | 450 | 46° - 60° |

See detail No.00 for section notes

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI CONCRETE DECK INSERTS

**BRACE BRACKET ATTACHMENT TYPE** | **ALLOWABLE LATERAL LOAD Fp LBS** | **BRACE BRACKET ATTACHMENT TYPE** | **ALLOWABLE LATERAL LOAD Fp LBS** | **MAX BRACE RANGE θ**  
--- | --- | --- | --- | ---  
50A TO 50G | 620 | 50A TO 50G | 620 | 30°- 45°  
50A TO 50F | 530 | 50A TO 50F | 530 | 46°- 60°  
50A TO 50G | 620 | 50A TO 50G | 620 | 30°- 45°  
50A TO 50F | 530 | 50A TO 50F | 530 | 46°- 60°  
50A TO 50G | 620 | 50A TO 50G | 620 | 30°- 45°  
50A TO 50F | 530 | 50A TO 50F | 530 | 46°- 60°  

**SPECIAL INSPECTION REQ’D**

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<tr>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
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<tbody>
<tr>
<td>⅛</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>½</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>⅜</td>
<td>6</td>
<td>3</td>
</tr>
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**MASSON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.**

1° OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

SEE DETAIL NO.00 FOR SECTION NOTES

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Jiefu “Jeff” Zhang, SE  
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P A G E N2.51.1
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI CONCRETE DECK INSERTS

REG. NUT (SNUG TIGHT), TYP MASON WEST MW-CDI CONCRETE INSERT, TYP MW-SAP-200-A

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

½" DIA. ASTM A307 BOLT & NUT (SNUG TIGHT)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

<table>
<thead>
<tr>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load Fp LBS</th>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load Fp LBS</th>
<th>Max Brace Range °</th>
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<tbody>
<tr>
<td>63A TO 63K</td>
<td>1080</td>
<td>63A TO 63K</td>
<td>1080</td>
<td>30° - 45°</td>
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<td>63A TO 63G</td>
<td>620</td>
<td>63A TO 63G</td>
<td>620</td>
<td>46° - 60°</td>
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</table>

Ωₜ = 2.0¹

MASON WEST MW-CDI CONCRETE INSERT (ICC ESR-3443) SPECIAL INSPECTION REQ'D

MIN. DIA. da INCH | MIN. SPACING Smin INCH | MIN. END DIST. Cmin INCH
--- | --- | ---
⅜ | 6 | 3

See Detail No. 00 for Section Notes

¹ OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (4) MASON WEST MW-CDI CONCRETE DECK INSERTS

<table>
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<th>BRACE BRACKET ATTACHMENT TYPE</th>
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<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE θ</th>
<th>BOLT DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
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<td>63A TO 63N</td>
<td>2340</td>
<td>30°-45°</td>
<td>5/8</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>63A TO 63N</td>
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<td>63A TO 63L</td>
<td>1550</td>
<td>46°-60°</td>
<td>5/8</td>
<td>6</td>
<td>3</td>
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<tr>
<td>75A TO 75Q</td>
<td>3500</td>
<td>75A TO 75N</td>
<td>2340</td>
<td>30°-45°</td>
<td>5/8</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>75A TO 75N</td>
<td>2020</td>
<td>75A TO 75L</td>
<td>1550</td>
<td>46°-60°</td>
<td>5/8</td>
<td>6</td>
<td>3</td>
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<tr>
<td>100A TO 100Q</td>
<td>3500</td>
<td>100A TO 100N</td>
<td>2340</td>
<td>30°-45°</td>
<td>5/8</td>
<td>6</td>
<td>3</td>
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<tr>
<td>100A TO 100N</td>
<td>2020</td>
<td>100A TO 100L</td>
<td>1550</td>
<td>46°-60°</td>
<td>5/8</td>
<td>6</td>
<td>3</td>
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Ω = 2.0

MASON WEST MW-CDI CONCRETE INSERT (ICC ESR-3443) SPECIAL INSPECTION REQ'D

REG. NUT (SNUG TIGHT), TYP
MASON WEST MW-CDI CONCRETE INSERT, TYP
MW-SAP-400-B FOR 5/8" BOLT
MW-SAP-400-C FOR 3/4" BOLT
MW-SAP-400-D FOR 1" BOLT
SEE PAGE X6.0, TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

ASTM A307 BOLT & NUT (SNUG TIGHT)
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) MASON WEST MW-CDI-B CONCRETE INSERT

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MASON WEST MW-CDI-B CONCRETE INSERT, TYP
REGULAR NUT (SNUG TIGHT), TYP
SEISMIC BRACE BRACKET MAY BE ROTATED TO ANY ANGLE FROM THE CENTERLINE OF THE CONCRETE INSERT, TYP

Fp

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<th>BRACE BRACKET ATTACHMENT TYPE</th>
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<th>Ω = 2.0</th>
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<td>170</td>
<td>100</td>
</tr>
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<td>63A TO 63D</td>
<td>290</td>
<td>170</td>
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<td>75A TO 75D</td>
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<td>170</td>
</tr>
<tr>
<td>50A TO 50D</td>
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<td>160</td>
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<tr>
<td>38A TO 38B</td>
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MAX BRACE RANGE

<table>
<thead>
<tr>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
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<tbody>
<tr>
<td>½</td>
<td>3</td>
<td>1½</td>
</tr>
<tr>
<td>½</td>
<td>3</td>
<td>1½</td>
</tr>
<tr>
<td>½</td>
<td>3</td>
<td>1½</td>
</tr>
<tr>
<td>⅜</td>
<td>3</td>
<td>1½</td>
</tr>
</tbody>
</table>

SEISMIC BRACE BRACKET MAY BE ROTATED TO ANY ANGLE FROM THE CENTERLINE OF THE CONCRETE INSERT, TYP

See Detail No.00 FOR SECTION NOTES

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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**SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK**

**WITH (1) MASON WEST MW-CDI-B CONCRETE INSERT AT LOWER FLUTE**

- MASON WEST MW-CDI-B CONCRETE INSERT, TYP
- REGULAR NUT (SNUG TIGHT), TYP
- SEISMIC BRACE BRACKET MAY BE ROTATED TO ANY ANGLE FROM THE CENTERLINE OF THE CONCRETE INSERT, TYP

---

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>DIAM. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
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<td>38A TO 38F</td>
<td>560</td>
<td>38A TO 38D</td>
<td>330</td>
<td>30°- 45°</td>
<td>½</td>
<td>9</td>
<td>4½</td>
</tr>
<tr>
<td>38A TO 38E</td>
<td>380</td>
<td>38A TO 38C</td>
<td>230</td>
<td>46°- 60°</td>
<td>½</td>
<td>9</td>
<td>4½</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>640</td>
<td>50A TO 50C</td>
<td>380</td>
<td>30°- 45°</td>
<td>½</td>
<td>9</td>
<td>4½</td>
</tr>
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<td>50A TO 50E</td>
<td>410</td>
<td>50A TO 50D</td>
<td>250</td>
<td>46°- 60°</td>
<td>½</td>
<td>9</td>
<td>4½</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>670</td>
<td>63A TO 63C</td>
<td>400</td>
<td>30°- 45°</td>
<td>½</td>
<td>9</td>
<td>4½</td>
</tr>
<tr>
<td>63A TO 63E</td>
<td>63A TO 63D</td>
<td>63A TO 63D</td>
<td>400</td>
<td>30°- 45°</td>
<td>½</td>
<td>9</td>
<td>4½</td>
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<tr>
<td>75A TO 75G</td>
<td>670</td>
<td>75A TO 75C</td>
<td>400</td>
<td>30°- 45°</td>
<td>¼</td>
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<td>4½</td>
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<td>250</td>
<td>46°- 60°</td>
<td>¼</td>
<td>9</td>
<td>4½</td>
</tr>
</tbody>
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See detail No.00 for section notes

\(^1\) OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

---

MASON WEST, INC.
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California SE No. S5270

PAGE N2.54.1

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
678 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI-B CONCRETE DECK INSERTS AT LOWER FLUTE

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MIN. $\frac{3}{16} \times \frac{3}{8} \times \frac{3}{16}$ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
MASON WEST MW-CDI-B CONCRETE INSERT, TYP
$\frac{5}{16} \times \frac{5}{8} \times 12$ GA SINGLE STRUT (SOLID ONLY)

REG. NUT (SNUG TIGHT), TYP
BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p$ LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p$ LBS</th>
<th>MAX BRACE RANGE $\theta$</th>
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</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50E</td>
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<tr>
<td>50A TO 50E</td>
<td>440</td>
<td>50A TO 50D</td>
<td>280</td>
<td>46° - 60°</td>
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<tr>
<td>50A TO 50G</td>
<td>620</td>
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<td>450</td>
<td>30° - 45°</td>
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<td>50A TO 50D</td>
<td>300</td>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

$\Omega_f = 2.0$

MIN. $\frac{5}{8}$ W/ MW-BON-\( \frac{5}{8} \) TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)

MASON WEST MW-SSN-\( \frac{5}{8} \) W/ MW-BON-\( \frac{5}{8} \) ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

SEE DETAIL NO.00 FOR SECTION NOTES

$^1$ OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) MASON WEST MW-CDI-B CONCRETE DECK INSERTS AT LOWER FLUTE

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE a</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>450</td>
<td>46° - 60°</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>490</td>
<td>46° - 60°</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>510</td>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

MASON WEST MW-CDI-B
CONCRETE INSERT
(ICC ESR-3443)
SPECIAL INSPECTION REQ'D

MIN. 3½x1½x1½ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
MASON WEST MW-CDI-B CONCRETE INSERT, TYP
1½x1½x12 GA SINGLE STRUT (SOLID ONLY)

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

REG. NUT (SNUG TIGHT), TYP
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

ALTERNATE INSTALL

See detail No. 00 for section notes
1 OVERTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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Jiefu "Jeff" Zhang, SE
California SE No. S5270
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) MASON WEST MW-CDI-B CONCRETE DECK INSERTS AT LOWER FLUTE

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE Θ MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A TO 63K</td>
<td>1080</td>
<td>63A TO 63H</td>
<td>800</td>
<td>30°- 45°</td>
<td>9</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>620</td>
<td>63A TO 63F</td>
<td>510</td>
<td>46°- 60°</td>
<td>4½</td>
</tr>
</tbody>
</table>

Ωθ = 2.0

MASON WEST MW-CDI-B CONCRETE INSERT
(ICC ESR-3443)
SPECIAL INSPECTION REQ'D

MIN. 20 GA STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

MIN. 20 GA STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED TO ANY ANGLE
AROUND BOLT

REG. NUT (SNUG TIGHT), TYP
MASTON WEST MW-CDI-B
CONCRETE INSERT, TYP

MW-SAP-200-A
SEE PAGE X6.0

SEE DETAIL NO.00 FOR SECTION NOTES

' OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (4) MASON WEST MW-CDI-B CONCRETE DECK INSERTS AT LOWER FLUTE

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE Ø</th>
<th>BOLT DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A TO 63P</td>
<td>2670</td>
<td>63A TO 63M</td>
<td>1600</td>
<td>30°-45°</td>
<td>5/16</td>
<td>3/4</td>
</tr>
<tr>
<td>63A TO 63M</td>
<td>1690</td>
<td>63A TO 63K</td>
<td>1010</td>
<td>46°-60°</td>
<td>5/16</td>
<td>3/4</td>
</tr>
<tr>
<td>75A TO 75P</td>
<td>2670</td>
<td>75A TO 75M</td>
<td>1600</td>
<td>30°-45°</td>
<td>5/16</td>
<td>3/4</td>
</tr>
<tr>
<td>75A TO 75M</td>
<td>1690</td>
<td>75A TO 75K</td>
<td>1010</td>
<td>46°-60°</td>
<td>5/16</td>
<td>3/4</td>
</tr>
<tr>
<td>100A TO 100P</td>
<td>2670</td>
<td>100A TO 100M</td>
<td>1600</td>
<td>30°-45°</td>
<td>5/16</td>
<td>3/4</td>
</tr>
<tr>
<td>100A TO 100M</td>
<td>1690</td>
<td>100A TO 100K</td>
<td>1010</td>
<td>46°-60°</td>
<td>5/16</td>
<td>3/4</td>
</tr>
</tbody>
</table>

\( \Omega_0 = 2.0^\circ \)

MASON WEST MW-CDI-B CONCRETE INSERT (ICC ESR-3443)
SPECIAL INSPECTION REQ'D

REG. NUT (SNUG TIGHT), TYP
MASON WEST MW-CDI-B CONCRETE INSERT, TYP
MW-SP-400-B FOR 5/8” Ø BOLT
MW-SP-400-C FOR 3/4” Ø BOLT
MW-SP-400-D FOR 1” Ø BOLT
SEE PAGE X6.0, TYP

ASTM A307 BOLT & NUT (SNUG TIGHT)
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

See detail no.00 for section notes
\( ^\circ \)OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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PAGE
N2.57
SEISMIC BRACKET ATTACHMENT  
TO CONCRETE FILLED METAL DECK  
WITH (1) MASON WEST MW-CDI-B CONCRETE INSERT

SEISMIC BRACE BRACKET MAY BE ROTATED TO ANY ANGLE FROM THE CENTERLINE OF THE CONCRETE INSERT, TYP

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38D</td>
<td>270</td>
<td>38A TO 38B</td>
<td>160</td>
<td>30°-45°</td>
<td>⅛</td>
<td>3</td>
<td>⅛</td>
</tr>
<tr>
<td>38A TO 38B</td>
<td>170</td>
<td>38A TO 38A</td>
<td>100</td>
<td>46°-60°</td>
<td>⅛</td>
<td>3</td>
<td>⅛</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>290</td>
<td>50A TO 50B</td>
<td>170</td>
<td>30°-45°</td>
<td>⅜</td>
<td>3</td>
<td>⅛</td>
</tr>
<tr>
<td>50A TO 50B</td>
<td>170</td>
<td>50A TO 50A</td>
<td>100</td>
<td>46°-60°</td>
<td>⅜</td>
<td>3</td>
<td>⅛</td>
</tr>
<tr>
<td>63A TO 63D</td>
<td>290</td>
<td>63A TO 63B</td>
<td>170</td>
<td>30°-45°</td>
<td>⅜</td>
<td>3</td>
<td>⅛</td>
</tr>
<tr>
<td>63A TO 63B</td>
<td>170</td>
<td>63A TO 63A</td>
<td>100</td>
<td>46°-60°</td>
<td>⅛</td>
<td>3</td>
<td>⅛</td>
</tr>
<tr>
<td>75A TO 75D</td>
<td>290</td>
<td>75A TO 75B</td>
<td>170</td>
<td>30°-45°</td>
<td>⅛</td>
<td>3</td>
<td>⅛</td>
</tr>
<tr>
<td>75A TO 75B</td>
<td>170</td>
<td>75A TO 75A</td>
<td>100</td>
<td>46°-60°</td>
<td>⅛</td>
<td>3</td>
<td>⅛</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MIN. 20 GA STEEL DECK,  
MIN. 3000 PSI NWC OR SLWC  
MASON WEST MW-CDI-B  
CONCRETE INSERT, TYP  
REG. NUT (SNUG TIGHT), TYP

MIN. 1 1/2 MIN, TYP

MIN. 20 GA STEEL DECK,  
MIN. 3000 PSI NWC OR SLWC  
MASON WEST MW-CDI-B  
CONCRETE INSERT, TYP  
REG. NUT (SNUG TIGHT), TYP

MIN: 2 1/2 MIN

MIN: 1 1/2 MAX

MIN: 2 3/4 MIN

MIN: 3/4 MIN TYP

MIN: hef = 1" MIN, TYP

MIN: 1/2 MIN

MIN: 30°-45°

MIN: 46°-60°

MIN: Ω0 = 2.0

MIN: Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

10/09/2020 683 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI-B CONCRETE DECK INSERTS

1" MIN, TYP
ALTERNATE INSTALL

hef = 1" MIN, TYP

REG. NUT (SNUG TIGHT), TYP
MASON WEST MW-SSN-12 W/ MW-BON-½ TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)

MIN. 3½x1½x1½ ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

\[ \Omega_v = \frac{2.0}{\text{F}_p} \]

| MASON WEST MW-CDI-B CONCRETE INSERT (ICC ESR-3443) SPECIAL INSPECTION REQ'D |
|---------------------------------|---------------------|---------------------|--------------------|-----------------------------|
| DIA. \( \text{da} \) \( \text{INCH} \) | MIN. SPACING \( \text{S}_{\text{min}} \) \( \text{INCH} \) | MIN. END DIST. \( \text{C}_{\text{min}} \) \( \text{INCH} \) |
| 50A TO 50D | 320 | 50A TO 50C | 190 | 30°-45° |
| 50A TO 50C | 200 | 50A TO 50A | 120 | 46°-60° |
| 50A TO 50D | 340 | 50A TO 50C | 210 | 30°-45° |
| 50A TO 50C | 210 | 50A TO 50A | 120 | 46°-60° |
| 50A TO 50D | 340 | 50A TO 50C | 210 | 30°-45° |
| 50A TO 50C | 210 | 50A TO 50A | 120 | 46°-60° |

\( \Omega_v = \frac{2.0}{\text{F}_p} \)

\( \Omega_v = \frac{2.0}{\text{F}_p} \)

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

SEE DETAIL NO. 00 FOR SECTION NOTES
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) MASON WEST MW-CDI-B CONCRETE DECK INSERTS

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MIN. 3/16 x 1-1/2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
MASON WEST MW-CDI-B CONCRETE INSERT, TYP
1-1/2 x 12 GA SINGLE STRUT (SOLID ONLY)

REG. NUT (SNUG TIGHT), TYP

MIN. 3/16 x 1-1/2 ASTM A36 STRUT WASHER

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

### Allowable Lateral Load Table

<table>
<thead>
<tr>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load Fp Lbs</th>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load Fp Lbs</th>
<th>Max Brace Range</th>
<th>Dia. da Inch</th>
<th>Min. Spacing Smin Inch</th>
<th>Min. End Dist. Cmin Inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50D</td>
<td>320</td>
<td>30° - 45°</td>
<td>3/8</td>
<td>3</td>
<td>1/2</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>330</td>
<td>50A TO 50C</td>
<td>200</td>
<td>45° - 60°</td>
<td>1/2</td>
<td>3</td>
<td>1/2</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>570</td>
<td>50A TO 50D</td>
<td>340</td>
<td>30° - 45°</td>
<td>3/8</td>
<td>3</td>
<td>1/2</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>350</td>
<td>50A TO 50C</td>
<td>210</td>
<td>45° - 60°</td>
<td>1/2</td>
<td>3</td>
<td>1/2</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>570</td>
<td>50A TO 50D</td>
<td>340</td>
<td>30° - 45°</td>
<td>3/8</td>
<td>3</td>
<td>1/2</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>350</td>
<td>50A TO 50C</td>
<td>210</td>
<td>45° - 60°</td>
<td>1/2</td>
<td>3</td>
<td>1/2</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES
1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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Jiefu “Jeff” Zhang, SE
California SE No. S5720

PAGE N2.59.1
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR

ANCHOR MAY BE INSTALLED IN THE
UPPER FLUTE OF THE STEEL DECK
PROVIDED THE MINIMUM HOLE
CLEARANCE IS SATISFIED

MIN. 20 GA STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED TO ANY
ANGLE AROUND CONCRETE ANCHOR

<table>
<thead>
<tr>
<th>MIN FLUTE WIDTH fw INCH</th>
<th>MIN EDGE DIST ED INCH</th>
<th>MIN CONC. COVER ha INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4/5</td>
<td>1 1/4</td>
<td>3/4</td>
</tr>
</tbody>
</table>

\[ \Omega_e = 2.0 \]

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR
(ICC ESR-2502)

SPECIAL INSPECTION REQ'D

MIN EFF. EMBED. hef INCH

\[ \text{MAX OF: } 3^\text{hef} \text{ OR } 1.5^\text{FLUTE WIDTH} \]

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38C</td>
<td>210</td>
<td>38A TO 38C</td>
<td>210</td>
<td>3/4</td>
<td>2</td>
<td>2 1/2</td>
<td>3/4</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>38A TO 38A</td>
<td>120</td>
<td>38A TO 38A</td>
<td>120</td>
<td>3/4</td>
<td>2</td>
<td>2 1/2</td>
<td>3/4</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>230</td>
<td>50A TO 50C</td>
<td>230</td>
<td>3/4</td>
<td>2</td>
<td>2 1/2</td>
<td>3/4</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>50A TO 50B</td>
<td>130</td>
<td>50A TO 50B</td>
<td>130</td>
<td>3/4</td>
<td>2</td>
<td>2 1/2</td>
<td>3/4</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>410</td>
<td>50A TO 50E</td>
<td>410</td>
<td>3/4</td>
<td>2</td>
<td>2 1/2</td>
<td>3/4</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

\[ \text{MAX OF: } 3^\text{hef} \text{ OR } 1.5^\text{FLUTE WIDTH} \]

FOR fw ≥ 4 1/2"

| 63A TO 63E                   | 420                           | 63A TO 63E                   | 420                           | 3/4          | 3/4                      | 2 1/2                    | 3/4                      | 60                       |                     |
| 63A TO 63D                   | 260                           | 63A TO 63D                   | 260                           | 3/4          | 4/4                      | 2 1/2                    | 3/4                      | 60                       |                     |
| 63A TO 63G                   | 670                           | 63A TO 63G                   | 650                           | 3/4          | 4/4                      | 2 1/2                    | 3/4                      | 60                       |                     |

\[ \text{MAX OF: } 3^\text{hef} \text{ OR } 1.5^\text{FLUTE WIDTH} \]

FOR fw ≥ 4 1/2"

| 75A TO 75F                   | 450                           | 75A TO 75E                   | 440                           | 3/4          | 3/4                      | 4                       | 11/4                     | 4 1/4                   | 110                   |
| 75A TO 75D                   | 280                           | 75A TO 75D                   | 280                           | 4/4          | 4/4                      | 2 1/2                    | 3/4                      | 110                      |                     |

SEE DETAIL NO.00 FOR SECTION NOTES

\(^*\) OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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Page N2.60

10/09/2020
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

ANCHOR MAY BE INSTALLED IN THE UPPER FLUTE OF THE STEEL DECK PROVIDED THE MINIMUM HOLE CLEARANCE IS SATISFIED

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP
1" MIN FOR NUT INSIDE STRUT

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)

BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

ALTERNATE INSTALL

MIN. 3/8" x 1 1/8" ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

MIN. 3/8" x 1 1/8" ASTM A36 STRUT WASHER

HOLE 3/4" DIA. LARGER THAN ANCHOR DIA, TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MIN. 1 1/2" MAX OF:
3*hef OR
1.5*FLUTE WIDTH

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

DO NOT HALLUCINATE.

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Jiefu “Jeff” Zhang, SE
California SE No. S5270

PAGE
N2.61

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
687 of 846
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

MIN. HOLE DEPTH ≤ 10”
MIN. 20 GA STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

MIN. 3½" x 1½" x 1½" ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.)

MIN. 3½" x 1½" x 1½" ASTM A36 STRUT WASHER

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED UP TO 15° FROM
THE CENTERLINE OF THE CHANNEL STRUT.

<table>
<thead>
<tr>
<th>MIN. FLUTE WIDTH fw INCH</th>
<th>MIN. EDGE DIST ED INCH</th>
<th>MIN. CONC. COVER ha INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>3½</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4½</td>
<td>1¼</td>
<td>3½</td>
</tr>
</tbody>
</table>

MIN. 3½ x 1½ x 1½" ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

ALTERNATE INSTALL

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)

ANCHOR MAY BE INSTALLED
IN THE UPPER FLUTE OF THE
STEEL DECK PROVIDED THE
MINIMUM HOLE CLEARANCE
IS SATISFIED

MIN. 20 GA STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP

1" MIN FOR NUT INSIDE STRUT

3" MAX

ALTERNATE INSTALL

Fp

MIN. 1½ x 1½ x 12 GA SINGLE STRUT (SOLID ONLY)

MIN. 1½ x 1½ x 1½" ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

BRACE BRACKET MAY
BE ROTATED TO ANY ANGLE AROUND BOLT

10¼" MIN, 15" MAX FOR fw = 3½"
10" MIN, 15" MAX FOR fw = 4½"
12" MIN, TYP

\[ \Omega_0 = 2.0 \]

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR
(ICC ESR-2502)
SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE ( \delta )</th>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOJE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50E</td>
<td>430</td>
<td>30° - 45°</td>
<td>( \frac{3}{8} )</td>
<td>2</td>
<td>2</td>
<td>MAX OF: 3&quot;h ef OR 1.5&quot;FLUTE WIDTH</td>
<td>( \frac{3}{8} )</td>
<td>20</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>500</td>
<td>50A TO 50D</td>
<td>300</td>
<td>46° - 60°</td>
<td>( \frac{1}{2} )</td>
<td>3¼</td>
<td>4</td>
<td>( \frac{4}{5} )</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30° - 45°</td>
<td>( \frac{3}{8} )</td>
<td>2</td>
<td>2</td>
<td>1½ &quot;HEF OR 1.5&quot; FLUTE WIDTH</td>
<td>( \frac{3}{8} )</td>
<td>20</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50F</td>
<td>530</td>
<td>46° - 60°</td>
<td>( \frac{1}{2} )</td>
<td>3¼</td>
<td>4</td>
<td>( \frac{4}{5} )</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

\(^1\) OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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PAGE

N2.61.1
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

ADD NUT WHEN SAP IS INSTALLED PARALLEL TO FLUTE.

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR (ICC ESR-2502)
SPECIAL INSPECTION REQ'D

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

MIN. FLUTE WIDTH fw INCH

MIN. EDGE DIST ED INCH

MIN. CONC. COVER ha INCH

3/8 1 2
4 1¼ 3/8

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR
(ICC ESR-2502)
SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE Ω</th>
<th>MIN. DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
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<tbody>
<tr>
<td>63A TO 63K</td>
<td>1080</td>
<td>63A TO 63K</td>
<td>1080</td>
<td>30°-45°</td>
<td>5/8</td>
<td>4/4</td>
<td>5/4</td>
<td>MAX OF: 3’hef OR 1.5’FLUTE WIDTH</td>
<td>6/8</td>
<td>60</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>620</td>
<td>63A TO 63G</td>
<td>620</td>
<td>46°-60°</td>
<td>3/8</td>
<td>1/4</td>
<td>3/8</td>
<td>2/8</td>
<td>6/8</td>
<td>60</td>
</tr>
</tbody>
</table>

Ω₀ = 2.0

SEE DETAIL NO.00 FOR SECTION NOTES

† OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (4) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MW-SAP-400-B FOR 3/8" Ø BOLT
MW-SAP-400-C FOR 5/16" Ø BOLT
MW-SAP-400-D FOR 1" Ø BOLT
SEE PAGE X6.0, TYP

ASTM A307 BOLT & NUT (SNUG TIGHT)

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING.
BRACE BRACKET MAY BE ROTATED
TO ANY ANGLE AROUND BOLT, TYP

\[ \Omega = 2.0 \]

\begin{tabular}{|c|c|c|c|c|c|c|c|}
\hline
BRACE BRACKET ATTACHMENT TYPE & ALLOWABLE LATERAL LOAD Fp LBS & \multicolumn{3}{|c|}{MAX BRACE RANGE} & BOLT DIA. da INCH & \multicolumn{2}{|c|}{TORQUE REQ'D} \\
\hline
& & DIA & EFF. & MIN. END & MIN. EN & FT-LBS \\
\hline
63A TO 63P & 3080 & 63A TO 63P & 2590 & 30° - 45° & 5/8 & \% & 60 \\
63A TO 63N & 2080 & 63A TO 63M & 1880 & 46° - 60° & 5/8 & \% & \\
75A TO 75Q & 3500 & 75A TO 75P & 2590 & 30° - 45° & 5/4 & \% & \\
75A TO 75N & 2020 & 75A TO 75M & 1880 & 46° - 60° & 5/4 & \% & \\
100A TO 100Q & 3500 & 100A TO 100P & 2590 & 30° - 45° & 1 & \% & \\
100A TO 100Q & 2020 & 100A TO 100M & 1880 & 46° - 60° & 1 & \% & \\
\hline
\end{tabular}

MIN. FLUTE WIDTH fw INCH
MIN. EDGE DIST ED INCH
MIN. CONC. COVER ha INCH

\begin{tabular}{|c|c|c|}
\hline
3/8 & 1 & 2 \\
4/5 & 1½ & 3/2 \\
\hline
\end{tabular}

\[ \text{SEE DETAIL NO.00 FOR SECTION NOTES} \]

\[ ^1 \text{OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.} \]
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC
DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR (TYP)
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE ANCHOR

### Table

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38C</td>
<td>190</td>
<td>38A TO 38C</td>
<td>200</td>
<td>30°- 45°</td>
<td>½</td>
<td>2</td>
<td>2½</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>38A TO 38A</td>
<td>110</td>
<td>38A TO 38B</td>
<td>130</td>
<td>45°- 60°</td>
<td>½</td>
<td>2</td>
<td>2½</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>230</td>
<td>50A TO 50D</td>
<td>260</td>
<td>30°- 45°</td>
<td>½</td>
<td>2</td>
<td>2½</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>50A TO 50B</td>
<td>130</td>
<td>50A TO 50B</td>
<td>170</td>
<td>45°- 60°</td>
<td>½</td>
<td>2</td>
<td>2½</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

Ω_o = 2.0^1

SEE DETAIL NO.00 FOR SECTION NOTES

^1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP
1 1/2" MIN FOR NUT INSIDE STRUT
1 1/2" MAX
2 1/2" MIN FOR NUT OUTSIDE STRUT
1 1/2x1 1/2x12 GA SINGLE STRUT (SOLID ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

HOLE 3/4" DIA. LARGER THAN ANCHOR DIA, TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

REG. NUT (SEE TABLE FOR TORQUE REQUIREMENT, TYP)

ALTERNATE INSTALL

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE o</th>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50E</td>
<td>360</td>
<td>50A TO 50C</td>
<td>220</td>
<td>30°-45°</td>
<td>3/8</td>
<td>2</td>
<td>2 1/2</td>
<td>6</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>250</td>
<td>50A TO 50B</td>
<td>150</td>
<td>46°-60°</td>
<td>3/8</td>
<td>2</td>
<td>2 1/2</td>
<td>6</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>450</td>
<td>50A TO 50D</td>
<td>270</td>
<td>30°-45°</td>
<td>1/2</td>
<td>2</td>
<td>2 1/4</td>
<td>6</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>300</td>
<td>50A TO 50C</td>
<td>180</td>
<td>46°-60°</td>
<td>1/2</td>
<td>2</td>
<td>2 1/4</td>
<td>6</td>
<td>3</td>
<td>40</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

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692 of 846

PAGE N2.65
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHORS

DEWALT/POWERS POWER-STUD+ SD2 CONCRETE ANCHOR, TYP

HOLE 3/4" DIA. LARGER THAN ANCHOR DIA, TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

1" MIN FOR NUT INSIDE STRUT

1/2" MIN OUTSIDE STRUT

3/4" MIN FOR NUT OUTSIDE STRUT

1/2" MIN FOR NUT INSIDE STRUT

1/2" MAX

1 1/2" MAX

1 1/4" MIN, TYP

3 1/2" MIN, TYP

2 1/2" MIN, TYP

2 1/2" MIN FOR NUT OUTSIDE STRUT

1/4" DIA. LARGER THAN ANCHOR DIA, TYP

MIN. 3/4" DIA. LARGER THAN ANCHOR DIA, TYP

DIC A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

MIN. ASTM A36 STRUT WASHER AND REG. NUT (SEE TABLE FOR TORQUE REQ.)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

ALTERNATE INSTALL

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P A G E
N2.65.1
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) CONCRETE SCREW ANCHOR AT LOWER FLUTE ONLY

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE ANCHOR

<table>
<thead>
<tr>
<th>ANCHOR</th>
<th>MIN FLUTE WIDTH fw INCH</th>
<th>MIN EDGE DIST ED INCH</th>
<th>MIN CONC. COVER ha INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEWALT/POWERS</td>
<td>3½</td>
<td>1</td>
<td>2½</td>
</tr>
<tr>
<td>MASON</td>
<td>4½</td>
<td>1½</td>
<td>1½</td>
</tr>
<tr>
<td>HILTI</td>
<td>4½</td>
<td>1½</td>
<td>3½</td>
</tr>
</tbody>
</table>

DEWALT/POWERS SCREW-BOLT+ CONCRETE SCREW ANCHOR (ICC ESR-3889) SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE q</th>
<th>DIA. da inch</th>
<th>MIN. EFF. EMBED. hef inch</th>
<th>MIN. HOLES DEPTH ho inch</th>
<th>MIN. SPACING Smin inch</th>
<th>MIN. END DIST. Cmin inch</th>
<th>MAX TORQUE FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A to 38D</td>
<td>280</td>
<td>38A to 38D</td>
<td>280</td>
<td>30°- 45°</td>
<td>⅝</td>
<td>2½</td>
<td>2½</td>
<td>6</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>38A to 38B</td>
<td>170</td>
<td>38A to 38B</td>
<td>170</td>
<td>46°- 60°</td>
<td>⅝</td>
<td>2½</td>
<td>3½</td>
<td>6½</td>
<td>3½</td>
<td>45</td>
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<tr>
<td>50A to 50D</td>
<td>310</td>
<td>50A to 50D</td>
<td>300</td>
<td>30°- 45°</td>
<td>⅝</td>
<td>2½</td>
<td>3½</td>
<td>6½</td>
<td>3½</td>
<td>45</td>
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<td>50A to 50C</td>
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<td>50A to 50C</td>
<td>190</td>
<td>46°- 60°</td>
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<td>4½</td>
<td>60</td>
</tr>
<tr>
<td>50A to 50F</td>
<td>570</td>
<td>50A to 50F</td>
<td>570</td>
<td>30°- 45°</td>
<td>⅝</td>
<td>3½</td>
<td>4½</td>
<td>9½</td>
<td>4½</td>
<td>60</td>
</tr>
<tr>
<td>50A to 50D</td>
<td>340</td>
<td>50A to 50D</td>
<td>340</td>
<td>46°- 60°</td>
<td>⅝</td>
<td>3½</td>
<td>4½</td>
<td>9½</td>
<td>4½</td>
<td>60</td>
</tr>
<tr>
<td>63A to 63D</td>
<td>250</td>
<td>63A to 63D</td>
<td>250</td>
<td>30°- 45°</td>
<td>⅝</td>
<td>2½</td>
<td>4½</td>
<td>8½</td>
<td>4½</td>
<td>60</td>
</tr>
<tr>
<td>63A to 63B</td>
<td>150</td>
<td>63A to 63B</td>
<td>150</td>
<td>46°- 60°</td>
<td>⅝</td>
<td>3½</td>
<td>5½</td>
<td>11½</td>
<td>5½</td>
<td>60</td>
</tr>
<tr>
<td>63A to 63E</td>
<td>370</td>
<td>63A to 63E</td>
<td>370</td>
<td>30°- 45°</td>
<td>⅝</td>
<td>3½</td>
<td>5½</td>
<td>11½</td>
<td>5½</td>
<td>60</td>
</tr>
<tr>
<td>63A to 63C</td>
<td>210</td>
<td>63A to 63C</td>
<td>210</td>
<td>46°- 60°</td>
<td>⅝</td>
<td>3½</td>
<td>4½</td>
<td>9½</td>
<td>4½</td>
<td>70</td>
</tr>
<tr>
<td>75A to 75F</td>
<td>490</td>
<td>75A to 75F</td>
<td>490</td>
<td>30°- 45°</td>
<td>⅝</td>
<td>3½</td>
<td>4½</td>
<td>9½</td>
<td>4½</td>
<td>70</td>
</tr>
<tr>
<td>75A to 75D</td>
<td>290</td>
<td>75A to 75D</td>
<td>290</td>
<td>46°- 60°</td>
<td>⅝</td>
<td>3½</td>
<td>4½</td>
<td>9½</td>
<td>4½</td>
<td>70</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES
1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 SEE PAGE N2.70.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.

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PAGE N2.70
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) CONCRETE SCREW ANCHOR AT LOWER FLUTE ONLY

**MASON IND. N.Y. SAST CONCRETE SCREW ANCHOR**
**(ICC ESR-2713)**
**SPECIAL INSPECTION REQ'D**

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE Ω</th>
<th>1/2</th>
<th>1/4</th>
<th>2/4</th>
<th>6/4</th>
<th>3/4</th>
<th>MAX TORQUE FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38B</td>
<td>130</td>
<td>38A TO 38B</td>
<td>130</td>
<td>30°-45°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>50</td>
</tr>
<tr>
<td>38A TO 38A</td>
<td>80</td>
<td>38A TO 38A</td>
<td>80</td>
<td>46°-60°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>65</td>
</tr>
<tr>
<td>50A TO 50B</td>
<td>140</td>
<td>50A TO 50A</td>
<td>140</td>
<td>30°-45°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>65</td>
</tr>
<tr>
<td>50A TO 50A</td>
<td>80</td>
<td>50A TO 50A</td>
<td>80</td>
<td>46°-60°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>65</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>300</td>
<td>50A TO 50D</td>
<td>300</td>
<td>30°-45°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>65</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>180</td>
<td>50A TO 50C</td>
<td>180</td>
<td>46°-60°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
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**HILTI KH-EZ CONCRETE SCREW ANCHOR**
**(ICC ESR-3027)**
**SPECIAL INSPECTION REQ'D**

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE Ω</th>
<th>1/2</th>
<th>1/4</th>
<th>2/4</th>
<th>6/4</th>
<th>3/4</th>
<th>MAX TORQUE FT-LBS</th>
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<td>38A TO 38D</td>
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<td>3/4</td>
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<td>38A TO 38C</td>
<td>220</td>
<td>38A TO 38C</td>
<td>220</td>
<td>46°-60°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
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<tr>
<td>50A TO 50D</td>
<td>260</td>
<td>50A TO 50D</td>
<td>250</td>
<td>30°-45°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
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<td>45</td>
</tr>
<tr>
<td>50A TO 50B</td>
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<td>50A TO 50B</td>
<td>160</td>
<td>46°-60°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>45</td>
</tr>
<tr>
<td>50A TO 50E</td>
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<td>50A TO 50E</td>
<td>370</td>
<td>30°-45°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>45</td>
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<td>50A TO 50D</td>
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<td>50A TO 50D</td>
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<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>45</td>
</tr>
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<td>63A TO 63B</td>
<td>330</td>
<td>63A TO 63B</td>
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<td>30°-45°</td>
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<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>45</td>
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<td>63A TO 63G</td>
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<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>45</td>
</tr>
<tr>
<td>63A TO 63E</td>
<td>400</td>
<td>63A TO 63E</td>
<td>400</td>
<td>46°-60°</td>
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<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>45</td>
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<tr>
<td>75A TO 75E</td>
<td>360</td>
<td>75A TO 75E</td>
<td>360</td>
<td>30°-45°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
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</tr>
<tr>
<td>75A TO 75C</td>
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<td>75A TO 75C</td>
<td>220</td>
<td>46°-60°</td>
<td>1/2</td>
<td>1/4</td>
<td>2/4</td>
<td>6/4</td>
<td>3/4</td>
<td>45</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES
1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

Page N2.70.1

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
695 of 846
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) CONCRETE SCREW ANCHORS AT LOWER FLUTE ONLY

MIN. 20 GA STEEL DECK,
MIN. 3000 PSI NWC OR SLWC

HOLE Ø\text{\textfrac{3}{16}}" DIA. LARGER
THAN ANCHOR DIA, TYP

CONCRETE SCREW ANCHOR, TYP

1\text{\textfrac{3}{16}}\times\text{\textfrac{3}{16}}\times12 \text{ GA SINGLE }
STRUT (SOLID ONLY)

OVERSIZED NUT, TYP

ALTERNATE INSTALL

\text{\textfrac{3}{4}}\times\text{\textfrac{1}{2}}\times\text{\textfrac{1}{2}} \text{ ASTM A36 STRUT WASHER}

DEWALT/POWERS SCREW-BOLT+
CONCRETE SCREW ANCHOR
(ICC ESR-3889)
SPECIAL INSPECTION REQ'D

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED UP TO 15° FROM
THE CENTERLINE OF THE CHANNEL STRUT.

<table>
<thead>
<tr>
<th>ANCHOR</th>
<th>MIN FLUTE WIDTH fw INCH</th>
<th>MIN EDGE DIST ED INCH</th>
<th>MIN CONC. COVER ha INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEWALT/POWERS</td>
<td>3\text{\textfrac{3}{4}}</td>
<td>1</td>
<td>2\text{\textfrac{1}{2}}</td>
</tr>
<tr>
<td>MASON</td>
<td>4\text{\textfrac{1}{2}}</td>
<td>1\text{\textfrac{1}{4}}</td>
<td>1\text{\textfrac{1}{2}}</td>
</tr>
<tr>
<td>HILTI</td>
<td>4\text{\textfrac{1}{2}}</td>
<td>1\text{\textfrac{1}{4}}</td>
<td>3\text{\textfrac{1}{2}}</td>
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</tbody>
</table>

\[ \Omega_s = 2.0^\circ \]

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE ( \delta )</th>
<th>DIA. ( \text{da} ) INCH</th>
<th>MIN. EFF. EMBED. ( \text{hef} ) INCH</th>
<th>MIN. HOLE DEPTH ( \text{ho} ) INCH</th>
<th>MIN. SPACING ( \text{Smin} ) INCH</th>
<th>MIN. END DIST. ( \text{Cmin} ) INCH</th>
<th>MAX TORQUE FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50F</td>
<td>560</td>
<td>50A TO 50D</td>
<td>330</td>
<td>30°-45°</td>
<td>( \frac{3}{8} )</td>
<td>2\text{\textfrac{1}{2}}</td>
<td>2\text{\textfrac{1}{4}}</td>
<td>6</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>390</td>
<td>50A TO 50C</td>
<td>240</td>
<td>46°-60°</td>
<td>( \frac{3}{8} )</td>
<td>2\text{\textfrac{1}{2}}</td>
<td>( \frac{3}{4} )</td>
<td>4\text{\textfrac{1}{2}}</td>
<td>4\text{\textfrac{1}{2}}</td>
<td>60</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50G</td>
<td>620</td>
<td>30°-45°</td>
<td>( \frac{1}{2} )</td>
<td>3\text{\textfrac{1}{4}}</td>
<td>4\text{\textfrac{1}{2}}</td>
<td>9\text{\textfrac{1}{2}}</td>
<td>4\text{\textfrac{1}{2}}</td>
<td>60</td>
</tr>
<tr>
<td>50A TO 50F</td>
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<td>480</td>
<td>46°-60°</td>
<td>( \frac{3}{8} )</td>
<td>3\text{\textfrac{1}{2}}</td>
<td>4\text{\textfrac{1}{2}}</td>
<td>9\text{\textfrac{1}{2}}</td>
<td>4\text{\textfrac{1}{2}}</td>
<td>60</td>
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</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES
1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 SEE PAGE N2.71.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.
# Seismic Bracket Attachment to Concrete Filled Metal Deck with (2) Concrete Screw Anchors at Lower Flute Only

### Brace Bracket Attachment Types and Allowable Lateral Loads

<table>
<thead>
<tr>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load $F_p$ LBS</th>
<th>Brace Bracket Attachment Type</th>
<th>Allowable Lateral Load $F_p$ LBS</th>
<th>Max Brace Range $q$</th>
</tr>
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<tbody>
<tr>
<td>50A TO 50D</td>
<td>290</td>
<td>50A TO 50C</td>
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<td>200</td>
<td>50A TO 50A</td>
<td>120</td>
<td>46°-60°</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50E</td>
<td>370</td>
<td>30°-45°</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>420</td>
<td>50A TO 50D</td>
<td>250</td>
<td>46°-60°</td>
</tr>
</tbody>
</table>

### Mason Ind. N.Y. Sast Concrete Screw Anchor (ICC ESR-2713) Special Inspection Req'd

<table>
<thead>
<tr>
<th>Dia. da INCH</th>
<th>Min. Eff. Embed. hef INCH</th>
<th>Min. Hole Depth ho INCH</th>
<th>Min. Spacing Smin INCH</th>
<th>Min. End Dist. Cmin INCH</th>
<th>Max Torque FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>1 ½</td>
<td>2 ½</td>
<td>6 ½</td>
<td>3 ½</td>
<td>65</td>
</tr>
<tr>
<td>½</td>
<td>2 ½</td>
<td>4</td>
<td>7 ½</td>
<td>3 ½ ¾</td>
<td>65</td>
</tr>
</tbody>
</table>

### Hilti Kh-Ez Concrete Screw Anchor (ICC ESR-3027) Special Inspection Req'd

<table>
<thead>
<tr>
<th>Dia. da INCH</th>
<th>Min. Eff. Embed. hef INCH</th>
<th>Min. Hole Depth ho INCH</th>
<th>Min. Spacing Smin INCH</th>
<th>Min. End Dist. Cmin INCH</th>
<th>Max Torque FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>2 ¼</td>
<td>3 ½</td>
<td>6 ¾</td>
<td>3 ½</td>
<td>45</td>
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<tr>
<td>½</td>
<td>3 ¼</td>
<td>4 ½</td>
<td>9 ½</td>
<td>4 ½</td>
<td>45</td>
</tr>
</tbody>
</table>

**See Detail No.00 for Section Notes**

1 Overstrength factor as required for anchorage to concrete.

---

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**Jiefu “Jeff” Zhang, SE**
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---

**PAGE N2.71.1**
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CONCRETE SCREW ANCHORS AT LOWER FLUTE ONLY

CONCRETE SCREW ANCHOR, TYP

1 3/8 x 1 1/2 x 12 GA SINGLE STRUT (SOLID ONLY)

DEWALT/POWERS SCREW-BOLT+
CONCRETE SCREW ANCHOR

(ICC ESR-3889)

SPECIAL INSPECTION REQ'D

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

HOLE 3/8" DIA. LARGER THAN ANCHOR DIA, TYP

MIN. 10" MIN, 15" MAX FOR fw = 3 7/8

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

HOLE 3/8" DIA. LARGER THAN ANCHOR DIA, TYP

MIN. 10" MIN, 15" MAX FOR fw = 4

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

2 SEE PAGE N2.71.3 FOR ADDITIONAL ALLOWABLE LOAD TABLES.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) CONCRETE SCREW ANCHORS AT LOWER FLUTE ONLY

### Allowable Lateral Load

<table>
<thead>
<tr>
<th>BRACE ATTACHMENT</th>
<th>ALLOWABLE LATERAL LOAD</th>
<th>MAX BRACE RANGE</th>
<th>MASON IND. N.Y. SAST CONCRETE SCREW ANCHOR</th>
<th>SPECIAL INSPECTION REQ'D</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50F</td>
<td>500</td>
<td>30° - 45°</td>
<td>DIA. da INCH, MIN. EFF. EMBED. hef INCH, MIN. HOLE DEPTH ho INCH, MIN. SPACING Smin INCH, MIN. END DIST. Cmin INCH, MAX TORQUE FT-LBS</td>
<td>1/2, 1 3/16, 2 1/2, 6 1/2, 3 1/16, 65</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>340</td>
<td>46° - 60°</td>
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<td>1/2, 2 5/16, 4, 7/8, 3 15/16, 65</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>30° - 45°</td>
<td></td>
<td>1/2, 3 4/8, 4, 9/4, 4 3/16, 45</td>
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<tr>
<td>50A TO 50E</td>
<td>430</td>
<td>46° - 60°</td>
<td></td>
<td>1/2, 3 4/8, 4, 9/4, 4 3/16, 45</td>
</tr>
</tbody>
</table>

SEE DETAIL NO. 00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

---

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California SE No. S5270
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CONCRETE SCREW ANCHORS

CONCRETE SCREW ANCHOR, TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

ADD OVERSIZED NUT WHEN SAP IS INSTALLED PARALLEL TO FLUTE.

MW-SAP-200-A
SEE PAGE X6.0

1/4" DIA. ASTM A307 BOLT & NUT (SNUG TIGHT), TYP

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

<table>
<thead>
<tr>
<th>ANCHOR</th>
<th>MIN FLUTE WIDTH fw INCH</th>
<th>MIN EDGE DIST ED INCH</th>
<th>MIN CONC. COVER ha INCH</th>
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</thead>
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<tr>
<td>DEWALT/POWERS</td>
<td>3/8</td>
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<td>2 1/2</td>
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<td>HILTI</td>
<td>4 1/2</td>
<td>1 1/4</td>
<td>3 1/2</td>
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<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>MAX BRACE RANGE</th>
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<td>63A TO 63J</td>
<td>880</td>
<td>63A TO 63F</td>
<td>30°-45°</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>610</td>
<td>63A TO 63E</td>
<td>30°-45°</td>
</tr>
<tr>
<td>63A TO 63J</td>
<td>1080</td>
<td>63A TO 63J</td>
<td>30°-45°</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>620</td>
<td>63A TO 63F</td>
<td>30°-45°</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>MAX TORQUE FT-LBS</th>
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</thead>
<tbody>
<tr>
<td>63A TO 63J</td>
<td>3/4</td>
<td>5</td>
<td>11 1/4</td>
<td>5 1/4</td>
<td>60</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>3</td>
<td>60</td>
<td>5 1/4</td>
<td>60</td>
<td>60</td>
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<table>
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<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>MAX BRACE RANGE</th>
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<tbody>
<tr>
<td>63A TO 63K</td>
<td>1060</td>
<td>63A TO 63G</td>
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<tr>
<td>63A TO 63G</td>
<td>620</td>
<td>63A TO 63F</td>
<td>30°-45°</td>
</tr>
<tr>
<td>63A TO 63K</td>
<td>1080</td>
<td>63A TO 63K</td>
<td>30°-45°</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>620</td>
<td>63A TO 63G</td>
<td>30°-45°</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>MAX TORQUE FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A TO 63K</td>
<td>3/4</td>
<td>5</td>
<td>11 1/4</td>
<td>5 1/4</td>
<td>85</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>3</td>
<td>60</td>
<td>5 1/4</td>
<td>60</td>
<td>85</td>
</tr>
</tbody>
</table>

DEWALT/POWERS SCREW-BOLT+ CONCRETE SCREW ANCHOR (ICC ESR-3889)
SPECIAL INSPECTION REQ'D

HILTI KH-EZ CONCRETE SCREW ANCHOR (ICC ESR-3027)
SPECIAL INSPECTION REQ'D

SEE DETAIL N0.00 FOR SECTION NOTES

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MASON WEST, INC.
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Jiefu "Jeff" Zhang, SE
California SE No. S5270

PAGE N2.72
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (4) CONCRETE SCREW ANCHORS

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MW-SAP-400-B FOR 3/8" Ø BOLT
MW-SAP-400-C FOR 5/8" Ø BOLT
MW-SAP-400-D FOR 1" Ø BOLT
SEE PAGE X6.0, TYP

ASTM A307 BOLT & NUT (SNUG TIGHT)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

CONCRETE SCREW ANCHOR, TYP

DEWALT/POWERS SCREW-BOLT+ CONCRETE SCREW ANCHOR (ICC ESR-3889) SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>ANCHOR</th>
<th>MIN FLUTE WIDTH</th>
<th>MIN EDGE DIST</th>
<th>MIN CONC. COVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEWALT/POWERS</td>
<td>3/4</td>
<td>1</td>
<td>2 1/2</td>
</tr>
<tr>
<td>HILTI</td>
<td>4 1/2</td>
<td>1 1/4</td>
<td>3 1/4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE Ω</th>
<th>BOLT DIA.</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A TO 63K</td>
<td>1770</td>
<td>63A TO 63K</td>
<td>1060</td>
<td>30°-45°</td>
<td>%</td>
</tr>
<tr>
<td>63A TO 63P</td>
<td>2850</td>
<td>63A TO 63M</td>
<td>1710</td>
<td>30°-45°</td>
<td>%</td>
</tr>
<tr>
<td>63A TO 63M</td>
<td>1870</td>
<td>63A TO 63K</td>
<td>730</td>
<td>46°-60°</td>
<td>%</td>
</tr>
<tr>
<td>75A TO 75P</td>
<td>2850</td>
<td>75A TO 75M</td>
<td>1710</td>
<td>30°-45°</td>
<td>%</td>
</tr>
<tr>
<td>75A TO 75M</td>
<td>1870</td>
<td>75A TO 75K</td>
<td>1120</td>
<td>46°-60°</td>
<td>%</td>
</tr>
<tr>
<td>100A TO 100P</td>
<td>2850</td>
<td>100A TO 100M</td>
<td>1710</td>
<td>30°-45°</td>
<td>%</td>
</tr>
<tr>
<td>100A TO 100M</td>
<td>1870</td>
<td>100A TO 100K</td>
<td>1120</td>
<td>46°-60°</td>
<td>%</td>
</tr>
</tbody>
</table>

Ω = 2.0

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
2 SEE PAGE N2.73.1 FOR ADDITIONAL ALLOWABLE LOAD TABLES.

Jiefu "Jeff" Zhang, SE
California SE No. S5270
# SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (4) CONCRETE SCREW ANCHORS

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>BOLT DIA. MIN. EFF. EMBED. DEPTH MIN. SPACEING MIN. END DIST. MAX TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A TO 63N</td>
<td>2130</td>
<td>63A TO 63L</td>
<td>1280</td>
<td>30° - 45°</td>
<td>%</td>
</tr>
<tr>
<td>63A TO 63L</td>
<td>1560</td>
<td>63A TO 63J</td>
<td>940</td>
<td>46° - 60°</td>
<td>%</td>
</tr>
<tr>
<td>63A TO 63P</td>
<td>3080</td>
<td>63A TO 63N</td>
<td>2010</td>
<td>30° - 45°</td>
<td>%</td>
</tr>
<tr>
<td>63A TO 63N</td>
<td>2080</td>
<td>63A TO 63M</td>
<td>1610</td>
<td>46° - 60°</td>
<td>%</td>
</tr>
<tr>
<td>75A TO 75P</td>
<td>3350</td>
<td>75A TO 75N</td>
<td>2010</td>
<td>30° - 45°</td>
<td>%</td>
</tr>
<tr>
<td>75A TO 75N</td>
<td>2020</td>
<td>75A TO 75M</td>
<td>1610</td>
<td>46° - 60°</td>
<td>%</td>
</tr>
<tr>
<td>100A TO 100P</td>
<td>3350</td>
<td>100A TO 100N</td>
<td>2010</td>
<td>30° - 45°</td>
<td>%</td>
</tr>
<tr>
<td>100A TO 100N</td>
<td>2020</td>
<td>100A TO 100M</td>
<td>1610</td>
<td>46° - 60°</td>
<td>%</td>
</tr>
</tbody>
</table>

$\Omega = 2.0$"
**SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) CONCRETE SCREW ANCHOR**

CONCRETE SCREW ANCHOR

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE ANCHOR

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>MAX TORQUE FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38D</td>
<td>270</td>
<td>30°-45°</td>
<td>3/8</td>
<td>2/2</td>
<td>3/8</td>
<td>7/8</td>
<td>3/4</td>
<td>40</td>
</tr>
<tr>
<td>38A TO 38B</td>
<td>160</td>
<td>46°-60°</td>
<td>1/2</td>
<td>1/2</td>
<td>2/3</td>
<td>5/4</td>
<td>2/5</td>
<td>45</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>180</td>
<td>30°-45°</td>
<td>7/8</td>
<td>2/2</td>
<td>5/8</td>
<td>3/4</td>
<td>2/5</td>
<td>45</td>
</tr>
<tr>
<td>50A TO 50A</td>
<td>110</td>
<td>46°-60°</td>
<td>17/8</td>
<td>1/2</td>
<td>2/5</td>
<td>5/4</td>
<td>2/5</td>
<td>45</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CONCRETE SCREW ANCHORS

1 ½" x 1 ½" x 12 GA SINGLE STRUT (SOLID ONLY), STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

HOLE ¾" DIA. LARGER THAN ANCHOR DIA, TYP

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

1" MIN, TYP
1 ¼" MIN
2 ½" MIN, TYP
3 ½" MAX, TYP
1 ½" MAX

OVERSIZED NUT, TYP

OVSRTRESS FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

ALTERNATE INSTALL

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

OVERSIZED NUT, TYP

DEWALT/POWERS SCREW-BOLT+ CONCRETE SCREW ANCHOR (ICC ESR-3889)
SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>DIA. da INCH</th>
<th>MIN. EFF. EMBED. hef INCH</th>
<th>MIN. HOLE DEPTH ho INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
<th>MAX TORQUE FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50F</td>
<td>520</td>
<td>30°-45°</td>
<td>½</td>
<td>2 ½</td>
<td>3 ½</td>
<td>7 ½</td>
<td>3 ¾</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>370</td>
<td>46°-60°</td>
<td>½</td>
<td>1 ¼</td>
<td>2 ½</td>
<td>5 ½</td>
<td>2 ¾</td>
<td>45</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) CONCRETE SCREW ANCHORS

CONCRETE SCREW ANCHOR, TYP

1½" x 1½" x 12 GA SINGLE STRUT (SOLID ONLY). STRUT MAY BE ROTATED TO ANY ANGLE IN PLAN, TYP

ALTERNATE INSTALL

OVERSIZED NUT, TYP

BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

DEWALT/POWERS SCREW-BOLT+
CONCRETE SCREW ANCHOR
(ICC ESR-3889)
SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp</th>
<th>ALLOWABLE MAX BRACE RANGE</th>
<th>DIA. da</th>
<th>MIN. EFF. EMBED. hef</th>
<th>MIN. HOLE DEPTH ho</th>
<th>MIN. SPACING Smin</th>
<th>MIN. END DIST. Cmin</th>
<th>MAX TORKUE</th>
<th>FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50F</td>
<td>530</td>
<td>30°-45°</td>
<td>3½</td>
<td>2½</td>
<td>7½</td>
<td>3½</td>
<td>40</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>50A TO 50E</td>
<td>380</td>
<td>46°-60°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50E</td>
<td>390</td>
<td>30°-45°</td>
<td>½</td>
<td>1½</td>
<td>2½</td>
<td>5¾</td>
<td>45</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>440</td>
<td>50A TO 50D</td>
<td>270</td>
<td>46°-60°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) HILTI KCM-MD-SP/LP CONCRETE INSERT

<table>
<thead>
<tr>
<th>INSERT SIZE</th>
<th>MIN. COVER (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;-5/8&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>5/8&quot;-3/4&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>7/8&quot;-1 1/2&quot;</td>
<td>SP @ LOWER FLUTE = 2 1/2</td>
</tr>
<tr>
<td></td>
<td>SP @ UPPER FLUTE = 3 1/4</td>
</tr>
<tr>
<td>1 1/2&quot;-5/8&quot;</td>
<td>SP @ LOWER FLUTE = 2 1/2</td>
</tr>
<tr>
<td></td>
<td>SP @ UPPER FLUTE = 3 1/4</td>
</tr>
<tr>
<td>5/8&quot;-3/4&quot;</td>
<td>LP @ EITHER FLUTE = 3 1/4</td>
</tr>
</tbody>
</table>

\[
\Omega_s = 2.0
\]

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD (Fp LBS)</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD (Fp LBS)</th>
<th>MAX BRACE RANGE (°)</th>
<th>ATR. DIA. (inch)</th>
<th>INSERT SIZE</th>
<th>MIN. EFF. EMBED (hef) INCH</th>
<th>MIN. SPACING (smin) INCH</th>
<th>MIN. END DIST. (cmin) INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38F</td>
<td>480</td>
<td>38A TO 38D</td>
<td>290</td>
<td>30°-45°</td>
<td>3/8&quot;</td>
<td>3/8&quot;-3/4&quot;</td>
<td>1 1/4</td>
<td>5 1/2</td>
<td>5/4</td>
</tr>
<tr>
<td>38A TO 38D</td>
<td>310</td>
<td>38A TO 38C</td>
<td>190</td>
<td>46°-60°</td>
<td>3/8&quot;</td>
<td>5/8&quot;-3/4&quot;</td>
<td>2</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50E</td>
<td>370</td>
<td>30°-45°</td>
<td>3/8&quot;</td>
<td>3/4&quot;-5/8&quot;</td>
<td>2 1/2</td>
<td>7 1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>410</td>
<td>50A TO 50C</td>
<td>240</td>
<td>46°-60°</td>
<td>3/4&quot;</td>
<td>5/8&quot;-3/4&quot;</td>
<td>2 1/2</td>
<td>7 1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>63A TO 63H</td>
<td>730</td>
<td>63A TO 63E</td>
<td>440</td>
<td>30°-45°</td>
<td>3/8&quot;</td>
<td>3/8&quot;-3/4&quot;</td>
<td>2 1/2</td>
<td>7 1/2</td>
<td>5/4</td>
</tr>
<tr>
<td>63A TO 63F</td>
<td>470</td>
<td>63A TO 63D</td>
<td>280</td>
<td>46°-60°</td>
<td>3/8&quot;</td>
<td>3/8&quot;-3/4&quot;</td>
<td>2 1/2</td>
<td>7 1/2</td>
<td>5/4</td>
</tr>
<tr>
<td>75A TO 75H</td>
<td>730</td>
<td>75A TO 75E</td>
<td>440</td>
<td>30°-45°</td>
<td>3/8&quot;</td>
<td>5/8&quot;-3/4&quot;</td>
<td>2 1/2</td>
<td>7 1/2</td>
<td>5/4</td>
</tr>
<tr>
<td>75A TO 75F</td>
<td>470</td>
<td>75A TO 75D</td>
<td>280</td>
<td>46°-60°</td>
<td>3/8&quot;</td>
<td>5/8&quot;-3/4&quot;</td>
<td>2 1/2</td>
<td>7 1/2</td>
<td>5/4</td>
</tr>
</tbody>
</table>

1. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
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Jiefu "Jeff" Zhang, SE
California SE No. S5270

PAGE N2.80
**SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK**

WITH (1) HILTI KCM-MD-SP/LP CONCRETE INSERT AT UPPER FLUTE

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE</th>
<th>ATR DIA.</th>
<th>INSERT SIZE</th>
<th>MIN. EFF. EMBED hef</th>
<th>MIN. COVER ha</th>
<th>MIN. SPACING Smin</th>
<th>MIN. END DIST. Cmin LBS</th>
<th>( \Omega_0 = 2.0 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38J</td>
<td>860</td>
<td>38A TO 38F</td>
<td>520</td>
<td>30°-45°</td>
<td>( \frac{5}{8} )</td>
<td>( \frac{5}{8}''-\frac{3}{4}'' )</td>
<td>1( \frac{1}{4} )</td>
<td>2( \frac{1}{2} )</td>
<td>5( \frac{1}{2} )</td>
<td>2( \frac{1}{4} )</td>
<td>1030</td>
</tr>
<tr>
<td>38A TO 38G</td>
<td>590</td>
<td>38A TO 38E</td>
<td>350</td>
<td>30°-45°</td>
<td>( \frac{3}{8} )</td>
<td>( \frac{3}{4}''-\frac{1}{2}'' )</td>
<td>1( \frac{1}{4} )</td>
<td>1( \frac{1}{2} )</td>
<td>6( \frac{1}{2} )</td>
<td>3</td>
<td>750</td>
</tr>
<tr>
<td>50A TO 50K</td>
<td>1120</td>
<td>50A TO 50G</td>
<td>670</td>
<td>30°-45°</td>
<td>( \frac{1}{2} )</td>
<td>( \frac{3}{8}''-\frac{5}{8}'' )</td>
<td>2( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>7( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>600</td>
</tr>
<tr>
<td>50A TO 50H</td>
<td>760</td>
<td>50A TO 50F</td>
<td>450</td>
<td>30°-45°</td>
<td>( \frac{1}{2} )</td>
<td>( \frac{3}{8}''-\frac{5}{8}'' )</td>
<td>2( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>7( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>600</td>
</tr>
<tr>
<td>63A TO 63L</td>
<td>1580</td>
<td>63A TO 63J</td>
<td>950</td>
<td>30°-45°</td>
<td>( \frac{1}{2} )</td>
<td>( \frac{3}{8}''-\frac{5}{8}'' )</td>
<td>2( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>7( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>670</td>
</tr>
<tr>
<td>63A TO 63K</td>
<td>1030</td>
<td>63A TO 63G</td>
<td>620</td>
<td>30°-45°</td>
<td>( \frac{1}{2} )</td>
<td>( \frac{3}{8}''-\frac{5}{8}'' )</td>
<td>2( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>7( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>600</td>
</tr>
<tr>
<td>75A TO 75L</td>
<td>1380</td>
<td>75A TO 75J</td>
<td>830</td>
<td>30°-45°</td>
<td>( \frac{1}{2} )</td>
<td>( \frac{3}{8}''-\frac{5}{8}'' )</td>
<td>2( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>7( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>600</td>
</tr>
<tr>
<td>75A TO 75J</td>
<td>940</td>
<td>75A TO 75F</td>
<td>560</td>
<td>30°-45°</td>
<td>( \frac{1}{2} )</td>
<td>( \frac{3}{8}''-\frac{5}{8}'' )</td>
<td>2( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>7( \frac{1}{2} )</td>
<td>3( \frac{1}{4} )</td>
<td>600</td>
</tr>
</tbody>
</table>

**MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC**

HILTI KCM-MD-LP CONCRETE INSERT

INSERT SLEEVE MAY BE TRIMMED AS REQ'D, TYP

ATR AND REG. NUT (SNUG TIGHT), TYP

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING.

- BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE INSERT, TYP

**SEE DETAIL NO.00 FOR SECTION NOTES**

° OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

DEWALT/POWERS BANG-IT+ CONCRETE INSERT, TYP ATR AND REG. NUT (SNUG TIGHT)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE INSERT

<table>
<thead>
<tr>
<th>MIN FLUTE WIDTH fw INCH</th>
<th>MIN EDGE DIST ED INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>4 1/2</td>
<td>1 1/2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE ø</th>
<th>ATR DIA ø</th>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38E</td>
<td>390</td>
<td>38A TO 38C</td>
<td>230</td>
<td>30°- 45°</td>
<td>3/8</td>
<td>0.7 (3/8&quot;)</td>
<td>5/4</td>
</tr>
<tr>
<td>38A TO 38D</td>
<td>260</td>
<td>38A TO 38B</td>
<td>160</td>
<td>46°- 60°</td>
<td>3/8</td>
<td>0.7 (3/8&quot;)</td>
<td>5/4</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>390</td>
<td>50A TO 50B</td>
<td>160</td>
<td>46°- 60°</td>
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<td>260</td>
<td>50A TO 50B</td>
<td>230</td>
<td>30°- 45°</td>
<td>3/8</td>
<td>0.7 (3/8&quot;)</td>
<td>5/4</td>
</tr>
<tr>
<td>63A TO 63E</td>
<td>410</td>
<td>63A TO 63C</td>
<td>160</td>
<td>46°- 60°</td>
<td>3/8</td>
<td>0.7 (3/8&quot;)</td>
<td>5/4</td>
</tr>
<tr>
<td>63A TO 63D</td>
<td>270</td>
<td>63A TO 63B</td>
<td>240</td>
<td>30°- 45°</td>
<td>3/8</td>
<td>1.0 (5/8&quot;)</td>
<td>5/4</td>
</tr>
<tr>
<td>75A TO 75E</td>
<td>410</td>
<td>75A TO 75C</td>
<td>240</td>
<td>30°- 45°</td>
<td>3/8</td>
<td>1.0 (5/8&quot;)</td>
<td>5/4</td>
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<td>160</td>
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<td>3/8</td>
<td>1.0 (5/8&quot;)</td>
<td>5/4</td>
</tr>
</tbody>
</table>

\[ \Omega_0 = 2.0 \]

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

SEE DETAIL NO.00 FOR SECTION NOTES

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

10/09/2020

Jiefu "Jeff" Zhang, SE
California SE No. S5270
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

DEWALT/POWERS BANG-IT+ CONCRETE INSERT, TYP
3/8" DIA. ATR, MIN 3/16x3/16x3/16 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
1 1/2x1 1/2x12 GA SINGLE STRUT (SOLID ONLY)
MIN. 3/16x3/16x3/16 ASTM A36 STRUT WASHER

REG. NUT (SNUG TIGHT), TYP
BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

ALTERNATE INSTALL

MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

ALLOWABLE LATERAL LOAD (LBS)

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50F</td>
<td>450</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>300</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>450</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>300</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>470</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>310</td>
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</tbody>
</table>

MAX BRACE RANGE

<table>
<thead>
<tr>
<th>DIA. da INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7 (3/8&quot;)</td>
<td>2&quot;</td>
</tr>
<tr>
<td>0.7 (1/2&quot;)</td>
<td>2&quot;</td>
</tr>
<tr>
<td>1.0 (5/8&quot;)</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jiefu "Jeff" Zhang, SE
California SE No. SS270

P A G E
N2.91
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MIN. 3/4 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

REG. NUT (SNUG TIGHT), TYP

MIN. 3/4 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

<table>
<thead>
<tr>
<th>MIN FLUTE WIDTH (fw)</th>
<th>MIN EDGE DIST (w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 1/4</td>
<td>3/4</td>
</tr>
<tr>
<td>4 1/2</td>
<td>1 1/2</td>
</tr>
</tbody>
</table>

DEWALT/POWERS BANG-IT+ CONCRETE INSERT, TYP

ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

REG. NUT (SNUG TIGHT), TYP

MIN. 3/4 x 1 1/2 x 1 1/2 ASTM A36 STRUT WASHER

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ALLOWABLE LATERAL LOAD (Fp)</th>
<th>MAX BRACE RANGE (p)</th>
<th>DIA. (da)</th>
<th>MIN SPACING (Smin)</th>
<th>MIN END DIST. (Cmin)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>30°- 45°</td>
<td>0.7 (5/8&quot;)</td>
<td>5/4</td>
<td>2/5</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>520</td>
<td>46°- 60°</td>
<td>0.7 (5/8&quot;)</td>
<td>5/4</td>
<td>2/5</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>30°- 45°</td>
<td>1.0 (5/8&quot;)</td>
<td>5/4</td>
<td>2/5</td>
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<tr>
<td>50A TO 50F</td>
<td>520</td>
<td>46°- 60°</td>
<td>1.0 (5/8&quot;)</td>
<td>5/4</td>
<td>2/5</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>650</td>
<td>30°- 45°</td>
<td>1.0 (5/8&quot;)</td>
<td>5/4</td>
<td>2/5</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td>46°- 60°</td>
<td>1.0 (5/8&quot;)</td>
<td>5/4</td>
<td>2/5</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED TO ANY ANGLE
AROUND BOLT, TYP

DEWALT/POWERS BANG-IT+
CONCRETE INSERT, TYP

MIN. 22 GA
STEEL DECK,
MIN. 3000 PSI
NWC OR SLWC

MW-SAP-200-A
SEE PAGE X6.0

½" DIA. ASTM A307 BOLT & NUT (SNUG TIGHT)

SPECIAL INSPECTION REQ'D

DEWALT/POWERS BANG-IT+
CONCRETE INSERT
(ICC ESR-3657)

<table>
<thead>
<tr>
<th>MIN. FLUTE WIDTH fw INCH</th>
<th>MIN. EDGE DIST ED INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>3½</td>
<td>¾</td>
</tr>
<tr>
<td>4½</td>
<td>1½</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE da</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A TO 63H</td>
<td>810</td>
<td>63A TO 63F</td>
<td>490</td>
<td>30°- 45°</td>
</tr>
<tr>
<td>63A TO 63F</td>
<td>540</td>
<td>63A TO 63D</td>
<td>320</td>
<td>46°- 60°</td>
</tr>
</tbody>
</table>

Ω₀ = 2.0¹

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

SEED DETAIL NO.00 FOR SECTION NOTES

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jeffrey Y. Kikumoto  
OPM-0043-13  
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

PAGE N2.92

711 of 846
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (4) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

DEWALT/POWERS BANG-IT+ CONCRETE INSERT, TYP

1/8" ASTM A36 ATR WITH REG. NUT (SNUG TIGHT), TYP

MW-SAP-400-B FOR 5/8" Ø BOLT
MW-SAP-400-C FOR 3/4" Ø BOLT
MW-SAP-400-D FOR 1" Ø BOLT
SEE PAGE X6.0, TYP

ASTM A307 BOLT & NUT (SNUG TIGHT)

MAISON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP

<table>
<thead>
<tr>
<th>MIN FLUTE WIDTH fw</th>
<th>MIN EDGE DIST ED</th>
</tr>
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<tbody>
<tr>
<td>3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>41/2</td>
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Ω₀ = 2.0

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<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE θ</th>
<th>BOLT DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A TO 63M</td>
<td>1630</td>
<td>63A TO 67J</td>
<td>980</td>
<td>30°- 45°</td>
<td>1.0 (5/8&quot;) Ø</td>
<td>5/4</td>
<td>2/4</td>
</tr>
<tr>
<td>63A TO 63K</td>
<td>1070</td>
<td>63A TO 63G</td>
<td>640</td>
<td>46°- 60°</td>
<td>1.0 (5/8&quot;) Ø</td>
<td>5/4</td>
<td>2/4</td>
</tr>
<tr>
<td>75A TO 75M</td>
<td>1630</td>
<td>75A TO 75J</td>
<td>980</td>
<td>30°- 45°</td>
<td>1.0 (5/8&quot;) Ø</td>
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<td>2/4</td>
</tr>
<tr>
<td>75A TO 75K</td>
<td>1070</td>
<td>75A TO 75G</td>
<td>640</td>
<td>46°- 60°</td>
<td>1.0 (5/8&quot;) Ø</td>
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<td>2/4</td>
</tr>
<tr>
<td>100A TO 100M</td>
<td>1630</td>
<td>100A TO 100J</td>
<td>980</td>
<td>30°- 45°</td>
<td>1.0 (5/8&quot;) Ø</td>
<td>5/4</td>
<td>2/4</td>
</tr>
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<td>100A TO 100K</td>
<td>1070</td>
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<td>2/4</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
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Jiefu "Jeff" Zhang, SE
California SE No. S5270

PAGE N2.93
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

DEWALT/POWERS BANG-IT+ CONCRETE INSERT, TYP

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE INSERT

DEWALT/POWERS BANG-IT+ CONCRETE INSERT, TYP
ATR AND REG. NUT (SNUG TIGHT)

MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>ATR DIA. INCH</th>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38C</td>
<td>230</td>
<td>38A TO 38B</td>
<td>140</td>
<td>30°- 45°</td>
<td>1⁄8</td>
<td>0.7 (1⁄8&quot;)</td>
<td>5⁄8</td>
<td>2⁄8</td>
</tr>
<tr>
<td>38A TO 38B</td>
<td>150</td>
<td>38A TO 38A</td>
<td>90</td>
<td>46°- 60°</td>
<td>1⁄4</td>
<td>0.7 (5⁄32&quot;)</td>
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<td>2⁄8</td>
</tr>
<tr>
<td>50A TO 50C</td>
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</tr>
<tr>
<td>50A TO 50A</td>
<td>150</td>
<td>50A TO 50A</td>
<td>90</td>
<td>46°- 60°</td>
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<td>63A TO 63D</td>
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<td>63A TO 63A</td>
<td>90</td>
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<td>1⁄4</td>
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<td>5⁄8</td>
<td>2⁄8</td>
</tr>
</tbody>
</table>

Ω₀ = 2.0°

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

SEE DETAIL NO.00 FOR SECTION NOTES

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

PAGE N2.94
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

MIN. 22 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

MIN. ¾" x 1¾" x 1¾" ASTM A36 STRUT WASHER

AVERAGE INSTALL

ALTERNATE INSTALL

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

SEE DETAIL NO.00 FOR SECTION NOTES
1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

Ω₀ = 2.0

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX Brace RANGE D</th>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50D</td>
<td>280</td>
<td>50A TO 50B</td>
<td>170</td>
<td>30° - 45°</td>
<td>0.7 (¾&quot;Ø)</td>
<td>5¼</td>
<td>2¾</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>180</td>
<td>50A TO 50A</td>
<td>110</td>
<td>46° - 60°</td>
<td>0.7 (¾&quot;Ø)</td>
<td>5¼</td>
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<td>170</td>
<td>30° - 45°</td>
<td>1.0 (¾&quot;Ø)</td>
<td>5¼</td>
<td>2¾</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>180</td>
<td>50A TO 50A</td>
<td>110</td>
<td>46° - 60°</td>
<td>1.0 (¾&quot;Ø)</td>
<td>5¼</td>
<td>2¾</td>
</tr>
</tbody>
</table>

Jiefu "Jeff" Zhang, SE
California SE No. S5270

P A G E

N2.95
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE da</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50F</td>
<td>470</td>
<td>50A TO 50D</td>
<td>280</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>300</td>
<td>50A TO 50C</td>
<td>180</td>
<td>46° - 60°</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>470</td>
<td>50A TO 50D</td>
<td>280</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>300</td>
<td>50A TO 50C</td>
<td>180</td>
<td>46° - 60°</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>490</td>
<td>50A TO 50D</td>
<td>290</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>310</td>
<td>50A TO 50C</td>
<td>180</td>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

\( \Omega_0 = 2.0 \)  

SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK
WITH (2) DEWALT/POWERS BANG-IT+ CONCRETE INSERT AT LOWER FLUTE

DEWALT/POWERS BANG-IT+ CONCRETE INSERT (ICC ESR-3657) SPECIAL INSPECTION REQ'D

<table>
<thead>
<tr>
<th>DIA. da INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7 (3/8&quot;)</td>
<td>5/4</td>
<td>2 1/2</td>
</tr>
<tr>
<td>0.7 (3/8&quot;)</td>
<td>5/4</td>
<td>2 1/2</td>
</tr>
<tr>
<td>1.0 (5/8&quot;)</td>
<td>5/4</td>
<td>2 1/2</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

MASON WEST, INC.
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SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) DEWALT DDI+ CONCRETE INSERT

DEWALT DDI+ CONCRETE INSERT, TYP
REGULAR NUT (SNUG TIGHT), TYP
SEISMIC BRACE BRACKET MAY BE ROTATED TO ANY ANGLE FROM THE CENTERLINE OF THE CONCRETE INSERT, TYP
MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE</th>
<th>MIN. EFF. EMBED. da INCH</th>
<th>MIN. COVER ha INCH</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38F</td>
<td>470</td>
<td>38A TO 38D</td>
<td>280</td>
<td>30° - 45°</td>
<td>⅛</td>
<td>1⅛</td>
<td>2</td>
<td>4⅛</td>
</tr>
<tr>
<td>38A TO 38D</td>
<td>340</td>
<td>38A TO 38C</td>
<td>210</td>
<td>46° - 60°</td>
<td>⅛</td>
<td>1⅛</td>
<td>2</td>
<td>4⅛</td>
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<td>50A TO 50H</td>
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<td>50A TO 50E</td>
<td>420</td>
<td>30° - 45°</td>
<td>⅛</td>
<td>1⅛</td>
<td>2</td>
<td>4⅛</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>490</td>
<td>50A TO 50D</td>
<td>290</td>
<td>46° - 60°</td>
<td>⅛</td>
<td>1⅛</td>
<td>2</td>
<td>4⅛</td>
</tr>
<tr>
<td>63A TO 63J</td>
<td>960</td>
<td>63A TO 63G</td>
<td>580</td>
<td>30° - 45°</td>
<td>⅛</td>
<td>2</td>
<td>3⅛</td>
<td>6</td>
</tr>
<tr>
<td>63A TO 63G</td>
<td>640</td>
<td>63A TO 63E</td>
<td>380</td>
<td>46° - 60°</td>
<td>⅛</td>
<td>2</td>
<td>3⅛</td>
<td>6</td>
</tr>
</tbody>
</table>

Ω₀ = 2.0

DEWALT DDI+ CONCRETE INSERT (ICC ESR-3958) SPECIAL INSPECTION REQ'D

SEE DETAIL N0.00 FOR SECTION NOTES

1 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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PAGE N2.100

SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) CADDY CRLM CONCRETE INSERT AT LOWER FLUTE

MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC

CADDY CRLM CONCRETE INSERT, TYP
ATR AND REG. NUT (SNUG TIGHT)
MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING. BRACE
BRACKET MAY BE ROTATED TO ANY
ANGLE AROUND CONCRETE INSERT

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE ( \delta )</th>
<th>ATR DIA. DIA.</th>
<th>MIN. SPACING Smin INCH</th>
<th>MIN. END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38E</td>
<td>390</td>
<td>38A TO 38C</td>
<td>230</td>
<td>30°-45°</td>
<td>( \frac{3}{8} )</td>
<td>0.61 (( \frac{3}{8} )Ø)</td>
<td>6</td>
</tr>
<tr>
<td>38A TO 38D</td>
<td>290</td>
<td>38A TO 38B</td>
<td>170</td>
<td>46°-60°</td>
<td>( \frac{3}{8} )</td>
<td>0.71 (( \frac{3}{8} )Ø)</td>
<td>6</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>550</td>
<td>50A TO 50D</td>
<td>330</td>
<td>30°-45°</td>
<td>( \frac{5}{8} )</td>
<td>0.61 (( \frac{5}{8} )Ø)</td>
<td>6</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>370</td>
<td>50A TO 50C</td>
<td>220</td>
<td>46°-60°</td>
<td>( \frac{5}{8} )</td>
<td>0.71 (( \frac{5}{8} )Ø)</td>
<td>6</td>
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</tbody>
</table>

\( \Omega_0 = 2.0 \)

CADDY CRLM CONCRETE INSERT
(ICC ESR-3964)
SPECIAL INSPECTION REQ'D

SEE DETAIL NO.00 FOR SECTION NOTES

\(^1\) OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

\(^2\) AXIAL SPACING PARALLEL TO FLUTE DIRECTION.

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PAGE N2.110
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK
WITH (1) CADDY CRLM CONCRETE INSERT AT UPPER FLUTE

\[ \Omega_0 = 2.0 \]

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD ( F_p ) LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD ( F_p ) LBS</th>
<th>MAX BRACE RANGE ( \delta )</th>
<th>ATR DIA. ( \text{INCH} )</th>
<th>DIA. ( \text{da} ) ( \text{INCH} )</th>
<th>MIN. SPACING ( S_{\text{min}} ) ( \text{INCH} )</th>
<th>MIN. END DIST. ( C_{\text{min}} ) ( \text{INCH} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38F</td>
<td>480</td>
<td>38A TO 38D</td>
<td>290</td>
<td>30°-45°</td>
<td>( \frac{3}{8} )</td>
<td>0.61 (( \frac{1}{8})( \text{Ø} ))</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>38A TO 38E</td>
<td>390</td>
<td>38A TO 38C</td>
<td>230</td>
<td>46°-60°</td>
<td>( \frac{3}{8} )</td>
<td>0.71 (( \frac{1}{4})( \text{Ø} ))</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>50A TO 50H</td>
<td>770</td>
<td>50A TO 50F</td>
<td>460</td>
<td>30°-45°</td>
<td>( \frac{1}{2} )</td>
<td>0.71 (( \frac{1}{4})( \text{Ø} ))</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>550</td>
<td>50A TO 50D</td>
<td>330</td>
<td>46°-60°</td>
<td>( \frac{1}{2} )</td>
<td>0.71 (( \frac{1}{4})( \text{Ø} ))</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

SPECIAL INSPECTION REQ'D

CADDY CRLM CONCRETE INSERT
(ICC ESR-3864)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CONCRETE INSERT

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PAGE N2.110.1
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CADDY CRLM CONCRETE INSERT AT LOWER FLUTE

CADDY CRLM CONCRETE INSERT, TYP
1/2" DIA. ATR, MIN 3/8x1 1/2x1 1/2" ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP
1 1/2"x1 1/2"x12 GA SINGLE STRUT (SOLID ONLY)
MIN. 3/8x1 1/2x1 1/2" ASTM A36 STRUT WASHER
REG. NUT (SNUG TIGHT), TYP

ALTERNATE INSTALL

ALTERNATE INSTALL

\[ \Omega = 2.0^{\frac{1}{3}} \]

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRAKE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE ( \theta )</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td>50A TO 50OR</td>
<td>390</td>
<td>30°-45°</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>430</td>
<td>50A TO 50D</td>
<td>260</td>
<td>46°-60°</td>
</tr>
</tbody>
</table>

CADDY CRLM CONCRETE INSERT (ICC ESR-3864) SPECIAL INSPECTION REQ'D

MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.
AXIAL SPACING PARALLEL TO FLUTE DIRECTION.

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P A G E
N2.111
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) CADDY CRLM CONCRETE INSERT AT LOWER FLUTE

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED UP TO 15° FROM THE CENTERLINE OF THE CHANNEL STRUT.

\[ \Omega = 2.0 \]

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>( \Omega = 2.0 )</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE ( \theta )</th>
<th>CADDY CRLM CONCRETE INSERT (ICC ESR-3864) SPECIAL INSPECTION REQ'D</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>620</td>
<td></td>
<td>50A TO 50G</td>
<td>620</td>
<td>30°-45°</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>530</td>
<td></td>
<td>50A TO 50F</td>
<td>450</td>
<td>46°-60°</td>
</tr>
</tbody>
</table>

MIN. \( 3/4 \times 1 \frac{3}{8} \times 1 \frac{3}{4} \) ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP

\( \text{MIN. 20 GA STEEL DECK, MIN. 3000 PSI NWC OR SLWC} \)

\( \text{MIN. 3/4 \times 1 \frac{3}{8} \times 1 \frac{3}{4} \text{ ASTM A36 STRUT WASHER} } \)

\( \text{MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP (REF. X4.0)} \)

ALTERNATE INSTALL

1" MIN, TYP

ALTERNATE INSTALL

\( \text{ASTM A36 STRUT WASHER AND REG. NUT (SNUG TIGHT), TYP} \)

\( \text{BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT} \)

\( \text{OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.} \)

\( \text{AXIAL SPACING PARALLEL TO FLUTE DIRECTION.} \)

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P A G E
N2.111.1
WIRE/CABLE BRACE ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) BADGER INDUSTRIES MDH NO-DRILL™ HANGER

BOLT SHALL BE EXPOSED AT TOP, BUT SHALL NOT CONTACT METAL DECKING.

L1x1x12GA, 1" LG. ANGLE MAY BE ROTATED TO ANY ANGLE IN PLAN.

MIN. 12GA ASTM A641 WIRE OR AIRCRAFT CABLE TIED W/ MIN. (4) TWISTS WITHIN 1½", TYP. WIRE OR CABLE HANGER SHALL BE FOR TENSION LOADS ONLY.

MIN. 20 GA VERCO W2, W3, PLW2 OR PLW3 STEEL DECK W/ MIN. 3000 PSI NWC OR SLWC.

FOR PROPER INSTALLATION, FLAT SURFACE SHALL FACE DOWN.

BADGER INDUSTRIES MDH NO-DRILL™ HANGER. SEE DETAIL B.

¾"Ø BOLT TO PROPER HOLE. ONLY ONE BOLT SHALL BE INSTALLED PER HANGER.

### BRACE BRACKET CONNECTION TYPE

<table>
<thead>
<tr>
<th>BRACKET CONNECTION TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp</th>
<th>MAX. BRACE RANGE</th>
<th>MDH SIZE</th>
<th>MIN SPACING Smin</th>
<th>MIN END DIST. Cmin</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38B</td>
<td>130</td>
<td>30°-45°</td>
<td>MDH3812</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>38A TO 38A</td>
<td>90</td>
<td>46°-60°</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

1. SEE DETAIL N0.00 FOR SECTION NOTES.
2. PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE MDH DOES NOT IMPACT THE LISTED MDH CAPACITIES.
3. INSTALLATION: CLEAN METAL DECKING GROOVES TO EXPOSE PLATED DECKING METAL PRIOR TO PLACEMENT OF THE MDH HANGER.

ACCURATELY PLACE MDH HANGER CHISEL POINT ENDS INTO METAL DECKING GROOVES WITH FLAT SURFACE FACING DOWNWARDS AND WITH THE LENGTH OF THE MDH BODY BEING PERPENDICULAR TO THE DECKING GROOVES. WHILE HOLDING THE BODY CHISEL POINT END TIGHT INTO METAL DECKING GROOVE, TIGHTEN TORQUE-OFF HEX NUT UNTIL BOTH CHISEL POINT ENDS ARE TIGHT AND SECURELY WEDGED INTO THE OPPOSING METAL DECKING GROOVES. WHILE HOLDING THE MDH HANGER BODY IN PLACE, TIGHTEN THE TORQUE-OFF HEX NUT WITH AN OPEN END WRENCH UNTIL THE HEX NUT HAS BROKEN AWAY FROM THE THREADED BARREL, LEAVING THE LOCK WASHER COMPRESSED AND THE HEX NUT LOOSE ON THE THREADED SHAFT. FOR REFERENCE, A MINIMUM OF 15 FT-LBS OF TORQUE IS REQUIRED FOR THE MDH3812.
SEISMIC BRACKET ATTACHMENT
TO STEEL BEAM OR OPEN WEB STEEL TRUSS
WITH SELF-DRILLING FASTENERS OR WELDING

STEEL BEAM, SEE DETAIL B FOR OPEN WEB STEEL TRUSS.
(MIN Fu = 58 KSI, TYP.)

SEE DETAIL C FOR WELDING OPTION

ITW BUILDEX SELF-DRILLING
SELF TAPPING METAL SCREW
(REF. ICC-ES ESR-1976)
#12-24 x 1½” HWH TEKS/5
FOR ½” TO ¾” BEAM FLANGE,
2 PER EACH SIDE, TYP.

1½” x 1½” x 12 GA SINGLE STRUT.
STRUT (SOLID ONLY) MAY BE
ROTATED TO ANY ANGLE, TYP.

MIN. ¾” x 1½” x 12 ASTM A36
STRUT WASHER, TYP.
MW-SSN-½ W/ MW-BON-½ TORQUED UNTIL
NUT BREAKS OFF, TYP. (REF. X4.0)

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING.

BRACE BRACKET MAY BE ROTATED
TO ANY ANGLE AROUND BOLT,
TYP.

NOTE: ALL WELDS TO BE MINIMUM
70xx ELECTRODE WELDS

---

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp</th>
<th>MAX BRACE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>590</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>480</td>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

1. SEE DETAIL N0.00 FOR SECTION NOTES
   ATTACHMENT TO STEEL BEAM SHALL
   NOT BE PLACED WITHIN THE PROTECTED
   ZONE AS DEFINED IN AISC 341.

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P A G E  N3.11

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OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020
SEISMIC BRACKET ATTACHMENT TO STEEL BEAM OR OPEN WEB STEEL TRUSS STRUCTURE WITH SELF-DRILLING FASTENERS

(4) #12-24 x 1 1/2" HWH TEKS/5 ITW BUILDEX TEKS SELF-DRILLING FASTENERS (REF. ICC-ES ESR-1976), 1" FROM END OF STRUT AND 2" OC THEREAFTER, TYP.

1 1/8x1 1/8x12 GA SINGLE STRUT (SOLID ONLY) 8" LONG, TYP.
MIN. 3/8x1 1/8x1 1/2 ASTM A36 STRUT WASHER, TYP.

CENTER LINE OF OPEN WEB STEEL TRUSS

OPEN WEB STEEL TRUSS (MIN Fu = 58 KSI)
MW-SSN-1/2 W/ MW-BON-1/2 TORQUED UNTIL NUT BREAKS OFF, TYP. (REF. X4.0)

MASON IND. N.Y. SEISMIC BRACKET FOR CABLE OR SOLID BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT, TYP.

CENTER LINE OF OPEN WEB STEEL TRUSS

DETAIL A

DETAIL B

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD ( F_p ) LBS</th>
<th>MAX BRACE RANGE ( \theta )</th>
<th>BOLT DIA.(INCH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50G</td>
<td>590</td>
<td>30*-45*</td>
<td>1/2</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>480</td>
<td>46*-60*</td>
<td>1/2</td>
</tr>
</tbody>
</table>

1. SEE DETAIL NO.00 FOR SECTION NOTES
2. ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
# Seismic Bracket Welded Attachment to a Structural Steel Beam

**SCB / SSB Welded Full Length on (2) Sides**

- \( E = \begin{array}{c} \frac{1}{8}'' \text{ for SCB} \\ \frac{3}{16}'' \text{ for SSB} \end{array} \)

- Braces to be welded as shown below

**Type MW-WBB**

See page X6.1

- Braces can be rotated to any angle as shown

- Do not bend brace beyond 90°

---

### Table: Allowable Lateral Load, \( F_p \), LBS

<table>
<thead>
<tr>
<th>Brace Bracket Attachment Type</th>
<th>Weld to Steel</th>
<th>Brace Bracket Attachment Type</th>
<th>With MW-WBB</th>
<th>Max Brace Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>75A TO 75Q</td>
<td>4440</td>
<td>75A TO 75Q</td>
<td>3800</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>75A TO 75P</td>
<td>3360</td>
<td>75A TO 75N</td>
<td>2190</td>
<td>46° - 60°</td>
</tr>
<tr>
<td>100A TO 100R</td>
<td>6410</td>
<td>100A TO 100Q</td>
<td>3800</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>100A TO 100Q</td>
<td>4280</td>
<td>100A TO 100N</td>
<td>2190</td>
<td>46° - 60°</td>
</tr>
<tr>
<td>125A TO 125R</td>
<td>6410</td>
<td>125A TO 125Q</td>
<td>3800</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>125A TO 125Q</td>
<td>4280</td>
<td>125A TO 125N</td>
<td>2190</td>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

1. See detail N0.00 for section notes
2. Welded attachment to steel beam shall not be placed within the protected zone as defined in AISC 341.

---

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---

**OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto**

724 of 846
SEISMIC BRACKET ATTACHMENT TO STEEL BEAM WITH STEEL BEAM CLAMPS

STEEL BEAM

\( \frac{3}{8}\)"Ø SHEAR BOLT (M12x1.75; GRADE 8.8, ISO R898), TYP. TIGHTEN UNTIL HEAD BREAKS OFF TO SECURE BEAM CLAMPS IN PLACE

ANVIL FIG. AF772 TYPE A
FOR \( w = 4" \) TO 15" & \( t = \frac{3}{8}" \) TO \( \frac{3}{4}" \\
ANVIL FIG. AF772 TYPE B
FOR \( w = 7" \) TO 15" & \( t = \frac{3}{8}" \) to 1\( \frac{1}{4}" \\

\( \frac{3}{8}" \) HEX HEAD C-CLAMP BOLT W/ FLAT & SPRING LOCK WASHER. TORQUE TO 55 FT-LBS

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING

\( \frac{3}{8}" \)Ø CARRIAGE BOLT (GRADE 5) W/ 3/4"Ø FLAT WASHER UNDER HEAD & HEAVY HEX HEAD MOUNTING NUT W/ PUSH NUT. TORQUE HEX NUT TO MIN. 40 FT-LBS

<table>
<thead>
<tr>
<th>BRACE BRACKET CONNECTION TYPE</th>
<th>ALLOWABLE LATERAL LOAD ( F_p ) LBS</th>
<th>MAX BRACE RANGE ( \theta )</th>
<th>CLAMP MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50F</td>
<td>480</td>
<td>30°-45°</td>
<td>ANVIL FIG. AF772</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>330</td>
<td>46°-60°</td>
<td></td>
</tr>
</tbody>
</table>

1 SEE DETAIL NO.00 FOR SECTION NOTES
2 ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
3 BRACE BRACKET TO BE INSTALLED PARALLEL TO BEAM ONLY, AND SHALL NOT BE INSTALLED PERPENDICULAR TO BEAM UNLESS APPROVED BY SEOR.
### Allowable Lateral Loads

<table>
<thead>
<tr>
<th>Brace Bracket Connection Type</th>
<th>Allowable Lateral Load</th>
<th>Max Brace Range</th>
<th>Clamp Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50L</td>
<td>1490 LBS</td>
<td>30° - 45°</td>
<td>ANVIL FIG. AF778</td>
</tr>
<tr>
<td>50A TO 50K</td>
<td>1030 LBS</td>
<td>46° - 60°</td>
<td>PHD FIG. 035</td>
</tr>
</tbody>
</table>

1. See Detail No. 00 for Section Notes
2. Attachment to steel beam shall not be placed within the protected zone as defined in AISC 341.
3. Steel member must fully engage throat of beam clamp.
4. Attachment to steel member shall be within 6" of chord panel point.

---

**Tighten shear bolts equally and alternatively until head breaks off, 2-Typ per beam clamp.**

Anvil Fig. AF778 for \( t = \frac{3}{8} " \) to \( \frac{3}{4} " \)

Phd Fig. 035 for \( t = \frac{3}{8} " \) to \( \frac{3}{4} " \)

Where brace attachment occurs, tighten inner \( \frac{3}{8} " \) hex head cap screw (ASTM A307) until min. 40 ft-lb torque is achieved, typ.

Mason Ind. N.Y. Seismic Bracket for solid or cable bracing, typ.
SEISMIC BRACKET ATTACHMENT
TO CONCRETE FILLED METAL DECK
WITH (1) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGER

MIN. 20 GA VERCO W3 OR PLW3 STEEL
DECK W/ MIN. 3000 PSI NWC OR SLWC

TIGHTEN SET BOLTS AS
STATED IN NOTE 5 BELOW

BADGER INDUSTRIES NDH4S-W3
NO-DRILL™ HANGER

¼" ø ATR & REG. NUT W/ ¾" MIN
ENGAGEMENT. (SNUG TIGHT) THREADS
SHALL NOT CONTACT STEEL DECKING

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING.
BRACE BRACKET MAY BE ROTATED
TO ANY ANGLE AROUND ATR

ALLOWABLE
LATERAL
LOAD
Fp
LBS
550
910

BRACE
BRACKET
CONNECTION
TYPE
50A TO 50F
50A TO 50J
50A TO 50J

MIN. SPACING
Smin
INCH
24
24
12

MIN END
DIST.
Cmin
INCH
12

1. SEE DETAIL NO.00 FOR SECTION NOTES
2. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE
3. PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE
ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.
4. FOR NDH HANGERS WITH SPACING LESS THAN Smin, THE COMBINED DEMAND OF
MULTIPLE NDH HANGERS SHALL NOT EXCEED THE CAPACITY OF A SINGLE NDH HANGER.
5. INSTALLATION: ALIGN THE LENGTH OF THE NDH4S-W3 TO BE PERPENDICULAR TO THE
LENGTH OF THE STEEL DECKING GROOVES. WHILE HOLDING THE NDH4S-W3 IN PLACE,
HAND TIGHTEN EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY MAKING
SURE THAT THE POINTED END OF EACH SET BOLT IS ENGAGED INTO THE STEEL DECKING
GROOVE. ONCE EACH OF THE (4) SET BOLTS ARE HAND TIGHT AND PROPER PLACEMENT
OF THE NDH4S-W3 HAS BEEN CHECKED, CONTINUE TIGHTENING (USING A BOX END
WRENCH) EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY UNTIL THE HEX
HEADS OF ALL SET BOLTS TO HAVE BROKEN AWAY. FOR REFERENCE, A MINIMUM OF 10
FT-LBS OF TORQUE IS REQUIRED.

MIN. 20 GA VERCO W3 OR PLW3 STEEL
DECK W/ MIN. 3000 PSI NWC OR SLWC

TIGHTEN SET BOLTS AS
STATED IN NOTE 5 BELOW

BADGER INDUSTRIES NDH4S-W3
NO-DRILL™ HANGER

¼" ø ATR & REG. NUT W/ ¾" MIN
ENGAGEMENT. (SNUG TIGHT) THREADS
SHALL NOT CONTACT STEEL DECKING

MASON IND. N.Y. SEISMIC BRACKET
FOR SOLID OR CABLE BRACING.
BRACE BRACKET MAY BE ROTATED
TO ANY ANGLE AROUND ATR

allowable lateral load Fp lbs
550
910

brace bracket connection type
50a to 50f
50a to 50j
50a to 50j

min. spacing Smin inch
24
24
12

min end dist. Cmin inch
12

See detail no.00 for section notes
overstrength factor as required for anchorage to concrete
proximity or spacing of new or existing concrete inserts or drilled hole
anchors to the ndh does not impact the listed ndh capacities.
for ndh hangers with spacing less than Smin, the combined demand of
multiple ndh hangers shall not exceed the capacity of a single ndh hanger.
Installation: align the length of the ndh4s-w3 to be perpendicular to the
length of the steel decking grooves. while holding the ndh4s-w3 in place,
hand tighten each of the (4) set bolts equally and alternatively making
sure that the pointed end of each set bolt is engaged into the steel decking
groove. once each of the (4) set bolts are hand tight and proper placement
of the ndh4s-w3 has been checked, continue tightening (using a box end
wrench) each of the (4) set bolts equally and alternatively until the hex
heads of all set bolts to have broken away. for reference, a minimum of 10
ft-lbs of torque is required.
SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGER

MIN. 20 GA VERCO W3 OR PLW3 STEEL DECK W/ MIN. 3000 PSI NWC OR SLWC

TIGHTEN SET BOLTS AS STATED IN NOTE 5 BELOW, TYP

BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGER, TYP

REG. NUT, SNUG TIGHT, TYP

¾" DIA. ATR IN CORRESPONDING HOLE W/ ½" MIN ENGAGEMENT, TYP. ATR CONTACT WITH STEEL DECKING SHALL NOT EXCEED SNUG TIGHT

MW-SAP-200-B
SEE PAGE X6.0

¾" DIA. ASTM A307 BOLT & NUT, SNUG TIGHT

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT

END OF CONCRETE FILLED METAL DECK

VIEW A-A:
INSTALLATION OF MULTIPLE INDEPENDENT SUPPORTS

<table>
<thead>
<tr>
<th>BRACE BRACKET CONNECTION TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>Ω = 2.0²</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE</th>
<th>MIN SPACING Smin INCH</th>
<th>MIN END DIST. Cmin INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A TO 63M</td>
<td>1830</td>
<td></td>
<td>63A TO 63K</td>
<td>1100</td>
<td>30° - 45°</td>
<td>24</td>
</tr>
<tr>
<td>63A TO 63K</td>
<td>1110</td>
<td></td>
<td>63A TO 63K</td>
<td>1100</td>
<td>46° - 60°</td>
<td></td>
</tr>
</tbody>
</table>

1 SEE DETAIL NO.00 FOR SECTION NOTES
2 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE
3 PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.
4 FOR NDH HANGERS WITH SPACING LESS THAN Smin, THE COMBINED DEMAND OF MULTIPLE NDH HANGERS SHALL NOT EXCEED THE CAPACITY OF A SINGLE NDH HANGER.
SEISMIC BRACKET ATTACHMENT TO STRUCTURAL TIMBER WITH (1) THRU BOLT OR THREADED ROD

MIN. 2x MEMBER, TYP. (MIN. SPECIES SPECIFIC GRAVITY G = 0.42 AND GRADE NO.2)
ASTM A307 BOLT OR ASTM A36 THREADED ROD, SNUG TIGHT TYP.
MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING.

ASTM A307 BOLT OR ASTM A36 THREADED ROD, ON BACK SIDE OF 4x6

NAIL THROUGH JOIST TO END OF 4x6 WITH 6-12d COMMON NAILS FOR 2x JOISTS, 6-40d COMMON NAILS FOR 4x JOISTS WITH MIN. EDGE 4D

MAX 4xJOIST, TYP. (MIN. SPECIES SPECIFIC GRAVITY G = 0.42 AND GRADE NO.2)
4x6 (MIN. SPECIES SPECIFIC GRAVITY G = 0.42 AND GRADE NO.2)
ADDITIONAL BLOCKING OF WOOD JOIST TO BE DESIGNED BY THE STRUCTURAL ENGINEER OF RECORD.

SEISMIC BRACE BRACKET PERPENDICULAR TO JOIST
SEISMIC BRACE BRACKET PARALLEL TO JOIST

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>DIA da INCH</th>
<th>MIN. EDGE Cmin1 INCH</th>
<th>Cmin2 INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38D</td>
<td>250</td>
<td>30° - 45°</td>
<td>⅜</td>
<td>⅛</td>
<td>⅝</td>
</tr>
<tr>
<td>38A TO 38B</td>
<td>150</td>
<td>46° - 60°</td>
<td>⅜</td>
<td>⅛</td>
<td>⅝</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>300</td>
<td>30° - 45°</td>
<td>½</td>
<td>⅛</td>
<td>Ⅻ</td>
</tr>
<tr>
<td>50A TO 50B</td>
<td>170</td>
<td>46° - 60°</td>
<td>½</td>
<td>⅛</td>
<td>Ⅻ</td>
</tr>
<tr>
<td>63A TO 63D</td>
<td>340</td>
<td>30° - 45°</td>
<td>⅜</td>
<td>⅛</td>
<td>Ⅻ</td>
</tr>
<tr>
<td>63A TO 63C</td>
<td>200</td>
<td>46° - 60°</td>
<td>⅜</td>
<td>⅛</td>
<td>Ⅻ</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

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PAGE N4.10
**SEISMIC BRACKET ATTACHMENT TO WOOD I-JOISTS WITH (1) THRU BOLT OR THREADED ROD**

2x6x1'-0" (MIN. SPECIES SPECIFIC GRAVITY G=0.42 AND GRADE NO. 2)

ASTM A307 BOLT OR ASTM A36 THREADED ROD, WITH STANDARD WASHER ON BACK SIDE OF JOIST, SNUG TIGHT TYP.  
12-12d (3½") COMMON NAIL, CLINCH NAILS AT I-JOIST WEB TYP.  
MASON IND., N.Y. SEISMIC BRACKET FOR CABLE OR SOLID BRACING.

ASTM A307 BOLT OR ASTM A36 THREADED ROD, WITH 2x2x⅛ PLATE WASHER ON BACK SIDE OF JOIST

ADDITIONAL BLOCKING OF WOOD JOIST TO BE DESIGNED BY THE STRUCTURAL ENGINEER OF RECORD.

**PERPENDICULAR TO JOIST**  
**PARALLEL TO JOIST**

BY: Jeffrey Y. Kikumoto  
DATE: 10/09/2020

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>DIA. da INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38B</td>
<td>150</td>
<td>30°- 45°</td>
<td>⅛</td>
</tr>
<tr>
<td>38A TO 38A</td>
<td>80</td>
<td>46°- 60°</td>
<td>⅛</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>180</td>
<td>30°- 45°</td>
<td>⅛</td>
</tr>
<tr>
<td>50A TO 50A</td>
<td>100</td>
<td>46°- 60°</td>
<td>⅛</td>
</tr>
<tr>
<td>63A TO 63C</td>
<td>210</td>
<td>30°- 45°</td>
<td>⅛</td>
</tr>
<tr>
<td>63A TO 63A</td>
<td>120</td>
<td>46°- 60°</td>
<td>⅛</td>
</tr>
</tbody>
</table>

SEE DETAIL NO. 00 FOR SECTION NOTES

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OPM-0043-13  
10/09/2020

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731 of 846
SEISMIC BRACKET ATTACHMENT TO WOOD I-JOISTS

2x2½ PLATE WASHER, TYP.

WOOD I-JOIST, TYP.

2½” MIN.

1½x1½x12 GA SINGLE STRUT (SOLID, PUNCHED, OR SLOTTED)

FLAT PLATE FITTING, SEE DETAIL A FOR MINIMUM REQUIREMENTS, TYP.

4½" Ø BOLT AND NUT, SNUG TIGHT TYP.

MIN ½", MAX ¾" WEB THICKNESS (MIN SPECIES SPECIFIC GRAVITY G=0.42), TYP

ADDITIONAL BLOCKING OF WOOD JOIST TO BE DESIGNED BY THE STRUCTURAL ENGINEER OF RECORD.

MIN. ⅜x⅞x1⅛ ASTM A36 STRUT WASHER

MW-SSN-⅞ W/ MW-BON-⅞ TORQUED UNTIL NUT BREAKS OFF, TYP. (REF. X4.0)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT.

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD FP LBS</th>
<th>MAX BRACE RANGE °</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50E</td>
<td>400</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>350</td>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

P A G E  N4.12

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OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

732 of 846
SEISMIC BRACKET ATTACHMENT TO WOOD JOIST

MIN. 2x (MIN. SPECIES SPECIFIC GRAVITY G=0.42 AND GRADE NO. 2), TYP.

2-1/2" DIA. ASTM A307 BOLT OR ASTM A36 THREADED ROD THROUGH 9/16" DIA. HOLE, WITH STANDARD WASHER ON BACK SIDE OF JOIST, SNUG TIGHT TYP.

L3x3x1/4, 5" LG.

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND BOLT.

ADDITIONAL BLOCKING OF WOOD JOIST TO BE DESIGNED BY THE STRUCTURAL ENGINEER OF RECORD.

AT JOIST

VIEW A-A

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
<th>DIA da INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38E</td>
<td>420</td>
<td>30°- 45°</td>
<td>3/8</td>
</tr>
<tr>
<td>38A TO 38D</td>
<td>300</td>
<td>46°- 60°</td>
<td>1/2</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>420</td>
<td>30°- 45°</td>
<td>5/8</td>
</tr>
<tr>
<td>50A TO 50D</td>
<td>300</td>
<td>46°- 60°</td>
<td></td>
</tr>
<tr>
<td>63A TO 63E</td>
<td>420</td>
<td>30°- 45°</td>
<td></td>
</tr>
<tr>
<td>63A TO 63D</td>
<td>300</td>
<td>46°- 60°</td>
<td></td>
</tr>
</tbody>
</table>

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PAGE N4.13

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
10/09/2020

733 of 846
SEISMIC BRACKET ATTACHMENT TO CMU WALL

FULLY GROUTED CMU WALL  
(f_m = 1500 PSI)

HILTI KB-3 CONCRETE ANCHOR BOLT, TYP. SEE TABLE BELOW FOR TORQUE REQUIREMENTS.

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND ANCHOR, TYP.

NOTE:

WHEN USING HILTI KB-3 CONCRETE ANCHOR ATTACHMENT TO CMU WALL, SEOR SHALL VERIFY:

1) MASONRY IS NOT CRACKED AS DEFINED IN ICC-ES AC01 SECTION 2.3: CALCULATION REQUIRED TO SHOW MASONRY WALL WOULD NOT CRACK UNDER THE DESIGN EARTHQUAKE LOADS UNDER ALL SERVICE LOAD CONDITIONS; WALL HAS TO REMAIN ELASTIC.

2) MASONRY WALL SHALL BE FULLY GROUTED IN ACCORDANCE WITH ESR-1385 SECTION 3.2.

3) CONDITION OF USE REQUIREMENTS IN ACCORDANCE WITH ESR-1385 SECTION 5.0 IS SATISFIED.

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>( \Omega = 2.0 )</th>
<th>HILTI KB-3 CONCRETE ANCHOR (ICC ESR-1385) SPECIAL INSPECTION REQ'D</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38E</td>
<td>390</td>
<td>38A TO 38C</td>
<td>240</td>
<td>30°- 45°</td>
<td>MIN. DI. da INCH, MIN. EFF. MEND, ef INCH, MIN. HOLE DEPTH h INCH, MIN. BASE TH. ha INCH, MIN. EDGE Cm INCH, MIN. SPACING Smin INCH, TORQUE REQ'D FT-LBS</td>
</tr>
<tr>
<td>38A TO 38D</td>
<td>310</td>
<td>38A TO 38D</td>
<td>190</td>
<td>46°- 60°</td>
<td>3/8 2 1/2 2 15/16 8 12 8 15</td>
</tr>
<tr>
<td>50A TO 50F</td>
<td>520</td>
<td>50A TO 50D</td>
<td>310</td>
<td>30°- 45°</td>
<td>1/2 3 1/2 4 11/16 8 12 8 25</td>
</tr>
<tr>
<td>50A TO 50E</td>
<td>430</td>
<td>50A TO 50D</td>
<td>260</td>
<td>46°- 60°</td>
<td>5/8 4 4 11/16 8 12 8 65</td>
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<tr>
<td>63A TO 63H</td>
<td>700</td>
<td>63A TO 63D</td>
<td>420</td>
<td>30°- 45°</td>
<td>3/4 4 3/8 5 3/8 8 12 8 120</td>
</tr>
<tr>
<td>63A TO 63F</td>
<td>560</td>
<td>63A TO 63D</td>
<td>340</td>
<td>46°- 60°</td>
<td>3/4 4 3/8 5 3/8 8 12 8 120</td>
</tr>
<tr>
<td>75A TO 75J</td>
<td>900</td>
<td>75A TO 75F</td>
<td>540</td>
<td>30°- 45°</td>
<td>3/4 4 3/8 5 3/8 8 12 8 120</td>
</tr>
<tr>
<td>75A TO 75H</td>
<td>720</td>
<td>75A TO 75E</td>
<td>430</td>
<td>46°- 60°</td>
<td>3/4 4 3/8 5 3/8 8 12 8 120</td>
</tr>
</tbody>
</table>

1) SEE DETAIL NO.00 FOR SECTION NOTES
2) HILTI KB-3 MASONRY ANCHOR MUST BE INSTALLED IN THE FACE OF CMU SHELLS A MINIMUM OF 1 3/8“ FROM ANY VERTICAL MORTAR JOINT AND LIMITED TO ONE ANCHOR PER CELL.
3) OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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Jeffrey Y. Kikumoto  
OPM-0043-13  
10/09/2020

Jiefu “Jeff” Zhang, SE  
California SE No. S5270

PAGE N5.10

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

734 of 846
SEISMIC BRACKET ATTACHMENT TO FULLY GROUTED CMU WALL WITH (2) HILTI KB-3 CONCRETE ANCHOR

FULLY GROUTED CMU WALL ($f_m = 1500$ PSI)

HILTI KB-3 CONCRETE ANCHOR
BOLT, TYP. SEE TABLE BELOW FOR TORQUE REQUIREMENTS

$\frac{1}{2}\times1\frac{3}{4}\times12$ GA SINGLE STRUT (SOLID ONLY), MUST BE IN-LINE WITH BRACE BRACKET.

MIN. $\frac{3}{4}\times\frac{1}{2}\times\frac{1}{4}$ ASTM A36 STRUT WASHER, TYP

MW-SSN-$\frac{3}{4}$ W/MW-BON-$\frac{1}{2}$ THREADED UNTIL NUT BREAKS OFF, TYP. (REF X4.0)

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING.

NOTE:

WHEN USING HILTI KB-3 CONCRETE ANCHOR ATTACHMENT TO CMU WALL, SEOR SHALL VERIFY:

1. MASONRY IS NOT CRACKED AS DEFINED IN ICC-ES AC01 SECTION 2.3; CALCULATION REQUIRED TO SHOW MASONRY WALL WOULD NOT CRACK UNDER THE DESIGN EARTHQUAKE LOADS UNDER ALL SERVICE LOAD CONDITIONS; WALL HAS TO REMAIN ELASTIC.

2. MASONRY WALL SHALL BE FULLY GROUTED IN ACCORDANCE WITH ESR-1385 SECTION 3.2.

3. CONDITION OF USE REQUIREMENTS IN ACCORDANCE WITH ESR-1385 SECTION 5.0 IS SATISFIED.

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD $F_p$ LBS</th>
<th>$\Omega_0 = 2.0^3$</th>
<th>MAX BRACE RANGE $\theta$</th>
<th>HILTI KB-3 CONCRETE ANCHOR (ICC ESR-1385) SPECIAL INSPECTION REQ'D</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50K</td>
<td>1000</td>
<td>50A TO 50G</td>
<td>620</td>
<td>$30^\circ - 45^\circ$</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>690</td>
<td>50A TO 50F</td>
<td>520</td>
<td>$46^\circ - 60^\circ$</td>
</tr>
<tr>
<td>50A TO 50K</td>
<td>1000</td>
<td>50A TO 50H</td>
<td>830</td>
<td>$30^\circ - 45^\circ$</td>
</tr>
<tr>
<td>50A TO 50G</td>
<td>600</td>
<td>50A TO 50G</td>
<td>670</td>
<td>$46^\circ - 60^\circ$</td>
</tr>
</tbody>
</table>

1. SEE DETAIL NO.00 FOR SECTION NOTES

2. HILTI KB-3 MASONRY ANCHOR MUST BE INSTALLED IN THE FACE OF CMU SHELLS A MINIMUM OF $1\frac{3}{8}$ INCH FROM ANY VERTICAL MORTAR JOINT AND LIMITED TO ONE ANCHOR PER CELL.

3. OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE.

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PAGE N5.11
SEISMIC BRACKET ATTACHMENT TO FULL HEIGHT METAL STUD WALL

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING, TYP.

#10 ITW BUILDEX TEKS SCREW (REF. ICC-ES ESR-1976), 1" FROM EDGE OF STRUT AND 2" OC THEREAFTER, TYP.

1½x⅛x12 GA SINGLE STRUT (SOLID ONLY), TYP.

MIN. ⅛x⅛x⅛ ASTM A36 STRUT WASHER, TYP.

MW-SSN-½ W/ MW-BON-½ TORQUED UNTIL NUT BREAKS OFF, TYP. (REF. X4.0)

MIN. 18 GAxFy=33KSI FULL HEIGHT METAL STUD WALL. MAXIMUM 2 LAYERS GWB

FLAT PLATE FITTING, SEE DETAIL A FOR MINIMUM REQUIREMENTS, TYP.

10"長 - OR - 24" MAX.

SEISMIC BRACE BRACKET AT STUD

SEISMIC BRACE BRACKET IN BETWEEN STUDS

STEEL PLATE TO BE ASTM A36

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50D</td>
<td>260</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>190</td>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

SEE DETAIL N0.00 FOR SECTION NOTES

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PAGE N6.10

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

736 of 846
SEISMIC BRACKET ATTACHMENT TO FULL HEIGHT METAL STUD WALL

MIN. 18GAxFy=33KSI FULL HEIGHT METAL STUD WALL. MAXIMUM 2 LAYERS GWB

MIN. 50KSI 400S200-68 STUD

(4) #10 ITW BUILDex TEKS SCREW (REF. ICC-ES ESR-1976) @ (E) METAL STUD (8-TOTAL)

SEE DETAIL A

ASTM A307 BOLT OR ASTM A36 THREADED ROD, SNUG TIGHT, TYP

MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING

SECTION A-A DETAIL A

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>E MIN (in)</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE °</th>
</tr>
</thead>
<tbody>
<tr>
<td>38A TO 38C</td>
<td>4</td>
<td>200</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>38A TO 38A</td>
<td>115</td>
<td>115</td>
<td>46° - 60°</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>200</td>
<td>200</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>50A TO 50A</td>
<td>115</td>
<td>115</td>
<td>46° - 60°</td>
</tr>
<tr>
<td>63A TO 63C</td>
<td>200</td>
<td>200</td>
<td>30° - 45°</td>
</tr>
<tr>
<td>63A TO 63A</td>
<td>115</td>
<td>115</td>
<td>46° - 60°</td>
</tr>
</tbody>
</table>

SEE DETAIL N0.00 FOR SECTION NOTES
SEISMIC BRACKET ATTACHMENT TO NON-CONCRETE FILLED METAL DECK

- 6" MIN. AND 24" MAX.
- ½" MIN. EDGE TYP.
- ½" MIN. TYP.
- MIN. 20 GA STEEL DECK
- #10 ITW BUILDEX TEKS SCREW, 4-TYP. (REF. ICC-ES ESR-1976)
- 1½x1½x12 GA SINGLE STRUT (SOLID ONLY)
- STRUT CONNECTING THE BRACE BRACKET MAY BE INSTALLED IN THE UPPER OR LOWER FLUTE
- STRUT WASHER, TYP
- MW-SSN-½ W/ MW-BON-½ TORQUED UNTIL NUT BREAKS OFF, TYP. (REF. X4.0)
- MIN. 3½x1½x1½ ASTM A36
- MASON IND. N.Y. SEISMIC BRACKET FOR SOLID OR CABLE BRACING. BRACE BRACKET MAY BE ROTATED TO ANY ANGLE AROUND CHANNEL STRUT.

<table>
<thead>
<tr>
<th>BRACE BRACKET ATTACHMENT TYPE</th>
<th>ALLOWABLE LATERAL LOAD Fp LBS</th>
<th>MAX BRACE RANGE δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>50A TO 50E</td>
<td>350</td>
<td>30°-45°</td>
</tr>
<tr>
<td>50A TO 50C</td>
<td>200</td>
<td>46°-60°</td>
</tr>
</tbody>
</table>

SEE DETAIL NO.00 FOR SECTION NOTES

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OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
**SUPPLEMENTAL STEEL DETAIL**

**NOTES:**
1. ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
2. SEE PAGE P1.10.1 FOR MEMBER SIZE AND ALLOWABLE LOADS. MULTIPLE HANGER RODS AND BRACE BRACKETS MAY BE ATTACHED TO STRUT MEMBER PROVIDED THAT THE MAX COMBINED ALLOWABLE LOAD (P\text{max} + F_p) IS NOT EXCEEDED.
4. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.

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P A G E

P1.10
**SUPPLEMENTAL STEEL DETAIL**

<table>
<thead>
<tr>
<th>SUPPLEMENTAL STEEL MEMBER</th>
<th>MAX BRACE RANGE</th>
<th>MAX BEAM LENGTH &quot;L&quot; FT</th>
<th>COMBINED ALLOWABLE LOAD Pmax + Fp LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1(\frac{1}{8})&quot;x1(\frac{3}{8})&quot;x12GA SINGLE CHANNEL STRUT</strong></td>
<td>30°- 45°</td>
<td>4</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>46°- 60°</td>
<td>4</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td><strong>1(\frac{1}{8})&quot;x1(\frac{3}{8})&quot;x12GA DOUBLE CHANNEL STRUT</strong></td>
<td>30°- 45°</td>
<td>4</td>
<td>1010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>630</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>430</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>310</td>
</tr>
<tr>
<td></td>
<td>46°- 60°</td>
<td>4</td>
<td>580</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>360</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>180</td>
</tr>
</tbody>
</table>

1. ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
2. MULTIPLE HANGER RODS AND BRACE BRACKETS MAY BE ATTACHED TO STRUT MEMBER PROVIDED THAT THE MAX COMBINED ALLOWABLE LOAD (Pmax + Fp) IS NOT EXCEEDED.
4. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.
SUPPLEMENTAL STEEL DETAIL

NOTES:
1. ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
2. SEE PAGE P1.11.1 FOR MEMBER SIZE AND ALLOWABLE LOADS. MULTIPLE HANGER RODS AND BRACE BRACKETS MAY BE ATTACHED TO HSS MEMBER PROVIDED THAT THE MAX COMBINED ALLOWABLE LOAD (Pmax + Fp) IS NOT EXCEEDED.
3. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.
## SUPPLEMENTAL STEEL DETAIL

<table>
<thead>
<tr>
<th>SUPPLEMENTAL STEEL MEMBER</th>
<th>MAX BRACE RANGE &quot;L&quot; FT</th>
<th>MAX BEAM LENGTH &quot;L&quot; FT</th>
<th>COMBINED ALLOWABLE LOAD Pmax + Fp LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSS3x3x3/8</td>
<td>30°- 45°</td>
<td>4</td>
<td>2850</td>
</tr>
<tr>
<td></td>
<td>30°- 45°</td>
<td>6</td>
<td>1900</td>
</tr>
<tr>
<td></td>
<td>30°- 45°</td>
<td>8</td>
<td>1420</td>
</tr>
<tr>
<td></td>
<td>30°- 45°</td>
<td>10</td>
<td>1140</td>
</tr>
<tr>
<td></td>
<td>46°- 60°</td>
<td>4</td>
<td>2080</td>
</tr>
<tr>
<td></td>
<td>46°- 60°</td>
<td>6</td>
<td>1390</td>
</tr>
<tr>
<td></td>
<td>46°- 60°</td>
<td>8</td>
<td>1040</td>
</tr>
<tr>
<td></td>
<td>46°- 60°</td>
<td>10</td>
<td>830</td>
</tr>
<tr>
<td>HSS4x4x3/8</td>
<td>30°- 45°</td>
<td>4</td>
<td>5400</td>
</tr>
<tr>
<td></td>
<td>30°- 45°</td>
<td>6</td>
<td>3600</td>
</tr>
<tr>
<td></td>
<td>30°- 45°</td>
<td>8</td>
<td>2700</td>
</tr>
<tr>
<td></td>
<td>30°- 45°</td>
<td>10</td>
<td>2160</td>
</tr>
<tr>
<td></td>
<td>46°- 60°</td>
<td>4</td>
<td>3950</td>
</tr>
<tr>
<td></td>
<td>46°- 60°</td>
<td>6</td>
<td>2640</td>
</tr>
<tr>
<td></td>
<td>46°- 60°</td>
<td>8</td>
<td>1980</td>
</tr>
<tr>
<td></td>
<td>46°- 60°</td>
<td>10</td>
<td>1580</td>
</tr>
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</table>

1. ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
2. MULTIPLE HANGER RODS AND BRACE BRACKETS MAY BE ATTACHED TO HSS MEMBER PROVIDED THAT THE MAX COMBINED ALLOWABLE LOAD (Pmax + Fp) IS NOT EXCEEDED.
3. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.
SUPPLEMENTAL STEEL DETAIL
WITH (2) BADGER INDUSTRIES SBC158 SERIES STEEL BEAM CLAMPS

NOTES:
1. ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
2. MULTIPLE HANGER RODS MAY BE ATTACHED TO STRUT MEMBER PROVIDED THE MAX ALLOWABLE LOAD (Pmax) IS NOT EXCEEDED.

<table>
<thead>
<tr>
<th>SUPPLEMENTAL STEEL MEMBER</th>
<th>MAX BEAM LENGTH &quot;L&quot; FT</th>
<th>ALLOWABLE VERTICAL LOAD Pmax LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1(\frac{5}{8})&quot;x1(\frac{1}{8})&quot;x12GA SINGLE CHANNEL STRUT</td>
<td>4</td>
<td>350</td>
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<tr>
<td></td>
<td>6</td>
<td>200</td>
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<tr>
<td></td>
<td>8</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>70</td>
</tr>
<tr>
<td>1(\frac{5}{8})&quot;x1(\frac{1}{8})&quot;x12GA DOUBLE CHANNEL STRUT</td>
<td>4</td>
<td>1010</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>620</td>
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<td>500</td>
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<td>10</td>
<td>360</td>
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</table>

FASTENER WITH STRUT NUT

<table>
<thead>
<tr>
<th>DIA. INCH</th>
<th>TORQUE REQ'D FT-LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{5}{8})&quot;</td>
<td>19</td>
</tr>
<tr>
<td>(\frac{1}{4})&quot; - (\frac{3}{8})&quot;</td>
<td>50</td>
</tr>
</tbody>
</table>

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STEEL PIPE (STANDARD SCHEDULE)
WATER FILLED WITH INSULATION
MAXIMUM SEISMIC BRACE SPACINGS

<table>
<thead>
<tr>
<th>NPS</th>
<th>PIPE SCHEDULE</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE BRACE SPACING BASED ON PIPE SIZE AND ( g ) FORCE (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td>0.25</td>
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<td>7</td>
<td>35</td>
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<tr>
<td>1 1/2</td>
<td>40</td>
<td>4.5</td>
<td>9</td>
<td>38</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>6.2</td>
<td>10</td>
<td>43</td>
</tr>
<tr>
<td>2 1/2</td>
<td>40</td>
<td>9.1</td>
<td>11</td>
<td>48</td>
</tr>
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<td>STD</td>
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<td>20</td>
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<td>214</td>
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<td>69</td>
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<tr>
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</tr>
<tr>
<td>30</td>
<td>STD</td>
<td>422</td>
<td>20</td>
<td>58</td>
</tr>
</tbody>
</table>

**NOTES:**
1. MAXIMUM BRACE SPACING IS BASED ON ASME B31E DESIGN BY ANALYSIS EQUATION. PIPE SIZE, MATERIALS, PRESSURES, ETC. NOT USED TO DETERMINE THESE TABLES MAY USE ASME B31E DESIGN BY ANALYSIS TO DETERMINE THE MAXIMUM SEISMIC BRACE SPACINGS ON A PROJECT BY PROJECT BASIS.
2. MAXIMUM GRAVITY SUPPORT SPACING IS BASED ON MSS SP-58 TABLE 4 LIMITED TO 20 FEET. PIPE WEIGHTS USED ARE BASED ON STANDARD SCHEDULE STEEL PIPES (40S) INCLUDING WATER AND INSULATION (REFER TO APPENDIX). PIPES WITH THICKER WALLS AND / OR FILLED WITH VAPOR OR GAS MAY USE SPACINGS AS TABULATED.
3. FOR LONGITUDINAL AND ALL-DIRECTIONAL BRACE SPACING, TRIPLE THE VALUES IN THE ABOVE TABLE. BRACE AND / OR CONNECTION CAPACITY MAY GOVERN MAXIMUM SPACING IN SOME CASES.
4. BRACE SPACINGS ARE BASED ON STEEL PIPE CONFORMING TO ASTM SPECIFICATION A53, TYPE E, GRADE B WITH MINIMUM \( F_y = 35 \) ksi AND \( S_{as} = 14.6 \) ksi AT MAXIMUM OPERATING PRESSURE AND TEMPERATURE OF 400 psi AND 650°F, RESPECTIVELY. FOR ASTM A53, TYPE E, GRADE A WITH MINIMUM \( F_y = 30 \) ksi AND \( S_{as} = 11.7 \) ksi, REDUCE SPACINGS BY A FACTOR OF 1.20 UP TO 14"Ø PIPE, 1.33 UP TO 30"Ø PIPE. STEEL PIPES, INCLUDING STAINLESS, WITH \( F_y \) AND \( S_{as} \) VALUES MEETING OR EXCEEDING ABOVE STATED MINIMUMS PER ASME B31 APPENDIX A MAY USE TABULATED SPACINGS WITH APPROPRIATE REDUCTION FACTORS, WHERE APPLICABLE.
5. PIPE FITTINGS AS IDENTIFIED IN ASME B31 APPENDIX D MAY INCLUDE THE FOLLOWING: LONG OR SHORT RADIUS ELBOWS, WELDING TEES, BRANCH WELD-ON FITTINGS, WELDED-IN CONTOUR FITTINGS AND CONCENTRIC REDUCERS. FOR FABRICATED TEES REDUCE SPACING BY A FACTOR OF 1.3 TO 12"Ø PIPE. (FABRICATED TEES ARE ACCEPTABLE FOR 14"Ø TO 30"Ø PIPE).
6. ACCEPTABLE PIPE CONNECTIONS INCLUDE BUTT WELDS, FILLET WELDS, THREADED JOINTS OR FLANGES AND RIGID GROOVED COUPLINGS. RIGID GROOVED COUPLINGS LISTED FOR UL STANDARD 213 MAY USE LISTED MAXIMUM BRACE SPACINGS (REF. A10.8, NOTES.)
# STEEL PIPE (WATER FILLED)

## SCHEDULE 10 WITHOUT INSULATION

## SCHEDULE 80 WITH INSULATION

MAXIMUM SEISMIC BRACE SPACING BASED ON PIPE SIZE AND g FORCE (FT)

<table>
<thead>
<tr>
<th>NPS</th>
<th>PIPE SCHEDULE OR TYPE</th>
<th>WT/FT</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE BRACE SPACING BASED ON PIPE SIZE AND g FORCE (FT)</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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<table>
<thead>
<tr>
<th>NPS</th>
<th>PIPE SCHEDULE OR TYPE</th>
<th>WT/FT</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE BRACE SPACING BASED ON PIPE SIZE AND g FORCE (FT)</th>
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</thead>
<tbody>
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</tbody>
</table>

**NOTES:**

1. **MAXIMUM BRACE SPACING IS BASED ON ASME B31E DESIGN BY ANALYSIS EQUATION.** PIPE SIZE, MATERIALS, PRESSURES, ETC. NOT USED TO DETERMINE THESE TABLES MAY USE ASME B31E DESIGN BY ANALYSIS TO DETERMINE THE MAXIMUM SEISMIC BRACE SPACINGS ON A PROJECT BY PROJECT BASIS.

2. PIPE WEIGHTS USED ARE BASED ON PIPE SCHEDULED WEIGHT INCLUDING WATER AND INSULATION FOR SCHEDULE 80 PIPE (REFER TO APPENDIX). PIPES WITH THICKER WALLS AND / OR FILLED WITH VAPOR OR GAS MAY USE SPACINGS AS TABULATED.

3. FOR LONGITUDINAL AND ALL-DIRECTIONAL BRACE SPACING, TRIPLE THE VALUES IN THE ABOVE TABLE. BRACE AND / OR CONNECTION CAPACITY MAY GOVERN MAXIMUM SPACING IN SOME CASES.

4. **BRACE SPACINGS ARE BASED ON STEEL PIPE CONFORMING TO ASTM SPECIFICATION A53, TYPE E, GRADE A WITH MINIMUM Fy = 30ksi AND Sy = 11.7ksi AT MAXIMUM OPERATING PRESSURE AND TEMPERATURE OF 400psi AND 650°F. STEEL PIPES, INCLUDING STAINLESS, WITH Fy AND Sy VALUES MEETING OR EXCEEDING ABOVE STATED MINIMUMS PER ASME B31 APPENDIX A MAY USE TABULATED SPACINGS WITH APPROPRIATE REDUCTION FACTORS, WHERE APPLICABLE.**

5. PIPE FITTINGS AS IDENTIFIED IN ASME B31 APPENDIX D MAY INCLUDE THE FOLLOWING: LONG OR SHORT RADIUS ELBOWS, WELDING TEES, BRANCH WELD-ON FITTINGS, WELDED-IN CONTOUR FITTINGS AND CONCENTRIC REDUCERS. FOR FABRICATED TEES CALCULATE BRACE SPACINGS PER NOTE 1.

6. ACCEPTABLE PIPE CONNECTIONS INCLUDE BUTT WELDS, FILLET WELDS, THREADED JOINTS OR FLANGES AND RIGID GROOVED COUPLINGS. RIGID GROOVED COUPLINGS LISTED FOR UL STANDARD 213 MAY USE LISTED MAXIMUM BRACE SPACINGS (REF. A10.6, NOTES.)

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**MASON WEST, INC.**

1601 E. Miraloma Ave. Placentia, CA 92870

TEL (714) 630 - 0701, www.masonwest.com

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**Jiefu "Jeff" Zhang, SE**

California SE No. S5270
### COPPER PIPE
**TYPE K OR L**
**MAXIMUM SEISMIC BRACE SPACINGS**

VERTICAL FORCE

\[ F_{pv} = 0.375g \text{ (ASD)} \]

**NOTES:**
1. MAXIMUM BRACE SPACING IS BASED ON ASME B31E DESIGN BY ANALYSIS. PIPE SIZE, MATERIALS, PRESSURES, ETC. NOT USED TO DETERMINE THESE TABLES MAY USE ASME B31E DESIGN BY ANALYSIS TO DETERMINE THE MAXIMUM SEISMIC BRACE SPACINGS ON A PROJECT BY PROJECT BASIS.
2. MAXIMUM GRAVITY SPACING IS BASED ON MSS SP-58 TABLE 4, LIMITED TO 10 FEET.
3. FOR LONGITUDINAL AND ALL-DIRECTIONAL BRACE SPACING, TRIPLE THE VALUES IN THE ABOVE TABLE. BRACE AND OR CONNECTION CAPACITY MAY GOVERN MAXIMUM SPACINGS IN SOME CASES.
4. BRACE SPACINGS ARE BASED ON PIPE CONFORMING TO ASTM SPECIFICATION B88 TYPE K OR L COPPER PIPE WITH MAXIMUM OPERATING PRESSURE AND TEMPERATURE OF 100 PSI AND 250°F, RESPECTIVELY. PIPING MAY BE DRAWN OR ANNEALED WITH SOLDERED OR BRAZED JOINTS.

**PIPE W/WATER AND INSULATION**

<table>
<thead>
<tr>
<th>NPS</th>
<th>WT/FT</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE BRACE SPACING BASED ON PIPE SIZE AND g FORCE (FT)</th>
</tr>
</thead>
<tbody>
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**PIPE ONLY (GAS)**

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<th>MAX TRANSVERSE BRACE SPACING BASED ON PIPE SIZE AND g FORCE (FT)</th>
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</thead>
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<td>MAX WEIGHT PER FOOT (LBS/FT)</td>
<td>MAX GRAVITY SUPPORT SPACING² (FT)</td>
<td>MAX TRANSVERSE BRACE SPACING BASED ON PIPE SIZE AND g FORCE (FT)</td>
</tr>
<tr>
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<td>---------------------------------------------------------------</td>
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<td>26 21 17 11 10</td>
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<tr>
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<td>82.1</td>
<td>8</td>
<td>10 10 10 10 10</td>
</tr>
</tbody>
</table>

NOTES:
1. MAXIMUM BRACE SPACING IS BASED ON ASTM C1540, FM 1680 CLASS I, AND ASCE 7-10 SECTION 13.6.8, NOTE c, 10 PERCENT OF THE MATERIAL MINIMUM SPECIFIED TENSILE STRENGTH FOR CAST IRON.
2. MAXIMUM GRAVITY SPACING IS BASED ON SUPPORT OF STANDARD 10 FOOT MAXIMUM PIPE LENGTH SEGMENTS SUPPORTED WITHIN 18 INCHES IN EACH DIRECTION FROM JOINT CONNECTION. TRIBUTARY LENGTH FOR EACH SUPPORT SHALL NOT EXCEED 5 FEET OF PIPE FULL OF WATER. PIPE WEIGHTS CONSIDERED FULL OF WATER (REFER TO APPENDIX).
3. BRACE SPACING SHALL BE 10 FEET MINIMUM AND 40 FEET MAXIMUM. BRACE AND OR CONNECTION CAPACITY MAY GOVERN MAXIMUM SPACING IN SOME CASES.
4. BRACE SPACINGS ARE BASED ON CAST IRON PIPE CONSTRUCTED TO ASTM A 888 OR CISPI 301 STANDARDS WITH A MINIMUM TENSILE STRENGTH OF 21,000 PSI.
5. CAST IRON PIPE (NO-HUB PIPE) BRACE SPACINGS SHALL NOT EXCEED THE TABULATED SPACINGS. NO-HUB COUPLINGS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C1540, SHALL BE CERTIFIED IN ACCORDANCE WITH FM 1680 CLASS I, AND GRAVITY HANGERS SHALL BE SPACED PER THE REQUIREMENTS OF TABLE 313.1 OF THE 2013 CALIFORNIA PLUMBING CODE (CPC 2013) FOR NO-HUB CAST IRON PIPE.
CAST IRON SOIL PIPE
FOR EMPTY SYSTEMS (NO WATER)
MAXIMUM SEISMIC BRACE SPACINGS

VERTICAL FORCE
\[ F_{pv} = 0.375g \text{ (ASD)} \]

<table>
<thead>
<tr>
<th>NPS</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORT SPACING ( \text{^2} ) (FT)</th>
<th>MAX TRANSVERSE BRACE SPACING BASED ON PIPE SIZE AND g FORCE (FT)</th>
<th>MAX LONGITUDINAL BRACE SPACING BASED ON PIPE SIZE AND g FORCE (FT)</th>
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<td></td>
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<td>g FORCE</td>
<td>g FORCE</td>
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<td>34</td>
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</tbody>
</table>

NOTES:
1. MAXIMUM BRACE SPACING IS BASED ON ASTM C1540, FM 1680 CLASS I, AND ASCE 7-10 SECTION 13.6.8, NOTE c, 10 PERCENT OF THE MATERIAL MINIMUM SPECIFIED TENSILE STRENGTH FOR CAST IRON.
2. MAXIMUM GRAVITY SPACING IS BASED ON SUPPORT OF STANDARD 10 FOOT MAXIMUM PIPE LENGTH SEGMENTS SUPPORTED WITHIN 18 INCHES IN EACH DIRECTION FROM JOINT CONNECTION. TRIBUTARY LENGTH FOR EACH SUPPORT SHALL NOT EXCEED 5 FEET OF PIPE. PIPE WEIGHTS CONSIDERED EMPTY (REFER TO APPENDIX).
3. BRACE SPACING SHALL BE 10 FEET MINIMUM AND 40 FEET MAXIMUM. BRACE AND OR CONNECTION CAPACITY MAY GOVERN MAXIMUM SPACING IN SOME CASES.
4. BRACE SPACINGS ARE BASED ON CAST IRON PIPE CONSTRUCTED TO ASTM A 888 OR CISPI 301 STANDARDS WITH A MINIMUM TENSILE STRENGTH OF 21,000 PSI.
5. CAST IRON PIPE (NO-HUB PIPE) BRACE SPACINGS SHALL NOT EXCEED THE TABULATED SPACINGS. NO-HUB COUPLINGS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C1540, SHALL BE CERTIFIED IN ACCORDANCE WITH FM 1680 CLASS I, AND GRAVITY HANGERS SHALL BE SPACED PER THE REQUIREMENTS OF TABLE 313.1 OF THE 2013 CALIFORNIA PLUMBING CODE (CPC 2013) FOR NO-HUB CAST IRON PIPE.
**ELECTRICAL METALLIC TUBING (EMT)**

**MAXIMUM SEISMIC BRACE SPACINGS**

**VERTICAL FORCE**

F<sub>pv</sub> = 0.375g (ASD)

<table>
<thead>
<tr>
<th>TRADE SIZE</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE BRACE SPACING BASED ON TRADE SIZE AND g FORCE (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>g FORCE</td>
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<tr>
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<td>4</td>
<td>13.64</td>
<td>10</td>
<td>50</td>
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</tbody>
</table>

**NOTES:**

1. MAXIMUM BRACE SPACING IS BASED ON ASCE 7-10 SECTION 13.6.8. NOTE b, 70 PERCENT OF THE MATERIAL MINIMUM SPECIFIED TENSILE STRENGTH FOR STEEL TUBING.

2. EMT CONSIDERED FULL OF CONDUCTORS WHEN DETERMINING WEIGHT (REFER TO APPENDIX).

3. FOR LONGITUDINAL AND ALL-DIRECTIONAL BRACE SPACING, MULTIPLY THE TABULATED VALUES BY 3. BRACE AND OR CONNECTION CAPACITY MAY GOVERN MAXIMUM SPACING IN SOME CASES.

4. BRACE SPACINGS ARE BASED ON EMT STEEL TUBING CONSTRUCTED TO UL-797 OR ANSI C-80.3 WITH A MINIMUM YIELD STRENGTH OF 30,000 PSI.

5. COUPLINGS FOR UP TO 2" EMT TO MEET PROJECT SPECIFICATIONS. HOWEVER, COMPRESSION COUPLINGS OR COUPLINGS WITH MIN. (2) SCREWS AT EACH END; e.g., CONDUIT CAN BE PUSHED INTO COUPLING ≈ 2" AND SET WITH MIN. (2) SCREWS, SHALL BE USED FOR 3", 3½", AND 4" EMT.
### INTERMEDIATE METAL CONDUIT (IMC) MAXIMUM SEISMIC BRACE SPACINGS

**VERTICAL FORCE**

\[ F_{pv} = 0.375g \text{ (ASD)} \]

<table>
<thead>
<tr>
<th>TRADE SIZE</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE BRACE SPACING BASED ON TRADE SIZE AND g FORCE (FT)</th>
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</thead>
<tbody>
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</tr>
<tr>
<td>4</td>
<td>16.32</td>
<td>20</td>
<td>55 49 46 44 41 38 36</td>
</tr>
</tbody>
</table>

**NOTES:**

1. MAXIMUM BRACE SPACING IS BASED ON ASCE 7-10 SECTION 13.6.8, NOTE b, 70 PERCENT OF THE MATERIAL MINIMUM SPECIFIED TENSILE STRENGTH FOR STEEL TUBING WITH THREADED CONNECTIONS.

2. IMC CONSIDERED FULL OF CONDUCTORS WHEN DETERMINING WEIGHT (REFER TO APPENDIX).

3. FOR LONGITUDINAL AND ALL-DIRECTIONAL BRACE SPACING, MULTIPLY THE TABULATED VALUES BY 3. BRACE AND OR CONNECTION CAPACITY MAY GOVERN MAXIMUM SPACING IN SOME CASES.

4. BRACE SPACINGS ARE BASED ON IMC STEEL TUBING CONSTRUCTED TO UL-1242 OR ANSI C-80.6 WITH A MINIMUM YIELD STRENGTH OF 30,000 PSI.

5. COUPLINGS CONNECTING IMC SEGMENTS SHALL BE DESIGNED OR TESTED TO ACCEPT SEISMIC LOADS, WHEN THREADED COUPLINGS ARE NOT USED, AND MAY LIMIT THE BRACE SPACINGS TO MANUFACTURER'S RATINGS. MANUFACTURER'S RATINGS MUST BE BASED ON REVIEWED CAPACITIES AND APPROVED BY OSHPD.

6. RIGID GROOVED COUPLINGS LISTED FOR UL STANDARD 213 MAY USE LISTED MAXIMUM BRACE SPACINGS.
### Rigid Metal Conduit (RMC)

#### Maximum Seismic Brace Spacings

<table>
<thead>
<tr>
<th>Trade Size</th>
<th>Max Weight Per Foot (LBS/FT)</th>
<th>Max Gravity Support Spacing (FT)</th>
<th>Max Transverse Brace Spacing Based on Trade Size and g Force (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>3</td>
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<td>3.5</td>
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<td>20</td>
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<td>4</td>
<td>19.67</td>
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<tr>
<td>6</td>
<td>40.03</td>
<td>20</td>
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</tbody>
</table>

**Notes:**

1. Maximum brace spacing is based on ASCE 7-10 Section 13.6.8, note b. 70 percent of the material minimum specified tensile strength for steel tubing with threaded connections.

2. RMC considered full of conductors when determining weight (refer to Appendix).

3. For longitudinal and all-directional brace spacing, multiply the tabulated values by 3. Brace and or connection capacity may govern maximum spacing in some cases.

4. Brace spacings are based on RMC steel tubing constructed to UL-6 or ANSI C-80.1 with a minimum yield strength of 30,000 PSI.

5. Couplings connecting RMC segments shall be designed or tested to accept seismic loads, when threaded couplings are not used, and may limit the brace spacings to manufacturer’s ratings. Manufacturer’s ratings must be based on reviewed capacities and approved by OSHPD.

6. Rigid grooved couplings listed for UL Standard 213 may use listed maximum brace spacings.
STEEL PIPE (STANDARD SCHEDULE)
WATER FILLED WITH INSULATION
MAXIMUM MW-SSC SPACINGS

**VERTICAL FORCE**
\[ F_{pv} = 0.375g \ (ASD) \]

### Maximum Pipe Clamp Spacing (Top of Trapeze Installation)

<table>
<thead>
<tr>
<th>PART #</th>
<th>NPS</th>
<th>PIPE SCHEDULE</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORTING SPACING (FT)</th>
<th>MAX TRANSVERSE SPACING (FT)</th>
<th>MAX LONGITUDINAL SPACING (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSC-13</td>
<td>1 1/4</td>
<td>40</td>
<td>3.8</td>
<td>7</td>
<td>35</td>
<td>106</td>
</tr>
<tr>
<td>SSC-15</td>
<td>1 1/2</td>
<td>40</td>
<td>4.5</td>
<td>9</td>
<td>38</td>
<td>115</td>
</tr>
<tr>
<td>SSC-20</td>
<td>2</td>
<td>40</td>
<td>6.2</td>
<td>10</td>
<td>43</td>
<td>128</td>
</tr>
<tr>
<td>SSC-25</td>
<td>2 1/2</td>
<td>40</td>
<td>9.1</td>
<td>10</td>
<td>48</td>
<td>143</td>
</tr>
<tr>
<td>SSC-30</td>
<td>3</td>
<td>40</td>
<td>12.1</td>
<td>10</td>
<td>53</td>
<td>152</td>
</tr>
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<td>SSC-40</td>
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<td>40</td>
<td>18.3</td>
<td>10</td>
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<td>167</td>
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<tr>
<td>SSC-50</td>
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<td>40</td>
<td>26.6</td>
<td>10</td>
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<td>182</td>
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<tr>
<td>SSC-60</td>
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<td>40</td>
<td>34.8</td>
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### Maximum Pipe Clamp Spacing (Bottom of Trapeze Installation)

<table>
<thead>
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<th>PART #</th>
<th>NPS</th>
<th>PIPE SCHEDULE</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORTING SPACING (FT)</th>
<th>MAX TRANSVERSE SPACING (FT)</th>
<th>MAX LONGITUDINAL SPACING (FT)</th>
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</thead>
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<tr>
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<tr>
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<td>3.8</td>
<td>7</td>
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<td>106</td>
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<td>SSC-15</td>
<td>1 1/2</td>
<td>40</td>
<td>4.5</td>
<td>9</td>
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<td>115</td>
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<tr>
<td>SSC-20</td>
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<td>40</td>
<td>6.2</td>
<td>10</td>
<td>43</td>
<td>128</td>
</tr>
<tr>
<td>SSC-25</td>
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<td>40</td>
<td>9.1</td>
<td>10</td>
<td>48</td>
<td>143</td>
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<tr>
<td>SSC-30</td>
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<td>18.3</td>
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<td>40</td>
<td>26.6</td>
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<td>65</td>
<td>182</td>
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<tr>
<td>SSC-60</td>
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<td>40</td>
<td>34.8</td>
<td>10</td>
<td>71</td>
<td>197</td>
</tr>
</tbody>
</table>

### Notes:
1. Maximum MW-SSC spacings are the minimums of values taken from S1.0 and MW-SSC capacities for their respective pipe size and g force.
2. Brace capacity may govern maximum spacing in some cases.
3. Ref. X8.0-X8.0.1 for MW-SSC data.
4. For multiple pipes supported on a trapeze, refer to page A10.6, note 3.
COPPER PIPE
TYPE L - DRAWN W/ SOLDERED JOINTS
MAX MW-SCC/SCCI SPACINGS

VERTICAL FORCE
Fpv = 0.375g (ASD)

PIPE W/WATER AND INSULATION

**MAX PIPE CLAMP SPACING (TOP OF TRAPEZE INSTALLATION)**

<table>
<thead>
<tr>
<th>PART #</th>
<th>NPS</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRavity Support SPACING (FT)</th>
<th>MAX TRANSVERSE SPACING (FT)</th>
<th>MAX LONGITUDINAL SPACING (FT) (MW-SCC-XX ONLY)</th>
<th>g FORCE</th>
<th>g FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.25</td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>0.5</td>
<td>0.625</td>
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<td></td>
<td></td>
<td>0.75</td>
<td>0.875</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>SCC-13/SCCI-X13</td>
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<td>2.30</td>
<td>7</td>
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<td>17</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>SCC-15/SCCI-X15</td>
<td>1 1/2</td>
<td>2.80</td>
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<td>26</td>
<td>22</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>SCC-20/SCCI-X20</td>
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<td>4.20</td>
<td>8</td>
<td>31</td>
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<td>22</td>
<td>20</td>
</tr>
<tr>
<td>SCC-25/SCCI-X25</td>
<td>2 1/2</td>
<td>5.80</td>
<td>9</td>
<td>34</td>
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<td>24</td>
<td>21</td>
</tr>
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<td>SCC-30/SCCI-X30</td>
<td>3</td>
<td>7.60</td>
<td>10</td>
<td>36</td>
<td>30</td>
<td>26</td>
<td>23</td>
</tr>
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<td>SCC-40/SCCI-X40</td>
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<td>12.4</td>
<td>10</td>
<td>44</td>
<td>36</td>
<td>31</td>
<td>28</td>
</tr>
<tr>
<td>SCC-50/SCCI-X50</td>
<td>5</td>
<td>18.6</td>
<td>10</td>
<td>45</td>
<td>37</td>
<td>32</td>
<td>26</td>
</tr>
<tr>
<td>SCC-60/SCCI-X60</td>
<td>6</td>
<td>25.1</td>
<td>10</td>
<td>49</td>
<td>38</td>
<td>29</td>
<td>23</td>
</tr>
</tbody>
</table>

**MAX PIPE CLAMP SPACING (TOP OF TRAPEZE INSTALLATION) FOR MULTIPLE PIPES SUPPORTED ON A TRAPEZE, REFER TO PAGE A10.6, NOTE 3.**

**MAX PIPE CLAMP SPACING (TOP OF TRAPEZE INSTALLATION) FOR MW-SCCI MAY ONLY BE USED FOR TRANSVERSE LOCATIONS.**

**NOTES:**

1. MAXIMUM MW-SCC/SCCI SPACINGS ARE THE MINIMUMS OF VALUES TAKEN FROM S1.2.1, MW-SCC CAPACITIES AND MW-SCCI CAPACITIES FOR THEIR RESPECTIVE PIPE SIZE AND g FORCE.
2. BRACE CAPACITY MAY GOVERN MAXIMUM SPACING IN SOME CASES.
3. REF. X8.1-X8.1.1 FOR MW-SCC DATA AND X8.6-X8.6.3 FOR MW-SCCI DATA.
4. FOR MULTIPLE PIPES SUPPORTED ON A TRAPEZE, REFER TO PAGE A10.6, NOTE 3.
5. MW-SCCI MAY ONLY BE USED FOR TRANSVERSE LOCATIONS.
### Copper Pipe

#### Type L - Annealed

**Max MW-SCC/SCCI Spacings**

<table>
<thead>
<tr>
<th>Pipe Material</th>
<th>Max Spacing (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Max Longitudinal Spacing (FT)</strong> (MW-SCC-XX Only)</td>
<td></td>
</tr>
<tr>
<td><strong>G Force</strong></td>
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</tr>
<tr>
<td><strong>Max Transverse Spacing (FT)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>G Force</strong></td>
<td>0.25</td>
</tr>
<tr>
<td>SCC-13/SCCI-X13</td>
<td>1 1/4</td>
</tr>
<tr>
<td>SCC-15/SCCI-X15</td>
<td>1 1/2</td>
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<tr>
<td>SCC-20/SCCI-X20</td>
<td>2</td>
</tr>
<tr>
<td>SCC-25/SCCI-X25</td>
<td>2 1/2</td>
</tr>
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<td>SCC-40/SCCI-X40</td>
<td>4</td>
</tr>
<tr>
<td>SCC-50/SCCI-X50</td>
<td>5</td>
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<tr>
<td>SCC-60/SCCI-X60</td>
<td>6</td>
</tr>
</tbody>
</table>

### Notes:

1. Maximum MW-SCC/SCCI spacings are the minimums of values taken from S1.2.1, MW-SCC capacities and MW-SCCI capacities for their respective pipe size and g force.
2. Brace capacity may govern maximum spacing in some cases.
3. Ref: X8.1-X8.1.1 for MW-SCC data and X8.6-X8.6.3 for MW-SCCI data.
4. For multiple pipes supported on a trapeze, refer to page A10.6, note 3.
5. MW-SCCI may only be used for transverse locations.

### Pipe Only (Gas)

**Max Pipe Clamp Spacing (Top of Trapeze Installation)**

<table>
<thead>
<tr>
<th>Part #</th>
<th>NPS</th>
<th>Max Weight Per Foot (LBS/FT)</th>
<th>Max Gravity Support Spacing (FT)</th>
<th>Max Longitudinal Spacing (FT) (MW-SCC-XX Only)</th>
<th>Max Transverse Spacing (FT)</th>
</tr>
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<tbody>
<tr>
<td>SCC-13/SCCI-X13</td>
<td>1 1/4</td>
<td>0.88</td>
<td>9</td>
<td>24</td>
<td>20</td>
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<tr>
<td>SCC-15/SCCI-X15</td>
<td>1 1/2</td>
<td>1.14</td>
<td>10</td>
<td>25</td>
<td>20</td>
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<td>SCC-20/SCCI-X20</td>
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<td>1.75</td>
<td>10</td>
<td>29</td>
<td>24</td>
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<tr>
<td>SCC-25/SCCI-X25</td>
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<td>2.48</td>
<td>10</td>
<td>33</td>
<td>27</td>
</tr>
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<td>SCC-30/SCCI-X30</td>
<td>3</td>
<td>3.33</td>
<td>10</td>
<td>37</td>
<td>30</td>
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<tr>
<td>SCC-40/SCCI-X40</td>
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<td>5.38</td>
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<td>37</td>
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<td>7.61</td>
<td>10</td>
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<td>39</td>
</tr>
<tr>
<td>SCC-60/SCCI-X60</td>
<td>6</td>
<td>10.2</td>
<td>10</td>
<td>52</td>
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</tr>
</tbody>
</table>
### Copper Pipe

#### Type K - Drawn W/ Soldered Joints

**MAXIMUM MW-SCC/SCCI SPACINGS ARE THE MINIMUMS OF VALUES TAKEN FROM S1.2.1, MW-SCC CAPACITIES AND MW-SCCI CAPACITIES FOR THEIR RESPECTIVE PIPE SIZE AND g FORCE.**

**NOTES:**
1. MAXIMUM MW-SCC/SCCI SPACINGS ARE THE MINIMUMS OF VALUES TAKEN FROM S1.2.1, MW-SCC CAPACITIES AND MW-SCCI CAPACITIES FOR THEIR RESPECTIVE PIPE SIZE AND g FORCE.
2. BRACE CAPACITY MAY GOVERN MAXIMUM SPACING IN SOME CASES.
3. REF. X8.1-X8.1.1 FOR MW-SCC DATA AND X8.6-X8.6.3 FOR MW-SCCI DATA.
4. FOR MULTIPLE PIPES SUPPORTED ON A TRAPEZE, REFER TO PAGE A10.6, NOTE 3.
5. MW-SCCI MAY ONLY BE USED FOR TRANSVERSE LOCATIONS.

### Pipe Only (Gas)

**MAX PIPE CLAMP SPACING (TOP OF TRAPEZE INSTALLATION)**

<table>
<thead>
<tr>
<th>PART #</th>
<th>NPS</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE SPACING (FT)</th>
<th>MAX LONGITUDINAL SPACING (FT) (MW-SCC-XX ONLY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCC-13/SCCI-X13</td>
<td>1 1/4</td>
<td>1.04</td>
<td>9</td>
<td>0.25</td>
<td>0.375</td>
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<td>SCC-15/SCCI-X15</td>
<td>1 1/2</td>
<td>1.36</td>
<td>10</td>
<td>0.25</td>
<td>0.375</td>
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<td>2.06</td>
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<td>0.375</td>
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<td>0.25</td>
<td>0.375</td>
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**Notes:**
- Fpv = 0.375g (ASD)
- VERTICAL FORCE
**COPPER PIPE**

**TYPE K - ANNEALED**

**MAX MW-SCC/SCCI SPACINGS**

**PIPE WITH WATER AND INSULATION**

**MAX PIPE CLAMP SPACING (TOP OF TRAPEZE INSTALLATION)**

<table>
<thead>
<tr>
<th>PART #</th>
<th>NPS</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE SPACING (FT)</th>
<th>MAX LONGITUDINAL SPACING (FT) (MW-SCC-XX ONLY)</th>
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<th>g FORCE</th>
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<tbody>
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<td>2.30</td>
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<td>0.375</td>
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<td>0.625</td>
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<td>SCC-15/SCC-15</td>
<td>1 1/2</td>
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<td>10</td>
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<td>17</td>
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<td>12</td>
<td>11</td>
</tr>
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<td>SCC-25/SCC-25</td>
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<td>5.80</td>
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<td>17</td>
<td>16</td>
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<td>19</td>
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<td>SCC-50/SCC-50</td>
<td>5</td>
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<td>22</td>
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**PIPE ONLY (GAS)**

**MAX PIPE CLAMP SPACING (TOP OF TRAPEZE INSTALLATION)**

<table>
<thead>
<tr>
<th>PART #</th>
<th>NPS</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE SPACING (FT)</th>
<th>MAX LONGITUDINAL SPACING (FT) (MW-SCC-XX ONLY)</th>
<th>g FORCE</th>
<th>g FORCE</th>
</tr>
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<tbody>
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<td>9</td>
<td>0.25</td>
<td>0.375</td>
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<td>0.625</td>
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<tr>
<td>SCC-15/SCC-15</td>
<td>1 1/2</td>
<td>1.36</td>
<td>10</td>
<td>27</td>
<td>22</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>SCC-20/SCC-20</td>
<td>2</td>
<td>2.06</td>
<td>10</td>
<td>28</td>
<td>23</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>SCC-25/SCC-25</td>
<td>2 1/2</td>
<td>2.93</td>
<td>10</td>
<td>32</td>
<td>27</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>SCC-30/SCC-30</td>
<td>3</td>
<td>4.00</td>
<td>10</td>
<td>37</td>
<td>30</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>SCC-40/SCC-40</td>
<td>4</td>
<td>6.51</td>
<td>10</td>
<td>41</td>
<td>33</td>
<td>29</td>
<td>26</td>
</tr>
<tr>
<td>SCC-50/SCC-50</td>
<td>5</td>
<td>9.67</td>
<td>10</td>
<td>53</td>
<td>43</td>
<td>38</td>
<td>34</td>
</tr>
<tr>
<td>SCC-60/SCC-60</td>
<td>6</td>
<td>13.9</td>
<td>10</td>
<td>59</td>
<td>48</td>
<td>42</td>
<td>37</td>
</tr>
</tbody>
</table>

**NOTES:**

1. MAXIMUM MW-SCC/SCCI SPACINGS ARE THE MINIMUMS OF VALUES TAKEN FROM S1.2.1, MW-SCC CAPACITIES AND MW-SCCI CAPACITIES FOR THEIR RESPECTIVE PIPE SIZE AND g FORCE.
2. BRACE CAPACITY MAY GOVERN MAXIMUM SPACING IN SOME CASES.
3. REF. X8.1-X8.1.1 FOR MW-SCC DATA AND X8.6-X8.6.3 FOR MW-SCCI DATA.
4. FOR MULTIPLE PIPES SUPPORTED ON A TRAPEZE, REFER TO PAGE A10.6, NOTE 3.
5. MW-SCC MAY ONLY BE USED FOR TRANSVERSE LOCATIONS.
### MAX PIPE CLAMP SPACING (TOP OF TRAPEZE INSTALLATION)

<table>
<thead>
<tr>
<th>PART #</th>
<th>NPS</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE SPACING (FT)</th>
<th>MAX LONGITUDINAL SPACING (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>g FORCE</td>
<td></td>
<td>g FORCE</td>
</tr>
<tr>
<td>SSC-30</td>
<td>3</td>
<td>8.26</td>
<td>0.25</td>
<td>0.375</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>45</td>
<td>41</td>
<td>38</td>
</tr>
<tr>
<td>SSC-40</td>
<td>4</td>
<td>13.64</td>
<td>50</td>
<td>45</td>
<td>41</td>
</tr>
</tbody>
</table>

### MAX PIPE CLAMP SPACING (BOTTOM OF TRAPEZE INSTALLATION)

<table>
<thead>
<tr>
<th>PART #</th>
<th>NPS</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE SPACING (FT)</th>
<th>MAX LONGITUDINAL SPACING (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>g FORCE</td>
<td></td>
<td>g FORCE</td>
</tr>
<tr>
<td>SSC-30</td>
<td>3</td>
<td>8.26</td>
<td>0.25</td>
<td>0.375</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>45</td>
<td>41</td>
<td>38</td>
</tr>
<tr>
<td>SSC-40</td>
<td>4</td>
<td>13.64</td>
<td>50</td>
<td>45</td>
<td>40</td>
</tr>
</tbody>
</table>

**NOTES:**

1. MAXIMUM MW-SSCE SPACINGS ARE THE MINIMUMS OF VALUES TAKEN FROM S2.0 AND MW-SSCE CAPACITIES FOR THEIR RESPECTIVE PIPE SIZE AND g FORCE.
2. BRACE CAPACITY MAY GOVERN MAXIMUM SPACING IN SOME CASES.
3. REF. X8.0-X8.0.1 FOR MW-SSCE DATA.
4. FOR MULTIPLE CONDUITS SUPPORTED ON A TRAPEZE, REFER TO PAGE A20.5, NOTE 3.
### Intermediate Metal Conduit (IMC)

**Maximum MW-SSC/SSCE Spacings**

**Vertical Force**

\[ F_{pv} = 0.375 \text{g (ASD)} \]

---

#### MAX Pipe Clamp Spacing (Top of Trapeze Installation)

<table>
<thead>
<tr>
<th>PART #</th>
<th>NPS</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX Gravity Support Spacing (FT)</th>
<th>MAX Transverse Spacing (FT)</th>
<th>MAX Longitudinal Spacing (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>( g ) FORCEN</td>
<td>0.25</td>
<td>0.375</td>
</tr>
<tr>
<td>SSC-30</td>
<td>3</td>
<td>10.69</td>
<td>10</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>SSC-40</td>
<td>4</td>
<td>16.32</td>
<td>10</td>
<td>55</td>
<td>46</td>
</tr>
</tbody>
</table>

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#### MAX Pipe Clamp Spacing (Bottom of Trapeze Installation)

<table>
<thead>
<tr>
<th>PART #</th>
<th>NPS</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX Gravity Support Spacing (FT)</th>
<th>MAX Transverse Spacing (FT)</th>
<th>MAX Longitudinal Spacing (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>( g ) FORCEN</td>
<td>0.25</td>
<td>0.375</td>
</tr>
<tr>
<td>SSC-30</td>
<td>3</td>
<td>10.69</td>
<td>10</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>SSC-40</td>
<td>4</td>
<td>16.32</td>
<td>10</td>
<td>55</td>
<td>42</td>
</tr>
</tbody>
</table>

---

**NOTES:**

1. Maximum MW-SSCE spacings are the minimums of values taken from S2.1 and MW-SSCE capacities for their respective pipe size and \( g \) force.
2. Brace capacity may govern maximum spacing in some cases.
3. Ref. X8.0-X8.0.1 for MW-SSCE data.
4. For multiple conduits supported on a trapeze, refer to page A20.5, note 3.

---

**MASON WEST, INC.**

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---

**PAGE**

S4.1
### MAX PIPE CLAMP SPACING (TOP OF TRAPEZE INSTALLATION)

<table>
<thead>
<tr>
<th>PART #</th>
<th>NPS</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE SPACING (FT)</th>
<th>MAX LONGITUDINAL SPACING (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.25</td>
<td>0.375</td>
</tr>
<tr>
<td>SSC-30</td>
<td>3</td>
<td>12.59</td>
<td>10</td>
<td>52</td>
<td>47</td>
</tr>
<tr>
<td>SSC-40</td>
<td>4</td>
<td>19.67</td>
<td>10</td>
<td>57</td>
<td>52</td>
</tr>
<tr>
<td>SSC-50</td>
<td>5</td>
<td>28.76</td>
<td>10</td>
<td>63</td>
<td>57</td>
</tr>
<tr>
<td>SSC-60</td>
<td>6</td>
<td>40.03</td>
<td>10</td>
<td>35</td>
<td>23</td>
</tr>
</tbody>
</table>

### MAX PIPE CLAMP SPACING (BOTTOM OF TRAPEZE INSTALLATION)

<table>
<thead>
<tr>
<th>PART #</th>
<th>NPS</th>
<th>MAX WEIGHT PER FOOT (LBS/FT)</th>
<th>MAX GRAVITY SUPPORT SPACING (FT)</th>
<th>MAX TRANSVERSE SPACING (FT)</th>
<th>MAX LONGITUDINAL SPACING (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.25</td>
<td>0.375</td>
</tr>
<tr>
<td>SSC-30</td>
<td>3</td>
<td>12.59</td>
<td>10</td>
<td>52</td>
<td>47</td>
</tr>
<tr>
<td>SSC-40</td>
<td>4</td>
<td>19.67</td>
<td>10</td>
<td>57</td>
<td>52</td>
</tr>
<tr>
<td>SSC-50</td>
<td>5</td>
<td>28.76</td>
<td>10</td>
<td>63</td>
<td>57</td>
</tr>
<tr>
<td>SSC-60</td>
<td>6</td>
<td>40.03</td>
<td>10</td>
<td>29</td>
<td>19</td>
</tr>
</tbody>
</table>

### NOTES:
1. MAXIMUM MW-SSC SPACINGS ARE THE MINIMUMS OF VALUES TAKEN FROM S2.2 AND MW-SSC CAPACITIES FOR THEIR RESPECTIVE PIPE SIZE AND g FORCE.
2. BRACE CAPACITY MAY GOVERN MAXIMUM SPACING IN SOME CASES.
3. REF. X8.0-X8.0.1 FOR MW-SSC DATA.
4. FOR MULTIPLE CONDUITS SUPPORTED ON A TRAPEZE, REFER TO PAGE A20.5, NOTE 3.
### Trapeze Selection Tables

#### Vertical Force

**Fpv = 0.375g (ASD)**

<table>
<thead>
<tr>
<th>Trapeze Size Designation @ Transverse Seismic Brace Locations</th>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>Max Trapeze Span</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36 IN</td>
<td>54 IN</td>
</tr>
<tr>
<td>Duct Weight (Lbs/ft)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>20</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>30</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>40</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>60</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>70</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>80</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>90</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>100</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Trapeze Member Table</th>
<th>Allowable Moment Capacity (Kip-in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36&quot; Span</td>
</tr>
<tr>
<td>A</td>
<td>13/16 x 1 1/8 x 12 Ga Single Strut</td>
</tr>
<tr>
<td>B</td>
<td>1 1/8 x 1 1/8 x 12 Ga Single Strut</td>
</tr>
<tr>
<td>C</td>
<td>1 1/8 x 3 1/4 x 12 Ga Single Strut</td>
</tr>
<tr>
<td>F</td>
<td>L3x3x1/4 (HS32x2x1/4)</td>
</tr>
<tr>
<td>G</td>
<td>L4x4x1/4 (HS32x2x1/4)</td>
</tr>
</tbody>
</table>

---

**Notes:**

1. Refer to Table above for Trapeze Member Size Designations & Allowable Moment Capacities.
2. Steel Angle may be used in place of Channel Strut. For 1 1/8" x 1 1/8" 12 Ga Single Strut, use L2 1/2" x 1/2". For 1 1/8" x 3 1/4" x 12 Ga Single Strut, use L3 x 3/4" x 1/4". Single Strut Contractor may use 1 1/8" x 1 1/8" x 12 Ga Double Strut as a substitution.
3. Trapeze Members may be provided with round holes. Refer to X7.0 and X7.1 for Strut Member Data.
4. Maximum Span of Trapeze Member is measured between center of hanger rods.
5. Contractor may use any Trapeze Member size larger than is tabulated. For example, if Trapeze Member "A" is the minimum requirement, Trapeze Member B, D, F, or G can also be used.
6. When increasing distance from edge of duct to center of hanger rod more than 6", increase the weight per foot by a factor of increased edge distance divided by 6". For example, a 12" duct weighing 9 lb/ft with an edge distance of 12" must increase the weight by a factor of 2 (12"/6") to use the above table.
7. Maximum transverse duct brace spacing is 30 feet.
### TRAPEZE SELECTION TABLES

**LATERAL FORCE**

\[ Fp = 0.25g \] (ASD)

**VERTICAL FORCE**

\[ Fpv = 0.375g \] (ASD)

#### TRAPEZE SIZE DESIGNATION @ ALL-DIRECTIONAL AND LONGITUDINAL SEISMIC BRACE LOCATIONS

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>10 FT</th>
<th>20 FT</th>
<th>30 FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX TRAPEZE SPAN</td>
<td>36 IN</td>
<td>54 IN</td>
<td>72 IN</td>
</tr>
<tr>
<td>MAX TRAPEZE SPAN</td>
<td>96 IN</td>
<td>120 IN</td>
<td>120 IN</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 40'-0&quot; MAX.</th>
<th>40 FT</th>
<th>50 FT</th>
<th>60 FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX TRAPEZE SPAN</td>
<td>36 IN</td>
<td>54 IN</td>
<td>72 IN</td>
</tr>
<tr>
<td>MAX TRAPEZE SPAN</td>
<td>96 IN</td>
<td>120 IN</td>
<td>120 IN</td>
</tr>
</tbody>
</table>

**NOTES:**

1. REFER TO PAGE T1.0 FOR TRAPEZE MEMBER SIZE DESIGNATIONS & ALLOWABLE MOMENT CAPACITIES.
2. STEEL ANGLE MAY BE USED IN PLACE OF CHANNEL STRUT. FOR 1 5/8" x 1 5/8" x 12 GA SINGLE STRUT, USE L2 x 2 x 1/4. FOR 1 5/8" x 3 1/4" x 12 GA SINGLE STRUT, USE L3 x 3 x 1/4. FOR 1 5/8" x 1 5/8" x 12 GA SINGLE STRUT CONTRACTOR MAY USE 1 5/8" x 1 16" x 12 GA DOUBLE STRUT AS A SUBSTITUTION.
3. TRAPEZE MEMBERS MAY BE PROVIDED WITH ROUND HOLES. REFER TO X7.0 AND X7.1 FOR STRUT MEMBER DATA.
4. MAXIMUM SPAN OF TRAPEZE MEMBER IS MEASURED BETWEEN CENTER OF HANGER RODS.
5. CONTRACTOR MAY USE ANY TRAPEZE MEMBER SIZE LARGER THAN IS TABULATED. FOR EXAMPLE, IF TRAPEZE MEMBER "A" IS THE MINIMUM REQUIREMENT, TRAPEZE MEMBER B, D, F, OR G CAN ALSO BE USED.
6. WHEN INCREASING DISTANCE FROM EDGE OF DUCT TO CENTER OF HANGER ROD MORE THAN 6", INCREASE THE WEIGHT PER FOOT BY A FACTOR OF INCREASED EDGE DISTANCE DIVIDED BY 6". FOR EXAMPLE, A 12" DUCT WEIGHING 9 LB/FT WITH AN EDGE DISTANCE OF 12" MUST INCREASE THE WEIGHT BY A FACTOR OF 2 (12"/6") TO USE THE ABOVE TABLE.
7. MAXIMUM LONGITUDINAL DUCT BRACE SPACING IS 60 FEET.
### Duct Trapeze Selection Tables

**Lateral Force**

Fp = 0.375g (ASD)

**Vertical Force**

Fpv = 0.375g (ASD)

#### Trapeze Size Designation @ All-Directional and Longitudinal Seismic Brace Locations

<table>
<thead>
<tr>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>10 FT</th>
<th>20 FT</th>
<th>30 FT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Max Trapeze Span</strong></td>
<td>36 IN</td>
<td>54 IN</td>
<td>72 IN</td>
</tr>
<tr>
<td>10</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>20</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>30</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>40</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>60</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>70</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>80</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>90</td>
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<td>A</td>
<td>B</td>
</tr>
<tr>
<td>100</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

**Notes:**

1. Refer to Page T1.0 for Trapeze Member Size Designations & Allowable Moment Capacities.
2. Steel angle may be used in place of Channel Strut. For 1 5/8" x 1 5/8" x 12 ga single strut, use L2 1/2 x 2 1/4 x 3/8. For 1 5/8" x 3 1/8" x 12 ga single strut, use L3 1/4 x 1/2. For 1 5/8" x 1 5/8" x 12 ga single strut, Contractor may use 1 5/8" x 1 3/4 x 12 ga double strut as a substitution.
3. Trapeze Members may be provided with round holes. Refer to X7.0 and X7.1 for strut member data.
4. Maximum span of Trapeze Member is measured between center of hanger rods.
5. Contractor may use any Trapeze Member size larger than is tabulated. For example, if Trapeze Member "A" is the minimum requirement, Trapeze Member B, D, F, or G can also be used.
6. When increasing distance from edge of duct to center of hanger rod more than 6", increase the weight per foot by a factor of increased edge distance divided by 6". For example, a 12" duct weighing 9 lb/ft with an edge distance of 12" must increase the weight by a factor of 2 (12"/6") to use the above table.
7. Maximum longitudinal Duct brace spacing is 60 feet.
### Trapeze Selection Tables

#### Lateral Force

Fp = 0.50g (ASD)  
Fpv = 0.375g (ASD)

<table>
<thead>
<tr>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>Trapeze Size Designation @ All-Directional and Longitudinal Seismic Brace Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Long. &amp; All-Dir. Seismic Location Spacing</td>
</tr>
<tr>
<td></td>
<td>10 FT</td>
</tr>
<tr>
<td>36 IN</td>
<td>54 IN</td>
</tr>
<tr>
<td>Duct Weight (Lbs/ft)</td>
<td></td>
</tr>
<tr>
<td>10 A</td>
<td>A</td>
</tr>
<tr>
<td>20 A</td>
<td>A</td>
</tr>
<tr>
<td>30 A</td>
<td>A</td>
</tr>
<tr>
<td>40 A</td>
<td>A</td>
</tr>
</tbody>
</table>

**NOTES:**

1. REFER TO PAGE T1.0 FOR TRAPEZE MEMBER SIZE DESIGNATIONS & ALLOWABLE MOMENT CAPACITIES.
2. STEEL ANGLE MAY BE USED IN PLACE OF CHANNEL STRUT. FOR 1 5/8"x1 5/8"x12 GA SINGLE STRUT, USE L2 1/2x2 1/2x 1/4. FOR 1 5/8"x3 1/2"x12 GA SINGLE STRUT, USE L3x3x 1/4. FOR 1 1/4"x1 1/4"x12 GA SINGLE STRUT CONTRACTOR MAY USE 1 1/4"x 1/16x12 GA DOUBLE STRUT AS A SUBSTITUTION.
3. TRAPEZE MEMBERS MAY BE PROVIDED WITH ROUND HOLES. REFER TO X7.0 AND X7.1 FOR STRUT MEMBER DATA.
4. MAXIMUM SPAN OF TRAPEZE MEMBER IS MEASURED BETWEEN CENTER OF HANGER RODS.
5. CONTRACTOR MAY USE ANY TRAPEZE MEMBER SIZE LARGER THAN IS TABULATED. FOR EXAMPLE, IF TRAPEZE MEMBER "A" IS THE MINIMUM REQUIREMENT, TRAPEZE MEMBER B, D, F, OR G CAN ALSO BE USED.
6. WHEN INCREASING DISTANCE FROM EDGE OF DUCT TO CENTER OF HANGER ROD MORE THAN 6", INCREASE THE WEIGHT PER FOOT BY A FACTOR OF INCREASED EDGE DISTANCE DIVIDED BY 6". FOR EXAMPLE, A 12" DUCT WEIGHING 9 LBS/FT WITH AN EDGE DISTANCE OF 12" MUST INCREASE THE WEIGHT BY A FACTOR OF 2 (12/6") TO USE THE ABOVE TABLE.
7. MAXIMUM LONGITUDINAL DUCT BRACE SPACING IS 60 FEET.

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Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020

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OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto  
763 of 846
### Duct Trapeze Selection Tables

**Fp = 0.625g (ASD)**

**Vertical Force**

Fpv = 0.375g (ASD)

#### Trapeze Size Designation

<table>
<thead>
<tr>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>10 FT</th>
<th>20 FT</th>
<th>30 FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long. &amp; All-Dir. Seismic Location Spacing</td>
<td>Max Trapeze Span</td>
<td>Max Trapeze Span</td>
<td>Max Trapeze Span</td>
</tr>
<tr>
<td>36 in</td>
<td>54 in</td>
<td>72 in</td>
<td>96 in</td>
</tr>
</tbody>
</table>

#### Duct Weight (LBS/FT)

<table>
<thead>
<tr>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>20 FT</th>
<th>50 FT</th>
<th>60 FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long. &amp; All-Dir. Seismic Location Spacing</td>
<td>Max Trapeze Span</td>
<td>Max Trapeze Span</td>
<td>Max Trapeze Span</td>
</tr>
<tr>
<td>36 in</td>
<td>54 in</td>
<td>72 in</td>
<td>96 in</td>
</tr>
</tbody>
</table>

#### Notes:

1. Refer to page T1.0 for Trapeze Member Size Designations & Allowable Moment Capacities.
2. Steel Angle may be used in place of Channel Strut. For 1.5" x 1.5" x 1/2 GA Single Strut, use L2 3/4" x 2 1/8 GA. For 1.5" x 3" x 1/2 GA Single Strut, use L3 3/4" x 3 1/4 GA. Single Strut Contractor may use 1.5" x 1.5" x 1/2 GA as a substitute.
3. Trapeze members may be provided with round holes. Refer to X7.0 and X7.1 for strut member data.
4. Maximum span of Trapeze member is measured between Center of Hanger Rods.
5. Contractor may use any Trapeze member size larger than is tabulated. For example, if Trapeze member "A" is the minimum requirement, Trapeze member B, D, F, or G can also be used.
6. When increasing distance from edge of duct to center of hanger rod more than 6", increase the weight per foot by a factor of increased edge distance divided by 6". For example, a 12" duct weighing 9 LB/FT with an edge distance of 12" must increase the weight by a factor of 2 (12"/6") to use the above table.
7. Maximum longitudinal duct brace spacing is 60 feet.
### TRAPEZE SELECTION TABLES

#### LATERAL FORCE
Fp = 0.75g (ASD)

#### VERTICAL FORCE
Fpv = 0.375g (ASD)

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>DUCT WEIGHT (LBS/FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAPEZE SIZE DESIGNATION @ ALL-DIRECTIONAL AND LONGITUDINAL SEISMIC BRACE LOCATIONS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>DUCT WEIGHT (LBS/FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAPEZE SIZE DESIGNATION @ ALL-DIRECTIONAL AND LONGITUDINAL SEISMIC BRACE LOCATIONS</td>
<td></td>
</tr>
</tbody>
</table>

### NOTES:

1. REFER TO PAGE T1.0 FOR TRAPEZE MEMBER SIZE DESIGNATIONS & ALLOWABLE MOMENT CAPACITIES.

2. STEEL ANGLE MAY BE USED IN PLACE OF CHANNEL STRUT. FOR 15/8"x15/8"x12 GA SINGLE STRUT, USE L2x2x2.5x3/4. FOR 15/8"x31/2"x12 GA SINGLE STRUT, USE L3x3x15/8. FOR 15/8"x15/8"x12 GA SINGLE STRUT CONTRACTOR MAY USE 15/8"x15/8"x12 GA DOUBLE STRUT AS A SUBSTITUTION.

3. TRAPEZE MEMBERS MAY BE PROVIDED WITH ROUND HOLES. REFER TO X7.0 AND X7.1 FOR STRUT MEMBER DATA.

4. MAXIMUM SPAN OF TRAPEZE MEMBER IS MEASURED BETWEEN CENTER OF HANGER RODS.

5. CONTRACTOR MAY USE ANY TRAPEZE MEMBER SIZE LARGER THAN IS TABULATED. FOR EXAMPLE, IF TRAPEZE MEMBER "A" IS THE MINIMUM REQUIREMENT, TRAPEZE MEMBER B, D, F, OR G CAN ALSO BE USED.

6. WHEN INCREASING DISTANCE FROM EDGE OF DUCT TO CENTER OF HANGER ROD MORE THAN 6", INCREASE THE WEIGHT PER FOOT BY A FACTOR OF INCREASED EDGE DISTANCE DIVIDED BY 6". FOR EXAMPLE, A 12" DUCT WEIGHING 9 LBS/Ft WITH AN EDGE DISTANCE OF 12" MUST INCREASE THE WEIGHT BY A FACTOR OF 2 (12/6") TO USE THE ABOVE TABLE.

7. MAXIMUM LONGITUDINAL DUCT BRACE SPACING IS 60 FEET.

---

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**Jiefu "Jeff" Zhang, SE**
California SE No. S5270

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10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
765 of 846
**TRAPEZE SELECTION TABLES**

**VERTICAL FORCE (ASD)**

*Fp* = 0.875g

*Fpv* = 0.375g

<table>
<thead>
<tr>
<th>DUCT SUPPORT AT 10'-0&quot; MAX.</th>
<th>MAX TRAPEZE SPAN</th>
<th>MAX TRAPEZE SPAN</th>
<th>MAX TRAPEZE SPAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 FT</td>
<td>20 FT</td>
<td>30 FT</td>
</tr>
<tr>
<td></td>
<td>36 IN</td>
<td>54 IN</td>
<td>72 IN</td>
</tr>
<tr>
<td></td>
<td>96 IN</td>
<td>120 IN</td>
<td></td>
</tr>
<tr>
<td><strong>DUCT WEIGHT (LBS/FT)</strong></td>
<td><strong>40 FT</strong></td>
<td><strong>50 FT</strong></td>
<td><strong>60 FT</strong></td>
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<tr>
<td>10</td>
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<td>A A A B B</td>
<td>A A A B B</td>
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<td>A A A B B</td>
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<td>40</td>
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<td>B D D D D D</td>
<td>B D D D D D</td>
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<tr>
<td>50</td>
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<td>B D D D D D</td>
<td>B D D D D D</td>
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<tr>
<td>60</td>
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<td>D D D D D D</td>
<td>D D D D D D</td>
</tr>
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<td>70</td>
<td>B B B B B B</td>
<td>D D D D D D</td>
<td>D D D D D D</td>
</tr>
<tr>
<td>80</td>
<td>B B B B B B</td>
<td>D D D D D D</td>
<td>D D D D D D</td>
</tr>
<tr>
<td>90</td>
<td>B B B B B B</td>
<td>D D D D D D</td>
<td>D D D D D D</td>
</tr>
<tr>
<td>100</td>
<td>B B B B B B</td>
<td>D D D D D D</td>
<td>D D D D D D</td>
</tr>
</tbody>
</table>

**NOTES:**

1. REFER TO PAGE T1.0 FOR TRAPEZE MEMBER SIZE DESIGNATIONS & ALLOWABLE MOMENT CAPACITIES.

2. STEEL ANGLE MAY BE USED IN PLACE OF CHANNEL STRUT. FOR 1 5/8"x1 5/8"x12 GA SINGLE STRUT, USE L2 1/2x2 1/2x 1/4. FOR 1 3/8"x3 3/4"x12 GA SINGLE STRUT, USE L3 3/4x3 3/4. FOR 1 3/4"x1 3/4"x12 GA SINGLE STRUT CONTRACTOR MAY USE 1 3/4x3 3/4x 1/2 AS A SUBSTITUTION.

3. TRAPEZE MEMBERS MAY BE PROVIDED WITH ROUND HOLES. REFER TO X7.0 AND X7.1 FOR STRUT MEMBER DATA.

4. MAXIMUM SPAN OF TRAPEZE MEMBER IS MEASURED BETWEEN CENTER OF HANGER RODS.

5. CONTRACTOR MAY USE ANY TRAPEZE MEMBER SIZE LARGER THAN IS TABULATED. FOR EXAMPLE, IF TRAPEZE MEMBER "A" IS THE MINIMUM REQUIREMENT, TRAPEZE MEMBER B, D, F, OR G CAN ALSO BE USED.

6. WHEN INCREASING DISTANCE FROM EDGE OF DUCT TO CENTER OF HANGER ROD MORE THAN 6", INCREASE THE WEIGHT PER FOOT BY A FACTOR OF INCREASED EDGE DISTANCE DIVIDED BY 6". FOR EXAMPLE, A 12" DUCT WEIGHING 9 LB/FT WITH A EDGE DISTANCE OF 12" MUST INCREASE THE WEIGHT PER FOOT BY A FACTOR OF 2 (12"/6") TO USE THE ABOVE TABLE.

7. MAXIMUM LONGITUDINAL DUCT BRACE SPACING IS 60 FEET.
### Trapeze Selection Tables

#### Long & All-Dir. Seismic Location Spacing

<table>
<thead>
<tr>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>10 FT</th>
<th>20 FT</th>
<th>30 FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duct Weight (lbs/ft)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>20</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>30</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>40</td>
<td>A</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>B</td>
<td>B</td>
<td>B</td>
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<tr>
<td>60</td>
<td>B</td>
<td>B</td>
<td>B</td>
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<tr>
<td>70</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>80</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>90</td>
<td>B</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>100</td>
<td>B</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

#### Long & All-Dir. Seismic Location Spacing

<table>
<thead>
<tr>
<th>Duct Support at 10'-0&quot; Max.</th>
<th>40 FT</th>
<th>50 FT</th>
<th>60 FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duct Weight (lbs/ft)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>20</td>
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<td>B</td>
<td>B</td>
</tr>
<tr>
<td>30</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>40</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>50</td>
<td>D</td>
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<td>80</td>
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<td>90</td>
<td>G</td>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>100</td>
<td>G</td>
<td>G</td>
<td>G</td>
</tr>
</tbody>
</table>

#### Notes:

1. Refer to page T1.0 for trapeze member size designations & allowable moment capacities.
2. Steel angle may be used in place of channel strut. For 1 1/8" x 1 1/8" x 12 GA single strut, use L2½x2½x3/8. For 1 1/2" x 3 1/2" x 12 GA single strut, use L3x3x5. For 1 1/2" x 1 1/2" x 12 GA single strut contractor may use 1 1/4" x 1 1/4" x 12 GA double strut as a substitution.
3. Trapeze members may be provided with round holes. Refer to X7.0 and X7.1 for strut member data.
4. Maximum span of trapeze member is measured between center of hanger rods.
5. Contractor may use any trapeze member size larger than is tabulated. For example, if trapeze member "A" is the minimum requirement, trapeze member B, D, F, or G can also be used.
6. When increasing distance from edge of duct to center of hanger rod more than 6", increase the weight per foot by a factor of increased edge distance divided by 6". For example, a 12" duct weighing 9 lbs/ft with an edge distance of 12" must increase the weight by a factor of 2 (12/6) to use the above table.
7. Maximum longitudinal duct brace spacing is 60 feet.

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Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

767 of 846
TRAPEZE SELECTION TABLES

VERTICAL FORCE

Fpv = 0.375g (ASD)

<table>
<thead>
<tr>
<th>PIPING/CONDUIT</th>
<th>TRAPEZE SIZE DESIGNATION @ TRANSVERSE SEISMIC BRACE LOCATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX TRAPEZE SPAN</td>
<td>36 IN</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------</td>
</tr>
<tr>
<td>Support at 10'-0&quot; Max.</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>30</td>
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<tr>
<td></td>
<td>400</td>
</tr>
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<td>600</td>
</tr>
</tbody>
</table>

TRAPEZE MEMBER TABLE

ALLOWABLE MOMENT CAPACITY (KIP-IN)

<table>
<thead>
<tr>
<th>DESIGNATION SIZE</th>
<th>36&quot; SPAN</th>
<th>54&quot; SPAN</th>
<th>72&quot; SPAN</th>
<th>96&quot; SPAN</th>
<th>120&quot; SPAN</th>
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</thead>
<tbody>
<tr>
<td>Mcx</td>
<td>Mcy</td>
<td>Mcx</td>
<td>Mcy</td>
<td>Mcx</td>
<td>Mcy</td>
</tr>
<tr>
<td>A</td>
<td>1 3/16 x 1 5/8 x 12GA SINGLE STRUT</td>
<td>1.61</td>
<td>3.94</td>
<td>1.60</td>
<td>3.41</td>
</tr>
<tr>
<td>AA</td>
<td>(2) 1 3/16 x 1 5/8 x 12GA SINGLE STRUT</td>
<td>1.61</td>
<td>7.88</td>
<td>1.60</td>
<td>6.81</td>
</tr>
<tr>
<td>B</td>
<td>1 5/8 x 1 5/8 x 12GA SINGLE STRUT</td>
<td>1.76</td>
<td>6.57</td>
<td>4.23</td>
<td>6.38</td>
</tr>
<tr>
<td>BB</td>
<td>(2) 1 5/8 x 1 5/8 x 12GA SINGLE STRUT</td>
<td>4.76</td>
<td>13.13</td>
<td>4.23</td>
<td>12.75</td>
</tr>
<tr>
<td>CC</td>
<td>(2) 1 3/16 x 1 5/8 x 12GA DOUBLE STRUT</td>
<td>4.58</td>
<td>17.00</td>
<td>4.58</td>
<td>15.62</td>
</tr>
<tr>
<td>DD</td>
<td>(2) 1 5/8 x 3 1/4 x 12GA SINGLE STRUT</td>
<td>13.26</td>
<td>22.23</td>
<td>9.25</td>
<td>22.23</td>
</tr>
<tr>
<td>EE</td>
<td>(2) 1 5/8 x 1 5/8 x 12GA DOUBLE STRUT</td>
<td>14.82</td>
<td>26.26</td>
<td>14.40</td>
<td>26.26</td>
</tr>
<tr>
<td>G</td>
<td>HSS 3 x 3 x 3/8</td>
<td>68.28</td>
<td>68.28</td>
<td>68.28</td>
<td>68.28</td>
</tr>
<tr>
<td>K</td>
<td>HSS 4 x 4 x 3/8</td>
<td>129.60</td>
<td>129.60</td>
<td>129.60</td>
<td>129.60</td>
</tr>
<tr>
<td>L</td>
<td>HSS 6 x 6 x 5/8</td>
<td>435.60</td>
<td>435.60</td>
<td>435.60</td>
<td>435.60</td>
</tr>
</tbody>
</table>

NOTES:
1. REFER TO TABLE ABOVE FOR TRAPEZE MEMBER SIZE DESIGNATIONS & ALLOWABLE MOMENT CAPACITIES.
2. STEEL ANGLE MAY BE USED IN PLACE OF CHANNEL STRUT. FOR 1 5/8" x 1 5/8" x 12GA SINGLE STRUT, USE L2 x 2 x 1/4. FOR 1 5/8" x 3 1/4" x 12GA SINGLE STRUT, USE L3 x 3 x 1/4. CONTRACTOR MAY USE 1 5/8" x 13/16 x 12GA DOUBLE STRUT AS A SUBSTITUTION.
3. TRAPEZE MEMBERS MAY BE PROVIDED WITH ROUND HOLES. REFER TO X7.0 AND X7.1 FOR STRUT MEMBER DATA.
4. MAXIMUM SPAN OF TRAPEZE MEMBER IS MEASURED BETWEEN CENTER OF HANGER RODS.
5. CONTRACTOR MAY USE ANY TRAPEZE MEMBER SIZE LARGER THAN IS TABULATED. FOR EXAMPLE, IF TRAPEZE MEMBER SIZE "A" IS THE MINIMUM REQUIREMENT, THEN TRAPEZE MEMBER AA, B, BB, C, CC, D, DD, E, EE, G, J, K, OR L CAN ALSO BE USED.
6. PIPING/CONDUIT WEIGHT IN CHARTS IS THE TOTAL COMBINED WEIGHT OF ALL SYSTEMS SUPPORTED BY THE TRAPEZE. TRAPEZE DESIGN IS BASED ON SUPPORT OF AT LEAST (2) PIPES AT 1/3-1/3-1/3. FOR CASES WHERE (1) PIPE (OR A CONCENTRATION OF (2) OR MORE PIPES) IS LOCATED AT OR NEAR THE MID-SPAN, INCREASE THE PIPING/CONDUIT WEIGHT IN THE CHARTS BY 50% AND THEN USE THE TABLE TO SELECT THE TRAPEZE MEMBER.
7. INDIVIDUAL PIPING/CONDUIT MAY GOVERN MAXIMUM GRAVITY SUPPORT AND TRANSVERSE BRACE SPACING. REFER TO S1 AND S2 PAGES.
## PIPING/CONDUIT TRAPEZE SELECTION TABLES

### LATERAL FORCE

| Fp = 0.25g (ASD) | Fpv = 0.375g (ASD) |

### PIPING/CONDUIT SUPPORT AT 10'-0" MAX.

#### PIPING/CONDUIT WEIGHT (LB/FT)

| Fp = 0.25g | Fpv = 0.375g |

#### TRAPEZE SIZE DESIGNATION @ ALL-DIRECTIONAL AND LONGITUDINAL SEISMIC BRACE LOCATIONS

<table>
<thead>
<tr>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 FT</td>
<td>20 FT</td>
<td>30 FT</td>
<td>40 FT</td>
</tr>
<tr>
<td>36 IN</td>
<td>54 IN</td>
<td>72 IN</td>
<td>96 IN</td>
</tr>
<tr>
<td>MAX TRAPEZE SPAN</td>
<td>MAX TRAPEZE SPAN</td>
<td>MAX TRAPEZE SPAN</td>
<td>MAX TRAPEZE SPAN</td>
</tr>
</tbody>
</table>

### NOTES:

1. REFER TO PAGE T2.0 FOR GENERAL NOTES.

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PAGE
T2.1
### Lateral Force

\[ F_p = 0.375g \]  
\[ F_{pv} = 0.375g \]  

### Vertical Force

\[ F_p = 0.375g \]  
\[ F_{pv} = 0.375g \]  

---

#### Piping/Conduit Support at 10'-0" Max.

<table>
<thead>
<tr>
<th>Lateral Force</th>
<th>Vertical Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ F_p = 0.375g ]</td>
<td>[ F_{pv} = 0.375g ]</td>
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</tbody>
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#### Trapeze Selection Tables

**PIPING/CONDUIT**

**TRAPEZE SELECTION TABLES**

<table>
<thead>
<tr>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
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<th>Long &amp; All-Dir. Seismic Location Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 ft</td>
<td>20 ft</td>
<td>30 ft</td>
<td>40 ft</td>
</tr>
<tr>
<td>Max Trapeze Span</td>
<td>Max Trapeze Span</td>
<td>Max Trapeze Span</td>
<td>Max Trapeze Span</td>
</tr>
<tr>
<td>36 in</td>
<td>54 in</td>
<td>72 in</td>
<td>96 in</td>
</tr>
</tbody>
</table>

**Piping/Conduit Support at 10'-0" Max.**

<table>
<thead>
<tr>
<th>Lateral Force</th>
<th>Vertical Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ F_p = 0.375g ]</td>
<td>[ F_{pv} = 0.375g ]</td>
</tr>
</tbody>
</table>

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#### Lateral Force

\[ F_p = 0.375g \]  
\[ F_{pv} = 0.375g \]  

#### Vertical Force

\[ F_p = 0.375g \]  
\[ F_{pv} = 0.375g \]  

---

### Notes:

1. Refer to Page T2.0 for General Notes.
<table>
<thead>
<tr>
<th>PIPING/CONDUIT SUPPORT AT 10'-0&quot; MAX.</th>
<th>TRAPEZE SELECTION TABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fp = 0.5g Fpv = 0.375g</td>
<td></td>
</tr>
</tbody>
</table>

### LATERAL FORCE
- Fp = 0.50g (ASD)

### VERTICAL FORCE
- Fpv = 0.375g (ASD)

#### TRAPEZE SIZE DESIGNATION @ ALL-DIRECTIONAL AND LONGITUDINAL SEISMIC BRACE LOCATIONS

### PIPE/CONDUIT SUPPORT AT 10'-0" MAX.

<table>
<thead>
<tr>
<th>PIPING/CONDUIT WEIGHT (LBS/FT)</th>
<th>MAX TRAPEZE SPAN</th>
<th>LATERAL FORCE</th>
<th>VERTICAL FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 FT</td>
<td>20 FT</td>
<td>30 FT</td>
</tr>
<tr>
<td></td>
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<td>72 IN</td>
</tr>
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<td>B</td>
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</tr>
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<td>D</td>
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<td>120 IN</td>
</tr>
</tbody>
</table>

#### NOTES:
1. REFER TO PAGE T2.0 FOR GENERAL NOTES.

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**MASON WEST, INC.**
1601 E. Miraloma Ave, Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

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**Jiefu "Jeff" Zhang, SE**
California SE No. S5270

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**PAGE T2.3**
### PIPING/CONDUIT TRAPEZE SELECTION TABLES

**LATERAL FORCE**
- \( F_p = 0.625g \) (ASD)

**VERTICAL FORCE**
- \( F_{pv} = 0.375g \) (ASD)

<table>
<thead>
<tr>
<th>PIPING/CONDUIT SUPPORT AT 10'-0&quot; MAX.</th>
<th>TRAPEZE SIZE DESIGNATION @ ALL-DIRECTIONAL AND LONGITUDINAL SEISMIC BRACE LOCATIONS</th>
</tr>
</thead>
<tbody>
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<td><strong>LONG. &amp; ALL-DIR. SEISMIC LOCATION SPACING</strong></td>
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<td><strong>MAX TRAPEZE SPAN</strong></td>
</tr>
<tr>
<td><strong>10 FT</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>54 IN</strong></td>
<td>36</td>
</tr>
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<td><strong>72 IN</strong></td>
<td>54</td>
</tr>
<tr>
<td><strong>96 IN</strong></td>
<td>72</td>
</tr>
<tr>
<td><strong>120 IN</strong></td>
<td>96</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>PIPING/CONDUIT WEIGHT (LBS/FT)</strong></th>
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<th><strong>150</strong></th>
<th><strong>200</strong></th>
<th><strong>300</strong></th>
<th><strong>400</strong></th>
<th><strong>600</strong></th>
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</thead>
<tbody>
<tr>
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<td><strong>20 FT</strong></td>
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<td><strong>50 FT</strong></td>
<td><strong>60 FT</strong></td>
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<td><strong>10 IN</strong></td>
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<table>
<thead>
<tr>
<th><strong>PIPING/CONDUIT WEIGHT (LBS/FT)</strong></th>
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<th><strong>200</strong></th>
<th><strong>300</strong></th>
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<tbody>
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<td><strong>40 FT</strong></td>
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<td><strong>400</strong></td>
<td><strong>600</strong></td>
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**NOTES:**
1. REFER TO PAGE T2.0 FOR GENERAL NOTES.
### PIPING/CONDUIT TRAPEZE SELECTION TABLES

<table>
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<th>Fp = 0.75g (ASD)</th>
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<td>Fpv = 0.375g (ASD)</td>
<td>VERTICAL FORCE</td>
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</tbody>
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#### PIPING/CONDUIT SUPPORT AT 10'-0" MAX.

<table>
<thead>
<tr>
<th>PIPING/CONDUIT WEIGHT (LB/FT)</th>
<th>TRAPEZE SIZE DESIGNATION @ ALL-DIRECTIONAL AND LONGITUDINAL SEISMIC BRACE LOCATIONS</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>LONG &amp; ALL-DIR. SEISMIC LOCATION SPACING</td>
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<tr>
<td>MAX TRAPEZE SPAN</td>
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</table>

#### NOTES:
1. REFER TO PAGE T2.0 FOR GENERAL NOTES. 

---

**MASON WEST, INC.**

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**Jeffrey Y. Kikumoto**

OPM-0043-13

10/09/2020
### Piping/Conduit Support at 10'-0" Max.

#### Truss Selection Table

**Notes:**
1. Refer to Page T2.0 for General Notes.

---

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---

**OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto**

T2.6

10/09/2020
### PIPING/CONDUIT TRAPEZE SELECTION TABLES

**LATERAL FORCE**  
Fp = 1.00g (ASD)  
**VERTICAL FORCE**  
Fpv = 0.375g (ASD)

#### TRAPEZE SIZE DESIGNATION @ ALL-DIRECTIONAL AND LONGITUDINAL SEISMIC BRACE LOCATIONS

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<td>96 IN</td>
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<tr>
<td>40'</td>
<td>36 IN</td>
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<td>90'</td>
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<td>54 IN</td>
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### PIPING/CONDUIT WEIGHT (LBS/FT)

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<tbody>
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<td>54 IN</td>
<td>72 IN</td>
<td>96 IN</td>
</tr>
<tr>
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<td>96 IN</td>
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### NOTES:

1. REFER TO PAGE T2.0 FOR GENERAL NOTES.
**Trapeze Size Designation @ Transverse Seismic Brace Locations**

<table>
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<th>CABLE TRAY SUPPORT AT 10'-0&quot; MAX.</th>
<th>MAX TRAPEZE SPAN</th>
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<td>90</td>
<td>B</td>
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<tr>
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**Cable Tray Support Table**

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<th>CABLE TRAY WEIGHT (LBS/FT)</th>
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<th>30</th>
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<th>50</th>
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<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
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<td>A</td>
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</table>

**Trapeze Member Table**

<table>
<thead>
<tr>
<th>DESIGNATION</th>
<th>SIZE</th>
<th>ALLOWABLE MOMENT CAPACITY (KIP-IN)</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td></td>
<td>Mxx</td>
<td>Myy</td>
</tr>
<tr>
<td>A</td>
<td>13/16 x 1 5/8 x 12GA SINGLE STRUT</td>
<td>4.31</td>
</tr>
<tr>
<td>AA</td>
<td>(2) 13/16 x 1 5/8 x 12GA SINGLE STRUT</td>
<td>1.61</td>
</tr>
<tr>
<td>B</td>
<td>1 5/8 x 1 5/8 x 12GA SINGLE STRUT</td>
<td>5.19</td>
</tr>
<tr>
<td>C</td>
<td>13/16 x 1 5/8 x 12GA DOUBLE STRUT</td>
<td>5.58</td>
</tr>
<tr>
<td>BB</td>
<td>(2) 1 5/8 x 1 5/8 x 12GA DOUBLE STRUT</td>
<td>4.58</td>
</tr>
<tr>
<td>CC</td>
<td>(2) 13/16 x 1 5/8 x 12GA DOUBLE STRUT</td>
<td>16.08</td>
</tr>
<tr>
<td>E</td>
<td>1 5/8 x 1 5/8 x 12GA DOUBLE STRUT</td>
<td>14.08</td>
</tr>
</tbody>
</table>

**Notes:**

1. Refer to Table below for Trapeze Member Size Designations & Allowable Moment Capacities.
2. Steel Angle may be used in place of Channel Strut. For 13/16" x 1 5/8" x 12 GA Single Strut, use L2 x 2 x 1/2". For 1 5/8" x 3 1/4" x 12 GA Single Strut, use L3 x 3 x 1/2" for 1 5/8" x 3 1/4" x 12 GA Single Strut Contractor may use 13/16" x 1 5/8" x 12GA Double Strut as a substitution.
3. Trapeze Members may be provided with Round Holes. Refer to X7.0 and X7.1 for Strut Member Data.
4. Maximum Span of Trapeze Member is measured between center of Hanger Rods.
5. Contractor may use any Trapeze Member Size Larger than is tabulated. For example, if Trapeze Member Size "A" is the minimum requirement, then Trapeze Member AA, BB, CC, DD, E, or EE can also be used.
6. When increasing distance from Edge of Cable Tray to Center of Hanger Rod more than 6", increase the Weight per Foot by a factor of increased edge distance divided by 6". For example, a 12" cable tray weighing 9 lb/ft with an edge distance of 12" must increase the weight by a factor of 2 (12"/6") to use the above table.

**Vertical Force**

Fpv = 0.375g (ASD)

**Trapeze Membrane Table**

<table>
<thead>
<tr>
<th>DESIGNATION</th>
<th>SIZE</th>
<th>ALLOWABLE MOMENT CAPACITY (KIP-IN)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>18&quot; SPAN</td>
<td>24&quot; SPAN</td>
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<tr>
<td></td>
<td>Mxx</td>
<td>Myy</td>
</tr>
<tr>
<td>A</td>
<td>13/16 x 1 5/8 x 12GA SINGLE STRUT</td>
<td>4.31</td>
</tr>
<tr>
<td>AA</td>
<td>(2) 13/16 x 1 5/8 x 12GA SINGLE STRUT</td>
<td>1.61</td>
</tr>
<tr>
<td>B</td>
<td>1 5/8 x 1 5/8 x 12GA SINGLE STRUT</td>
<td>5.19</td>
</tr>
<tr>
<td>C</td>
<td>13/16 x 1 5/8 x 12GA DOUBLE STRUT</td>
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</tr>
<tr>
<td>BB</td>
<td>(2) 1 5/8 x 1 5/8 x 12GA DOUBLE STRUT</td>
<td>4.58</td>
</tr>
<tr>
<td>CC</td>
<td>(2) 13/16 x 1 5/8 x 12GA DOUBLE STRUT</td>
<td>16.08</td>
</tr>
<tr>
<td>E</td>
<td>1 5/8 x 1 5/8 x 12GA DOUBLE STRUT</td>
<td>14.08</td>
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</tbody>
</table>
### Cable Tray Trapeze Selection Tables

**Cable Tray Support at 10'-0" Max.**

<table>
<thead>
<tr>
<th>Cable Tray Weight (lb/ft)</th>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
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<tbody>
<tr>
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<td>24 in</td>
<td>36 in</td>
<td>48 in</td>
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<tr>
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<td>D</td>
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</tbody>
</table>

**Notes:**

1. Refer to page T3.0 for Trapeze Member Size Designations & Allowable Moment Capacities.
2. Steel Angle may be used in place of Channel Strut. For 1\(\frac{1}{2}\)"x1\(\frac{1}{2}\)"x12 GA Single Strut, use L2\(\frac{1}{2}\)x2\(\frac{1}{2}\)x\(\frac{3}{16}\). For 1\(\frac{1}{2}\)"x3\(\frac{1}{8}\)"x12 GA Single Strut, Contractor may use L3\(\frac{1}{2}\)x3\(\frac{1}{4}\)x\(\frac{1}{4}\) as a substitution.
3. Trapeze Members may be provided with round holes. Refer to X7.0 and X7.1 for Strut Member Data.
4. Maximum span of Trapeze Member is measured between center of Hanger Rods.
5. Contractor may use any Trapeze Member Size larger than is tabulated. For example, if Trapeze Member Size "A" is the minimum requirement, then Trapeze Member B, BB, C, CC, D, DD, E, or EE can also be used.
6. When increasing distance from edge of cable tray to center of hanger rod more than 6", increase the weight per foot by a factor of increased edge distance divided by 6". For example, a 12" cable tray weighing 9 lb/ft with an edge distance of 12" must increase the weight by a factor of 2 (12/6") to use the above table.
# CABLE TRAY TRAPEZE SELECTION TABLES

| *Fp* = 0.375g | *Fpv* = 0.375g |

## LATERAL FORCE

**Fp** = 0.375g (ASD)

## VERTICAL FORCE

**Fpv** = 0.375g (ASD)

## Cable Tray Support at 10'-0" Max.

### Trapeze Size Designation @ All-Directional and Longitudinal Seismic Brace Locations

<table>
<thead>
<tr>
<th>Cable Tray Support at 10'-0&quot; Max.</th>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
<th>Long &amp; All-Dir. Seismic Location Spacing</th>
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<td></td>
<td>18 IN</td>
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## Cable Tray Weight (LBS/FT)

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</tbody>
</table>

### NOTES:

1. REFER TO PAGE T3.0 FOR TRAPEZE MEMBER SIZE DESIGNATIONS & ALLOWABLE MOMENT CAPACITIES.
2. STEEL ANGLE MAY BE USED IN PLACE OF CHANNEL STRUT. FOR 15/8"x15/8"x12 GA SINGLE STRUT, USE L2(1/2)x2(1/2)x(1/2). FOR 15/8"x3/16"x12 GA SINGLE STRUT, CONTRACTOR MAY USE L3/16x3/16x12 GA DOUBLE STRUT AS A SUBSTITUTION.
3. TRAPEZE MEMBERS MAY BE PROVIDED WITH ROUND HOLES. REFER TO X7.0 AND X7.1 FOR STRUT MEMBER DATA.
4. MAXIMUM SPAN OF TRAPEZE MEMBER IS MEASURED BETWEEN CENTER OF HANGER RODS.
5. CONTRACTOR MAY USE ANY TRAPEZE MEMBER SIZE LARGER THAN IS TABULATED. FOR EXAMPLE, IF TRAPEZE MEMBER SIZE "A" IS THE MINIMUM REQUIREMENT, THEN TRAPEZE MEMBER B, BB, C, CC, DD, DD, E, OR EE CAN ALSO BE USED.
6. WHEN INCREASING DISTANCE FROM EDGE OF CABLE TRAY TO CENTER OF HANGER ROD MORE THAN 6", INCREASE THE WEIGHT PER FOOT BY A FACTOR OF INCREASED EDGE DISTANCE DIVIDED BY 6". FOR EXAMPLE, A 12" CABLE TRAY WEIGHING 9 LB/FT WITH AN EDGE DISTANCE OF 12" MUST INCREASE THE WEIGHT BY A FACTOR OF 2 (12"/6") TO USE THE ABOVE TABLE.

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

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**PAGE T3.2**

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10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
778 of 846
### CABLE TRAY TRAPEZE SELECTION TABLES

**LATERAL FORCE**
\( F_p = 0.50 \text{g (ASD)} \)

**VERTICAL FORCE**
\( F_{pv} = 0.375 \text{g (ASD)} \)

### Table 1: Trapeze Size Designation @ All-Directional and Longitudinal Seismic Brace Locations

<table>
<thead>
<tr>
<th>Cable Tray Support at 10'-0&quot; Max.</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>10 FT</td>
<td>20 FT</td>
<td>30 FT</td>
<td>40 FT</td>
</tr>
<tr>
<td></td>
<td>1 ft</td>
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<td>5 ft</td>
<td>7 ft</td>
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<tr>
<td></td>
<td>18 in</td>
<td>24 in</td>
<td>36 in</td>
<td>48 in</td>
</tr>
<tr>
<td><strong>Cable Tray Weight (lbs/ft)</strong></td>
<td><strong>Max Trapeze Span</strong></td>
<td><strong>Max Trapeze Span</strong></td>
<td><strong>Max Trapeze Span</strong></td>
<td><strong>Max Trapeze Span</strong></td>
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</table>

### Table 2: Trapeze Size Designation @ All-Directional and Longitudinal Seismic Brace Locations (Continued)

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<th>Cable Tray Support at 10'-0&quot; Max.</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing</th>
</tr>
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<td>48 in</td>
</tr>
<tr>
<td><strong>Cable Tray Weight (lbs/ft)</strong></td>
<td><strong>Max Trapeze Span</strong></td>
<td><strong>Max Trapeze Span</strong></td>
<td><strong>Max Trapeze Span</strong></td>
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</tbody>
</table>

### Notes:

1. Refer to Page T3.0 for Trapeze Member Size Designations & Allowable Moment Capacities.
2. Steel Angle may be used in place of channel strut. For 1\(\frac{1}{4}\)"x1\(\frac{1}{2}\)"x12 GA single strut, use L2\(\frac{3}{4}\)x2\(\frac{3}{4}\)x\(\frac{3}{4}\). For 1\(\frac{1}{2}\)"x3\(\frac{1}{2}\)"x12 GA single strut, contractor may use 1\(\frac{1}{2}\)"x3\(\frac{1}{2}\)"x12 GA double strut as a substitution.
3. Trapeze Members may be provided with round holes. Refer to X7.0 and X7.1 for strut member data.
4. Maximum span of Trapeze Member is measured between center of hanger rods.
5. Contractor may use any Trapeze Member size larger than is tabulated. For example, if Trapeze Member size "A" is the minimum requirement, then Trapeze Member B, BB, C, CC, D, DD, E, or EE can also be used.
6. When increasing distance from edge of cable tray to center of hanger rod more than 6", increase the weight per foot by a factor of increased edge distance divided by 6". For example, a 12" cable tray weighing 9 lb/ft with an edge distance of 12" must increase the weight by a factor of 2 (12"/6") to use the above table.

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**MASON WEST, INC.**
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com
### LATERAL FORCE

Fp = 0.625g (ASD)  
Fpv = 0.375g (ASD)

#### TRAPEZE SELECTION TABLES

<table>
<thead>
<tr>
<th>CABLE TRAY SUPPORT AT 10'-0&quot; MAX.</th>
<th>MAX TRAPEZE SPAN</th>
<th>MAX TRAPEZE SPAN</th>
<th>MAX TRAPEZE SPAN</th>
<th>MAX TRAPEZE SPAN</th>
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</thead>
<tbody>
<tr>
<td>CABLE TRAY WEIGHT (LBS/FT)</td>
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<td>18 IN 24 IN 36 IN 48 IN 60 IN</td>
<td>18 IN 24 IN 36 IN 48 IN 60 IN</td>
<td>18 IN 24 IN 36 IN 48 IN 60 IN</td>
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<td>D D D D D D D</td>
<td>D D D D D D D</td>
<td>D D D D D D D</td>
</tr>
</tbody>
</table>

#### NOTES:

1. REFER TO PAGE T3.0 FOR TRAPEZE MEMBER SIZE DESIGNATIONS & ALLOWABLE MOMENT CAPACITIES.

2. STEEL ANGLE MAY BE USED IN PLACE OF CHANNEL STRUT. FOR 1\(\frac{5}{8}\)"x1\(\frac{5}{8}\)"x12 GA SINGLE STRUT, USE L2\(\frac{5}{8}\)x2\(\frac{5}{8}\)x\(\frac{5}{8}\). FOR 1\(\frac{5}{8}\)"x3\(\frac{1}{4}\)"x12 GA SINGLE STRUT CONTRACTOR MAY USE 1\(\frac{5}{8}\)"x3\(\frac{1}{4}\)x12GA DOUBLE STRUT AS A SUBSTITUTION.

3. TRAPEZE MEMBERS MAY BE PROVIDED WITH ROUND HOLES. REFER TO X7.0 AND X7.1 FOR STRUT MEMBER DATA.

4. MAXIMUM SPAN OF TRAPEZE MEMBER IS MEASURED BETWEEN CENTER OF HANGER RODS.

5. CONTRACTOR MAY USE ANY TRAPEZE MEMBER SIZE LARGER THAN IS TABULATED. FOR EXAMPLE, IF TRAPEZE MEMBER SIZE "A" IS THE MINIMUM REQUIREMENT, THEN TRAPEZE MEMBER B, B, BB, C, D, DD, E, OR EE CAN ALSO BE USED.

6. WHEN INCREASING DISTANCE FROM EDGE OF CABLE TRAY TO CENTER OF HANGER ROD MORE THAN 6", INCREASE THE WEIGHT PER FOOT BY A FACTOR OF INCREASED EDGE DISTANCE DIVIDED BY 6". FOR EXAMPLE, A 12" CABLE TRAY WEIGHING 9 LB/FT WITH AN EDGE DISTANCE OF 12" MUST INCREASE THE WEIGHT BY A FACTOR OF 2 (12/6") TO USE THE ABOVE TABLE.

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Jeffrey Y. Kikumoto  
OPM-0043-13  
10/09/2020  

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto  
780 of 846
### CABLE TRAY SELECTION TABLES

**LATERAL FORCE**

\( F_p = 0.75g \text{ (ASD)} \)

**VERTICAL FORCE**

\( F_{pv} = 0.375g \text{ (ASD)} \)

#### Cable Tray Support at 10'-0" Max.

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<th>Cable Tray Support</th>
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<th>30 FT</th>
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<tr>
<td>MAX TRAPEZE SPAN</td>
<td>18 IN</td>
<td>24 IN</td>
<td>36 IN</td>
<td>48 IN</td>
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<td>18 IN</td>
<td>24 IN</td>
<td>36 IN</td>
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<td>48 IN</td>
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<td>60 IN</td>
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<td>60 IN</td>
<td>60 IN</td>
<td>18 IN</td>
<td>24 IN</td>
<td>36 IN</td>
</tr>
</tbody>
</table>

#### Notes:

1. REFER TO PAGE T3.0 FOR TRAPEZE MEMBER SIZE DESIGNATIONS & ALLOWABLE MOMENT CAPACITIES.

2. STEEL ANGLE MAY BE USED IN PLACE OF CHANNEL STRUT. FOR 1\( \frac{1}{8} \)"x1\( \frac{1}{8} \)"x12 GA SINGLE STRUT, USE L2\( \frac{1}{8} \)x2\( \frac{1}{8} \)x2. FOR 1\( \frac{1}{8} \)"x3\( \frac{1}{4} \)"x12 GA SINGLE STRUT CONTRACTOR MAY USE 1\( \frac{3}{8} \)"x3\( \frac{1}{4} \)"x12GA DOUBLE STRUT AS A SUBSTITUTION.

3. TRAPEZE MEMBERS MAY BE PROVIDED WITH ROUND HOLES. REFER TO X7.0 AND X7.1 FOR STRUT MEMBER DATA.

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### LATERAL FORCE

$F_p = 0.875g$ (ASD)

### VERTICAL FORCE

$F_{pv} = 0.375g$ (ASD)

## Trapeze Selection Tables

### Trapeze Size Designation @ All-Directional and Longitudinal Seismic Brace Locations

<table>
<thead>
<tr>
<th>CABLE TRAY SUPPORT AT 10'-0&quot; MAX.</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing (10')</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing (20')</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing (30')</th>
<th>Long. &amp; All-Dir. Seismic Location Spacing (40')</th>
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</thead>
<tbody>
<tr>
<td>Max Trapeze Span</td>
<td>18 IN</td>
<td>24 IN</td>
<td>36 IN</td>
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<tr>
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<td>D</td>
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</tbody>
</table>

### Notes:

1. Refer to page T3.0 for Trapeze Member Size Designations & Allowable Moment Capacities.

2. Steel angle may be used in place of channel strut. For 1½" x 1½" x 12 GA single strut, use L2½ x 2½ x ½. For 1½" x 1½" x 12 GA single strut, use L3 x 3 x ½. For 1½" x 3½" x 12 GA single strut, Contractor may use 1½" x 3½" x 12 GA double strut as a substitution.

3. Trapeze members may be provided with round holes. Refer to X7.0 and X7.1 for strut member data.

4. Maximum span of Trapeze member is measured between center of hanger rods.

5. Contractor may use any Trapeze member size larger than is tabulated. For example, if Trapeze member size "A" is the minimum requirement, then Trapeze member B, BB, C, CC, D, DD, E, or EE can also be used.

6. When increasing distance from edge of cable tray to center of hanger rod more than 6", increase the weight per foot by a factor of increased edge distance divided by 6". For example, a 12" cable tray weighing 9 lb/ft with an edge distance of 12" must increase the weight by a factor of 2 (12/6") to use the above table.
### Cable Tray Trapeze Selection Tables

#### Lateral Force
- \( F_p = 1.00 \text{g (ASD)} \)
- \( F_{pv} = 0.375 \text{g (ASD)} \)

#### Trapeze Size Designation @ All-Directional and Longitudinal Seismic Brace Locations

<table>
<thead>
<tr>
<th>Cable Tray Support at 10'-0&quot; Max.</th>
<th>Long &amp; All-Dir. Seismic Location SPACING</th>
<th>Long &amp; All-Dir. Seismic Location SPACING</th>
<th>Long &amp; All-Dir. Seismic Location SPACING</th>
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<tr>
<td></td>
<td>18 IN</td>
<td>24 IN</td>
<td>36 IN</td>
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<tr>
<td>Cable Tray Weight (Lbs/ft)</td>
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</table>

#### Notes:

1. Refer to Page T3.0 for Trapeze Member Size Designations & Allowable Moment Capacities.
2. Steel angle may be used in place of channel strut. For 1½"x½"x12 ga single strut, use L2½x2½x2½ ga. For 1½"x3½"x12 ga single strut, use 1½"x3½"x3½ ga. For 1½"x3½"x12 ga single strut, contractor may use 1½"x3½"x12 ga double strut as a substitution.
3. Trapezoidal members may be provided with round holes. Refer to X7.0 and X7.1 for strut member data.
4. Maximum span of Trapeze member is measured between center of hanger rods.
5. Contractor may use any Trapeze member size larger than is tabulated. For example, if Trapeze member size "A" is the minimum requirement, then Trapeze member B, BB, C, CC, D, DD, E, or EE can also be used.
6. When increasing distance from edge of cable tray to center of hanger rod more than 6", increase the weight per foot by a factor of increased edge distance divided by 6". For example, a 12" cable tray weighing 9 lbs/ft with an edge distance of 12" must increase the weight by a factor of 2 (12"/6") to use the above table.
## Type SCB Dimensions (inches mm)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCB-0</td>
<td>1 3/4</td>
<td>33</td>
<td>2 1/2</td>
<td>32</td>
<td>35</td>
<td>25</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>SCB-1</td>
<td>1 3/4</td>
<td>35</td>
<td>2</td>
<td>51</td>
<td>1</td>
<td>25</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td>SCB-2</td>
<td>1 3/4</td>
<td>41</td>
<td>2 3/4</td>
<td>70</td>
<td>35</td>
<td>1 3/4</td>
<td>44</td>
<td></td>
</tr>
</tbody>
</table>

## Type SCB Assembly Ratings (ASD)

### Lateral Load Ratings

<table>
<thead>
<tr>
<th>SIZE</th>
<th>Cable Dia.</th>
<th>30° - 45°</th>
<th>46° - 60°</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(in)</td>
<td>lbs</td>
<td>kN</td>
</tr>
<tr>
<td>SCB-0</td>
<td>3/8</td>
<td>283</td>
<td>1.3</td>
</tr>
<tr>
<td>SCB-1</td>
<td>1/4</td>
<td>565</td>
<td>2.5</td>
</tr>
<tr>
<td>SCB-2</td>
<td>5/16</td>
<td>1188</td>
<td>5.3</td>
</tr>
</tbody>
</table>

### Torque on Bolts

<table>
<thead>
<tr>
<th>SIZE</th>
<th>30° - 45°</th>
<th>46° - 60°</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ft-lbs</td>
<td>N-m</td>
</tr>
<tr>
<td>SCB-0</td>
<td>30</td>
<td>41</td>
</tr>
<tr>
<td>SCB-1</td>
<td>25</td>
<td>34</td>
</tr>
<tr>
<td>SCB-2</td>
<td>45</td>
<td>61</td>
</tr>
</tbody>
</table>

1. Cables shall meet the following specifications: MIL-DTL-83420M with Amendment 2 and RR-W-410F.
2. Brace angle measured from horizontal.
3. Refer to Page X4.0 for break-off nut (MW-SCB-BON) option to standard hex nut.
4. Attachment to steel or other substrates (e.g., concrete, wood) may govern the design of the overall brace assembly and shall be evaluated on a project by project basis per attachment load ratings in Section N.

---

**MASON WEST, INC.**

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---

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California SE No. S5270

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**PAGE**

X1.0
### Type SCBH Dimensions (inches, mm)

<table>
<thead>
<tr>
<th>Size</th>
<th>For Use With Rod Sizes</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCBH-0</td>
<td>⅝</td>
<td>10</td>
<td>⅜</td>
<td>35</td>
<td>⅞</td>
<td>6</td>
<td>1⅛</td>
<td>1⅝</td>
<td>1⅛</td>
</tr>
<tr>
<td>SCBH-1</td>
<td>⅞</td>
<td>13</td>
<td>⅜</td>
<td>48</td>
<td>⅞</td>
<td>6</td>
<td>1⅛</td>
<td>1⅝</td>
<td>1⅛</td>
</tr>
<tr>
<td>SCBH-2</td>
<td>⅞</td>
<td>19</td>
<td>⅛</td>
<td>73</td>
<td>⅞</td>
<td>9⅜</td>
<td>1⅛</td>
<td>1⅝</td>
<td>1⅛</td>
</tr>
</tbody>
</table>

### Type SCBH Assembly Ratings (ASD)

- **Cable Dia.**
  - (in)  SCBH-0: ⅝, SCBH-1: ⅞, SCBH-2: ⅞
  - (mm)  SCBH-0: 2.4, SCBH-1: 3, SCBH-2: 5

- **Lateral Load Ratings**
  - 30° - 45°
    - lbs kN kg lbs kN kg
    - SCBH-0: 283 1.3 128 200 0.9 91
    - SCBH-1: 565 2.5 256 400 1.8 181
    - SCBH-2: 1030 4.6 467 480 2.2 218
  - 45° - 60°
    - lbs kN kg
    - SCBH-0: 200 1.5 91
    - SCBH-1: 400 2.0 181
    - SCBH-2: 480 2.5 218

- **Torque on Bolts**
  - Ft-lbs N-m Kg-m
    - SCBH-0: 30 41 4.2
    - SCBH-1: 25 34 3.5
    - SCBH-2: 45 61 6.2

1. Cables shall meet the following specifications: MIL-DTL-83420M with Amendment 2 and RR-W-410F.
2. Brace angle measured from horizontal.
3. Refer to page X4.0 for break-off nut (MW-SCB-BON) option to standard hex nut.
4. Standard washer required for rod sizes smaller than the hook inside diameter 'g'.
5. Attachment to steel or other substrates (e.g., concrete, wood) may govern the design of the overall brace assembly and shall be evaluated on a project by project basis per attachment load ratings in section N.
MASON IND. N.Y. SSBS - SEISMIC SOLID BRACE

SOLID BRACE ANCHOR (FORMED STEEL)

FINISH:
ALL PARTS ARE ZINC ELECTROPLATED

STRUT SHOWN MAY BE STEEL ANGLE DRILLED TO SUIT. (ASTM A36, Fy = 36 KSI)

STRUT ATTACHMENT NUT WITH STAMPED TEETH AT OPEN FACE OF STRUT

TYPE SSBS DIMENSIONS & RATINGS (ASD)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>A (in)</th>
<th>ROD/BOLT SIZE (mm)</th>
<th>30° - 45° lbs</th>
<th>30° - 45° kN</th>
<th>46° - 60° lbs</th>
<th>46° - 60° kN</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSBS-12</td>
<td>15/32</td>
<td>13/32 x 10</td>
<td>660</td>
<td>2.90</td>
<td>299</td>
<td>4.30</td>
</tr>
<tr>
<td>SSBS-12</td>
<td>15/32</td>
<td>5/16 x 16</td>
<td>660</td>
<td>2.90</td>
<td>299</td>
<td>4.30</td>
</tr>
<tr>
<td>SSBS-20</td>
<td>25/32</td>
<td>5/16 x 16</td>
<td>660</td>
<td>2.90</td>
<td>299</td>
<td>4.30</td>
</tr>
<tr>
<td>SSBS-20</td>
<td>25/32</td>
<td>5/16 x 19</td>
<td>660</td>
<td>2.90</td>
<td>299</td>
<td>4.30</td>
</tr>
<tr>
<td>SSBS-25</td>
<td>1/2</td>
<td>3/8 x 22</td>
<td>660</td>
<td>2.90</td>
<td>299</td>
<td>4.30</td>
</tr>
<tr>
<td>SSBS-25</td>
<td>1/2</td>
<td>1/2 x 25</td>
<td>660</td>
<td>2.90</td>
<td>299</td>
<td>4.30</td>
</tr>
</tbody>
</table>

1. BRACE ANGLE MEASURED FROM HORIZONTAL
2. REFER TO PAGE X4.0 FOR STRUT NUT WITH STUD (MW-SSN) WITH BREAK-OFF NUT (MW-BON) OPTION TO STRUT NUT AND HEX BOLT.
3. ATTACHMENT TO STEEL OR OTHER SUBSTRATES (e.g., CONCRETE, WOOD) MAY GOVERN THE DESIGN OF THE OVERALL BRACE ASSEMBLY AND SHALL BE EVALUATED ON A PROJECT BY PROJECT BASIS PER ATTACHMENT LOAD RATINGS IN SECTION N.

NOTE: NOT TO BE USED AS A HANGER FOR EQUIPMENT, DUCTWORK OR PIPING. TO BE USED AS A SEISMIC RESTRAINT ONLY.

STRUT NUT DIMENSIONS:
STRUT ATTACHMENT NUT (ASTM A36) MUST HAVE STAMPED TEETH TO ACHIEVE THESE VALUES.

PRODUCT IDENTIFICATION

MASON WEST, INC.
1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com
MASON IND. N.Y. SHB - SEISMIC HOOK BRACE

TYPE SHB DIMENSIONS & RATINGS (ASD)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>ROD DIA. (RD)</th>
<th>COUNTERBORED HOLE DIA. (CH) x DEPTH (D)</th>
<th>W (in)</th>
<th>A (in)</th>
<th>MAX LENGTH (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(in) (mm)</td>
<td>(in) (mm)</td>
<td></td>
<td></td>
<td>5'-0&quot; 9'-6&quot; 14'-6&quot;</td>
</tr>
<tr>
<td>SHB-3/8</td>
<td>⅜ 10</td>
<td>⅜ x ⅜ 19 x 24</td>
<td>2</td>
<td>51</td>
<td>1400 650 475</td>
</tr>
<tr>
<td>SHB-1/2</td>
<td>⅜ 13</td>
<td>⅜ x ⅜ 25 x 4</td>
<td>2</td>
<td>51</td>
<td>3950 2200 1200</td>
</tr>
<tr>
<td>SHB-5/8</td>
<td>⅜ 16</td>
<td>⅜ x ⅜ 30 x 4</td>
<td>2⅔ 54</td>
<td>1⅔ 49</td>
<td>5790 1970 920</td>
</tr>
<tr>
<td>SHB-3/4</td>
<td>⅜ 19</td>
<td>⅜ x ⅜ 37 x 4</td>
<td>2⅓ 57</td>
<td>1⅔ 48</td>
<td>14400 6200 3000</td>
</tr>
</tbody>
</table>

NOTE: STRUT MUST BE ASTM A1011SS GR 33 COLD ROLLED MILD STEEL, SLOTTED, PUNCHED OR SOLID (REF X7.0 & X7.1). DOUBLE STRUT MUST BE MINIMUM 2'-0" LONG. ANGLE MUST BE A36 STEEL.

LONGITUDINAL BRACING

STRUT ATTACHMENT NUT WITH STAMPED TEETH AT OPEN FACE OF STRUT

STANDARD WASHER, TYP.

COUNTERBORED NUT RESTRAINT HOLE

FINISH:
ALL PARTS ARE ZINC ELECTROPLATED

REFER TO D11.10 - D11.13 FOR CONNECTION TO SUSPENDED EQUIPMENT

NOTE: STRUT MIGHT BE A36 ANGLE DRILLED TO SUIT. (ASTM A36, Fy = 36 KSI)

NOTE: NOT TO BE USED AS A HANGER FOR EQUIPMENT, DUCTWORK OR PIPING. TO BE USED AS A SEISMIC RESTRAINT ONLY.

STRUT ATTACHMENT NUT DIMENSIONS

STRUT ATTACHMENT NUT (ASTM A36) MUST HAVE STAMPED TEETH TO ACHIEVE THESE VALUES.

NOTE: STRUT MUST BE ASTM A1011SS GR 33 COLD ROLLED MILD STEEL, SLOTTED, PUNCHED OR SOLID (REF X7.0 & X7.1). DOUBLE STRUT MUST BE MINIMUM 2'-0" LONG. ANGLE MUST BE A36 STEEL.

1. BRACE ANGLE MEASURED FROM HORIZONTAL.

2. REFER TO PAGE X4.0 FOR STRUT NUT WITH STUD (MW-SSN) WITH BREAK-OFF NUT (MW-BON) OPTION TO STRUT NUT AND HEX BOLT.

3. ATTACHMENT TO STEEL OR OTHER SUBSTRATES (e.g., CONCRETE, WOOD) MAY GOVERN THE DESIGN OF THE OVERALL BRACE ASSEMBLY AND SHALL BE EVALUATED ON A PROJECT PER ATTACHMENT LOAD RATINGS IN SECTION N.

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California SE No. S5270

PAGE

X2.1
MASON IND. N.Y. SSB - SEISMIC SOLID BRACE

FINISH:
ALL PARTS ARE
ZINC ELECTROPLATED

NOTE: NOT TO BE USED AS A HANGER FOR
EQUIPMENT, DUCTWORK OR PIPING.
TO BE USED AS A SEISMIC RESTRAINT ONLY.

TYPE SSB DIMENSIONS (inches mm)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSB-3</td>
<td>2</td>
<td>51</td>
<td>3 1/2</td>
<td>51</td>
<td>3 1/2</td>
<td>44</td>
<td>1 7/8</td>
<td>37</td>
</tr>
<tr>
<td>SSB-4</td>
<td>3 3/8</td>
<td>79</td>
<td>5</td>
<td>127</td>
<td>2 1/2</td>
<td>64</td>
<td>1 7/8</td>
<td>49</td>
</tr>
</tbody>
</table>

TYPE SSB ASSEMBLY RATINGS (ASD)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>ROD/BOLT SIZE (in) (mm)</th>
<th>LATERAL LOAD RATINGS</th>
<th>30° - 45°</th>
<th>46° - 60°</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MAX LENGTH (FT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5'-0&quot;</td>
<td>9'-6&quot;</td>
<td>14'-6&quot;</td>
</tr>
<tr>
<td>SSB-3</td>
<td>3/4</td>
<td>19</td>
<td>5640</td>
<td>25.0</td>
</tr>
<tr>
<td>SSB-4</td>
<td>1</td>
<td>25</td>
<td>6410</td>
<td>28.5</td>
</tr>
<tr>
<td>SSB-4</td>
<td>1 1/4</td>
<td>32</td>
<td>6410</td>
<td>28.5</td>
</tr>
</tbody>
</table>

1. BRACE ANGLE MEASURED FROM HORIZONTAL
2. ATTACHMENT TO STEEL OR OTHER SUBSTRATES (e.g., CONCRETE, WOOD) MAY GOVERN THE DESIGN OF THE OVERALL BRACE ASSEMBLY AND SHALL BE EVALUATED ON A PROJECT BY PROJECT BASIS PER ATTACHMENT LOAD RATINGS IN SECTION N.
3. WHEN USING SSB-4 WITH 1" ROD/BOLT, 1 1/16" ID RING IS REQUIRED.

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788 of 846
SSBS / SHB ALTERNATE CONNECTIONS

SSBS (1) BOLT ATTACHMENT TO STRUT

OPEN SIDE OF SINGLE OR DOUBLE STRUT MEMBER, TYP. \(^2\) (REF X2.0)

(1) 1/2"Ø BOLT (ASTM A307) AND STRUT NUT IN CENTER HOLE, TORQUE TO 50 FT-LBS OR USE 50 FT-LBS MIN. BREAK-OFF NUT

SSBS (2) BOLT ATTACHMENT TO STRUT

OPEN SIDE OF SINGLE OR DOUBLE STRUT MEMBER, TYP. \(^2\) (REF X2.0)

(2) 1/2"Ø BOLTS (ASTM A307) AND STRUT NUTS IN (2) OUTSIDE HOLES, TORQUE TO 50 FT-LBS OR USE 50 FT-LBS MIN. BREAK-OFF NUT

SHB (1) BOLT ATTACHMENT TO STRUT

OPEN SIDE OF SINGLE OR DOUBLE STRUT MEMBER, TYP. \(^2\) (REF X2.1)

(1) 1/2"Ø BOLT (ASTM A307) AND STRUT NUT IN CENTER HOLE, TORQUE TO 50 FT-LBS OR USE 50 FT-LBS MIN. BREAK-OFF NUT

SHB (2) BOLT ATTACHMENT TO STRUT

OPEN SIDE OF SINGLE OR DOUBLE STRUT MEMBER, TYP. \(^2\) (REF X2.1)

(2) 1/2"Ø BOLTS (ASTM A307) AND STRUT NUTS IN (2) OUTSIDE HOLES, TORQUE TO 50 FT-LBS OR USE 50 FT-LBS MIN. BREAK-OFF NUT

SSBS (2) BOLT ATTACHMENT TO STEEL ANGLE

STEEL ANGLE MEMBER (REF X2.0)

(2) 1/2"Ø BOLTS (ASTM A307) AND NUTS IN (2) OUTSIDE HOLES, SNUG TIGHT

3/8"Ø HOLE, TYP

STANDARD WASHER, TYP

1/2" MIN.

SHB (2) BOLT ATTACHMENT TO STEEL ANGLE

STEEL ANGLE MEMBER (REF X2.1)

(2) 1/2"Ø BOLTS (ASTM A307) AND NUTS IN (2) OUTSIDE HOLES, SNUG TIGHT

1/4"Ø HOLE, TYP

STANDARD WASHER, TYP

1/2" MIN.

NOTES:
1. MW-SSN AND MW-BON MAY BE SUBSTITUTED FOR 1/2"Ø BOLT AND STRUT NUT DETAILED ABOVE. (REF PAGE X4.0)
2. FOR INSTALLATION TO CLOSED SIDE OF STRUT MEMBER, USE 1/2"Ø BOLT(S) (ASTM A307) AND NUTS.
MASON IND. N.Y. UCC - SEISMIC ROD CLAMPS
FOR STRUT CHANNELS

THREADED ROD

1\(\frac{1}{2}\)" x 1\(\frac{1}{2}\)" x 12 GA
SINGLE STRUT STIFFENER
(REF X7.0 & 7.1)

\(\frac{1}{2}\)" x 1-\(\frac{1}{2}\)" x 13 UNC
LOCKING BOLT
TORQUED TO 10 FT-LBS
(REF. PAGE X4.0 FOR
BREAK-OFF BOLT
(MW-UCC-BOB) OPTION)

MASON IND. N.Y. UCC
SEISMIC ROD CLAMP

MASON IND. N.Y. UCC - SEISMIC ROD CLAMPS
FOR STRUT CHANNELS

## TYPE UCC WITH STEEL STRUT ASSEMBLY RATINGS (ASD)

<table>
<thead>
<tr>
<th>ROD SIZE (INCHES)</th>
<th>MAX COMPRESSION FORCE (LBS)</th>
<th>MAXIMUM STRUT STIFFENER LENGTH (INCHES)</th>
<th>MAX UCC SPACING (INCHES)</th>
<th>MAXIMUM UNBRACED LENGTH (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{3}{8})</td>
<td>440</td>
<td>156</td>
<td>28</td>
<td>18</td>
</tr>
<tr>
<td>(\frac{1}{2})</td>
<td>735</td>
<td>156</td>
<td>38</td>
<td>25</td>
</tr>
<tr>
<td>(\frac{5}{8})</td>
<td>1155</td>
<td>156</td>
<td>48</td>
<td>31</td>
</tr>
<tr>
<td>(\frac{3}{4})</td>
<td>1700</td>
<td>156</td>
<td>57</td>
<td>37</td>
</tr>
<tr>
<td>(\frac{7}{8})</td>
<td>3130</td>
<td>84</td>
<td>42</td>
<td>27</td>
</tr>
</tbody>
</table>

MASON WEST, INC.
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PAGE X3.0

Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

791 of 846
# MASON IND. N.Y. SRC - SEISMIC ROD CLAMPS FOR STEEL ANGLES

**"C" ANGLE SIZE**
(ASTM A36, Fy=36KSI)

**"B" SNUG TIGHT AND ADD ½ TURN**

**PRODUCT IDENTIFICATION**

---

## MASON IND. N.Y. SRC - SEISMIC ROD CLAMP FOR STEEL ANGLE STIFFENER

<table>
<thead>
<tr>
<th>SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>MAXIMUM COMPRESSION FORCE (LBS)</th>
<th>MAXIMUM LENGTH (INCHES)</th>
<th>MAXIMUM SRC SPACING (INCHES)</th>
<th>MAXIMUM UNBRACED LENGTH (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRC - 1½</td>
<td>1 3/8 (40)</td>
<td>5/8 x 2 LONG (16 x 51 LONG)</td>
<td>1 1/2 x 1 1/2 x 1/4 (38 x 38 x 6)</td>
<td>7/8</td>
<td>2339</td>
<td>132</td>
<td>66</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 2945</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRC - 2</td>
<td>1 3/4 (44)</td>
<td>5/8 x 3 LONG (16 x 76 LONG)</td>
<td>2 x 2 x 1/4 (51 x 51 x 6)</td>
<td>1</td>
<td>3990</td>
<td>132</td>
<td>66</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 1/4</td>
<td>4686</td>
<td>120</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 1/2</td>
<td>8455</td>
<td>84</td>
<td></td>
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</tbody>
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---

MASON WEST, INC.
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Jeffrey Y. Kikumoto
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

792 of 846
BREAK-OFF BOLT AND NUT HARDWARE

MW-SCB-BON & MW-SPC-BON RATINGS (ASD)

TENSION, (T_A)  SHEAR, (V_A1)  SHEAR, (V_A2)
2620 LBS  1630 LBS  810 LBS

NOTE:
1. RATING ARE FOR (1) ATTACHMENT ONLY. CONDITIONS WITH MULTIPLE ATTACHMENTS WERE NOT TESTED.
2. COMBINED TENSION AND SHEAR LOADS SHALL BE CHECKED FOR UNITY, T/T_A + V/V_A1 + V/V_A2 = 1.0
3. ONLY (1) MW-SSN-1/2 SHALL OCCUR WITHIN SPAN S AND ANY ADJACENT MW-SSN-1/2 SHALL BE A MINIMUM OF 4" AWAY.
4. FOR SHEAR LOADS APPLIED AT AN ANGLE UP TO 45°, THE 3" MIN. EDGE DISTANCE IS REQUIRED.

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Jeffrey Y. Kikumoto  
OPM-0043-13
10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
MW-PAL-A-MD CONCRETE INSERT

STEEL NUT TO SECURE INSERT TO METAL DECKING

3/8"-9 UNC 2A INSERT EQUIVALENT TO ASTM A283 WITH Fy = 33 KSI AND Fu = 50 KSI

MULTI-THREADED INTERNALLY FOR 3/8"-16 UNC 2A, 1/2"-13 UNC 2A AND 5/8"-11 UNC 2A DIAMETER THREADED ROD OR BOLT

PLASTIC SLEEVE OR COMBINATION OF STEEL SNAP NUT W/ PLASTIC SLEEVE. PROVIDE 7/8"Ø NUT WHERE REQ'D; REFER TO APPLICABLE DETAILS

EMBEDMENT LOCATOR STRIP

STEEL SNAP NUT

SEE PAGE X5.1, X5.2.ASD AND X5.2.SD FOR INSERT DESIGN CAPACITY
MW-PAL-A-CS CONCRETE INSERT

MULTI-THREADED INTERNALLY FOR 3/8"-16 UNC 2A, 1/2"-13 UNC 2A AND 5/8"-11 UNC 2A DIAMETER THREADED ROD OR BOLT

TACK IN PLACE

PL 16GAx2x4

1/2" Ø HOLE FOR NAILING OR SCREWING TO FORM

1 1/16" Ø HOLE THREADED ROD ACCESS

MW-PAL-A-CS PROVIDED WITH OR WITHOUT EXTERNAL THREADS

SEE PAGE X5.2.1 FOR INSERT DESIGN CAPACITY
MW-CDI CONCRETE INSERT (ICC ESR-3443)

SOLID SHANK MAY BE PROVIDED WITH OR WITHOUT EXTERNAL THREADS

3/8" THICK INSERT PLACEMENT STRAP

5/8" Ø HOLE FOR FASTENING TO DECK

3/8" Ø - 16 UNC THREADS

1/2" Ø - 13 UNC THREADS

5/8" Ø - 11 UNC THREADS

3/4" Ø - 10 UNC THREADS

SEE PAGE X5.4 FOR INSERT DESIGN CAPACITY

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See Page X5.6 for Insert Design Capacity

Solid Shank may be provided with or without external threads.

3/8" thick insert placement strap

5/16" hole for fastening to deck

Model

<table>
<thead>
<tr>
<th>Model</th>
<th>D</th>
<th>ASTM A307 Gr A Bolt Class 2A</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW-CDI-B-38</td>
<td>3/4&quot;</td>
<td>3/8&quot; Ø - 16 UNC threads</td>
</tr>
<tr>
<td>MW-CDI-B-50</td>
<td>1/2&quot;</td>
<td>5/16&quot; Ø - 13 UNC threads</td>
</tr>
<tr>
<td>MW-CDI-B-63</td>
<td>9/16&quot;</td>
<td>5/8&quot; Ø - 11 UNC threads</td>
</tr>
<tr>
<td>MW-CDI-B-75</td>
<td>5/8&quot;</td>
<td>3/4&quot; Ø - 10 UNC threads</td>
</tr>
</tbody>
</table>
## MW-PAL-A-MD Concrete Insert

**Emplacement Locator Strip**
- Must be visible after insert installation, typ.
- \( \frac{1}{4}\times\frac{1}{4}\times2" \) shim where req'

**Minimum 20 Ga. Type W3 Steel Deck**
- With \( f'c=3,000 \) PSI NWC or SLWC

**MW-PAL-A-MD External Threads**
- Can accommodate \( \frac{3}{8}" \) diameter regular or reducing coupling nuts to accept \( \frac{3}{8}" \) or \( 1" \) diameter threaded rods

**MW-PAL-A-MD Internal Threads**
- Can accommodate \( \frac{7}{8}" \) \& \( \frac{5}{8}" \) diameter threaded rod or bolt

---

**MW-PAL-A-MD Strength Design (SD) and Allowable Stress Design (ASD) Values for Concrete Filled Metal Decks**

<table>
<thead>
<tr>
<th>MW-PAL-A-MD with ASTM A36 Threaded Rod (Ref. X5.0.MD for More Info)</th>
<th>Tension Capacity (Non-Seismic)</th>
<th>Tension Capacity (Seismic)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STRENGTH DESIGN (SD)</strong></td>
<td><strong>ALLOWABLE STRESS DESIGN (ASD)</strong></td>
<td><strong>STRENGTH DESIGN (SD)</strong></td>
</tr>
<tr>
<td>LOWER FLUTE</td>
<td>UPPER FLUTE</td>
<td>LOWER FLUTE</td>
</tr>
<tr>
<td>( \frac{3}{4}&quot; )</td>
<td>1480</td>
<td>3230</td>
</tr>
<tr>
<td>( \frac{1}{2}&quot; )</td>
<td>1480</td>
<td>4120</td>
</tr>
<tr>
<td>( \frac{3}{4}&quot; )</td>
<td>1480</td>
<td>4120</td>
</tr>
<tr>
<td>( \frac{5}{4}&quot; )</td>
<td>1480</td>
<td>4120</td>
</tr>
</tbody>
</table>

1. Insert required spacing is \( 6^\circ \). However, inserts may be installed at \( 3\frac{3}{4}" \) minimum spacing provided the combined demand of multiple inserts does not exceed the capacity of one single insert. Insert required end distance is \( 5\frac{1}{2}" \).
2. Connection of threaded rods, regular nuts and coupling nuts to MW-PAL-A-MD inserts shall not be torqued, snug tight only.
3. \( \frac{3}{8}" \) nut is only required where the insert is installed at the upper flute and there is a vertical upward load exceeding 390 lbs in allowable stress design. Nut shall be reg., jam or slip-on type. Bevel washer is required between nut and decking when MW-PAL-A-MD is installed with an angle exceeding \( 3^\circ \) off vertical.
4. Design capacity is based on the smaller of the concrete insert and the threaded rod strength.
5. Insert installed on the upper flute can be anywhere along the flute, typ.
6. The \( 6^\circ \) allowable installed angle is permitted for all installations.
7. This insert may be used with any other Osipd OPM approved system provided the resultant loading of the job-specific application does not exceed the values stated above.
8. Overstrength factor must be used when using \( Na_\text{ASD} \) values from table. Where overstrength factor is not used, divide \( Na_\text{ASD} \) values from table by 1.2.

---

**Mason West, Inc.**

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Jiefu "Jeff" Zhang, SE
California SE No. S5270

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10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
798 of 846
MW-PAL-A-MD CONCRETE INSERT

LOWER FLUTE INSTALLATION

- 3/4" MIN
- 1 1/2" MAX, TYP
- 3" MAX
- 3/4" MAX
- 2" MIN
- 1 1/2" MIN

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MW-PAL-A-MD ALLOWABLE STRESS DESIGN (ASD) VALUES FOR CONC. FILLED METAL DECKS

FOR LOWER FLUTE INSTALLATION

<table>
<thead>
<tr>
<th>MW-PAL-A-MD WITH ASTM A36 THREADED ROD (REF. X5.0.MD FOR MORE INFO.)</th>
<th>LOWER FLUTE</th>
<th>UPPER FLUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TENSION Na (LBS)</td>
<td>SHEAR V (LBS)</td>
<td>FPASD @ BRACE ANGLE (ASD)</td>
</tr>
<tr>
<td>TENSION Na (LBS)</td>
<td>SHEAR V (LBS)</td>
<td>FPASD @ BRACE ANGLE (ASD)</td>
</tr>
<tr>
<td>3/4&quot; ATR W/ NUT</td>
<td>930</td>
<td>1160</td>
</tr>
<tr>
<td>3/4&quot; ATR W/ NUT</td>
<td>930</td>
<td>1230</td>
</tr>
<tr>
<td>3/4&quot; ATR W/ NUT</td>
<td>930</td>
<td>1750</td>
</tr>
<tr>
<td>3/4&quot; NUT</td>
<td>930</td>
<td>2370</td>
</tr>
</tbody>
</table>

1. INSERT REQUIRED SPACING IS 6". HOWEVER, INSERTS MAY BE INSTALLED AT 3/4" MINIMUM SPACING PROVIDED THE COMBINED LOAD OF MULTIPLE INSERTS DOES NOT EXCEED THE CAPACITY OF ONE SINGLE INSERT. INSERT REQUIRED END DISTANCE IS 3/4".
2. CONNECTION OF THREADED RODS, REGULAR NUTS AND COUPLING NUTS TO MW-PAL-A-MD INSERTS SHALL NOT BE TORQUED, SNUG TIGHT ONLY.
3. 3/4" NUT IS ONLY REQUIRED WHERE THE INSERT IS INSTALLED AT THE UPPER FLUTE AND THERE IS A VERTICAL UPWARD LOAD EXCEEDING 450 LBS IN ALLOWABLE STRESS DESIGN. NUT SHALL BE REG., JAM OR SLIP-ON TYPE. BEVEL WASHER IS REEQUIRED BETWEEN NUT AND DECKING WHEN MW-PAL-A-MD IS INSTALLED WITH AN ANGLE EXCEEDING 3° OFF VERTICAL.
4. DESIGN CAPACITY IS BASED ON THE SMALLER OF THE CONCRETE INSERT AND THE THREADED ROD STRENGTH.
5. INSERT INSTALLED ON THE UPPER FLUTE CAN BE ANYWHERE ALONG THE FLUTE.
6. THE 6° ALLOWABLE INSTALLED ANGLE IS PERMITTED FOR ALL INSTALLATIONS.
7. THIS INSERT MAY BE USED WITH ANY OTHER OSHPD OPM APPROVED SYSTEM PROVIDED THE RESULTANT LOADING OF THE JOB-SPECIFIC APPLICATION DOES NOT EXCEED THE VALUES STATED ABOVE.
8. OVERSTRENGTH FACTOR MUST BE USED WHEN USING Va (ASD) AND Na (ASD) VALUES FROM TABLE. WHERE OVERSTRENGTH FACTOR IS NOT USED, DIVIDE Va (ASD) AND Na (ASD) VALUES FROM TABLE BY 1.2.

FOR UPPER FLUTE INSTALLATION

EMBEDMENT LOCATOR STRIP MUST BE VISIBLE AFTER INSERT INSTALLATION, TYP

MINIMUM 20 GA TYPE W3 STEEL DECK WITH Fc=3,000 PSI NWC OR SLWC

EMBEDMENT LOCATOR STRIP MUST BE VISIBLE AFTER INSERT INSTALLATION, TYP

MINIMUM 20 GA TYPE W3 STEEL DECK WITH Fc=3,000 PSI NWC OR SLWC

TO USE THE DESIGN CURVE
A - CALCULATE THE VERTICAL AND HORIZONTAL REQ'D FORCES.
B - PLOT HORIZONTAL LOAD vs VERTICAL LOAD.
C - IF THE POINT IS BELOW THE SOLID CURVE THEN THE ANCHOR IS ADEQUATE.

TO USE EQUATION
A - CALCULATE THE VERTICAL AND HORIZONTAL REQ'D FORCES, Nua AND Vua RESPECTIVELY.
B - Nua/Na + Vua/Va ≤ 1.0 (LOWER FLUTE) Nua/Na + Vua/Va ≤ 1.2 (UPPER FLUTE)
C - THE DESIGN CAPACITY Na AND Va HAS BEEN TABULATED WITH THE APPROPRIATE REDUCTION FACTORS FOR SEISMIC LOADS AND CONCRETE AND STEEL STRENGTH, ADDITIONAL REDUCTION FACTORS NEED NOT APPLY.
MW-PAL-A-MD CONCRETE INSERT

EMBEDMENT LOCATOR STRIP MUST BE VISIBLE AFTER INSERT INSTALLATION, TYP

MINIMUM 20 GA TYPE W3 STEEL DECK WITH Fc=3,000 PSI NWC OR SLWC

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X5.2.SD

MW-PAL-A-MD STRENGTH DESIGN (SD) VALUES FOR CONCRETE FILLED METAL DECKS

MW-PAL-A-MD WITH ASTM A36 THREADED ROD (REF. X5.0.MD FOR MORE INFO.)

<table>
<thead>
<tr>
<th>LOWER FLUTE</th>
<th>UPPER FLUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TENSION Na</td>
<td>TENSION Na</td>
</tr>
<tr>
<td>(LBS)</td>
<td>(LBS)</td>
</tr>
<tr>
<td>30°</td>
<td>45°</td>
</tr>
<tr>
<td>¼&quot; ATR W/NUT</td>
<td>1115</td>
</tr>
<tr>
<td>½&quot; ATR W/NUT</td>
<td>1115</td>
</tr>
<tr>
<td>⅝&quot; ATR W/NUT</td>
<td>1115</td>
</tr>
<tr>
<td>7/8&quot; NUT</td>
<td>1115</td>
</tr>
</tbody>
</table>

1. INSERT REQUIRED SPACING IS 6°. HOWEVER, INSERTS MAY BE INSTALLED AT 3½ MINIMUM SPACING PROVIDED THE COMBINED DEMAND OF MULTIPLE INSERTS DOES NOT EXCEED THE CAPACITY OF ONE SINGLE INSERT. INSERT REQUIRED END DISTANCE IS 5½.
2. CONNECTION OF THREADED RODS, REGULAR NUTS AND COUPLING NUTS TO MW-PAL-A-MD INSERTS SHALL NOT BE TORQUED, SNUG TIGHT ONLY.
3. ¾" NUT IS ONLY REQUIRED WHERE THE INSERT IS INSTALLED AT THE UPPER FLUTE AND THERE IS A VERTICAL UPWARD LOAD EXCEEDING 550 LBS IN STRENGTH DESIGN. NUT SHALL BE REG., JAM OR SLIP-ON TYPE. BEVEL WASHER IS REQUIRED BETWEEN NUT AND DECKING WHEN MW-PAL-A-MD IS INSTALLED WITH AN ANGLE EXCEEDING 3° OFF VERTICAL.
4. DESIGN CAPACITY IS BASED ON THE SMALLER OF THE CONCRETE INSERT AND THE THREADED ROD STRENGTH.
5. INSERT INSTALLED ON THE UPPER FLUTE CAN BE ANYWHERE ALONG THE FLUTE.
6. THE 6° ALLOWABLE INSTALLED ANGLE IS PERMITTED FOR ALL INSTALLATIONS.
7. THIS INSERT MAY BE USED WITH ANY OTHER OSHPD OPM APPROVED SYSTEM PROVIDED THE RESULTANT LOADING OF THE JOB-SPECIFIC APPLICATION DOES NOT EXCEED THE VALUES STATED ABOVE.
MW-PAL-A-CS STRENGTH DESIGN (SD) AND ALLOWABLE STRESS DESIGN (ASD) VALUES FOR CONCRETE SLAB 1,2,3,4,5,6,7

**MW-PAL-A-CS STRENGTH DESIGN (SD) CURVE**

<table>
<thead>
<tr>
<th>MW-PAL-A-CS WITH ASTM A36 THREADED ROD (REF. X5.0.CS FOR MORE INFO.)</th>
<th>FOR TENSION</th>
<th>FOR SHEAR</th>
<th>ALLOWABLE STRESS DESIGN CAPACITY (ASD)</th>
<th>STRENGTH DESIGN CAPACITY (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TENSION</td>
<td>SHEAR</td>
<td>Na&lt;sub&gt;ASD&lt;/sub&gt; (LBS)</td>
<td>Va&lt;sub&gt;ASD&lt;/sub&gt; (LBS)</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>4 1/2</td>
<td>9</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>4 1/2</td>
<td>9</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>4 1/2</td>
<td>9</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

1 - INSERT TABULATED DESIGN CAPACITY IS BASED ON REQUIRED SPACING. HOWEVER, INSERTS MAY BE INSTALLED AT A MINIMUM REDUCED SPACING OF FOUR TIMES DIAMETER OF ANCHOR (4*da) PROVIDED THE COMBINED DEMAND OF MULTIPLE INSERTS DOES NOT EXCEED THE CAPACITY OF ONE SINGLE INSERT.

2 - INSERT TABULATED DESIGN CAPACITY IS BASED ON REQUIRED EDGE DISTANCE FOR ALL EDGES. IF THE SHEAR CAPACITY IS REDUCED BY 40%, EDGE DISTANCE MAY BE REDUCED TO 4/5 INCHES.

3 - CONNECTION OF THREADED ROD AND NUT TO MW-PAL-A-CS INSERT SHALL NOT BE TORQUED, SNUG TIGHT ONLY.

4 - DESIGN CAPACITY IS BASED ON THE SMALLER OF THE CONCRETE INSERT AND THE THREADED ROD STRENGTH.

5 - THE 6' ALLOWABLE INSTALLED ANGLE IS PERMITTED FOR ALL INSTALLATIONS.

6 - THIS INSERT MAY BE USED WITH ANY OTHER OSHPD OPM APPROVED SYSTEM PROVIDED THE RESULTANT LOADING OF THE JOB-SPECIFIC APPLICATION DOES NOT EXCEED THE VALUES STATED ABOVE.

7 - OVERSTRENGTH FACTOR MUST BE USED WHEN USING Va<sub>ASD</sub>, Na<sub>ASD</sub> AND F<sub>P<sub>ASD</sub></sub> VALUES FROM TABLE. WHERE OVERSTRENGTH FACTOR IS NOT USED, DIVIDE Va<sub>ASD</sub>, Na<sub>ASD</sub> AND F<sub>P<sub>ASD</sub></sub> VALUES FROM TABLE BY 1.2.

8 - PER 2016 CBC SECTION 1905A.18, CONCRETE COMpressive STRENGTH, f<sub>c</sub>, SHALL BE LIMITED TO 8,000 PSI MAX, BUT MAY BE INCREASED SUBJECT TO OSHPD REVIEW AND APPROVAL ON A PROJECT BY PROJECT BASIS.
X5.4

MW-CDI CONCRETE INSERT (ICC ESR-3443)

SAND LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE (MIN f'c = 3,000 PSI)
MIN 20GA ASTM A653 SS
GR 50 METAL DECK

MW-CDI-38
MW-CDI-50
MW-CDI-63
MW-CDI-75

1 - INSERT DESIGN LOADS ARE BASED ON REQUIRED ANCHOR SPACING. HOWEVER, INSERTS MAY BE INSTALLED AT 4 TIMES ANCHOR BOLT DIAMETER MINIMUM SPACING PROVIDED THE COMBINED DEMAND OF MULTIPLE INSERTS DOES NOT EXCEED THE CAPACITY OF ONE SINGLE INSERT.
2 - THE 6º ALLOWABLE INSTALLED ANGLE IS PERMITTED FOR ALL INSTALLATIONS.
3 - DESIGN CAPACITY IS BASED ON THE SMALLER OF THE CONCRETE INSERT AND THE THREADED ROD STRENGTH.
4 - DECK INSERTS MAY BE PLACED IN THE UPPER OR LOWER FLUTE OF THE STEEL DECK ASSEMBLY. UPPER FLUTE INSTALLATIONS REQUIRE A MINIMUM OF 3⁄4" CONCRETE COVER ABOVE THE HEAD OF THE INSERT. INSERTS IN THE LOWER FLUTE MAY BE INSTALLED WITH MINIMUM EDGE DISTANCE AS INDICATED. INSERTS IN UPPER FLUTE MAY BE INSTALLED ANYWHERE ACROSS UPPER FLUTE.
5 - CONNECTION OF THREADED RODS, REGULAR NUTS AND COUPLING NUTS TO MW-CDI INSERTS ARE NOT REQUIRED TO BE TORQUED, SNUG TIGHT ONLY.
6 - AXIAL SPACING ALONG THE FLUTE LENGTH SHALL BE MINIMUM 3hef.
7 - MW-CDI INSERTS PLACED IN THE UPPER FLUTE ARE NOT SUBJECT TO METAL PAN DECK DIMENSION LIMITATIONS OR MINIMUM GAUGE (TENSION ONLY) LIMITATIONS.

MW-CDI STRENGTH DESIGN (SD) AND ALLOWABLE STRESS DESIGN (ASD) VALUES FOR CONCRETE FILLED METAL DECKS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>INSERT DIA. (IN)</th>
<th>INSERT REQ'D SPACING (IN)</th>
<th>MIN. REQ'D INSERT END DIST. (IN)</th>
<th>STRENGTH DESIGN (SD) Na^SD (LBS)</th>
<th>ALLOWABLE STRESS DESIGN (ASD) Na^ASD (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW-CDI-38</td>
<td>3⁄8&quot;</td>
<td>6&quot;</td>
<td>3&quot;</td>
<td>1660</td>
<td>1160</td>
</tr>
<tr>
<td>MW-CDI-50</td>
<td>3⁄8&quot;</td>
<td>6&quot;</td>
<td>3&quot;</td>
<td>1660</td>
<td>1160</td>
</tr>
<tr>
<td>MW-CDI-63</td>
<td>3⁄8&quot;</td>
<td>6&quot;</td>
<td>3&quot;</td>
<td>1660</td>
<td>1160</td>
</tr>
<tr>
<td>MW-CDI-75</td>
<td>3⁄8&quot;</td>
<td>6&quot;</td>
<td>3&quot;</td>
<td>1660</td>
<td>1160</td>
</tr>
</tbody>
</table>

1. INSERT DESIGN LOADS ARE BASED ON REQUIRED ANCHOR SPACING. HOWEVER, INSERTS MAY BE INSTALLED AT 4 TIMES ANCHOR BOLT DIAMETER MINIMUM SPACING PROVIDED THE COMBINED DEMAND OF MULTIPLE INSERTS DOES NOT EXCEED THE CAPACITY OF ONE SINGLE INSERT.
2. THE 6º ALLOWABLE INSTALLED ANGLE IS PERMITTED FOR ALL INSTALLATIONS.
3. DESIGN CAPACITY IS BASED ON THE SMALLER OF THE CONCRETE INSERT AND THE THREADED ROD STRENGTH.
4. DECK INSERTS MAY BE PLACED IN THE UPPER OR LOWER FLUTE OF THE STEEL DECK ASSEMBLY. UPPER FLUTE INSTALLATIONS REQUIRE A MINIMUM OF 3⁄4" CONCRETE COVER ABOVE THE HEAD OF THE INSERT. INSERTS IN THE LOWER FLUTE MAY BE INSTALLED WITH MINIMUM EDGE DISTANCE AS INDICATED. INSERTS IN UPPER FLUTE MAY BE INSTALLED ANYWHERE ACROSS UPPER FLUTE.
5. CONNECTION OF THREADED RODS, REGULAR NUTS AND COUPLING NUTS TO MW-CDI INSERTS ARE NOT REQUIRED TO BE TORQUED, SNUG TIGHT ONLY.
6. AXIAL SPACING ALONG THE FLUTE LENGTH SHALL BE MINIMUM 3hef.
7. MW-CDI INSERTS PLACED IN THE UPPER FLUTE ARE NOT SUBJECT TO METAL PAN DECK DIMENSION LIMITATIONS OR MINIMUM GAUGE (TENSION ONLY) LIMITATIONS.
MW-CDI-B STRENGTH DESIGN (SD) AND ALLOWABLE STRESS DESIGN (ASD) VALUES FOR CONCRETE FILLED METAL DECKS

<table>
<thead>
<tr>
<th>TYPE (SEE PAGE X5.0.1 FOR MORE INFO.)</th>
<th>INSERT DIA. (IN)</th>
<th>INSERT REQ'D SPACING (IN)</th>
<th>MIN. REQ'D INSERT END DIST. (IN)</th>
<th>STRENGTH DESIGN (SD)</th>
<th>ALLOWABLE STRESS DESIGN (ASD)</th>
<th>INSERT REQ'D SPACING (IN)</th>
<th>MIN. REQ'D INSERT END DIST. (IN)</th>
<th>STRENGTH DESIGN (SD)</th>
<th>ALLOWABLE STRESS DESIGN (ASD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW-CDI-38</td>
<td>3/8&quot;</td>
<td>3&quot;</td>
<td>1 1/2&quot;</td>
<td>380</td>
<td>260</td>
<td>9&quot;</td>
<td>4 1/2&quot;</td>
<td>1000</td>
<td>700</td>
</tr>
<tr>
<td>MW-CDI-50</td>
<td>1/2&quot;</td>
<td>3&quot;</td>
<td>1 1/2&quot;</td>
<td>380</td>
<td>260</td>
<td>9&quot;</td>
<td>4 1/2&quot;</td>
<td>1000</td>
<td>700</td>
</tr>
<tr>
<td>MW-CDI-63</td>
<td>5/8&quot;</td>
<td>3&quot;</td>
<td>1 1/2&quot;</td>
<td>380</td>
<td>260</td>
<td>9&quot;</td>
<td>4 1/2&quot;</td>
<td>1000</td>
<td>700</td>
</tr>
<tr>
<td>MW-CDI-75</td>
<td>3/4&quot;</td>
<td>3&quot;</td>
<td>1 1/2&quot;</td>
<td>380</td>
<td>260</td>
<td>9&quot;</td>
<td>4 1/2&quot;</td>
<td>1000</td>
<td>700</td>
</tr>
</tbody>
</table>

1. INSERT DESIGN LOADS ARE BASED ON REQUIRED ANCHOR SPACING. HOWEVER, INSERTS MAY BE INSTALLED AT 4 TIMES ANCHOR BOLT DIAMETER MINIMUM SPACING PROVIDED THE COMBINED DEMAND OF MULTIPLE INSERTS DOES NOT EXCEED THE CAPACITY OF ONE SINGLE INSERT.

2. THE 6° ALLOWABLE INSTALLED ANGLE IS PERMITTED FOR ALL INSTALLATIONS.

3. DESIGN CAPACITY IS BASED ON THE SMALLER OF THE CONCRETE INSERT AND THE THREADED ROD STRENGTH.

4. DECK INSERTS MAY BE PLACED IN THE UPPER OR LOWER FLUTE OF THE STEEL DECK ASSEMBLY. UPPER FLUTE INSTALLATIONS REQUIRE A MINIMUM OF 3/4" CONCRETE COVER ABOVE THE HEAD OF THE INSERT. INSERTS IN THE LOWER FLUTE MAY BE INSTALLED WITH MINIMUM EDGE DISTANCE AS INDICATED. INSERTS IN UPPER FLUTE MAY BE INSTALLED ANYWHERE ACROSS UPPER FLUTE. INSERTS INSTALLED IN THE "SLANTED" PORTION OF THE DECK PROFILE BETWEEN UPPER AND LOWER FLUTES ARE LIMITED TO TENSION LOADS ONLY.

5. CONNECTION OF THREADED RODS, REGULAR NUTS AND COUPLING NUTS TO MW-CDI INSERTS ARE NOT REQUIRED TO BE TORQUED, SNUG TIGHT ONLY.

6. AXIAL SPACING ALONG THE FLUTE LENGTH SHALL BE MINIMUM 3"hef.

7. MW-CDI-B INSERTS PLACED IN THE UPPER FLUTE ARE NOT SUBJECT TO METAL PAN DECK DIMENSION LIMITATIONS OR MINIMUM GAUGE (TENSION ONLY) LIMITATIONS.
**MW-CDI-B STRENGTH DESIGN (SD) AND ALLOWABLE STRESS DESIGN (ASD) VALUES FOR CONCRETE FILLED METAL DECKS**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>INSERT DIA. (IN)</th>
<th>INSERT REQ'D SPACING (IN)</th>
<th>MIN. REQ'D INSERT END DIST. (IN)</th>
<th>STRENGTH DESIGN (SD)</th>
<th>ALLOWABLE STRESS DESIGN (ASD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW-CDI-B-38</td>
<td>3/8&quot;</td>
<td>2&quot;</td>
<td>1½&quot;</td>
<td>Na&lt;sub&gt;SD&lt;/sub&gt;</td>
<td>Na&lt;sub&gt;ASD&lt;/sub&gt;</td>
</tr>
<tr>
<td>MW-CDI-B-50</td>
<td>5/16&quot;</td>
<td>3&quot;</td>
<td>1½&quot;</td>
<td>380</td>
<td>260</td>
</tr>
<tr>
<td>MW-CDI-B-63</td>
<td>1/4&quot;</td>
<td>4&quot;</td>
<td>1½&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MW-CDI-B-75</td>
<td>1/8&quot;</td>
<td>5&quot;</td>
<td>1½&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. INSERT DESIGN LOADS ARE BASED ON REQUIRED ANCHOR SPACING. HOWEVER, INSERTS MAY BE INSTALLED AT 4 TIMES-ANCHOR BOLT DIAMETER MINIMUM SPACING PROVIDED THE COMBINED DEMAND OF MULTIPLE INSERTS DOES NOT EXCEED THE CAPACITY OF ONE SINGLE INSERT.
2. THE 6° ALLOWABLE INSTALLED ANGLE IS PERMITTED FOR ALL INSTALLATIONS.
3. DESIGN CAPACITY IS BASED ON THE SMALLER OF THE CONCRETE INSERT AND THE THREADED ROD STRENGTH.
4. DECK INSERTS MAY BE PLACED IN THE UPPER OR LOWER FLUTE OF THE STEEL DECK ASSEMBLY. UPPER FLUTE INSTALLATIONS REQUIRE A MINIMUM OF 3/8" CONCRETE COVER ABOVE THE HEAD OF THE INSERT. INSERTS IN THE LOWER FLUTE MAY BE INSTALLED WITH MINIMUM EDGE DISTANCE AS INDICATED. INSERTS IN UPPER FLUTE MAY BE INSTALLED ANYWHERE ACROSS UPPER FLUTE. INSERTS INSTALLED IN THE "SLANTED" PORTION OF THE DECK PROFILE BETWEEN UPPER AND LOWER FLUTES ARE LIMITED TO TENSION LOADS ONLY.
5. CONNECTION OF THREADED RODS, REGULAR NUTS AND COUPLING NUTS TO MW-CDI INSERTS ARE NOT REQUIRED TO BE TORQUED, SNUG TIGHT ONLY.
6. AXIAL SPACING ALONG THE FLUTE LENGTH SHALL BE MINIMUM 3*hef.
7. MW-CDI-B INSERTS PLACED IN THE UPPER FLUTE ARE NOT SUBJECT TO METAL PAN DECK DIMENSION LIMITATIONS OR MINIMUM GAUGE (TENSION ONLY) LIMITATIONS.
MW-MDI METAL DECK INSERT

3/8" THICK INSERT PLACEMENT STRAP

5/16" Ø HOLE FOR FASTENING TO DECK

MW-MDI-38
3/8" Ø - 16 UNC THREADS

MW-MDI-50
1/2" Ø - 13 UNC THREADS

MW-MDI-63
5/8" Ø - 11 UNC THREADS

ASTM A307 GR A BOLT CLASS 2A

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PAGE X5.7
**MW - SAP - SEISMIC ANCHOR PLATE**

**DIMENSION (IN) AND RATINGS (LBS) (ASD)**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>TENSION, T</th>
<th>T</th>
<th>L</th>
<th>B</th>
<th>D</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP 200-A</td>
<td>1080</td>
<td>7/16&quot;</td>
<td>5</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>SAP 200-B</td>
<td>1930</td>
<td>1/2&quot;</td>
<td>5</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>SAP 400-A</td>
<td>2280</td>
<td>1/2&quot;</td>
<td>10</td>
<td>7</td>
<td>15/16&quot;</td>
<td>13/16&quot;</td>
</tr>
<tr>
<td>SAP 400-B</td>
<td>3600</td>
<td>1/2&quot;</td>
<td>15</td>
<td>12</td>
<td>13/16&quot;</td>
<td>13/16&quot;</td>
</tr>
<tr>
<td>SAP 400-C</td>
<td>3500</td>
<td>1/2&quot;</td>
<td>15</td>
<td>12</td>
<td>13/16&quot;</td>
<td>13/16&quot;</td>
</tr>
<tr>
<td>SAP 400-D</td>
<td>3500</td>
<td>1/2&quot;</td>
<td>15</td>
<td>12</td>
<td>13/16&quot;</td>
<td>13/16&quot;</td>
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### MW-WBB RATINGS (ASD)

<table>
<thead>
<tr>
<th>TYPE</th>
<th>h</th>
<th>t</th>
<th>L</th>
<th>w</th>
<th>&quot;D&quot;</th>
<th>VERTICAL</th>
<th>LATERAL</th>
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<tbody>
<tr>
<td>MW-WBB-38</td>
<td>4&quot;</td>
<td>½&quot;</td>
<td>4&quot;</td>
<td>¾&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
</tr>
<tr>
<td>MW-WBB-50</td>
<td>4&quot;</td>
<td>¾&quot;</td>
<td>4&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
</tr>
<tr>
<td>MW-WBB-63</td>
<td>4&quot;</td>
<td>⅞&quot;</td>
<td>4&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
</tr>
<tr>
<td>MW-WBB-75</td>
<td>5&quot;</td>
<td>⅞&quot;</td>
<td>6&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
</tr>
<tr>
<td>MW-WBB-88</td>
<td>6&quot;</td>
<td>⅞&quot;</td>
<td>6&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
</tr>
<tr>
<td>MW-WBB-100</td>
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<td>⅞&quot;</td>
<td>6&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
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<tr>
<td>MW-WBB-125</td>
<td>6&quot;</td>
<td>⅞&quot;</td>
<td>6&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
<td>⅞&quot;</td>
</tr>
</tbody>
</table>

**NOTE:**

Loading can be applied simultaneously in all three directions provided the applied loads are less than tabulated loads shown on above table.
STRUT CHANNEL

1 3/8 x 1 3/8 x 12 ga SINGLE STRUT

1 3/8 x 1 3/8 x 12 ga DOUBLE STRUT

1 3/8 x 3 3/8 x 12 ga SINGLE STRUT

1 3/8 x 3 3/8 x 12 ga DOUBLE STRUT

PROVIDE 1ST WELDS AT MAXIMUM 3” FROM EACH END OF DOUBLE STRUT. SEE NOTE

NOTE: REFER TO X7.1 FOR MATERIAL GRADE AND MINIMUM SECTION PROPERTIES AND WELD OPTIONS.

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PAGE
X7.0

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
808 of 846
STRUT CHANNEL SECTION PROPERTIES

MINIMUM STRUT CHANNEL SECTION PROPERTIES

<table>
<thead>
<tr>
<th>STRUT MEMBER</th>
<th>WEIGHT (LBS/FT)</th>
<th>AREA (IN²)</th>
<th>Iₓ (IN⁴)</th>
<th>Sₓ (IN)</th>
<th>rₓ (IN)</th>
<th>Iᵧ (IN⁴)</th>
<th>Sᵧ (IN)</th>
<th>rᵧ (IN)</th>
<th>UNISTRUT/POWER-STRUT ALTERNATIVE¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>1⁷/₈”x11⁄₈”x12GA SINGLE STRUT</td>
<td>1.37</td>
<td>0.374</td>
<td>0.030</td>
<td>0.062</td>
<td>0.283</td>
<td>0.135</td>
<td>0.166</td>
<td>0.600</td>
<td>N/A</td>
</tr>
<tr>
<td>1⁷/₈”x11⁄₈”x12GA DOUBLE STRUT</td>
<td>2.70</td>
<td>0.748</td>
<td>0.140</td>
<td>0.184</td>
<td>0.432</td>
<td>0.270</td>
<td>0.332</td>
<td>0.600</td>
<td>P4521/PS 520 2T3</td>
</tr>
<tr>
<td>11⁄₈”x11⁄₈”x12GA SINGLE STRUT</td>
<td>1.89</td>
<td>0.544</td>
<td>0.180</td>
<td>0.195</td>
<td>0.575</td>
<td>0.233</td>
<td>0.287</td>
<td>0.655</td>
<td>N/A</td>
</tr>
<tr>
<td>11⁄₈”x11⁄₈”x12GA DOUBLE STRUT</td>
<td>3.78</td>
<td>1.088</td>
<td>0.896</td>
<td>0.570</td>
<td>0.908</td>
<td>0.466</td>
<td>0.574</td>
<td>0.655</td>
<td>P1001/PS 200 2T3</td>
</tr>
<tr>
<td>11⁄₈”x3⁄₈”x12GA SINGLE STRUT</td>
<td>3.05</td>
<td>0.844</td>
<td>1.073</td>
<td>0.609</td>
<td>1.102</td>
<td>0.429</td>
<td>0.529</td>
<td>0.696</td>
<td>N/A</td>
</tr>
<tr>
<td>11⁄₈”x3⁄₈”x12GA DOUBLE STRUT</td>
<td>6.10</td>
<td>1.768</td>
<td>6.064</td>
<td>1.896</td>
<td>1.852</td>
<td>0.859</td>
<td>1.057</td>
<td>0.696</td>
<td>P5001/PS 100 2 T3</td>
</tr>
</tbody>
</table>

NOTES
1. STRUT MATERIAL TO BE MANUFACTURED OF COLD ROLLED MILD STEEL MEETING ASTM-A1011SS GRADE 33.
2. 1⁷/₈” STRUT May BE SUBSTITUTED WITH 1½” STRUT OF SAME 1½” HEIGHT AND 12 ga THICKNESS MATERIAL.
3. RATED LOADS AT BOLTED CONNECTIONS SHOWN IN OPM-0043 ARE NOT VALID AT SLOTTED HOLES IN STRUT CHANNEL. ALL BOLT HOLES SHALL BE STANDARD HOLES (BOLT DIA. + 1/₁₆”).
4. UNISTRUT P4521, P1001, AND P5001 OR POWER-STRUT PS 520 2T3, PS 200 2T3, AND PS 100 2 T3 DOUBLE STRUT MEMBERS WITH FACTORY SPOT WELDING ARE ACCEPTABLE IN LIEU OF STITCH WELDING OF OUTER STRUT WALLS. CONTRACTOR MAY USE OTHER MANUFACTURERS IF SPOT WELDING TESTING IS PROVIDED, SUBJECT TO REVIEW AND APPROVAL BY MASON WEST AND THE AUTHORITY HAVING JURISDICTION.
MASON WEST MW-SSC AND MW-SSCE

Part # | Nom. Pipe Size (IN) | D (IN) | Strap GA. | Bolt (IN) | BOLT TORQUE (FT-LB) | MAX LOAD 1 (LBS) | MAX LOAD 2 (LBS) | MAX LOAD 3 (LBS)
--- | --- | --- | --- | --- | --- | --- | --- | ---
SSC-13 | 1½ | 1.66 | 14 | ⅛ | 6 | 1470 | 130 | 220
SSC-15 | 1½ | 1.9 | 12 | ⅛ | 11 | 1660 | 150 | 160
SSC-20 | 2 | 2.375 | 12 | ⅛ | 11 | 2050 | 250 | 400
SSC-25 | 2½ | 2.875 | 12 | ⅛ | 11 | 2430 | 320 | 440
SSC-30 | 3 | 3.5 | 12 | ⅛ | 11 | 2820 | 390 | 460
SSC-40 | 4 | 4.5 | 11 | ⅛ | 20 | 3280 | 500 | 330
SSC-50 | 5 | 5.563 | 11 | ⅛ | 20 | 3740 | 770 | 580
SSC-60 | 6 | 6.625 | 10 | ⅛ | 20 | 2840 | 350 | 450
SSC-80 | 8 | 8.625 | 10 | ⅛ | 20 | 2840 | 350 | 440
SSC-100 | 10 | 10.75 | 10 | ⅛ | 20 | 2840 | 340 | 400
SSC-120 | 12 | 12.75 | 10 | ⅛ | 20 | 2840 | 350 | 410

Part # | Nom. Pipe Size (IN) | D (IN) | Strap GA. | Bolt (IN) | BOLT TORQUE (FT-LB) | MAX LOAD 1 (LBS) | MAX LOAD 2 (LBS) | MAX LOAD 3 (LBS)
--- | --- | --- | --- | --- | --- | --- | --- | ---
SSCE-13 | 1½ | 1.51 | 14 | ⅛ | 6 | 2000 | 140 | 210
SSCE-15 | 1½ | 1.74 | 12 | ⅛ | 11 | 2240 | 180 | 290
SSCE-20 | 2 | 2.197 | 12 | ⅛ | 11 | 2730 | 240 | 350
SSCE-25 | 2½ | 2.875 | 12 | ⅛ | 11 | 2880 | 240 | 390
SSCE-30 | 3 | 3.5 | 12 | ⅛ | 11 | 3020 | 230 | 380
SSCE-40 | 4 | 4.5 | 11 | ⅛ | 20 | 3150 | 280 | 430

1. - Steel pipe shall be minimum schedule 10. Rigid steel conduit shall be manufactured to UL6 and ANSI C80.3.
2. - For piping/conduit suspended from strut, refer to page X8.0.1 for combined max vertical and lateral loads.
3. - Load 2 and load 3 may be rotated up to 15° max from the referenced load direction in plan.
### MAXIMUM ALLOWABLE LOADS FOR MASON WEST MW-SSC PIPE CLAMPS
#### FOR SCH. 40 STEEL PIPING AND RIGID CONDUIT

<table>
<thead>
<tr>
<th>PART #</th>
<th>NOM. PIPE SIZE (INCH)</th>
<th>MAX SUPPORT SPACING (FT)</th>
<th>LOAD 1 (LBS)</th>
<th>LOAD 2 (Fp) (LBS)</th>
<th>LOAD 1 (LBS)</th>
<th>LOAD 2 (Fp) (LBS)</th>
<th>LOAD 1 (LBS)</th>
<th>LOAD 2 or LOAD 3 (Fp) (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSC-13</td>
<td>1 ¼</td>
<td>7</td>
<td>40</td>
<td>120</td>
<td>40</td>
<td>210</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>SSC-15</td>
<td>1 ½</td>
<td>9</td>
<td>60</td>
<td>150</td>
<td>60</td>
<td>150</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>SSC-20</td>
<td>2</td>
<td>10</td>
<td>90</td>
<td>240</td>
<td>90</td>
<td>380</td>
<td>90</td>
<td>190</td>
</tr>
<tr>
<td>SSC-25</td>
<td>2 ½</td>
<td>10</td>
<td>130</td>
<td>300</td>
<td>130</td>
<td>410</td>
<td>130</td>
<td>220</td>
</tr>
<tr>
<td>SSC-30</td>
<td>3</td>
<td>10</td>
<td>170</td>
<td>360</td>
<td>170</td>
<td>430</td>
<td>170</td>
<td>250</td>
</tr>
<tr>
<td>SSC-40</td>
<td>4</td>
<td>10</td>
<td>260</td>
<td>460</td>
<td>260</td>
<td>300</td>
<td>260</td>
<td>230</td>
</tr>
<tr>
<td>SSC-50</td>
<td>5</td>
<td>10</td>
<td>370</td>
<td>690</td>
<td>370</td>
<td>520</td>
<td>370</td>
<td>370</td>
</tr>
<tr>
<td>SSC-60</td>
<td>6</td>
<td>10</td>
<td>480</td>
<td>290</td>
<td>480</td>
<td>360</td>
<td>480</td>
<td>200</td>
</tr>
<tr>
<td>SSC-80</td>
<td>8</td>
<td>10</td>
<td>760</td>
<td>260</td>
<td>760</td>
<td>330</td>
<td>760</td>
<td>180</td>
</tr>
</tbody>
</table>

### MAXIMUM ALLOWABLE LOADS FOR MASON WEST MW-SSCE AND MW-SSC PIPE CLAMPS
#### FOR EMT AND IMC CONDUIT

<table>
<thead>
<tr>
<th>PART #</th>
<th>NOM. PIPE SIZE (INCH)</th>
<th>MAX SUPPORT SPACING (FT)</th>
<th>LOAD 1 (LBS)</th>
<th>LOAD 2 (Fp) (LBS)</th>
<th>LOAD 1 (LBS)</th>
<th>LOAD 2 (Fp) (LBS)</th>
<th>LOAD 1 (LBS)</th>
<th>LOAD 2 or LOAD 3 (Fp) (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSCE-13</td>
<td>1 ¼</td>
<td>10</td>
<td>40</td>
<td>140</td>
<td>40</td>
<td>210</td>
<td>40</td>
<td>110</td>
</tr>
<tr>
<td>SSCE-15</td>
<td>1 ½</td>
<td>10</td>
<td>50</td>
<td>180</td>
<td>50</td>
<td>290</td>
<td>50</td>
<td>140</td>
</tr>
<tr>
<td>SSCE-20</td>
<td>2</td>
<td>10</td>
<td>70</td>
<td>230</td>
<td>70</td>
<td>340</td>
<td>70</td>
<td>170</td>
</tr>
<tr>
<td>SSCE-25</td>
<td>2 ½</td>
<td>10</td>
<td>110</td>
<td>230</td>
<td>110</td>
<td>370</td>
<td>110</td>
<td>180</td>
</tr>
<tr>
<td>SSCE-30</td>
<td>3</td>
<td>10</td>
<td>150</td>
<td>220</td>
<td>150</td>
<td>360</td>
<td>150</td>
<td>170</td>
</tr>
<tr>
<td>SSCE-40</td>
<td>4</td>
<td>10</td>
<td>230</td>
<td>260</td>
<td>230</td>
<td>400</td>
<td>230</td>
<td>200</td>
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</table>

#### Footnotes:
1. Refer to Page X8.0 for load direction, identification, and balance of information.
2. The combined max vertical and lateral loads shown above are applicable for piping/conduit suspended from strut, where pipe clamps resist pullout.
3. The lateral loads (Fp) shown above consider loading at 15 degrees max from the referenced load direction.
4. The combined max vertical and lateral loads may be adjusted for specific gravity support spacing if the following is satisfied. Refer to Page X8.0 for Max Load 1, 2, and 3.
   \[
   T \leq \frac{\text{MAX LOAD 1}}{4} + \frac{\text{MAX LOAD 2}}{4} + \frac{\text{MAX LOAD 3}}{4} \leq 1.0
   \]
   - \( T \): Gravity load + vertical seismic load.
   - \( L_t \): Max transverse lateral load.
   - \( L_L \): Max longitudinal lateral load.
5. For SCH. 10 and SCH. 80 steel pipe, the registered design professional (RDP) shall calculate the combined clamp capacities using the formulas in Footnote 4.
### Copper Pipe (Type K or L)

<table>
<thead>
<tr>
<th>PART #</th>
<th>NOM. PIPE SIZE (IN)</th>
<th>D (IN)</th>
<th>t (IN)</th>
<th>STRAP GA.</th>
<th>BOLT (IN)</th>
<th>BOLT TORQUE (FT-LB)</th>
<th>MAX LOAD 1 (LBS)</th>
<th>MAX LOAD 2 (LBS)</th>
<th>MAX LOAD 3 (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCC-13</td>
<td>1(\frac{1}{2})</td>
<td>1.375</td>
<td>.1425</td>
<td>12</td>
<td>(\frac{3}{16})</td>
<td>11</td>
<td>2380</td>
<td>130</td>
<td>210</td>
</tr>
<tr>
<td>SCC-15</td>
<td>1(\frac{1}{2})</td>
<td>1.625</td>
<td>.1375</td>
<td>12</td>
<td>(\frac{3}{16})</td>
<td>11</td>
<td>2290</td>
<td>170</td>
<td>170</td>
</tr>
<tr>
<td>SCC-20</td>
<td>2</td>
<td>2.125</td>
<td>.125</td>
<td>11</td>
<td>(\frac{3}{16})</td>
<td>11</td>
<td>2570</td>
<td>190</td>
<td>240</td>
</tr>
<tr>
<td>SCC-25</td>
<td>2(\frac{1}{2})</td>
<td>2.625</td>
<td>.125</td>
<td>11</td>
<td>(\frac{3}{16})</td>
<td>11</td>
<td>2850</td>
<td>180</td>
<td>200</td>
</tr>
<tr>
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<td>.1875</td>
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1. For piping suspended from strut, refer to page X8.1.1 for combined max vertical and lateral loads.
2. Load 2 and Load 3 may be rotated up to 15° max from the referenced load direction in plan.
# MAXIMUM ALLOWABLE LOADS FOR MASON WEST MW-SCC PIPE CLAMPS FOR WATER FILLED COPPER PIPING

<table>
<thead>
<tr>
<th>PART #</th>
<th>NOM. PIPE SIZE (INCH)</th>
<th>MAX SUPPORT SPACING (FT)</th>
<th>LOAD 1 (LBS)</th>
<th>LOAD 2 Fp (LBS)</th>
<th>LOAD 1 (LBS)</th>
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<td>7</td>
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1 - REFER TO PAGE X8.1 FOR LOAD DIRECTION, IDENTIFICATION, AND BALANCE OF INFORMATION.
2 - THE COMBINED MAX VERTICAL AND LATERAL LOADS SHOWN ABOVE ARE APPLICABLE FOR PIPING/CONDUIT SUSPENDED FROM STRUT, WHERE PIPE CLAMPS RESIST PULLOUT.
3 - THE LATERAL LOADS (Fp) SHOWN ABOVE CONSIDER LOADING AT 15 DEGREES MAX FROM THE REFERENCED LOAD DIRECTION.
4 - THE COMBINED MAX VERTICAL AND LATERAL LOADS MAY BE ADJUSTED FOR SPECIFIC GRAVITY SUPPORT SPACING IF THE FOLLOWING IS SATISFIED. REFER TO PAGE X8.1 FOR MAX LOAD 1, 2, AND 3.

\[
\frac{T}{(\text{MAX LOAD 1})} + \frac{L_t}{(\text{MAX LOAD 2})} + \frac{L_l}{(\text{MAX LOAD 3})} \leq 1.0
\]

\[
L_t = \text{MAX TRANSVERSE LATERAL LOAD},
\]

\[
L_l = \text{MAX LONGITUDINAL LATERAL LOAD}.
\]

5 - FOR VAPOR FILLED COPPER PIPE, THE REGISTERED DESIGN PROFESSIONAL (RDP) SHALL CALCULATE THE COMBINED CLAMP CAPACITIES USING THE FORMULAS IN FOOTNOTE 4.
1. MASON WEST MW-SSC, MW-SSCE, MW-SCC, OR MW-SCCI PIPE CLAMPS CAN BE USED WITH THE FOLLOWING STRUT MEMBERS (REF. PAGE X7.0 & X7.1 FOR STRUT MEMBER DATA):
   1. 1½x1½x12GA SINGLE STRUT
   2. 1½x1½x12GA DOUBLE STRUT
   3. 1½x1½x12GA SINGLE STRUT
   4. 1½x1½x12GA DOUBLE STRUT
   5. 1½x3/4x12GA SINGLE STRUT

2. STRUT MEMBERS MAY BE PROVIDED WITH PUNCHED OR SLOTTED HOLES. (REF. PAGE X7.1)

3. MASON WEST MW-SSN-1/2 STRUT NUTS WITH MW-BON-1/2 MAY BE REPLACED WITH 1/2" STRUT NUTS AND BOLTS IF TORQUED TO 50 FT-LBS.

MASON WEST, INC.
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Jiefu "Jeff" Zhang, SE
California SE No. S5270

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
814 of 846
**MASON WEST MW-SPC**

**EMBLEM STAMPED ON BOTTOM OF MW-SPC**

**NOTE:**

**KNURLED BOLT** TYP.

**KNURLED BOLT** TYP.

**STANDARD NUT OR BREAK-OFF NUT, TYP (REF. X4.0)**

**1 ¼"Ø TO 3"Ø**

**4"Ø TO 12"Ø**

**MATERIAL:**

CLAMP: AISI 1050 CARBON STEEL  
BOLT: Q235 CARBON STEEL TESTED TO ASTM F606

**LOAD 1 (VERTICAL)**

**LOAD 2 (TRANSVERSE)**

**LOAD 3 (LONGITUDINAL)**

---

**PART #** | **NOM. PIPE SIZE (INCH)** | **A (INCH)** | **B (INCH)** | **C (INCH)** | **D (INCH)** | **TC (INCH)** | **WIDTH (INCH)** | **BOLT DIA. (INCH)** | **MIN BOLT TORQUE (FT-LB)** | **H (INCH)** | **W (INCH)** | **Th (INCH)** | **HOLE DIA. (INCH)**
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
SPC-13 | 1 ½ | 4 | ½ | 1 ½ | 1.66 | ½ | 1 | ½ | 20 | ¼ | ½ | ¾ | ¾
SPC-15 | 1 ½ | 4 ¼ | ½ | 1 ½ | 1.9 | ½ | 1 | ½ | 20 | ¼ | ½ | ¾ | ¾
SPC-20 | 2 | 5 ¼ | ½ | 2 | 2.375 | ½ | 1 | ½ | 20 | ¼ | ½ | ¾ | ¾
SPC-25 | 2 ½ | 6 | ½ | 2 | 2.875 | ¾ | 1 ½ | ½ | 45 | ¾ | ¾ | ¾ | ¾
SPC-30 | 3 | 7 | ¾ | 2 ½ | 3.5 | ¾ | 1 ½ | ½ | 45 | ¾ | ¾ | ¾ | ¾
SPC-40 | 4 | 8 ½ | ¾ | 3 ½ | 4.5 | ¾ | 1 ½ | ½ | 45 | ¾ | ¾ | ¾ | ¾
SPC-50 | 5 | 9 ¾ | ¾ | 3 ⅞ | 5.625 | ¾ | 1 ½ | ½ | 45 | ¾ | ¾ | ¾ | ¾
SPC-60 | 6 | 11 ½ | ¾ | 4 ½ | 6.625 | ¾ | 2 | ¾ | 75 | 2 ½ | 2 ½ | ½ | ¾
SPC-80 | 8 | 13 ½ | 1 | 5 ⅞ | 8.625 | ¾ | 2 | ¾ | 75 | 2 ½ | 2 ½ | ½ | ¾
SPC-100 | 10 | 16 | 1 | 7 ½ | 10.75 | ¾ | 2 ½ | ¾ | 100 | 3 ¾ | ¾ | ½ | ¾
SPC-120 | 12 | 18 ½ | 1 | 8 ⅛ | 12.75 | ¾ | 2 ½ | ¾ | 100 | 3 ¾ | ¾ | ½ | ¾

**NOTE:** THIS CLAMP CAN BE USED FOR MINIMUM SCHEDULE 10 STEEL PIPE, NO-HUB CAST IRON PIPE AND RIGID STEEL CONDUIT. RIGID STEEL CONDUIT SHALL BE MANUFACTURED TO UL6 AND AISI C80.1

---

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Jeffu "Jeff" Zhang, SE  
California SE No. S5270

10/09/2020  
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto  
815 of 846
### Maximum Allowable Loads for Mason West MW-SPC Pipe Clamps for Steel Piping and Rigid Conduit

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### Maximum Allowable Loads for Mason West MW-SPC Pipe Clamps for Cast Iron Piping

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1. Refer to page X8.3 for load direction, identification, and balance of information.
2. The max combined vertical and lateral loads may be adjusted for specific gravity support spacing if the following is satisfied:

\[
\frac{T}{(\text{MAX LOAD 1})} + \frac{L_v}{(\text{MAX LOAD 2})} \leq 1.0
\]

OR

\[
\frac{T}{(\text{MAX LOAD 1})} + \frac{L_v}{(\text{MAX LOAD 3})} \leq 1.0
\]

- **T** = Max vertical load, including vertical seismic
- **L_v** = Max transverse lateral load only
- **L_L** = Max longitudinal lateral load only

---

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California SE No. S5270

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**Page X8.3.1**
## MASON WEST MW-WPL
### WELDED PIPE HANGER LUG

![Diagram of MW-WPL LUG](image)

**Both Sides of MW-WPL (E70XX)**

"WELD" BOTH SIDES OF MW-WPL (E70XX)

![Diagram of MW-WPL LUG](image)

**PIPE**

NUT MAY BE TACK WELDED ONTO MW-WPL FOR EASE OF INSTALLATION

### Design Loads (ASD)

<table>
<thead>
<tr>
<th>PART #</th>
<th>PIPE SIZE</th>
<th>MAXIMUM HANGER SPACING</th>
<th>L</th>
<th>H</th>
<th>W</th>
<th>Th</th>
<th>HOLE SIZE</th>
<th>WELD</th>
<th>MAXIMUM VERTICAL LOAD ONLY (LBS)</th>
<th>COMBINED MAXIMUM VERTICAL AND LATERAL LOADS</th>
<th>COMBINED MAXIMUM VERTICAL AND LATERAL LOADS</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPL-38</td>
<td>1 ½</td>
<td>10</td>
<td>2</td>
<td>1 ½</td>
<td>½</td>
<td>½</td>
<td>1 ½</td>
<td>½</td>
<td>720</td>
<td>540</td>
<td>175</td>
</tr>
<tr>
<td>WPL-50</td>
<td>2 ½</td>
<td>12</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2 ½</td>
<td>3 ½</td>
<td>1320</td>
<td>780</td>
<td>350</td>
</tr>
<tr>
<td>WPL-63</td>
<td>4 ½</td>
<td>16</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4 ½</td>
<td>8 ½</td>
<td>2880</td>
<td>1760</td>
<td>750</td>
</tr>
<tr>
<td>WPL-75</td>
<td>6 ½</td>
<td>19</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>6 ½</td>
<td>11 ½</td>
<td>4800</td>
<td>3200</td>
<td>1250</td>
</tr>
<tr>
<td>WPL-75A</td>
<td>10</td>
<td>20</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2 ½</td>
<td>5 ½</td>
<td>5 ½</td>
<td>8000</td>
<td>6000</td>
<td>2750</td>
</tr>
<tr>
<td>WPL-88</td>
<td>10</td>
<td>20</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1 ½</td>
<td>3 ½</td>
<td>6900</td>
<td>6000</td>
<td>2500</td>
</tr>
<tr>
<td>WPL-100</td>
<td>14</td>
<td>20</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>1 ½</td>
<td>5 ½</td>
<td>8880</td>
<td>6900</td>
<td>3000</td>
</tr>
<tr>
<td>WPL-125</td>
<td>20</td>
<td>20</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>1 ½</td>
<td>5 ½</td>
<td>11400</td>
<td>10200</td>
<td>5750</td>
</tr>
</tbody>
</table>

1. MW-WPL LUG IS MADE FROM ASTM A36 OR ASTM A500 GRADE B STEEL.
2. PIPE/CONDUIT MATERIAL TO BE STANDARD SCHEDULE PIPE (MIN. SCH. 40S) MADE OF CARBON OR STAINLESS STEEL MATERIAL PER ASME B31.1 STANDARDS.
3. WHEN USING MW-WPL WITH COMBINED VERTICAL AND LATERAL LOADS, EACH OF THE LOADS MUST BE BELOW WHAT IS SHOWN IN THE ABOVE TABLE.
MASON WEST MW-SCCI

LOAD 1

LOAD 2 (TRANSVERSE)

LOAD 3 (15° SKEW)

NOTE: LOAD DIRECTIONS ARE LIMITED AS INDICATED. THE SCCI IS NOT RATED IN THE LONGITUDINAL (AXIAL) DIRECTION BEYOND THE 10° SKEW.

PARTIAL DETAIL OF MASON WEST MW-SCCI SEISMIC STEEL PIPE CLAMP

NOTE: MW-SCCI SEISMIC STEEL PIPE CLAMPS ARE SPECIALLY DESIGNED FOR USE WITH THE HYDRA-ZORB KLO-SHURE INSULATION COUPLINGS.

MATERIAL:
CLAMP: HOT ROLLED MILD STEEL, ASTM A1011 SS GR 33
INSULATION COUPLING: THERMOPLASTIC TOQ-247 MSDS NO. B26057
BOLT: ASTM A307, GRADE A

NOTES:
1 - SPECIFY ELASTOMERIC OR FIBERGLASS INSULATION WHEN ORDERING BY ADDING AN E FOR ELASTOMERIC OR F FOR FIBERGLASS TO THE END OF THE PART #. i.e. SCCI-408E
2 - ±0.05” DIMENSIONS TO ACCOUNT FOR SMALL VARIATION IN ELASTOMERIC VERSUS FIBERGLASS INSULATION THICKNESSES.

COPPER PIPE (TYPE K OR L) WITH ¾” ELASTOMERIC OR FIBERGLASS INSULATION

<table>
<thead>
<tr>
<th>PART #</th>
<th>NOM. PIPE</th>
<th>d</th>
<th>D²</th>
<th>STRAP GA.</th>
<th>BOLT</th>
<th>DESIGN LOADS (ASD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCCI-413</td>
<td>1 ¼</td>
<td>1.375</td>
<td>2.50</td>
<td>12</td>
<td>⅛</td>
<td>LOAD 1 (LBS)</td>
</tr>
<tr>
<td>SCCI-415</td>
<td>1 ½</td>
<td>1.625</td>
<td>2.80</td>
<td>12</td>
<td>⅝</td>
<td>LOAD 2 (LBS)</td>
</tr>
<tr>
<td>SCCI-420</td>
<td>2</td>
<td>2.125</td>
<td>3.27</td>
<td>12</td>
<td>⅛</td>
<td>LOAD 3 (LBS)</td>
</tr>
<tr>
<td>SCCI-425</td>
<td>2 ¼</td>
<td>2.625</td>
<td>3.75</td>
<td>12</td>
<td>⅝</td>
<td>LOAD 1 (LBS)</td>
</tr>
<tr>
<td>SCCI-430</td>
<td>3</td>
<td>3.125</td>
<td>4.25</td>
<td>12</td>
<td>⅞</td>
<td>LOAD 2 (LBS)</td>
</tr>
<tr>
<td>SCCI-440</td>
<td>4</td>
<td>4.125</td>
<td>5.25</td>
<td>12</td>
<td>⅞</td>
<td>LOAD 3 (LBS)</td>
</tr>
</tbody>
</table>

LOAD DIRECTIONS ARE LIMITED AS INDICATED. THE SCCI IS NOT RATED IN THE LONGITUDINAL (AXIAL) DIRECTION BEYOND THE 10° SKEW.

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P A G E  X8.6
# MASON WEST MW-SCCI

**COPPER PIPE (TYPE K OR L) WITH 3/8" ELASTOMERIC INSULATION**

- **PART #**
- **NOM. PIPE SIZE**
- **d**
- **D**
- **STRAP GA.**
- **BOLT**
- **LOAD 1 (LBS)**
- **LOAD 2 (LBS)**
- **LOAD 3 (LBS)**

<table>
<thead>
<tr>
<th>PART #</th>
<th>NOM. PIPE SIZE</th>
<th>d</th>
<th>D</th>
<th>STRAP GA.</th>
<th>BOLT</th>
<th>LOAD 1 (LBS)</th>
<th>LOAD 2 (LBS)</th>
<th>LOAD 3 (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCCI-613</td>
<td>1/2</td>
<td>1.375</td>
<td>3</td>
<td>12</td>
<td>1/8</td>
<td>495</td>
<td>115</td>
<td>105</td>
</tr>
<tr>
<td>SCCI-615</td>
<td>1/2</td>
<td>1.625</td>
<td>3.25</td>
<td>12</td>
<td>1/8</td>
<td>555</td>
<td>175</td>
<td>155</td>
</tr>
<tr>
<td>SCCI-620</td>
<td>2</td>
<td>2.125</td>
<td>3.75</td>
<td>12</td>
<td>1/8</td>
<td>680</td>
<td>215</td>
<td>195</td>
</tr>
<tr>
<td>SCCI-625</td>
<td>21/2</td>
<td>2.625</td>
<td>4.25</td>
<td>12</td>
<td>1/8</td>
<td>780</td>
<td>245</td>
<td>220</td>
</tr>
<tr>
<td>SCCI-630</td>
<td>3</td>
<td>3.125</td>
<td>4.75</td>
<td>12</td>
<td>1/8</td>
<td>860</td>
<td>270</td>
<td>245</td>
</tr>
<tr>
<td>SCCI-640</td>
<td>4</td>
<td>4.125</td>
<td>5.75</td>
<td>12</td>
<td>1/8</td>
<td>980</td>
<td>320</td>
<td>290</td>
</tr>
</tbody>
</table>

**MATERIAL:**
- CLAMP: HOT ROLLED MILD STEEL, ASTM A1011 SS GR 33
- INSULATION COUPLING: THERMOPLASTIC TOQ-947 MSDS NO. B26057
- BOLT: ASTM A307, GRADE A

**NOTE:** MW-SCCI SEISMIC STEEL PIPE CLAMPS ARE SPECIALLY DESIGNED FOR USE WITH THE HYDRA-ZORB KLO-SHURE INSULATION COUPLINGS.

**NOTE:** LOAD DIRECTIONS ARE LIMITED AS INDICATED. THE SCCI IS NOT RATED IN THE LONGITUDINAL (AXIAL) DIRECTION BEYOND THE 10° SKEW.
**COPPER PIPE (TYPE K OR L) WITH 1" ELASTOMERIC OR FIBERGLASS INSULATION**

<table>
<thead>
<tr>
<th>PART #</th>
<th>NOM. PIPE SIZE</th>
<th>d</th>
<th>D²</th>
<th>STRAP GA.</th>
<th>BOLT</th>
<th>LOAD 1 (LBS)</th>
<th>LOAD 2 (LBS)</th>
<th>LOAD 3 (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCCI-813</td>
<td>11/4</td>
<td>1.375</td>
<td>3.57</td>
<td>12</td>
<td>5/6</td>
<td>11</td>
<td>425</td>
<td>135</td>
</tr>
<tr>
<td>SCCI-815</td>
<td>11/2</td>
<td>1.625</td>
<td>3.82</td>
<td>12</td>
<td>5/8</td>
<td>20</td>
<td>515</td>
<td>200</td>
</tr>
<tr>
<td>SCCI-820</td>
<td>2</td>
<td>2.125</td>
<td>4.19</td>
<td>12</td>
<td>5/8</td>
<td>20</td>
<td>650</td>
<td>255</td>
</tr>
<tr>
<td>SCCI-825</td>
<td>21/2</td>
<td>2.625</td>
<td>6.91</td>
<td>12</td>
<td>5/8</td>
<td>20</td>
<td>755</td>
<td>290</td>
</tr>
<tr>
<td>SCCI-830</td>
<td>3</td>
<td>3.125</td>
<td>9.81</td>
<td>12</td>
<td>5/8</td>
<td>20</td>
<td>845</td>
<td>325</td>
</tr>
<tr>
<td>SCCI-840</td>
<td>4</td>
<td>4.125</td>
<td>16.81</td>
<td>12</td>
<td>5/8</td>
<td>20</td>
<td>980</td>
<td>385</td>
</tr>
</tbody>
</table>

1 - SPECIFY ELASTOMERIC OR FIBERGLASS INSULATION WHEN ORDERING BY ADDING AN E FOR ELASTOMERIC OR F FOR FIBERGLASS TO THE END OF THE PART #, i.e. SCCI-888F

2 - ±0.125" DIMENSIONS FOR 1" DIA., ±0.07" DIMENSIONS FOR ALL OTHERS TO ACCOUNT FOR SMALL VARIATION IN ELASTOMERIC VERSUS FIBERGLASS INSULATION THICKNESSES.

**NOTE:** MW-SCCI SEISMIC STEEL PIPE CLAMPS ARE SPECIALLY DESIGNED FOR USE WITH THE HYDRA-ZORB KLO-SHURE INSULATION COUPLINGS.

**NOTE:** LOAD DIRECTIONS ARE LIMITED AS INDICATED. THE SCCI IS NOT RATED IN THE LONGITUDINAL (AXIAL) DIRECTION BEYOND THE 10° SKEW.

**CLAMP:** HOT ROLLED MILD STEEL, ASTM A1011SS GR 33

**INSULATION COUPLING:** THERMOPLASTIC, TOD-247 MSDS NO. B26057

**BOLT:** ASTM A307, GRADE A

**DESIGN LOADS (ASD)**

**LOAD DIRECTIONS ARE LIMITED AS INDICATED. THE SCCI IS NOT RATED IN THE LONGITUDINAL (AXIAL) DIRECTION BEYOND THE 10° SKEW.**

**PARTIAL DETAIL OF MASON WEST MW-SCCI SEISMIC STEEL PIPE CLAMP**
MASON WEST MW-SCCI

COPPER PIPE (TYPE K OR L) WITH 1\½" ELASTOMERIC OR FIBERGLASS INSULATION

<table>
<thead>
<tr>
<th>PART #</th>
<th>NOM. PIPE SIZE</th>
<th>D</th>
<th>D²</th>
<th>STRAP GA.</th>
<th>BOLT TORQUE (FT-LB)</th>
<th>LOAD 1 (LBS)</th>
<th>LOAD 2 (LBS)</th>
<th>LOAD 3 (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCCI-913</td>
<td>1¼</td>
<td>1.375</td>
<td>4.5</td>
<td>12</td>
<td>3/16</td>
<td>11</td>
<td>230</td>
<td>150</td>
</tr>
<tr>
<td>SCCI-915</td>
<td>1\½</td>
<td>1.625</td>
<td>4.75</td>
<td>12</td>
<td>3/8</td>
<td>20</td>
<td>240</td>
<td>120</td>
</tr>
<tr>
<td>SCCI-920</td>
<td>2</td>
<td>2.125</td>
<td>5.25</td>
<td>12</td>
<td>3/8</td>
<td>20</td>
<td>285</td>
<td>135</td>
</tr>
<tr>
<td>SCCI-925</td>
<td>2½</td>
<td>2.625</td>
<td>5.75</td>
<td>12</td>
<td>3/8</td>
<td>20</td>
<td>325</td>
<td>150</td>
</tr>
<tr>
<td>SCCI-930</td>
<td>3</td>
<td>3.125</td>
<td>6.25</td>
<td>12</td>
<td>3/8</td>
<td>20</td>
<td>345</td>
<td>145</td>
</tr>
</tbody>
</table>

1 - SPECIFY ELASTOMERIC OR FIBERGLASS INSULATION WHEN ORDERING BY ADDING AN E FOR ELASTOMERIC OR F FOR FIBERGLASS TO THE END OF THE PART #, i.e. SCCI-915E
2 - ±0.07" DIMENSIONS (±0.19" FOR 1\½" DIA.) TO ACCOUNT FOR SMALL VARIATION IN ELASTOMERIC VERSUS FIBERGLASS INSULATION THICKNESSES.

NOTE: LOAD DIRECTIONS ARE LIMITED AS INDICATED. THE SCCI IS NOT RATED IN THE LONGITUDINAL (AXIAL) DIRECTION BEYOND THE 10° SKEW.

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Jiefu “Jeff” Zhang, SE
California SE No. S5270

P A G E  X8.6.3

10/09/2020
OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto
821 of 846
Z-1011 SEISMIC SNUBBER DESIGN GENERAL NOTES

1) This OSHPD Preapproval of Manufacturer's Certification (OPM) is based on the 2013 CBC. The demand (design forces) for use with this OPM shall be based on the 2013 CBC.

2) Per ASCE 7-10, Section 13.3.1, restraints and their anchorages must be capable of restraining horizontal, \( F_p \), and vertical, \( F_{PV} \), seismic accelerations as follows.

\[
F_p = (0.7) \frac{0.4a_p S_{DS} W_p (1+2z)}{R_p I_p h} \quad \text{(ASD)} \quad \text{(ASCE 7-10 EQ 13.3-1)}
\]

is not required to be taken greater than \((0.7)1.6S_{DS}W_p\) \(\text{(ASD)}\)
shall not be taken less than \((0.7)0.3S_{DS}W_p\) \(\text{(ASD)}\)

\[
F_{PV} = (0.7)0.2S_{DS}W_p \quad \text{(ASD)}
\]

Where:

\( S_{DS} \) = short period spectral acceleration - up to 2.5g. Values of \( S_{DS} \) indicated in the general notes of the structural drawing take precedence over those calculated per ASCE 7-10, 11.4.4.

\( W_p \) = component or system operating weight

\( I_p \) = component importance factor

\( a_p \) = component amplification factor (Ref. ASCE 7-10, Table 13.6-1)

\( R_p \) = component response modification factor (Ref. ASCE 7-10, Table 13.6-1)

\( z \) = height in structure of point of connection of component with respect to base (ft).

\( h \) = average roof height of structure with respect to base (ft).

3) For systems anchored to concrete only, the anchorage to concrete overstrength factor, \( \Omega_c \), must be applied. \( \Omega_c \) is not applicable if a yielding steel element is considered in the load path. Refer to ACI 318-11 Appendix D, Section D.3.3.4.3 or ACI 318-14 Chapter 17, Section 17.2.3.4.3 for a list of qualifying conditions.

4) It is the responsibility of the Registered Design Professional (RDP) in responsible charge to:

i. Verify that the nonstructural components or system is seismically qualified in accordance with the 2013 CBC.

ii. Verify that the proper Mason Industries Z1011 seismic snubber is selected to meet the seismic requirements of this OPM.

iii. Design the attachment of Mason Industries Z1011 seismic snubber to the nonstructural component.

iv. Design the supports and attachments for Mason Industries Z1011 seismic snubber to supporting structure.

5) The Structural Engineer of Record (SEOR) shall verify that the supporting structure is adequate for the forces imposed on it by the supports, attachments and restraints installed in accordance with the pre-approval in addition to all other loads.
**MASON IND. Z-1011 SEISMIC SNUBBER**

**Z-1011 Sizes 1 & 2**

- D - Bolt Hole Diameter
- AB - Anchor Bolt Diameter
- Bolts By Others
- Upper Bracket
- Equipment or Mounting Bracket
- SAE Grade 5 Bolt
- Lower Bracket

**Replacable 3/4"[19mm] thick**

All-Directional
Natural Rubber Bushings

Dimples to maintain
1/8"[3mm] Side to Side
operating clearance

Splines to maintain
1/8"[3mm] Internal
operating clearance

**NORMAL 90° POSITION**

When steel sole plates are used, level and anchor sole plates properly to concrete.
Snubber Baseplate may be bolted or welded to sole plate.

### TYPE Z-1011 DIMENSIONS

<table>
<thead>
<tr>
<th>Size</th>
<th>A</th>
<th>AB</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>TL</th>
<th>TU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-1011-1</td>
<td>2</td>
<td>1/8</td>
<td>1/2</td>
<td>6</td>
<td>1/16</td>
<td>7/16</td>
<td>2.7/8</td>
<td>2.1/4</td>
<td>3/4</td>
<td>1/8</td>
</tr>
<tr>
<td>Z-1011-1</td>
<td>54</td>
<td>13</td>
<td>152</td>
<td>37</td>
<td>14</td>
<td>93</td>
<td>57</td>
<td>70</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Z-1011-2</td>
<td>54</td>
<td>13</td>
<td>152</td>
<td>43</td>
<td>14</td>
<td>86</td>
<td>60</td>
<td>70</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

- All steel members ASTM A-36. Snubber Bushings are 70 Durometer Bridge-Bearing Natural Rubber compound.
- Refer to page X9.0.3 for Snubber load ratings and stiffness data
- Refer to page X9.0.4 for Snubber installation instructions

---

**Jeffrey Y. Kikumoto**

OPM-0043-13

10/09/2020

OPM-0043-13: Reviewed for Code Compliance by Jeffrey Kikumoto

823 of 846
MASON IND. Z-1011 SEISMIC SNUBBER

Z-1011 Sizes 3, 4 & 5

- All steel members ASTM A-36. Snubber Bushings are 70 Durometer Bridge-Bearing Natural Rubber compound.
- Refer to page X9.0.3 for Snubber load ratings and stiffness data
- Refer to page X9.0.4 for Snubber installation instructions

<table>
<thead>
<tr>
<th>Size</th>
<th>A</th>
<th>AB</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>TL</th>
<th>TU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-1011-3</td>
<td>3/16</td>
<td>1/2</td>
<td>7</td>
<td>3</td>
<td>9/16</td>
<td>5/8</td>
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<td>5/8</td>
<td>3</td>
<td>3/4</td>
</tr>
<tr>
<td>Z-1011-4</td>
<td>3/16</td>
<td>5/8</td>
<td>9</td>
<td>1</td>
<td>11/16</td>
<td>5</td>
<td>1/2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Z-1011-3</td>
<td>79</td>
<td>13</td>
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- Refer to page X9.0.2
MASON IND. Z-1011 SEISMIC SNUBBER
MAXIMUM ALLOWABLE LOADS & STIFFNESS DATA

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1 - The combined vertical and horizontal loads on each snubber must satisfy the following condition:

\[
(P_V/P_{VA}) + (P_{TH}/P_{THA}) + (P_{LH}/P_{LHA}) < 1.00
\]

\[P_V, P_{TH}, \text{ and } P_{LH}\] are calculated vertical, transverse horizontal, and longitudinal horizontal load.
Z-1011 SEISMIC SNUBBER INSTALLATION INSTRUCTIONS

1) Snubbers are inactive during normal operation and clearance must be maintained.

2) If Snubbers are installed on equipment or system with flexible connections that move and remain in a different position during operation, final positioning and adjustment of Snubbers must be made with equipment in operation.

3) Use one piece, full size shim (1/4" maximum thickness) at Upper or Lower Brackets of the Snubbers as required so that no pressure from the equipment dead and live load will be applied on the Rubber Bushings.

4) Use the Upper and Lower Bracket bolt holes to layout then drill attachment holes on equipment or frame and on supporting structure if bolting attachment is preferred.

5) Bolt or weld the Snubber onto the equipment or frame and to the supporting structure. Follow design example provided in this section by Mason Industries.

6) A steel Sole Plate may be bolted or welded to Snubber Baseplate when anchoring into concrete. Consult the Registered Design Professional for design of Sole Plate.

7) Snubbers are to be used in conjunction with spring isolators without restraints. Snubbers shall not be used to support gravity loads.
Example illustration: spring isolated pump with (4) Mason Z-1011-3 snubbers, anchored to structural steel (provided by SEOR).

Total system weight = 4000 lbs

PUMP FRAME

1/2" ASTM A307 BOLTS & HEX NUTS (TYPICAL)

STRUCTURAL STEEL (PER SEOR)

FIGURE 1 - LAYOUT OF SEISMIC SNUBBERS
Example:

A 4000-lbs spring isolated pump is located on the 1st floor of a 4-story OSHPD 1 building, on a steel platform (by SEOR), 5 feet above grade level. The elevation of each floor is 15 feet.

The component will be installed with (4) Mason Z-1011-3 snubbers as shown in Figure 1.

The short period spectral acceleration, $S_{DS}$, listed on the contract structural drawings, is 1.02.

Note: Since the supports and attachments for the Z-1011 snubber will be to steel, the concrete overstrength factor, $\Omega_p$, will not be used in this example.

Step 1. Determine Seismic Forces

Seismic design parameters:

$W_p = 4000\# \quad S_{DS} = 1.02 \quad I_p = 1.5 \quad a_p = 2.5 \quad R_p = 2.0 \quad z = 5\text{ft} \quad h = 60\text{ft}$

Therefore,

\[
F_p = (0.7)(0.4)(2.5)(1.02)(4000\#)/(2.0)(1.5) = 2500 \text{ lbs} \quad (\text{Governs})
\]

\[
F_{P\text{min}} = (0.7)(0.3)(1.02)(1.5)(4000\#) = 1285 \text{ lbs}
\]

\[
F_{P\text{max}} = (0.7)(1.6)(1.02)(1.5)(4000\#) = 6854 \text{ lbs}
\]

\[
F_{PV} = (0.7)(0.2)(1.02)(4000\#) = 571 \text{ lbs}
\]

Step 2. Determine Reaction Loads on Each Z-1011 Snubber

Component overturning calculations based on seismic load applied at a critical angle, $\Theta$.

\[
b_1 = 54\" = \text{distance between snubbers along length}
\]

\[
b_2 = 52\" = \text{distance between snubbers along width}
\]

\[N = 4 \quad \text{total number of snubbers}
\]

\[h = 28\" = \text{C.G. height}
\]
Z-1011 SNUBBER DESIGN PROCEDURE EXAMPLE (CONTINUED)

\[
\tan \theta = \frac{I_{yy} \cdot b_1}{I_{xx} \cdot b_2} = 0.96 \quad \Rightarrow \quad \theta = \tan^{-1} \left( \frac{I_{yy} \cdot b_1}{I_{xx} \cdot b_2} \right) = 43.9^\circ = 0.77\text{rad}
\]

Where \( I_{xx} = \frac{N(N+2)}{12(N-2)} \cdot (b_1)^2 = 2916 \text{ in}^2 \) and \( I_{yy} = \frac{N}{4} \cdot (b_2)^2 = 2704 \text{ in}^2 \)

Maximum net uplift load on snubber location 2:

\[
P_V = \frac{-F_{pv}}{N} - \frac{F_p \cdot \cos \theta \cdot h}{I_{yy}} \cdot \frac{b_2}{2} - \frac{F_p \cdot \sin \theta \cdot h}{I_{xx}} \cdot \frac{b_1}{2} = -1077 \text{ lbs} \quad \text{(negative indicate uplift)}
\]

Maximum net compressive load on snubber location 4:

\[
P_C = \frac{F_{pv}}{N} + \frac{F_p \cdot \cos \theta \cdot h}{I_{yy}} \cdot \frac{b_2}{2} + \frac{F_p \cdot \sin \theta \cdot h}{I_{xx}} \cdot \frac{b_1}{2} = 1077 \text{ lbs}
\]

Maximum shear load per snubber:

\[
P_H = \frac{F_p}{N} = 625 \text{ lbs}
\]

Resolving into transverse and longitudinal components,

\[
P_{TH} = P_H \cdot \cos \theta = 450 \text{ lbs}
\]
\[
P_{LH} = P_H \cdot \sin \theta = 433 \text{ lbs}
\]

Combining the loads on the snubber for the interaction check:

\[
\left[ \frac{P_V}{P_{VA}} \right] + \left[ \frac{P_{TH}}{P_{THA}} \right] + \left[ \frac{P_{LH}}{P_{LHA}} \right] = \left[ \frac{1077}{4537} \right] + \left[ \frac{450}{6986} \right] + \left[ \frac{433}{6721} \right] = 0.37 \leq 1.00 \quad \text{Z1011-3 snubbers are adequate}
\]
Step 3. Supports and Attachments Design for Z-1011 Snubber

Max. tension per bolt (including orthogonal loading effect)

$$T_{boll} = \frac{P_H \cdot C}{2B} + \frac{0.3P_H \cdot C}{2E} + \frac{P_V \cdot 0.3}{4} = 856 \text{ lbs}$$

Max. shear per bolt

$$V_{bolt} = \frac{P_H}{4} = 156 \text{ lbs}$$

Steel bolt connection design per AISC, 14th Edition, Sections J3.6 & J3.7 (ASD):

For 1/2” A307 bolt,

- $A_t = 0.142 \text{ in}^2$
- $A_k = 0.136 \text{ in}^2$
- $A_b = 0.196 \text{ in}^2$
- $F_{nt} = 45 \text{ ksi}$
- $F_{nv} = 24 \text{ ksi}$
- $f_v = \frac{V_{bolt}}{A_k} = 1148 \text{ psi}$
- $f_t = \frac{T_{boll}}{A_t} = 6028 \text{ psi}$

$$T_{allow} = \frac{R_n}{\Omega} = \frac{F_{nt} \cdot A_b}{2.0} = 4418 \text{ lbs}$$

$$V_{allow} = \frac{R_n}{\Omega} = \frac{F_{nv} \cdot A_b}{2.0} = 2356 \text{ lbs}$$

$$\frac{T_{boll}}{T_{allow}} = 0.19 < 1.00 \quad \text{And} \quad \frac{V_{bolt}}{V_{allow}} = 0.07 < 1.00$$

1/2” A307 bolts are adequate.
Check steel bolts at Snubber attachment to equipment base:

Max. tension per bolt (including orthogonal loading effect)

\[ T_{\text{bolt}} = \frac{P_v \cdot H}{2G} + \frac{0.3P_H \cdot H}{2K} + \frac{P_H}{4} = 1559 \text{ lbs} \]

Max. shear per bolt

\[ V_{\text{bolt}} = \frac{P_v}{4} = 269 \text{ lbs} \]

Steel bolt connection design per AISC, 14th Edition, Sections J3.6 & J3.7 (ASD):

For 1/2" A307 bolt,

\[ A_t = 0.142 \text{ in}^2 \quad A_k = 0.136 \text{ in}^2 \]

\[ F_{nt} = 45 \text{ ksi} \quad F_{nv} = 24 \text{ ksi} \]

\[ f_t = \frac{T_{\text{bolt}}}{A_t} = 10979 \text{ psi} \quad f_v = \frac{V_{\text{bolt}}}{A_k} = 1148 \text{ psi} \]

\[ T_{\text{allow}} = \frac{R_n \cdot A_b}{\Omega} = \frac{F_{nt} \cdot A_b}{2.0} = 4418 \text{ lbs} \]

Where, \( F_{nt} = 1.3 \cdot F_{nt} \cdot \frac{\Omega \cdot F_{nt}}{F_{nv}} \cdot f_v \leq F_{nt} \)

\[ V_{\text{allow}} = \frac{R_n \cdot A_b}{\Omega} = \frac{F_{nv} \cdot A_b}{2.0} = 2356 \text{ lbs} \]

\[ \frac{T_{\text{bolt}}}{T_{\text{allow}}} = 0.35 < 1.00 \quad \text{And} \quad \frac{V_{\text{bolt}}}{V_{\text{allow}}} = 0.11 < 1.00 \]

1/2" A307 bolts are adequate
# DUCT WEIGHTS

**GALVANIZED RECTANGULAR DUCT**

24 GAGE - SIZES 3” x 3” TO 28” x 28”

(LBS/FT)

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**NOTES:**

- WEIGHTS INCLUDE ALLOWANCE FOR LAPS AND SEAMS.
- REFER TO PAGE APP1.6 FOR DIFFERENT GAGE WEIGHT CONVERSIONS.
## DUCT WEIGHTS

GALVANIZED RECTANGULAR DUCT
22 GAGE - SIZES 30" x 3" TO 40" x 40"
(LBS/FT)

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**NOTES:**
- WEIGHTS INCLUDE ALLOWANCE FOR LAPS AND SEAMS.
- REFER TO PAGE APP1.6 FOR DIFFERENT GAGE WEIGHT CONVERSIONS.
# Duct Weights

**Galvanized Rectangular Duct**

20 Gauge - Sizes 42" x 3" to 58" x 58"

(LBS/FT)

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**Notes:**

Weights include allowance for laps and seams.

Refer to page APP1.6 for different gage weight conversions.
PIPE - TOC

ELEC - TOC

DUCT - TOC

DUCT WEIGHTS
GALVANIZED RECTANGULAR DUCT
18 GAGE - SIZES 60" x 6" TO 98" x 98"
(LBS/FT)

SIZE
(IN)

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NOTES:
WEIGHTS INCLUDE ALLOWANCE FOR LAPS AND SEAMS.
REFER TO PAGE APP1.6 FOR DIFFERENT GAGE WEIGHT CONVERSIONS.

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MASON WEST, INC.

1601 E. Miraloma Ave. Placentia, CA 92870
TEL (714) 630 - 0701, www.masonwest.com

10/09/2020

PAGE

Jiefu "Jeff" Zhang, SE
California SE No. S5270

APP1.3

836 of 846


**DUCT WEIGHTS**

**GALVANIZED ROUND DUCT**

30 TO 24 GAGE - SIZES 3" TO 84"

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**NOTES:**

- WEIGHTS INCLUDE ALLOWANCE FOR LAPS AND SEAMS.
- REFER TO PAGE APP1.6 FOR DIFFERENT GAGE WEIGHT CONVERSIONS.
# DUCT WEIGHTS

## GALVANIZED ROUND DUCT

22 TO 16 GAGE - SIZES 3" TO 84"

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**NOTES:**

WEIGHTS INCLUDE ALLOWANCE FOR LAPS AND SEAMS.

REFER TO PAGE APP1.6 FOR DIFFERENT GAGE WEIGHT CONVERSIONS.
### DUCT WEIGHTS

**GALVANIZED SHEET METAL CONVERSION CHARTS**

**TABLE A - CONVERTING LIGHTER GAGES TO HEAVIER GAGES**

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## PIPE WEIGHTS - STEEL

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## PIPE WEIGHTS - STEEL (CONT.)

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**MASON WEST, INC.**  
1601 E. Miraloma Ave. Placentia, CA 92870  
TEL (714) 630 - 0701, www.masonwest.com  

---

**Jiefu "Jeff" Zhang, SE**  
California SE No. S5270
## PIPE WEIGHTS - PVC

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### NO-HUB CAST IRON PIPE

(TYPICAL USES: WASTE, VENT, STORM DRAIN)

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### PRESSURE CLASS 150 CAST IRON PIPE

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#### INTERMEDIATE METAL CONDUIT (IMC) WEIGHT

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#### RIGID METAL CONDUIT (RMC) WEIGHT

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<th>Pipe Weight Per Foot (LBS)</th>
<th>Conductors</th>
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# CABLE TRAY WEIGHT TABLES

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<th>9&quot; (LBS/FT)</th>
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