OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

# APPLICATION FOR OSHPD PREAPPROVAL OF MANUFACTURER’S CERTIFICATION (OPM)

OFFICE USE ONLY
**APPLICATION #:** **OPM-0403-13**

## OSHPD Preapproval of Manufacturer’s Certification (OPM)

**Type:** ☐ New ☒ Renewal ☒ Update to Pre-CBC 2013 OPA Number: OPA-0485-07 (2007 CBC)

## Manufacturer Information

Manufacturer: TOMARCO / International Seismic Application Technology (ISAT)

Manufacturer’s Technical Representative: Anthony Rubalcava

Mailing Address: 14848 Northam Street, La Mirada, CA 90638

Telephone: 714-356-3286 Email: arubalcava@isatsb.com

## Product Information

Product Name: ISAT Seismic Restraint Hardware for Non-Structural Components

Product Type: Seismic Restraint Hardware For Suspended MEP Distributed Systems

Product Model Number: RCHWs, ABHWs, PIP, SDI, PRPIP, PRSDI, RCTF, TF, SERIES 2000 2PC STRUT CLAMPS, SERIES 7000 1PC STRUT CLAMPS, LRDs, LRDWB, WEDGY23, WEDGY45, SROH-1-1250 / 2865 AND SROH-1-50 / 1000 SPRING ASSEMBLY

General Description: Seismic Restraint Guidelines For Suspended MEP Distributed Systems

## Applicant Information

Applicant Company Name: TOMARCO / International Seismic Application Technology (ISAT)

Contact Person: Anthony Rubalcava

Mailing Address: 14848 Northam Street, La Mirada, CA 90638

Telephone: 714-356-3286 Email: arubalcava@isatsb.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2013.

Signature of Applicant: Anthony Rubalcava Date: 03/22/2019

Title: Principal Structural Engineer Company Name: TOMARCO / ISAT

“Access to Safe, Quality Healthcare Environments that Meet California’s Diverse and Dynamic Needs”

## Registered Design Professional Preparing Engineering Recommendations

Company Name: TOMARCO / ISAT

Name: Anthony Rubalcava California License Number: S4710

Mailing Address: 14848 Northam Street, La Mirada, CA 90638

Telephone: 714-356-3286 Email: arubalcava@isatsb.com

## OSHPD Special Seismic Certification Preapproval (OSP)

☐ Special Seismic Certification is preapproved under OSP-
(Separate application for OSP is required)

☐ Special Seismic Certification is not preapproved

## Certification Method(s)

☒ Testing in accordance with: ☐ ICC-ES AC156 ☒ FM 1950-10

☒ Other* (Please Specify): Approved OSHPD Cyclic Testing Protocol for Nonstructural Component and Assemblies (4-24-18)

*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):

## List of Attachments Supporting the Manufacturer's Certification

☒ Test Report ☒ Drawings ☒ Calculations ☒ Manufacturer's Catalog

☐ Other(s) (Please Specify):

## OFFICE USE ONLY – OSHPD APPROVAL VALID FOR CBC 2013 & ALL PRE-2013 CODE BASED PROJECTS

Signature: Date: December 19, 2019

Print Name: Ali Sumer

Title: District Structural Engineer

Condition of Approval (if applicable):

"Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs"

ISAT
TOTAL SUPPORT
Innovation • Engineering • BIM • Fabrication
A Division of Tomarco Contractor Specialties

# OSHPD PRE-APPROVAL OF MANUFACTURER CERTIFICATION

# OPM-0403-13 MANUAL

## Version 2.5

## SEISMIC RESTRAINT SYSTEMS GUIDELINES

## CALIFORNIA BUILDING CODE 2013 (CBC 2013)

*“Empowered by Experience”*

## *TABLE OF CONTENT*

Anthony A. Rubalcava
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## *INDEX - INTRODUCTION, GUIDELINES AND NOTES*

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# INTERNATIONAL SEISMIC APPLICATION TECHNOLOGY
## Engineered Seismic Bracing of Suspended Utilities

| | | |
|---|---|---|
| *Electrical Systems* | *Mechanical Piping* | *HVAC Duct* |
| *Plumbing Piping* | *Process Piping* | *Equipment* |

## INTRODUCTION
### *2013 California Building Code Compliant*

The International Seismic Application Technology (ISAT) *Applications, Design and Inspection Manual* provides guidelines for the design and installation of engineered seismic restraint systems for interior suspended utilities for OSHPD 1, 2 & 4 buildings regulated by the Office of Statewide Health Planning and Development (OSHPD). These applications include hospitals, skilled nursing facilities, intermediate care facilities and correctional treatment centers.

This pre-approval is limited to seismic bracing of interior pipes, ducts, and electrical raceways only. It does not address other loads such as, but not limited to, those generated by thermal growth, pressure, fluid dynamics, pipe rupture, or movement of equipment to which brace components are attached. It does not address components that cross seismic separation 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 utility components encompassed within the *Manual* are:

**DISTRIBUTED ELECTRICAL SYSTEMS (RACEWAYS) & EQUIPMENT**
- Electrical Conduit
- Cable Trays
- Bus Duct and Busway
- Suspended Equipment

**DISTRIBUTED PIPING SYSTEMS & MECHANICAL SYSTEMS**
- Mechanical Piping
- HVAC Duct
- Plumbing and Process Piping
- Suspended Equipment
- Fire Protection (Outside the scope of this manual)

The bracing details provide options for utilizing ISAT seismic restraint brackets in conjunction with approved Brace Arm Assembly options cataloged in Subsection "E" of the Manual.

**BRACING MEMBERS USED FOR OPM**
- Strut Channel
- Cable 7x19 Steel Small Diameter Galvanized Specialty Cord, ASTM A1023/A1023M Table 7
- EMT

## INTRODUCTION (CONTINUED)

### RANGE OF COMPONENT SIZES AND MATERIAL USED FOR OPM

- a) Pipes:
    - a. Steel; Sch. 10 and larger - Sizes up to 36"
    - b. Copper; Type L and K - Sizes up to 6”
    - c. Cast Iron Pipe - Sizes 2” - 15”
- b) Ducts:
    - a. Galvanized Rectangular Duct; all sizes up to 120" wide
    - b. Galvanized Round Duct; 3" to 72"
- c) Conduits/Cable Trays:
    - a. RMC Conduit - Sizes up to 6"
    - b. IMC Conduit - Sizes up to 4"
    - c. EMT Conduit - Sizes up to 4"
    - d. Cable trays -- ladder type, all sizes

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

- a. Concrete
- b. Metal Deck
- c. Steel
- d. Wood
- e. Masonry

# INTRODUCTION (CONTINUED)

## GENERAL CODE COMPLIANCE

ISAT installation details and engineered bracing tables are suitable for use under the following codes and requirements:

- 2013 California Building Code (CBC 2013)
- ASCE 7-10, Minimum Design Loads For Buildings and Other Structures, as amended by the CBC 2013

Exemptions from the seismic design of nonstructural components are defined by the CBC 2013 Section 1616A.1.18 for OSHPD 1 & 4 buildings and by ASCE 7-10, Sections 13.1.4 and 13.6 as amended by Chapter 16, 2013 CBC for OSHPD 2 buildings.

## SEISMIC FORCE FORMULAS

The *ISAT Applications, Design and Inspection Manual* provides seismic restraint requirements engineered for use within a broad range of horizontal accelerations. Information required at the beginning of the process includes project type, location, seismic force variables, and the seismic design specifications or performance criteria. Once these parameters have been determined and certain basic calculations have been performed, ISAT's Engineered Bracing Tables and Detail Drawings are used to define the seismic bracing requirements for the suspended utilities.

ASCE 7-10, Section 13.1.1 requires design of the seismic restraints for nonstructural components. The resultant construction documents are to be prepared by a registered design professional.

Seismic Design Force for the component, Fp, is calculated per ASCE 7-10 Equations 13.3-1 thru 13.3-3. In order to perform these calculations, it is first necessary that the project specific $S_{DS}$ value, be provided by the Engineer of Record or the Project Architect. The $S_{DS}$ value should be identified on the construction documents.

Note: Max allowable $S_{DS}$ for this OPM is limited to 2.5g

## SEISMIC FORCE VARIABLES

Spectral Response Acceleration at Short Periods, $S_{DS}$
Component Amplification Factor, $a_p$
Component Response Modification Factor, $R_p$
Component Importance Factor, $I_p$
Component Operating Weight, $W_p$
Height in Structure, Point of Component Attachment With Respect To Base, $z$
Average Roof Height With Respect To Base, $h$

Component importance factor, Ip, for design of supports and attachments shall be in accordance with the CBC 2013 Section 1616A.1.17 for OSHPD 1 & 4 buildings. Component importance factor, Ip, for OSHPD 2 buildings shall be in accordance with ASCE 7-10 Section 13.1.3

The ISAT Project Worksheet located at the back of the *Manual* is provided as a vehicle for gathering the required information. To obtain assistance in performing calculations, complete the Worksheet and transmit it to ISAT Technical Service. The resultant $F_p$ values will then be calculated by ISAT and returned in conjunction with project specific submittal documentation in accordance with OSHPD PIN 62.

## INTRODUCTION (CONTINUED)

### ISAT ENGINEERED BRACING TABLES

The cumulative result of applying the seismic demand formulas is the need to provide engineered seismic restraint systems covering a substantial range of possible horizontal accelerations. For simplicity, the worst case horizontal acceleration can be calculated at the underside of the roof deck and then used for all floors of the structure. However, to achieve economy of installation, the horizontal acceleration for each floor can be computed separately and used in conjunction with the ISAT bracing tables.

In response to this need ISAT has generated concise tables of the minimum restraint requirements for a broad array of component accelerations applied to commonly used suspended utilities.

Please note - The use of the ISAT Engineered Bracing Tables is only applicable in conjunction with the use of ISAT's family of seismic restraint hardware. No Substitutions Allowed.

### SECTION DESCRIPTIONS

This Manual encompass ten sections described below:

**Section 1**: **INTRODUCTION, GUIDELINES AND NOTES:** Includes introduction, design considerations, nomenclature, general application notes, and seismic bracing notes for suspended Mechanical, Electrical and Piping (MEP) bracing systems. In addition, tables with requirements and exceptions are included for different Seismic Design Categories (SDC).

**Section A - GENERAL LAYOUTS GUIDELINES, OFFSETS AND SETBACKS**: This section comprises general layouts guidelines, offsets and setbacks for MEP trades including single hung and trapeze applications. Trades included: Conduit, Steel Piping and HVAC Mechanical Ducts.

**Section B – MEP SYSTEMS SEISMIC BRACING CONSTRUCTION DETAILS:** General details for MEP seismic rigid and cable bracing construction are included in this section. Details are divided in subsections with drawings for single hung and trapeze supported applications for different services such as Conduit, Steel Pipe, HVAC Duct, Cable Trays, Bus Duct, Suspended Fans, among others.

**Section C – SEISMIC RESTRAINT ENGINEERED BRACING TABLES:** Seismic bracing tables incorporate engineered solutions using Seismic Design Forces ranging from 0.25G to 1.50G. The bracing tables present the minimum brace assemblies and anchorages (form pour and metal deck) required for the single hung and trapeze applications.

**Section D – BRACE ARM ANCHORAGE DETAILS:** This section contains drawings for connections to form pour and metal and decks, including PRPIP and PRSDI inserts. Post Installed anchorage load capacity details are included for Hilti and Powers. Structural member connections details such as beam to beam, open web steel, wood, and walls are presented in charts showing load capacities with construction notes.

**Section E – SEISMIC RESTRAINT BRACE ARM ASSEMBLIES:** This section defines the most common seismic restraint (rigid and cable) brace arm assemblies. Rigid bracing assembly connections include Tite-End True torque and strut nut connectors. Cable bracing Wedgy assembly connections include thru-bolted, cable clip and swaged connection details.

# INTRODUCTION (CONTINUED)

**Section F –** ISAT SEISMIC RESTRAINT HARDWARE: The ISAT seismic restraint hardware section includes brackets, Longitudinal Restraint Devices (LRD), pipe hanger accessories, inserts for PIP and Steel Deck (SDI) applications.

**Section G – VERTICAL SUPPORT SYSTEMS:** Vertical support systems section includes rod stiffening, strut channel, and structural steel load requirements. Also, maximum tension values for ISAT Blue Banger Hanger (BBH) and Push Rod Inserts. Load capacities of various post installed concrete anchorages are evaluated including Hilti and Powers anchors. Design is controlled by seismic forces. Non-seismic forces such as gravity are outside the scope of this OPM.

**Section H – GENERAL HARDWARE:** Into the general hardware section this Manual includes maximum design load tables for all-thread rods, strut channels, screws, and FM approved PHD Manufacturing hardware.

**Section X – REFERENCE DOCUMENTS:** This section includes weight charts for Steel piping, Copper tubing, Cast-Iron Pipe, Electrical conduit, and HVAC ducts.

Shannon Rose,
Director - Engineering Services

Anthony Rubalcava
Anthony Rubalcava
Principal Structural Engineer

Alejandro Contreras
Engineering Resource

## DESIGN CONSIDERATIONS

1. Information within the ISAT *Manual* is intended only as a guideline for the design of seismic restraint systems. It is not intended as the basis for the design of the suspended utility nor is it intended to be all inclusive of every element of the suspended utility. Certain elements of systems such as trapeze assemblies, support frames for suspended mechanical equipment or pipe anchors and guides for steam lines may require additional design, analysis and detailing by a Registered Design Professional.

2. Distribution system supports and attachment shall require submittal of layout drawings in accordance with OSHPD PIN 62 Item # 11

3. Any deviation from the ISAT Bracing Tables or ISAT Installation Details shall only be made using sound design practices by a qualified engineer with the approval of the Engineer of Record and OSHPD.

4. It is the responsibility of the Engineer of Record for the building to confirm suitability of the structure to accept the vertical support loads and seismic reactions generated as a result of these designs.

5. All ISAT brace assemblies employ proprietary ISAT seismic brackets, third party tested and witnessed by a licensed California structural engineer. No deviations or substitutions allowed without OSHPD review and approval, and the express written consent of ISAT. Any unauthorized deviation or substitution voids all engineering.

6. Use of ISAT's elemental engineering data for the generation of custom engineered bracing solutions is solely the responsibility of the designer. Consultation with ISAT is advised. ISAT design values are subject to change without notice.

7. Where California Building Standards Code, 2013 (CBSC 2013) specification or job requirements deviate from those shown in the ISAT *Manual*, the more stringent requirement shall prevail.

8. ISAT materials and design work are produced with a degree of care and skill ordinarily exercised by other reputable members of our profession. No other warranty, expressed or implied, is made.

9. Where design of nonstructural components or their supports is required by ASCE 7-10, as amended by the CBC 2013, such design shall be shown in the construction documents prepared by a registered design professional for use by the owner, building officials, contractors and inspectors.

## DESIGN CONSIDERATIONS (CONTINUED)

10. The installation of seismic restraints for nonstructural components is subject to special inspections, testing and observation in accordance with OSHPD approved Testing, Inspection and Observation (TIO) form.

11. 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:

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

    B. Verify that the proper ISAT brace system is selected to meet the seismic requirements of this OPM.

    C. Verify that the structure to which the ISAT seismic brace is anchored meets the requirements of the applicable anchorage ICC ESR Report.

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

    E. 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.

## DESIGN CONSIDERATIONS (CONTINUED)

12. Layout Drawings:
  - A. Layout drawings of the supports, attachments, and bracing systems in accordance with the pre-approval shall be submitted to the 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.
    - a. 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 braces installed in accordance with the pre-approval in addition to all other loads.
    - b. The SEOR shall forward the supports, attachments, and bracing drawings (including construction documents for supplementary framing, where required) to the discipline 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.
    - c. A "review stamp" may be used to indicate compliance with this requirement.
    - d. The Registered Design Professional (RDP), other than SEOR, may provide the shop drawing 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 construction documents.
  - C. The layout drawings with the review stamp, shall be submitted to OSHPD for verification of the following:
    - a. Structure supporting the distribution system has adequate capacity;
    - b. Seismic design forces ($F_P$) are in accordance with the 2013 CBC; and
    - c. Submittal is within the scope of OSHPD Preapproval of Manufacturer's Certification (OPM):
      - i. Size of distribution system components
      - ii. Spacing of bracing and flex. joints, and
      - iii. Substrate for attachments
      - iv. Review of those parts not approved through the OPM.
  - D. The layout drawings (with the shop drawing stamp) shall be kept on the jobsite and can then be used for installation of the support and bracing.
    - a. OSHPD field staff will review the installation.
  - 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.
    - a. It is the contractor's responsibility to obtain copies of the OPM and furnish the IOR with one copy of each.

## DESIGN CONSIDERATIONS (CONTINUED)

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

13. Post installed concrete anchors:

A. Meet requirements of 2013 CBC §1616A.1.19, & be installed per their ICC-ES ESR

B. Anchors to be tested in accordance with 2013 CBC §1913A.7.

## DESIGN CONSIDERATIONS (CONTINUED)

14. Post Installed Anchor Test Values:

| ANCHOR | ANCHOR SIZE (IN) | CONCRETE SLAB TEST VALUES | CONCRETE OVER METAL DECK TEST VALUES | TORQUE TEST VALUES (FT-LBS) |
|---|---|---|---|---|
| HILTI KWIK BOLT-TZ (ESR-1917) | 3/8" x 2" | 1515 | 890 | 25 |
| | 1/2" x 2" | 1605 | 890 | 40 |
| | 1/2" x 3 1/4" | 3281 | 1597 | 40 |
| | 5/8" x 3 1/8" | 3135 | N/A | 60 |
| | 5/8" x 4" | 4539 | 2831 | 60 |
| | 3/4" x 3 3/4" | 4120 | N/A | 110 |
| HILTI KWIK BOLT-TZ B DECK (ESR-1917) | 3/8" x 2" | N/A | 1012 | 25 |
| | 1/2" x 2" | N/A | 807 | 40 |
| | 1/2" x 3 1/4" | N/A | 1831 | 40 |
| | 5/8" x 3 1/8" | N/A | 1758 | 60 |
| POWER-STUD SD2 (ESR-2502) | 3/8" x 2" | 1402 | 881 | 20 |
| | 1/2" x 2" | 1605 | 893 | 40 |
| | 1/2" x 3 1/4" | 2921 | 1584 | 40 |
| | 5/8" x 3 1/4" | 3324 | N/A | 60 |
| | 5/8" x 4 1/4" | 4435 | 3178 | 60 |
| | 3/4" x 3 3/4" | 3892 | N/A | 110 |
| POWER-STUD SD2 - B DECK | 3/8" x 2" | N/A | 762 | 20 |
| | 1/2" x 2" | N/A | 874 | 40 |
| POWERS POWER WEDGE – BOLT (ESR-2526) | 3/8" x 1.43" | 724 | 868 | 245[10] |
| | 1/2" x 1.65" | 901 | 1069 | 300[10] |
| | 1/2" x 2.5" | 1682 | 1069 | 300[10] |
| | 5/8" x 3.10" | 2864 | 1624 | 350[10] |
| HILTI KWIK HUS-EZ (ESR-3027) | 1/4" x 1.18" | 357 | 378 | 114[10] |
| | 3/8" x 1.11" | 484 | 494 | 114[10] |
| | 1/2" x 1.52" | 1063 | 500 | 137[10] |
| | 1/2" x 3.22" | 3279 | 2057 | 450[10] |
| | 5/8" x 3.88" | 4337 | 3644 | 450[10] |
| POWERS SNAKE (ESR-2272) | 3/8" x 1 1/8" | 873 | 655 | 8 |
| POWERS VERTIGO (ESR-2526) | 1/4" x 1.425" | 724 | 859 | 185[10] |
| | 3/8" x 1.425" | 724 | 859 | 185[10] |
| | 1/2" x 1.425" | 724 | 859 | 185[10] |

| ANCHOR | ANCHOR SIZE (IN) | CMU Wall Test Values | TORQUE TEST VALUES (FT-LBS) |
|---|---|---|---|
| HILTI KB3 (ESR-1385) | 1/2" | 1450 | 25 |
| | 5/8” | 2070 | 65 |

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**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. TEST FREQUENCY: 50 percent or alternate bolts in a group, including at least one-half the anchors in each group, shall be tested. Exception: Where the factored design tension on anchors is less than 100 lbs. and those anchors are clearly noted on the approved construction documents, only 10 percent of those anchors shall be tested.
6. 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.
7. The following criteria apply for the acceptance of installed anchors:
    a. HYDRAULIC RAM METHOD: Anchors tested shall maintain the test load for a minimum of 15 seconds and exhibit no discernable movement at the applicable test load. A practical way to determine discernable movement is that the washer under the nut becomes loose.
    b. TORQUE WRENCH METHOD: The applicable test torque must be reached within ¼ turn of the nut for ⅜" diameter anchors and ½" turn of the nut for all others.
8. Testing should occur 24 hours minimum after installation of the subject anchors.
9. Refer to appropriate D and G pages for appropriate slab installation parameters. Refer to appropriate D and G pages for appropriate concrete over metal deck installation parameters.
10. Maximum Impact Wrench Torque (Values not applicable for hand wrench)

# NOMENCLATURE

| | |
|---|---|
| a | Acceleration |
| ABF | Angle Bracket, Fixed |
| ABHW | Anchor Bracket, Hinged Welded |
| AB45 | Angle Bracket, 45 Degree (w/ Factory Tied Wire) |
| AB90 | Angle Bracket, 90 Degree (w/ Factory Tied Wire) |
| ACI | American Concrete Institute |
| AHJ | Authority Having Jurisdiction |
| ASJ | All Service Jacket |
| ASCE | American Society of Civil Engineers |
| ASD | Allowable Stress Design |
| ASHRAE | American Society of Heating, Refrigerating and Air-Conditioning Engineers |
| ASME | American Society of Mechanical Engineers |
| ASTM | American Society for Testing and Materials |
| Anc | Anchor |
| ANSI | American National Standards Institute |
| ATR | All Thread Rod |
| AWG | American Wire Gage |
| Ax | Torsional Acceleration Factor |
| ap | Component Acceleration Factor |
| api | Acceleration at Level *i* for Modal Analysis |
| CB | Cable Brace Arm |
| CBC | California Building Code |
| CBS | Cross Bolt Sleeve |
| Dia | Diameter |
| Dp | Relative Seismic Displacement of a Component |
| Fp | Component Seismic Design Force |
| FSB | Flute Span Bracket |
| Ft, ft | Feet |
| ft-lbs | Foot-Pounds, Torque or Moment |
| Fv | Vertical Seismic Acceleration |
| G, g | Gravitation Force |
| Ga, ga | Gage |
| h | Average Roof Height |
| HVAC | Heating, Ventilation and Air Conditioning |

# NOMENCLATURE (CONTINUED)

| | |
|---|---|
| ICC | International Code Council |
| IFI | Industrial Fasteners Institute |
| Ip | Component Importance Factor |
| ISAT | International Seismic Application Technology |
| L | Longitudinal |
| Lbs | Pounds Force |
| lf | Linear Foot |
| LRD | Longitudinal Restraint Device |
| LRFD | Load and Resistance Factor Design |
| LWC | Sand Light Weight Concrete (See General Application Note No. 34, pg 4.4) |
| m | Meter |
| mm | Millimeter |
| Max | Maximum |
| MEP | Mechanical, Electrical and Plumbing |
| Mfg | Manufacturer |
| Min | Minimum |
| MSS | Manufacturers Standardization Society |
| NWC | Normal Weight Concrete |
| NFPA | National Fire Protection Association |
| OSHPD | Office of Statewide Health Planning and Development, CA |
| OSP | OSHPD Special Seismic Certification Preapproval per OSHPD PIN 55 |
| P | Brace Reaction |
| $P_h$ | Brace Reaction, Horizontal Component |
| $P_v$ | Brace Reaction, Vertical Component |
| PIP | Poured-In-Place Insert |
| Pl | Plate |
| PLF | Pounds Per Linear Foot |
| POR | Professional Of Record |
| PSI, psi | Pounds per Square Inch |
| RB | Rigid Brace Arm |
| rad | Radian |
| RCC | Rod Capture Cable Bracket |
| RCHW | Rod Capture, Hinged Welded Bracket |
| $S_{DS}$ | Design Spectral Acceleration, short period |
| SDF | Seismic Design Force (Fp) |
| SDI | Steel Deck Insert |
| SSC | Special Seismic Certification |
| s/m | Sheet Metal |

## NOMENCLATURE (CONTINUED)

| | |
|---|---|
| SMACNA | Sheet Metal And Air-Conditioning Contractors National Association |
| T | Transverse |
| TL | Transverse, Longitudinal |
| TR | Trapeze |
| TVL | Total Vertical Load |
| Wp | Component Operating Weight |
| Wshr | Washer |
| z | Component Attachment Height within the Structure |

## GENERAL APPLICATION NOTES

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

2. "Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7, as modified by the CBC 2013.

3. Project seismic design parameters shall be defined on the plans or within the construction documents by the Engineer of Record in accordance with CBC 2013 Section 1603A.1.5, "Earthquake design data". Specific earthquake data used for nonstructural seismic bracing design includes $S_{DS}$, z/h and $I_p$. Component Importance Factors are those assigned by the design team, not ISAT.

4. Information within the ISAT Manual is intended only as a guideline for the design of seismic restraint systems. It is not intended as the basis for the design of the suspended utility nor is it intended to be all inclusive of every element of the suspended utility. Certain elements of systems such as trapeze assemblies, support frames for suspended equipment may require additional design, analysis and detailing by a Registered Structural Engineer. Contact ISAT Technical Service for assistance.

5. All seismic bracing assemblies shall utilize ISAT supplied, proprietary, seismic brackets unless noted otherwise. No Substitutions Allowed.

6. The Engineer of Record for the building shall review the ISAT attachment details and loads to determine the suitability of the structure to accept such loads prior to installation of the seismic bracing system (Consistent with OSHPD PIN 62).

7. Component importance factor, $I_p$, for design of supports and attachments shall be in accordance with the CBC 2013 Section 1616A.1.17 for OSHPD 1 & 4 buildings. Component importance factor, $I_p$, for OSHPD 2 buildings shall be in accordance with ASCE 7-10 Section 13.1.3. Structural Engineer of Record shall assign the importance factor for OSHPD review and approval.

8. Every run which requires bracing shall have a minimum of two Transverse Brace locations and one Longitudinal Brace location.

9. For the purpose of these guidelines a "run" is defined as a suspended, distributed utility having a minimum of 10 foot straight run length. Refer to Page A1.2 for guidance on treating interconnected short runs with multiple off-sets.

10. If a change in run direction results in an offset in the run, the offset may not be required to be braced. Refer to specific guidelines per the "A" series pages.

## GENERAL APPLICATION NOTES (CONTINUED)

11. Solid strut provides higher design capacities than punched or slotted and may allow for greater brace spacing. The ISAT Bracing Tables, therefore, are based on the use of solid strut for rigid seismic restraint brace arm construction unless noted otherwise. Refer to page E1 for brace arm lengths and capacities. Punched or short slot channel may be used provided the reduced design values on Page E1.1 and E1.2 are accounted for.

12. For trapeze construction at seismic restraint locations, strut may be solid or punched with holes. Trapeze beam elements and maximum uniform loads are shown on Page G2.

13. Solid, punched or short slot strut may be used for rod stiffening per Page G1 and for rigid brace arms or as trapeze elements. Use short slot strut as trapeze elements only at non-seismic locations.

14. Strut with 3” long slot or large diameter knockouts are not to be used.

15. Where brace elements are through-bolted, the mounting hole in the element is to be no more than 1/16” in diameter larger than the bolt or threaded rod.

16. A Longitudinal Brace at a 90 degree change in direction may act as a Transverse Brace if it is located within 2 feet of the change in direction or within the set back distances per the “A” series pages. The brace arm and anchorage must be sized to meet or exceed the requirements of the tabulated total brace loads. A brace arm for a smaller distributed utility is not to be utilized as transverse or longitudinal brace for an adjoining run of a larger distributed utility.

17. A Transverse Brace at a 90 degree change in direction may act as a Longitudinal Brace if it is located within 2 feet of the change in direction or within the set back distances per the “A” series pages. The brace arm and anchorage must be sized to meet or exceed the requirements of the tabulated total brace loads. A brace arm for a smaller distributed utility is not to be utilized as transverse or longitudinal brace for an adjoining run of a larger distributed utility.

18. A brace arm for a smaller distributed utility is not to be utilized as a transverse or longitudinal brace for an adjoining run of a larger distributed utility.

19. When utilizing cable bracing (for other than vibration isolated systems or on piping likely to have thermal expansion and/or contraction), tension the cable to remove slack without inducing uplift of the suspended element. Cable installation is to be symmetrical.

20. Avoid bracing to structural elements which may respond differently in a seismic event.

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## GENERAL APPLICATION NOTES (CONTINUED)

21. As a general rule, do not mix rigid bracing and cable bracing within the same direction in the same run. However, once bracing has made a 90 degree change in run direction, the bracing type may switch from rigid to cable or vice versa when approved by OSHPD.

22. Bracing may be installed with up to +/- 7-½ degrees variation from “true” Transverse or “true” Longitudinal alignment without the need for additional engineering. Refer to installation details.

23. Minimum Rod Diameter sizes for seismic brace locations are shown within the ISAT “C” Series Engineered Bracing Tables. For locations utilizing cable brace arms, the rod size is based on dead load plus a vertical seismic acceleration force equal to 0.2 $S_{DS}$ $W_P$ in accordance with ASCE 7-10, Sections 12.4.2.2 and 13.3.1. Where rigid brace arms are to be utilized the vertical component of the seismic brace reaction has also been added to the rod load. Rod strength values are listed within the “H” series pages.

24. Compare ISAT minimum rod diameters to the local trade specific requirements and to the project specifications. The more conservative of the two shall govern.

25. Bolt connection strength and strut-nut slippage design values are based on the Manufacturer’s recommended bolt torque. If these are not given use the values listed here:

| | |
|---|---|
| 3/8” Diameter Bolt | 19 ft-lbs |
| 1/2" Diameter Bolt | 50 ft-lbs |
| 5/8” Diameter Bolt | 100 ft-lbs |

For RC-1, RC-2 and RC2.1 Rod Stiffener tightening requirements, refer to Page G1.

26. Project Engineer of Record to determine minimum required spacing from ceiling support wires to un-braced suspended utilities. Ceiling support and bracing wires shall be spaced a minimum of 6” from all pipes, ducts, conduits and equipment that are not braced for horizontal forces, unless approved otherwise by the building official.

## GENERAL APPLICATION NOTES (CONTINUED)

27. Post installed anchor strength values used for attachment of seismic bracing to concrete decks are based on combined tension and shear in accordance with the recommendations of the Manufacturer's data given in the ICC evaluation report for the anchor. Refer to anchor installation pages for anchor torque, minimum anchor spacing and edge distance requirements.

28. Post installed mechanical expansion anchor embedment shown on ISAT details is to be measured before the anchor setting torque is applied. The observed anchor projection after the proper torque is applied may increase by a maximum of one bolt diameter.

29. Seismic bracing may not pass through a structural seismic separation joint. Utility systems that pass through a seismic separation joint must be seismically restrained within 2 feet of both sides of the separation or within 2 feet of point of connection of any hardware designed to accommodate seismic movement across the span of the separation joint in accordance with ASCE 7-10 Section 13.3.2.2.

30. With the approval of the Structural Engineer of Record, utility systems within a basement that are suspended from the overhead deck may be braced to load bearing basement walls provided that the walls and the overhead deck will respond similarly during a seismic event.

31. The ISAT component design and published loads to the structure are working loads. Maximum anchorage design loads are working loads based on combined tension and shear. Anchor ultimate strength values have been converted to working loads in accordance with the anchor manufacturer's ICC Report.

32. For ISAT seismic restraint components, refer to Section F. For all general components refer to Section H, Approved Hardware and Qualified Manufacturers.

33. Where the Code allows seismic restraints to be omitted from a component, provisions shall be made to avoid seismic impact with other components or impact with elements of the building structure. Consequential damage risk analysis of non-braced components to be by others in accordance with CBC 2016, 1616A.1.21 Modification to ASCE 7, Section 13.5.6.2.2 Item #5.

34. For anchorage designs presented in this Manual, light weight concrete (LWC) is to be sand light weight concrete.

35. In developing the ISAT Bracing Tables, the pipe stress limitations of ASCE 7-10, Section 13.6.8 were determined and accounted for when engineering the Maximum Allowable Transverse Brace Spacing.

## GENERAL APPLICATION NOTES (CONTINUED)

36. Brace locations may be field relocated to an alternate support location within the same utility run when the length of the utility tributary to the brace does not exceed the brace spacing tabulated in the C-Series Bracing Tables. Anchorage and support rod details are to be taken from the Bracing Tables.

37. 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. Exception: Cast-iron (no-hub pipe) brace spacings shall be 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.

# HOW TO UTILIZE THE MANUAL

To effectively utilize the ISAT Engineered Bracing Tables and Detail Drawings, employ the following procedure.

Step One: **Determine “Seismic Design Force”**

1. Determine the “Seismic Design Force” (SDF) requirements for the project by gathering site specific seismic parameters from the plan set, contract documents and/or the Engineer of Record. See Project Information Worksheet in the back of the Manual. Most of the required information is typically found on the title sheet of the structural plans (commonly Dwg. S.0 or similar).

2. Using the “Structural Engineering Data” from the Project Worksheet calculate Seismic Design Force (Fp) per Formulae 13.3-1, 13.3-2 and 13.3-3 from ASCE 7-10, Section 13.3. The Code Formulae can be found on the ISAT Project Information Worksheet at the back of the Manual. The Component Coefficients, ap, Rp, are to be those taken from ASCE 7-10, Table 13.6-1.

$$F_p = \frac{0.4a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)}\left(1 + 2\frac{z}{h}\right) \qquad (13.3\text{-}1)$$

$F_p$ is not required to be taken as greater than

$$F_p = 1.6 S_{DS} I_p W_p \qquad (13.3\text{-}2)$$

and $F_p$ shall not be taken as less than

$$F_p = 0.3 S_{DS} I_p W_p \qquad (13.3\text{-}3)$$

3. The elevation “z”, the height in structure of point of attachment of the component with respect to the base of the structure plays an important role in deriving the SDF. Each story of the structure can have a different SDF value. When considering elevation and its influence there are several approaches which may be employed for calculating Seismic Design Force.

   a. To generate a single Seismic Design Force value which may be universally applied to the entire structure, calculate SDF utilizing the Roof Elevation as the factor for both *z* and *h.* This provides a worst-case result which may then be used on any story of the structure where $z \leq h$.

## HOW TO UTILIZE THE MANUAL – CONTINUED

b. For optimum economy of bracing installation, it may be desirable to calculate Seismic Design Force on a floor-by-floor basis. To do so, calculate SDF for each story using the elevation of the floor above as *z*, (eg. for the 3rd Floor, use the 4th Floor elevation in the calculation. For the Top Floor, use the Roof Elevation.) The results will be such that the lowest floor levels will require bracing to comply with a comparatively low seismic force while the upper floors will require bracing to comply with a much higher force.

c. For multi-story high rise construction, it may be desirable to group floors into quadrants for the purposes of calculating SDF. Using a 20-story structure, for example, consider the structure as 4 separate zones. Calculate SDF for the 5th Floor and apply this value to the 5th Floor and all Floors below it. Do the same for the 10th Floor and apply the result to all floors from 6 up through 10. Continue the same method up to the top of the structure.

d. Compare the results against minimum and maximum force requirements per Formulas 13.3-2 & -3.

e. As a final step before proceeding on to utilize ISAT's pre-engineered Bracing Tables, convert the results to Allowable Stress Design (ASD) by dividing the Seismic Design Force for the overall structure or for each floor by 1.4. Contact ISAT Technical Support if assistance is required in performing any of the above calculations.

f. ASCE 7-10 table 13.6-1requirement, "over-strength factor $\Omega_0$, required for anchorage to concrete" has been accounted for within the calculations for all pre-engineered anchorages within the ISAT Manuals and need not be applied to the values derived within the ISAT Worksheet.

Step Two: **Determine the Correct Bracing Table and Detail**

4. Refer to the Index of Electrical Systems Seismic Bracing Tables beginning on Page C0.1. Identify the Bracing Table most closely related to the calculated SDF value and the specific utility system being braced. When the SDF falls between two Horizontal Force break points, use the next higher Horizontal Force. Never round down. For elements suspended from a trapeze, determine the correct trapeze weight range in lbs/lf. When the trapeze weight falls between two break points, use the next higher trapeze weight range. Never round down.

   Note: Within certain parameters, the user may select from rigid, cable or wire bracing systems.

5. From the Bracing Table, select the correct row of information for the conduit size or trapeze weight range. The selected row defines the minimum requirements for installation of the vertical support and seismic restraints.

6. Next to the "Bracing Pattern" is the installation reference page (B Series). Turn to the series of pages indicated. Locate the detail most representative of the utility being braced and install the seismic restraints in compliance with the Bracing Table requirements, the requirements of the Brace Pattern Detail and associated call-outs

7. Prior to beginning installation, read a) the General Notes and b) the Seismic Bracing Notes – Suspended Electrical Systems, beginning on Pages 4.1 and 7.1 respectively.

Step Three: **Determine Brace Spacing, Brace Arms and Anchorage**

8. Lay out the seismic bracing on a run-by-run basis. Do not exceed the Maximum Transverse and Longitudinal Brace Spacing requirements from the Bracing Tables.

9. Construct the brace arms based on the Minimum Brace Assembly requirements from the Bracing Tables. See Pages E1 thru E4. for Assembly details and hardware requirements.

10. From the Bracing Table select the Minimum Brace Anchorage appropriate to the type of overhead concrete deck:

    Normal Weight Concrete (NWC); Page D1.

    Light Weight Concrete On Metal Deck (LWC); Page D2.

11. For Brace Anchorage connections to Structural Steel see the D3 thru D5 series pages. For Wood Framing see the D6 thru D7 series pages. For Wall Connections see the D8 series pages.

## EXAMPLES – HOW TO UTILIZE THE ISAT MANUAL

The examples that are provided are intended solely to demonstrate how to utilize the ISAT pre-engineered bracing Manual. The SDS values shown are those furnished by the USGS based on the zip code of the Central Post Office for the example city and have not been adjusted for site specific soil conditions. The values shown are not to be used for project specific purposes.

### EXAMPLE 1

Step One: **Determine "Seismic Design Force"**

Select an appropriate seismic restraint system for a 2 1/2" diameter steel pipe with welded connections on the 4th floor of a 4-story essential hospital facility in Anaheim. The pipe is suspended from the overhead roof deck. The overhead deck is composite 3" fluted metal deck and minimum 3,000 psi light weight concrete. The minimum concrete thickness is 3-1/4" above the top of the metal deck. Top of the deck is 60 feet above grade. Use rigid bracing for single hung pipe that is rigidly mounted at 45° from horizontal.

1. From the structural cover sheet of the contract drawings, the following information is used to complete the Structural Engineering Data section of the ISAT Project Worksheet.
    - Ip = 1.50 SDS = 0.94 Seismic Design Category: "F"
    - z = 60 feet h = 60 feet
2. Per ASCE 7-10, Table 13.6-1, for high deformability pipe with welded joints use ap = 2.5, Rp = 6 for anchorage per ASCE-7-10 section 13.4.1. You now have sufficient information to perform the SDF calculation as shown on the ISAT worksheet.
   Fp = 0.71g.

Step Two: **Determine the Correct Bracing Table**

1. Divide the result by 1.4 to arrive at "Allowable Stress Design" for use in applying the ISAT Engineered Bracing Tables.
    - 0.71/1.4 = 0.50 g's
2. Turn to Page C0.1
    - Select Page C11-0.5-45 for 0.50 g's Horizontal Force.

Step Three: **Determine Brace Spacing, Brace Arms and Anchorage**

1. From Page C11-0.5-45, using the row corresponding to 2 1/2" diameter pipe, read across the Table for the minimum Transverse Bracing Requirements:
    - Support the 2 1/2" pipe via a minimum 1/2" diameter threaded rod at a maximum of 10 feet o.c.
    - Install a 1-way transverse brace.

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## EXAMPLE 1. CONTINUED

- Maximum Transverse Brace Spacing to be 40 feet.
- Utilize a R12AAEM306 Brace Arm Assembly. Refer to Page E1.1-45° for assembly details. A R12AAEM306 consists of an RCHFR12 Rod Capture Bracket for connection to the vertical support rod, an appropriate length of "EM3" EMT per Page E0.1 and an RCTFR bracket for connection to the overhead structure. See pg. D2.1SD23, brace anchorage designation. Match 1SD23812 Anchor Type from page D2 and page D2.1SD23 for 3/8" x 2" anchor.
- The Transverse Minimum Brace Anchorage is to be an L3 anchorage. Refer to Page D2 which indicates that for an L3 anchorage we may utilize a post installed anchor from one of the pre- approved manufacturers shown.
- Turn to Page B1.4 for a detail of the proper method for installation of the Transverse Brace Arm.
- Brace assembly capacities have been checked against LRD transverse design loads per pages F7, F7.1 and F7.6.

2. Continue reading across Table C11-05.45 for the minimum Longitudinal Brace Spacing Requirements:
    - At a maximum distance of 40 feet beyond the previous brace point and no more than 80 feet from the start of the run, install another Transverse Brace per the steps above.
    - At the same location, install a Longitudinal Restraint Device and (1) Longitudinal Brace Arm.
    - Utilize a R12AAEM406 Brace Arm Assembly.
    - The requirements for the Transverse Minimum Brace Anchorage are the same as stated above.
    - The Longitudinal Minimum Brace Anchorage is to be an L6 level anchorage. Refer to Page D2 which indicates that for an L6 anchorage we may utilize a post installed anchor from one of the pre-approved manufacturers shown.
    - Refer to Page B3.0, B3.1 or B3.3 for the proper installation detail for installing both the Transverse and Longitudinal brace arms at the same hanger location. See page D2.1SD23, brace anchorage designation. Match 1SD21218 anchor type from D2 and page D2.1SD23 for 1/2"x 3/8" anchor.
    - Brace assembly capacities have been checked against LRD longitudinal design loads per pages F7, F7.1 and F7.6.
3. Turn to pages G1 and G1.1 to determine Rod Stiffener requirements for the 1/2" diameter vertical support rod.

## EXAMPLE 2

### Step One: Determine “Seismic Design Force”

Select an appropriate seismic restraint system for a 5th floor, non-vibration isolated rectangular duct weighing 33 pounds per lineal foot located in an 8-story essential hospital facility Hemet. The overhead deck is a form pour slab six inches thick consisting of minimum 4,000 psi normal weight concrete. The trapeze is 36” wide from center-to-center of the support rods and is suspended every 10 feet on center. The weight of the duct is distributed uniformly on the trapeze. For this example, we will elect to use rigid bracing installed at 45° from horizontal.

1. From the structural cover sheet of the contract drawings, the following information is used to complete the Structural Engineering Data section of the ISAT Project Worksheet.
    - Ip = 1.50 SDS = 1.146 Seismic Design Category: “F”
    - z = 75 feet h = 120 feet
2. Per ASCE 7-10, Table 13.6-1, for non-welded, non-vibration isolated HVAC duct use ap= 2.5, Rp = 6.0. You now have sufficient information to perform the SDF calculation as shown on the ISAT worksheet. Fp = 0.64g.

### Step Two: Determine the Correct Bracing Table

1. Divide the result by 1.4 to arrive at “Allowable Stress Design” for use in applying the ISAT Engineered Bracing Tables.
    - 0.64/1.4 = 0.46 g’s
    - Round 0.46 g’s up to 0.50.
2. Turn to Page C0.1.
    - From the index on Page C0.1 select Page C21-0.5-45, Bracing Table for maximum 0.50 g’s horizontal force.
    - The Bracing Table indicates that the Page B30.0 or B33.0 bracing details are to be utilized for installation of 1-way transverse braces. Turning to these respective details, the user will see that the appropriate size duct trapeze element is to be selected from Page G2.
    - From Page G2 determine whether or not the trapeze may be constructed of “B1”, 12 ga., 1-5/8 x 1-5/8 Single Channel for gravity loads. The trapeze vertical gravity load equals 330 pounds (33 pounds per lineal foot x 10 foot hanger spacing). Per Page G2 the Maximum Uniform Load for a 36” span of solid channel “B1” single channel = 940 pounds. For “B1” with 9/16” diameter punched holes, Maximum Uniform Load = 840 pounds. Therefore, from the B1 chart, B1 channel at a 36” span has adequate capacity. Use B1 as the trapeze element at transverse only seismic locations. Instructions for trapeze elements at longitudinal locations are provided at the end of this example.

## EXAMPLE 2. CONTINUED

### Step Three: Determine Brace Spacing, Brace Arms and Anchorage

1. From Page C21-0.5-45, select the row corresponding to a maximum trapeze weight of 35 lbs/lf .
2. To meet the minimum Transverse Bracing Requirements:
    - Minimum support rod diameter to be 5/8”. Trapeze spacing to be 10 feet o.c. maximum.
    - Install a single Transverse Brace on one of the 2 support rods.
    - Maximum Brace Spacing to be 30 feet.
    - Utilize R58AAEM506 Brace Arm Assemblies. Refer to Page B30.0 for assembly details. A R58AAEM506 consists of an RCTFR58 Rod Capture Bracket for connection to the trapeze, an appropriate length of EM5 EMT per Page E0.1 and an RCTFR bracket for connection to the overhead structure.
    - The Transverse Minimum Brace Anchorage is to be a N9 anchorage. Refer to Page D1 which indicates that for an N9 anchorage we may utilize post installed anchors from one of the pre-approved manufacturers shown. See page D1.1SD24, brace anchorage designation. Match 1SD25819 anchor type from D1 and page D1.1SD24 for 5/8” x 3 1/4” anchors.
    - Refer to Page B30.0 for the proper method for installation of the Transverse Brace Arm.
3. To meet the minimum Longitudinal Brace Spacing Requirements, continue reading across the Table for the minimum Longitudinal Brace Spacing Requirements. Refer to Page B30.2 for assembly details.
    - At a maximum distance of 60 feet beyond the previous brace point, install another brace per the steps above.
    - At the same location, install (2) R58AAEM506 Longitudinal Brace Arm Assemblies, one to each rod. A R58AAEM506 consists of an RCTFR58 Rod Capture Bracket for connection to the trapeze, an appropriate length of EM5 EMT per Page E0.1 and an RCTFR bracket for connection to the overhead structure.
    - The Longitudinal Minimum Brace Anchorage is to be an N11 anchorage. Refer to Page D1 which indicates that for an N11 anchorage we may utilize a PIP Blue Banger Hanger cast-in- place deck insert or post installed anchors from one of the pre-approved manufacturers shown. See page D1.1SD24, brace anchorage designation. Match 1SD25824 anchor type from D1 and page D1.1SD24 for 5/8” x 4 1/4” anchors.
    - Turn to Page B30.2 for the proper method for installing the Transverse and Longitudinal Brace Arms.

## EXAMPLE 2. CONTINUED

4. Turn to Page G1 to determine Rod Stiffening requirements for the 5/8” diameter vertical support rod at all Transverse and Longitudinal Brace Locations.
5. Because, by code, bi-axial bending of the trapeze strut must be considered, at trapeze locations with longitudinal bracing the trapeze strut member must be sized using information from the G3 page series. From Bracing Table Page C21-0.5-45 we know that the maximum longitudinal brace spacing is 80 feet. From the G3-Series pages with G = 0.60, a 8 x longitudinal brace spacing and a total load of 330 pounds we find that the section best meeting these requirements is “B2” channel rated for 330 pounds per Page G3.2 with a max span of 36 inches.

## SEISMIC BRACING NOTES

## SUSPENDED ELECTRICAL SYSTEMS

1. In compliance with the 2013 CBC, seismic bracing is to be installed for all suspended distributed electrical systems and suspended electrical equipment per ISAT's engineered bracing tables, ISAT's installation details and the following criteria.

| BRACING REQUIREMENTS FOR ELECTRICAL SERVICES | | |
|---|---|---|
| **Seismic Design Category** | **$I_P$ [a]** | **Service Bracing Requirements** |
| D, E, F | $\geq$1.0 | Brace Conduit > 2-1/2" Trade Size or<br>Brace Trapeze (Refer to CBC 2013 Section 1616A.1.23 for Additional Requirements) Assemblies Supporting Raceways $\geq$ 10 lbs/lf |
| EXCEPTIONS | ALL | Light Fixtures Suspended From the Structure Having Attachments Designed To Accommodate 1.4 x Weight In Both the Vertical and Horizontal Directions and With 360° Range of Motion. And In-Lay Ceiling Grid Light Fixtures < 56 Lbs With Safety Wires Per ASTM E580. Refer to ASCE 7-10 Section 13.6.1, ASTM E580 & 2013 CBC 1616A.1.20 for additional requirements. |

**a. $I_p$ = Component Importance Factor.**

2. Where bracing is allowed to be omitted, connections between any fixed juncture, equipment or component are to be installed with adequate flexibility to accommodate differential displacements.

3. Conduit > 2.5" connected to panels, cabinets or other equipment to be installed with flexible connections or designed for seismic forces and seismic relative displacements.

4. For Seismic Design Categories D, E or F, brace suspended components where component $I_p$ > 1.0. Component Importance Factors are those assigned by the design team, not ISAT. Component importance factor, $I_p$, for design of supports and attachments shall be in accordance with the CBC 2013 Section 1616A.1.17 for OSHPD 1 & 4 buildings. Component importance factor, $I_p$, for OSHPD 2 buildings shall be in accordance with ASCE 7-10 Section 13.1.3.

5. Where the actual weight of the conduit plus conductor is unknown, refer to ISAT's conduit weight charts, Section X.

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## SEISMIC BRACING NOTES

## SUSPENDED ELECTRICAL SYSTEMS (CONTINUED)

6. Seismic design is not required for:
   a. Components weighing $\le$ 20 lbs or distributed systems $\le$ 5 lb/lf that have flexible connections between the equipment and associated utilities, where components are positively attached to structure.
   b. Floor supported components weighing less than 400 lbs., with a center of mass located 4 ft or less above the adjacent floor, the component is attached via flexible connections between itself and associated utilities (conduit, piping, etc.) and the component is positively attached to the floor *(CBC 2013 Section 1616A.1.18)* except components requiring Special Seismic Certification.
7. Seismic restraints are not required for conduit, cable trays and other electrical distributed systems (raceways) if the following conditions are met for the full length of the run *(CBC 2013 Section 1616A.1.23)*:
   a. The raceway is supported by hangers and each hanger in the raceway run is 12 in. or less from the raceway support point to the overhead supporting structure.
   b. When rod hangers are used with a diameter greater than 3/8 in. they shall be equipped with swivels to prevent inelastic bending in the rod.
   c. Provisions are made for raceways to accommodate expected deflections.
8. Tests, Special Inspections and Observations (TIO) shall be in accordance with OSHPD approved TIO form.
9. Brace spacing shall not exceed the maximum allowable brace spacing as engineered by ISAT. Refer to individual ISAT bracing charts compiled by conduit size or trapeze weight. See C-Series pages.
10. All seismic bracing assemblies shall utilize ISAT supplied, proprietary, seismic brackets unless noted otherwise. Any substitution shall be subject to ISAT review and OSHPD approval.

## SEISMIC BRACING NOTES

## SUSPENDED ELECTRICAL SYSTEMS (CONTINUED)

11. Every raceway which requires bracing shall have a minimum of two transverse braces and one longitudinal brace. For the purposes of this Manual, a “run” is defined as suspended raceway of 10 foot minimum straight length.

12. A longitudinal brace at a 90 degree change in direction may act as a transverse brace if it is within 2 feet of the change in direction or located within prescribed distances from the change in direction as shown on pages A6.0 and A6.1. The brace arm and anchorage must be sized to meet or exceed the requirements of the total brace reaction. A brace arm for a smaller distributed utility is not to be utilized as transverse or longitudinal brace for an adjoining run of a larger distributed utility.

13. A transverse brace at a 90 degree change in direction may act as a longitudinal brace if it is within 2 feet of the change in direction or located within prescribed distances from the change in direction as shown on pages A6.0 and A6.1. The brace arm and anchorage must be sized to meet or exceed the requirements of the total brace reaction. A brace arm for a smaller distributed utility is not to be utilized as transverse or longitudinal brace for an adjoining run of a larger distributed utility.

14. A transverse brace for a smaller raceway is not to be utilized as the longitudinal brace for an adjoining run of a larger raceway. A longitudinal brace for a smaller raceway is not to be utilized as the transverse brace for an adjoining run of a larger raceway.

15. All longitudinal brace locations, for individually supported conduit, shall employ an ISAT Longitudinal Restraint Device (LRD) as illustrated on F7 series pages and installed per the individual detail drawings within section B of the manual.

16. Standard supports in accordance with ASME B31, NFPA 13 or MSS SP-58 designed by tested load rating or analysis considering all loads are acceptable. There shall be a vertical support within 12’’ of all seismic braces to ensure a seismic load path.

17. Vertical support spacing for electrical components is to be the lesser of 10 foot maximum, or the minimum as dictated by the California Electrical Code, 2013 (CEC 2013), as listed in the project specifications, or as allowed by the local code authority.

18. Each layer of a multi-layer trapeze rack shall be braced individually based on the weight of the individual layer, or as specifically engineered by ISAT. Layers supporting loads < 10 lbs/lf need not be braced provided that the load is accounted for in the nearest braced layer.

## SEISMIC BRACING NOTES

## SUSPENDED ELECTRICAL SYSTEMS (CONTINUED)

19. When used to construct a rigid brace arm assembly, minimum 12 gauge steel channel shall be solid, punched or short slot channel. Brace arm design values shown on Page E1.1 and E1.2.

20. When using back-to-back 12 gauge steel channel as a trapeze assembly, raceways may be mounted to both the top and the underside provided the limitations of Page G2 and G3 are not exceeded.

21. When using back-to-back 12 gauge steel channel as a trapeze assembly, raceways may be mounted to both the top and the underside provided the limitations of Page G2 and G3 are not exceeded.

22. Batteries on racks shall have wrap-around restraints with spacers between restraints and cells. Refer to ASCE 7-10 Section 13.6.4 Item #3.

23. Pull boxes in-line with conduit are not electro-mechanical devices and are not required to be seismically braced unless otherwise called for in the construction documents. Brace pull boxes greater than 75 lbs.

# SEISMIC BRACING NOTES

## SUSPENDED MECHANICAL PIPING

1. In compliance with the 2013 CBC, seismic bracing is to be installed on all suspended pipe and equipment per ISAT's engineered bracing tables, ISAT's installation details and the following criteria:

**BRACING REQUIREMENTS FOR MECHANICAL PIPING SERVICES**

| Seismic Design Category | $I_P$ [a] | Service Bracing Requirements |
|---|---|---|
| ***Steel or Copper Piping Systems* [b]** | | |
| D, E, F | 1.0 | Brace All Pipe > 3" Diameter |
| | 1.5 | Brace All Pipe > 1" Diameter<br>Exceptions: Single Hung Pipe With Non-Hazardous Content With An Operating Weight ≤ 5 lbs/lf.;<br>- Sch. 40 Steel Vent Lines ≤ 2" Diameter<br>- Full Sch. 40 Steel Lines ≤ 1-1/2" Diameter<br>- Copper Vent Lines < 3-1/2" Diameter<br>- Full Copper Lines ≤ 2" Diameter |
| | All | Brace All Trapeze Assemblies Supporting Loads ≥ 10 Lbs/Lf And No Single Pipe Exceeds The Limits in 1616A.1.26 ASCE 7, 13.6.8.3(3a) & (3b) |
| EXCEPTIONS | All | Piping Systems Designed And Braced in Accordance with ASCE 7, Section 13.6.8.1 and ASME B31. |
| ***Cast Iron Piping Systems* [b]** | | |
| D, E, F | All | Brace All Pipe With Non-Hazardous Content With An Operating Weight > 5 lbs/lf:<br>- No-Hub Cast Iron Gravity Lines > 2" Diameter<br>- No-Hub Cast Iron Vent Lines > 3" Diameter |

**a. $I_p$ = Component Importance Factor.**

**b. Use of flexible connectors required between un-braced piping and components.**

1.1. For Seismic Design Categories D, E or F, brace suspended components where component $I_p > 1.0$. Component Importance Factors are those assigned by the design team, not ISAT. Component importance factor, $I_p$, for design of supports and attachments shall be in accordance with the CBC 2013 Section 1616A.1.17 for OSHPD 1 & 4 buildings. Component importance factor, $I_p$, for OSHPD 2 buildings shall be in accordance with ASCE 7-10 Section 13.1.3.

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## SEISMIC BRACING NOTES

### SUSPENDED MECHANICAL PIPING (CONTINUED)

2. Where the component does not convey hazardous content, seismic design is not required for:

   a. Components weighing $\leq$ 20 lbs or distributed systems $\leq$ 5 lbs/lf ($I_p \geq 1.0$, CBC) that have flexible connections between the equipment and associated utilities, where components are positively attached to structure, except components requiring Special Seismic Certification *(2013 CBC, 1616A.1.18).*

   b. Components weighing less than 400 lbs., with a center of mass located 4 ft or less above the adjacent floor or roof, the component is attached via flexible connections between itself and associated utilities (conduit, piping, etc.) and the component is positively attached to the floor or roof *(2013 CBC, 1616A.1.18)* except components requiring Special Seismic Certification.

3. For any situation in which seismic bracing is allowed to be omitted, flexible connections are to be provided between the components and piping. Provisions are to be made to avoid or protect the pipe from impact.

4. Un-braced, suspended piping attached to components is to be installed with adequate flexibility to accommodate differential displacements.

5. Seismic restraints are not required for piping components if the following conditions are met for the full length of the run:

   a. The piping is supported by hangers and each hanger from the top of the pipe is 12 in. or less in length to the supporting structure for single hung pipe or the hangers are 12 in. or less for trapeze hangers.

   b. When rod hangers are used (> 3/8” dia., CBC), they shall be equipped with swivels to prevent inelastic bending in the rod.

6. For the purpose of calculating weight, pipe weights are to be the operating weights, include weight of pipe insulation as required. If actual pipe weight is unknown, refer to pipe weight charts in Section X.

7. Tests, Special Inspections and Observations (TIO) shall be in accordance with OSHPD approved TIO form.

8. Brace spacing shall not exceed the maximum allowable brace spacing as engineered by ISAT. Refer to individual ISAT bracing charts compiled by pipe size or trapeze weight. See Index Page C.0.

## SEISMIC BRACING NOTES

### SUSPENDED MECHANICAL PIPING (CONTINUED)

9. When calculating seismic design force for pipes constructed of low deformability materials such as cast iron, the value $R_p$ = 3.0 is to be utilized.

10. All seismic bracing assemblies shall utilize ISAT supplied, proprietary seismic brackets unless noted otherwise. Any substitution shall be subject to ISAT review and OSHPD approval.

11. Every pipe run which requires bracing shall have a minimum of two transverse braces and one longitudinal brace. For the purposes of this *Manual*, a “run” is defined as suspended piping of 10 foot minimum straight length.

12. 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. Exception: Cast-iron (no-hub pipe) brace spacings shall be 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.

13. A longitudinal brace at a 90 degree change in direction may act as a transverse brace if it is within 2 feet of the change in direction or located within prescribed distances from the change in direction as shown on pages A4.0 through A5.1. The brace arm and anchorage must be sized to meet or exceed the requirements of the total brace reaction. A brace arm for a smaller distributed utility is not to be utilized as transverse or longitudinal brace for an adjoining run of a larger distributed utility.

14. A transverse brace at a 90 degree change in direction may act as a longitudinal brace if it is within 2 feet of the change in direction or located within prescribed distances from the change in direction as shown on pages A4.0 through A5.1. The brace arm and anchorage must be sized to meet or exceed the requirements of the total brace reaction. A brace arm for a smaller distributed utility is not to be utilized as transverse or longitudinal brace for an adjoining run of a larger distributed utility.

15. A transverse brace for a smaller pipe is not to be utilized as the longitudinal brace for an adjoining run of larger pipe. A longitudinal brace for a smaller pipe is not to be utilized as the transverse brace for an adjoining run of larger pipe except when specifically engineered by ISAT technical support.

# SEISMIC BRACING NOTES

## SUSPENDED MECHANICAL PIPING (CONTINUED)

16. Except where transverse braces are acting as a longitudinal brace at a change in direction, all longitudinal brace locations, for individually supported pipe, shall employ an ISAT Longitudinal Restraint Device (LRD) as illustrated on F7 series pages and installed per the individual detail drawings within section B of the manual.

17. Standard supports in accordance with ASME B31, NFPA 13 or MSS SP-58 designed by tested load rating or analysis considering all loads are acceptable. There shall be a vertical support within 12'' of all seismic braces to ensure a seismic load path.

18. Vertical support spacing for trapeze mounted pipe runs is to be the lesser of 10 foot maximum or the maximum as dictated by the CPC 2013 or CMC 2013, as listed in the project specifications.

19. Each layer of a multi-layer trapeze rack shall be braced individually based on the weight of the individual layer, or as specifically engineered by ISAT. Layers supporting loads < 10 lbs/lf need not be braced provided that the load is accounted for in the nearest braced layer.

20. This OPM is limited to seismic bracing of interior pipes only. It does not address other loads such as, but not limited to, those generated by thermal growth, pressure, fluid dynamics, pipe rupture, or movement of equipment to which brace components are attached. It does not address components that cross seismic separation 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. Project specific design and OSHPD approval shall be required for design not covered by the OPM.

21. When used to construct a rigid brace arm assembly, minimum 12 gauge steel channel shall be solid, punched or short slot channel. Brace arm design values shown on Page E1.1 and E1.2.

22. Vertical pipe systems supported at each floor shall be considered seismically braced if the pipe has a riser clamp or bracket appropriately designed for seismic and vertical loads or if the penetration through each floor is tightly packed with approved insulation or firestops, satisfying NFPA 13-13 Section 9.3.5.8.5 and floor to floor spacing does not exceed maximum spacing tabulated in the C-series Bracing tables. Tops of risers exceeding 3 ft. shall be provided with supports or bracing appropriately designed. Where this bracing is attached to the horizontal piping, it shall be installed within 2 ft. of the riser.

## SEISMIC BRACING NOTES

### SUSPENDED MECHANICAL PIPING (CONTINUED)

23. Re-insulate any locations where pipe insulation had been originally removed for direct attachment of Longitudinal Restraint Devices (LRD) to single hung pipe.

24. When using back-to-back 12 gauge steel channel as a trapeze assembly, pipe may be mounted to both the top and the underside provided the limitations of Page G2 and G3 are not exceeded.

### VIBRATION ISOLATED PIPING

1. ISAT includes designs for the seismic restraint of vibration isolated piping suspended from spring hangers. However, design of the vibration isolated support system itself must be accomplished separately on a job specific basis by a qualified engineer. Hanger design shall satisfy PIN 62, item #12 and springs must have OSHPD approval for strength and stiffness.

2. Install vibration isolation hardware per manufacturer's instructions to achieve the required degree of isolation and/or deflection.

3. Vibration isolated hangers that also require seismic bracing shall be braced using galvanized steel cable or minimum 12 gage hanging wire tied to ISAT designed and tested seismic brackets.

4. Cable to be installed with sufficient slack to accommodate, but not exceed, the vibration isolators calculated deflection. See manufacturer's vibration isolator specifications. Do not tension cables to the extent that they support gravity loads. Cable installation is to be symmetrical.

## SEISMIC BRACING NOTES

### HVAC DUCT AND MECHANICAL COMPONENTS

1. In compliance with the 2013 CBC, seismic bracing is to be installed on all suspended HVAC duct runs and mechanical components per ISAT's engineered bracing tables, ISAT's installation details and the following criteria.

**BRACING REQUIREMENTS FOR SUSPENDED HVAC DUCT AND MECHANICAL COMPONENTS**

| Seismic Design Category | $I_P$ [a] | Service Bracing Requirements |
|---|---|---|
| D, E, F | > 1.0 | Brace <u>All</u> Duct Designed To Carry Or Convey Toxic, Highly Toxic Or Flammable Gases Or Used For Smoke Control. |
| | ≥ 1.0 | Brace All Duct Having A Cross-Sectional Area > 6 $ft^2$ |

a. **$I_p$ = Component Importance Factor.**

1.1. For Seismic Design Categories D, E or F, brace suspended components where component $I_p$ > 1.0. Component Importance Factors are those assigned by the design team, not ISAT. Component importance factor, $I_p$, for design of supports and attachments shall be in accordance with the CBC 2013 Section 1616A.1.17 for OSHPD 1 & 4 buildings. Component importance factor, $I_p$, for OSHPD 2 buildings shall be in accordance with ASCE 7-10 Section 13.1.3.

2. Where component $I_p$ = 1.0, seismic restraints are not required for:

   a. Components weighing ≤ 20 lbs or distributed systems ≤ 5 lbs/lf ($I_p$ ≥ 1.0, *CBC*) having flexible connections between equipment and associated utilities, where components are positively attached to structure, except components requiring Special Seismic Certification *(2013 CBC, 1616A.1.18)*.

   b. Floor supported components weighing less than 400 lbs., with a center of mass located 4 ft or less above the adjacent floor, the component is attached via flexible connections between itself and associated utilities (conduit, piping, etc.) and the component is positively attached to the floor *(2013 CBC, 1616A.1.18)* except components requiring Special Seismic Certification.

# SEISMIC BRACING NOTES

## HVAC DUCT AND MECHANICAL COMPONENTS (CONTINUED)

3. Components that are installed in-line with the duct system and have an operating weight greater than 75 lbs (334N), such as fans, heat exchangers and humidifiers, shall be supported and laterally braced independent of the duct system. If the in-line device requires special seismic certification or use an OSP (OSHPD Special Seismic Certification Preapproval per OSHPD PIN 55), support & lateral brace shall be provided as specified in the certification or OSP document, regardless of the in-line duct device operating weight.

4. 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.

5. Un-braced piping attached to in-line components or equipment shall be provided with adequate flexible connections to accommodate seismic relative displacements.

6. Design duct for the displacements across seismic joints, regardless of size, weight or where hanger length ≤ 12 inches.

7. Bracing for suspended components installed in-line with the duct system is not required where the operating weight is ≤ 75 lbs. unless:

    a. The components convey, support or otherwise contain toxic, highly toxic or explosive substances, flammable gasses or are used for smoke control. *(ASCE 7-10, Sec. 13.6.7)*

    b. The component is a "Designated Seismic System" (Ip >1.0) *(ASCE 7-10, Sec. 13.2.2)* and is within or attached to a Risk Category IV structure. *(ASCE 7-10, Sec. 13.1.3).* The load path from the component to the structure is to be per the equipment Special Seismic Certification and the manufacturer's instructions. Where such guidance does not exist for a Designated Seismic System, engineered restraints are to be provided. *(ASCE 7-10, Sec. C13.6.5.5).*

8. 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 directly connected to the ductwork on each end (no flexible connections) may be considered part of the duct run and do not require independent support and seismic bracing if the weight if the duct on each side of the component equals or exceeds the weight of the component; or if the duct is braced with the mass of the in-line component considered in the forces tributary to the adjacent braces. Unbraced piping attached to in-line components or equipment shall be provided with adequate flexibility (e.g. flexible connections or (3) 90 degree elbows) to accommodate the seismic relative displacements.

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# SEISMIC BRACING NOTES

## HVAC DUCT AND MECHANICAL COMPONENTS (CONTINUED)

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 the in-line duct device operating weight.

9. Seismic restraints are not required for duct components if the following conditions are met for the full length of the run:
    a. The duct is supported by hangers and each hanger in the run is 12 in. or less in length from the duct support point to the overhead supporting structure.
    b. When rod hangers are used (> 3/8” dia., CBC), they shall be equipped with swivels to prevent inelastic bending in the rod.
10. Where bracing is allowed to be omitted:
    a. Flexible connections are required between any fixed juncture or component and the connecting HVAC duct.
    b. Provisions are to be made to avoid impact with larger ducts or mechanical components or to protect the ducts in the event of impact.
11. All trapeze assemblies supporting ducts shall be braced considering the total weight of the duct(s) and insulation on the trapeze. If the actual weight of the duct is unknown, refer to Duct Weight Charts, Section X.
12. All seismic bracing assemblies shall utilize ISAT supplied, proprietary seismic brackets unless noted otherwise. Any substitution shall be subject to ISAT review and OSHPD approval.
13. Brace spacing shall not exceed the maximum allowable brace spacing as engineered by ISAT. Refer to individual ISAT bracing charts compiled by duct trapeze weight. See Index Page C.0.
14. Every HVAC duct run which requires bracing shall have a minimum of two transverse braces and one longitudinal brace. For the purposes of this *Manual*, a run is defined as a suspended element of 10 foot minimum straight length.
15. A rigid transverse brace shall be installed on one side of a horizontal 90 degree change in duct direction.

## SEISMIC BRACING NOTES

## HVAC DUCT AND MECHANICAL COMPONENTS (CONTINUED)

16. A transverse brace may act as a longitudinal brace if it is located within two duct widths of a 90 degree change in direction, if the brace arm and anchor have been sized to meet or exceed the requirements of the longitudinal brace and the transverse brace is installed on the larger of the two ducts or as engineered by ISAT technical support.

17. A longitudinal brace may act as a transverse brace if it is located within two duct widths of a 90 degree change in direction, if the brace arm and anchor have been sized to meet or exceed the requirements of the transverse brace and the longitudinal brace is installed on the larger of the two ducts or as engineered by ISAT technical support.

18. Tests, Special Inspections and Observations (TIO) shall be in accordance with OSHPD approved TIO form.

19. Flexible connections at walls are not allowed as Transverse Brace locations.

20. Where a duct passes through a wall may be considered a transverse brace location provided the duct is tightly constrained and it is a rigid connection. The ability of a breakaway smoke damper to act as a transverse brace location is to 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.

21. Vertical support spacing for trapeze mounted duct is to be the lesser of 10 foot maximum, or the maximum as dictated by the California Mechanical Code.

22. Each layer of a multi-layer trapeze rack shall be braced individually based on the weight of the individual layer, or as specifically engineered by ISAT. Layers supporting loads < 10 lbs/lf need not be braced provided that the load is accounted for in the nearest braced layer.

23. All vertical riser ducts shall include engineered lateral restraint and vertical supports at the top and bottom of the riser and at each intermediate floor not to exceed a maximum interval from the C-series Bracing Tables. The lateral seismic restraint and the vertical support shall be engineered on an individual project basis.

## SEISMIC BRACING NOTES

## HVAC DUCT AND MECHANICAL COMPONENTS (CONTINUED)

24. Vertical risers which are mechanically attached to floors at the point of penetration are considered a transverse and longitudinal brace location when the supports and anchorages are sized to accommodate the lateral load.

25. When used to construct a rigid brace arm assembly, minimum 12 gauge steel channel shall be solid, punched or short slot channel. Brace arm design values shown on Page E1.1 and E1.2.

## VIBRATION ISOLATED HVAC DUCT AND MECHANICAL COMPONENTS

1. ISAT includes designs for the seismic restraint of vibration isolated piping suspended from spring hangers. However, design of the vibration isolated support system itself must be accomplished separately on a job specific basis by a qualified engineer. Hanger design shall satisfy PIN 62, item #12 and springs must have OSHPD approval for strength and stiffness.

2. Install vibration isolation hardware per manufacturer's instructions to achieve the required degree of isolation and/or deflection.

3. Vibration isolated hangers that also require seismic bracing shall be braced using galvanized steel cable or minimum 12 gage hanging wire tied to ISAT designed and tested seismic brackets.

4. Cable to be installed with sufficient slack to accommodate, but not exceed, the vibration isolators calculated deflection. See manufacturer's vibration isolator specifications. Do not tension cables to the extent that they support gravity loads. Cable installation is to be symmetrical.

## SEISMIC BRACING NOTES

## SUSPENDED PLUMBING PIPING

1. In compliance with the 2013 CBC, seismic bracing is to be installed on all suspended pipe and equipment per ISAT's engineered bracing tables, ISAT's installation details and the following criteria:

| BRACING REQUIREMENTS FOR PLUMBING PIPING SERVICES | | |
|---|---|---|
| **Seismic Design Category** | **$I_P$ [a]** | **Service Bracing Requirements** |
| ***Steel or Copper Piping Systems [b]*** | | |
| D, E, F | 1.0 | Brace All Pipe > 3" Diameter Except Pipe With An Operating Weight ≤ 5 lbs/lf. |
| | >1.0 | Brace All Pipe > 1" Diameter<br>Exceptions: Pipe With Non-Hazardous Content With An Operating Weight ≤ 5 lbs/lf.;<br>- Sch. 40 Steel Vent Lines ≤ 2" Diameter<br>- Full Sch. 40 Steel Lines ≤ 1-1/2" Diameter<br>- Copper Vent Lines < 3-1/2" Diameter<br>- Full Copper Lines ≤ 2" Diameter |
| | ≥1.0 | Brace All Trapeze Assemblies Supporting Loads ≥ 10 Lbs/Lf And No Single Pipe Exceeds The Limits in 1616A.1.26 ASCE 7, 13.6.8.3 (3a) & (3b) |
| EXCEPTIONS | All | Piping Systems Designed And Braced in Accordance with ASCE 7, Section 13.6.8.1 and ASME B31. |
| ***Cast Iron Piping Systems [b]*** | | |
| D, E, F | All | Brace All Pipe With Non-Hazardous Content With An Operating Weight > 5 lbs/lf:<br>- No-Hub Cast Iron Gravity Lines > 2" Diameter<br>- No-Hub Cast Iron Vent Lines > 3" Diameter |

**a. $I_p$ = Component Importance Factor.**

**b. Use of flexible connectors required between un-braced piping and components.**

1.1. For Seismic Design Categories D, E or F, brace suspended components where component $I_p$ > 1.0. Component Importance Factors are those assigned by the design team, not ISAT. Component importance factor, $I_p$, for design of supports and attachments shall be in accordance with the CBC 2013 Section 1616A.1.17 for OSHPD 1 & 4 buildings. Component importance factor, $I_p$, for OSHPD 2 buildings shall be in accordance with ASCE 7-10 Section 13.1.3.

## SEISMIC BRACING NOTES

### SUSPENDED PLUMBING PIPING (CONTINUED)

2. Seismic design is not required for:
   a. Components weighing ≤ 20 lbs. or distributed systems ≤ 5 lbs/lf that have flexible connections between the equipment and associated utilities, where components are positively attached to structure.
   b. Floor supported components weighing less than 400 lbs., with a center of mass located 4 ft or less above the adjacent floor, the component is attached via flexible connections between itself and associated utilities (conduit, piping, etc.) and the component is positively attached to the floor *(CBC 2013 Section 1616A.1.18)* except components requiring Special Seismic Certification.
3. For any situation in which seismic bracing is allowed to be omitted, flexible connections are to be provided between the components and piping. Provisions are to be made to avoid or protect the pipe from impact.
4. Un-braced, suspended piping attached to components is to be installed with adequate flexibility to accommodate differential displacements.
5. Seismic restraints are not required for piping components if the following conditions are met for the full length of the run:
   a. The piping is supported by hangers and each hanger from the top of the pipe is 12 in. or less in length to the supporting structure for single hung pipe or the hangers are 12 in. or less for trapeze hangers.
   b. When rod hangers are used (> 3/8” dia., CBC), they shall be equipped with swivels to prevent inelastic bending in the rod.
6. For the purpose of calculating weight, pipe weights are to be the operating weights, include weight of pipe insulation. If actual pipe weight is unknown, refer to pipe weight charts in Section X.
7. Tests, Special Inspections and Observations (TIO) shall be in accordance with OSHPD approved TIO form.
8. Brace spacing shall not exceed the maximum allowable brace spacing as engineered by ISAT. Refer to individual ISAT bracing charts compiled by pipe size or trapeze weight. See Index Page C.0.

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## SEISMIC BRACING NOTES

### SUSPENDED PLUMBING PIPING (CONTINUED)

9. When calculating seismic design force for pipes constructed of low deformability materials such as cast iron, the value $R_p$ = 3.0 is to be utilized.

10. All seismic bracing assemblies shall utilize ISAT supplied, proprietary seismic brackets unless noted otherwise. Any substitution shall be subject to ISAT review and OSHPD approval.

11. Every pipe run which requires bracing shall have a minimum of two transverse braces and one longitudinal brace. For the purposes of this *Manual*, a “run” is defined as suspended piping of 10 foot minimum straight length.

12. 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.

13. A longitudinal brace at a 90 degree change in direction may act as a transverse brace if it is within 2 feet of the change in direction or located within prescribed distances from the change in direction as shown on pages A4.0 through A5.1. The brace arm and anchorage must be sized to meet or exceed the requirements of the total brace reaction.

14. A transverse brace at a 90 degree change in direction may act as a longitudinal brace if it is within 2 feet of the change in direction or located within prescribed distances from the change in direction as shown on pages A4.0 through A5.1. The brace arm and anchorage must be sized to meet or exceed the requirements of the total brace reaction.

15. A transverse brace for a smaller pipe is not to be utilized as the longitudinal brace for an adjoining run of larger pipe. A longitudinal brace for a smaller pipe is not to be utilized as the transverse brace for an adjoining run of larger pipe except when specifically engineered by ISAT technical support.

16. Except where transverse braces are acting as a longitudinal brace at a change in direction, all longitudinal brace locations, for individually supported pipe, shall employ an ISAT Longitudinal Restraint Device (LRD) as illustrated on F7 series pages and installed per the individual detail drawings within section B of the manual.

## SEISMIC BRACING NOTES

### SUSPENDED PLUMBING PIPING (CONTINUED)

17. Standard supports in accordance with ASME B31, NFPA 13 or MSS SP-58 designed by tested load rating or analysis considering all loads are acceptable. There shall be a vertical support within 12'' of all seismic braces to ensure a seismic load path.

18. Vertical support spacing for trapeze mounted pipe runs is to be the lesser of 10 foot maximum or the maximum as dictated by the CPC 2013 or CMC 2013, as listed in the project specifications.

19. Each layer of a multi-layer trapeze rack shall be braced individually based on the weight of the individual layer, or as specifically engineered by ISAT. Layers supporting loads < 10 lbs/lf need not be braced provided that the load is accounted for in the nearest braced layer.

20. This OPM is limited to seismic bracing of interior pipes only. It does not address other loads such as, but not limited to, those generated by thermal growth, pressure, fluid dynamics, pipe rupture, or movement of equipment to which brace components are attached. It does not address components that cross seismic separation 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. Project specific design and OSHPD approval shall be required for design not covered by the OPM.

21. When used to construct a rigid brace arm assembly, minimum 12 gauge steel channel shall be solid, punched or short slot channel. Brace arm design values shown on Page E1.1 and E1.2.

22. Vertical pipe systems supported at each floor shall be considered seismically braced if the pipe has a riser clamp or bracket appropriately designed for seismic and vertical loads or if the penetration through each floor is tightly packed with approved insulation or firestops, satisfying NFPA 13-13 Section 9.3.5.8.5 and floor to floor spacing does not exceed maximum spacing tabulated in the C-series Bracing tables. Tops of risers exceeding 3 ft. shall be provided with supports or bracing appropriately designed. Where this bracing is attached to the horizontal piping, it shall be installed within 2 ft. of the riser.

23. Re-insulate any locations where pipe insulation had been originally removed for direct attachment of Longitudinal Restraint Devices (LRD) to single hung pipe.

24. When using back-to-back 12 gauge steel channel as a trapeze assembly, pipe may be mounted to both the top and the underside provided the limitations of Page G2 and G3 are not exceeded.

## VIBRATION ISOLATED PIPING

1. ISAT includes designs for the seismic restraint of vibration isolated piping suspended from spring hangers. However, design of the vibration isolated support system itself must be accomplished separately on a job specific basis by a qualified engineer. Hanger design shall satisfy PIN 62, item #12 and springs must have OSHPD approval for strength and stiffness.

2. Install vibration isolation hardware per manufacturer's instructions to achieve the required degree of isolation and/or deflection.

3. Vibration isolated hangers that also require seismic bracing shall be braced using galvanized steel cable or minimum 12 gage hanging wire tied to ISAT designed and tested seismic brackets.

4. Cable to be installed with sufficient slack to accommodate, but not exceed, the vibration isolators calculated deflection. See manufacturer's vibration isolator specifications. Do not tension cables to the extent that they support gravity loads. Cable installation is to be symmetrical.

## INDEX - GENERAL LAYOUTS GUIDELINES, OFFSETS & SETBACKS

*PAGE* *DESCRIPTION*

*CONDUIT*

*PIPING AND MECHANICAL*

*STEEL AND IRON PIPE*

*COPPER TUBING*

*SEISMIC BRACING EXCLUSIONS*

OPM-0403-13
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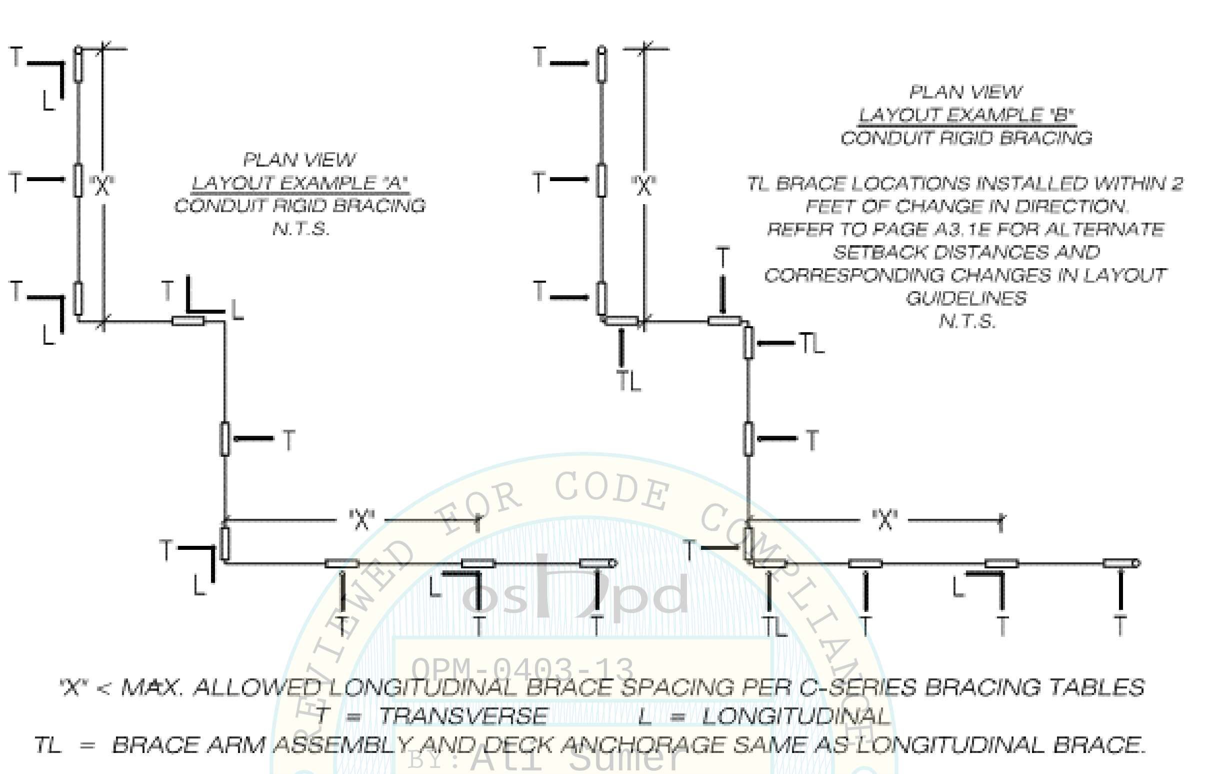
*Rev. 0*
*12/28/18*

# GENERAL LAYOUT GUIDELINES

## SINGLE HUNG CONDUIT



"X" < MAX. ALLOWED LONGITUDINAL BRACE SPACING PER C-SERIES BRACING TABLES

T = TRANSVERSE L = LONGITUDINAL

TL = BRACE ARM ASSEMBLY AND DECK ANCHORAGE SAME AS LONGITUDINAL BRACE.

1. From the Engineered Bracing Table, C-Series pages, for a specific size of conduit determine the allowable Maximum Transverse and Longitudinal Brace Spacing.

2. As you begin laying out bracing, every pipe run which requires bracing shall have a minimum of two Transverse Braces and one Longitudinal Brace. For the purposes of this manual, a “run” or an “offset” is defined as suspended pipe of 10 foot minimum straight length.

3. Beginning at one end of a straight run install a Transverse brace at the beginning and at the end of the run.

4. From the first hanger, proceed a distance equal to the Maximum Transverse Brace Spacing. Install Transverse Bracing at the nearest hanger not exceeding this distance. Continue from this hanger location repeating the procedure until the Transverse brace at the end of the run is arrived at.

## GENERAL LAYOUT GUIDELINES

## SINGLE HUNG CONDUIT (CONTINUED)

5. Determine the maximum allowable Longitudinal Brace spacing from the Engineered Bracing Table. Layouts “A” and “B” above for ductile conduit provide two examples of rational Longitudinal brace placement. Longitudinal Bracing is typically installed at twice the spacing of Transverse Bracing.

   As shown the number of hanger locations requiring bracing may be minimized by the judicious placement of bracing at changes in run direction. If a Transverse Brace is installed within 2 feet of a change in run direction or as shown on page A4.1, it may also serve as the Longitudinal Brace for the next portion of the run provided that the brace arm, brace attachments and the deck anchorage have been sized to meet the requirements of the Longitudinal Brace.

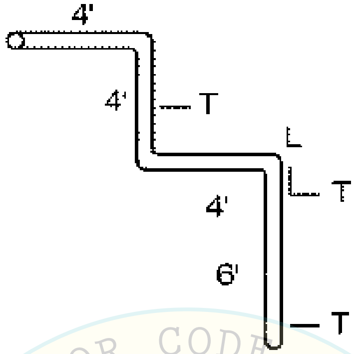
   Similarly, a Longitudinal Brace at a 90 degree change in direction may act as a Transverse Brace if it is located within 2 feet of the change in direction or spaced as shown on Page A4.1.

6. Refer to Pages A3.0E thru A3.1E for additional offset and setback allowances.

7. Diagonal brace component must be within 12” of a vertical brace component assembly; vertical assembly may require restraints if assembled with a threaded rod.

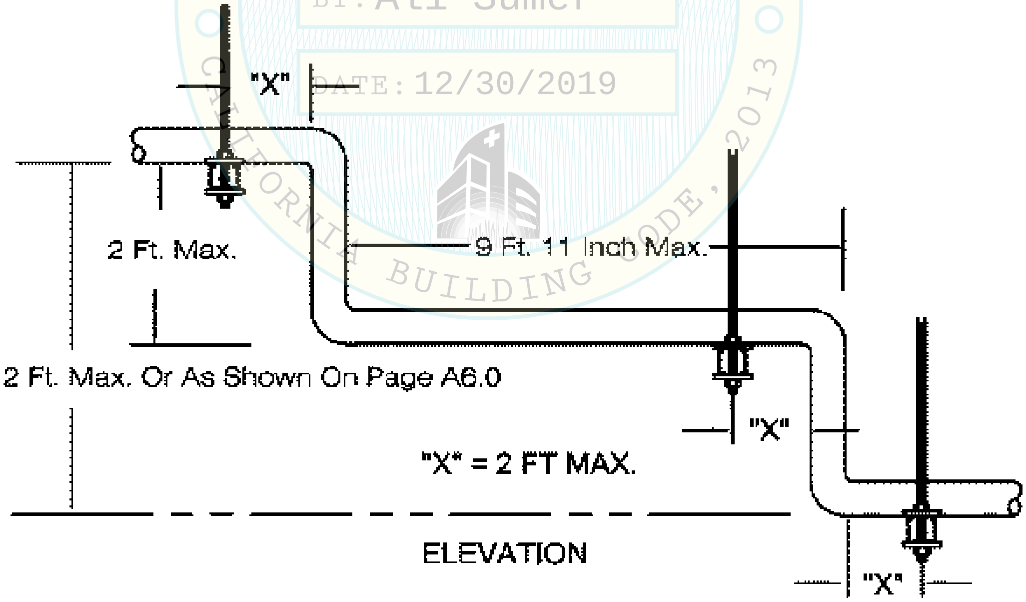
# GENERAL LAYOUT GUIDELINES

## SINGLE HUNG CONDUIT (CONTINUED)



**PLAN VIEW (N.T.S.)**

**BRACING LAYOUT GENERAL EXAMPLE**
**SHORT OFFSETS NOT EXCEEDING 10 FOOT CUMULATIVE LENGTH**
**T - TRANSVERSE BRACE ARM ASSEMBLY AND DECK ANCHORAGE**
**L - LONGITUDINAL BRACE ARM ASSEMBLY AND DECK ANCHORAGE**



ELEVATION

**FOR SEISMIC RESTRAINT PURPOSES**
**WHERE CUMULATIVE VERTICAL RISE ≤ 2 FT OVER A HORIZONTAL SPAN NO GREATER THAN 9 FT. 11 IN., TREAT AS A CONTINUOUS RUN.**

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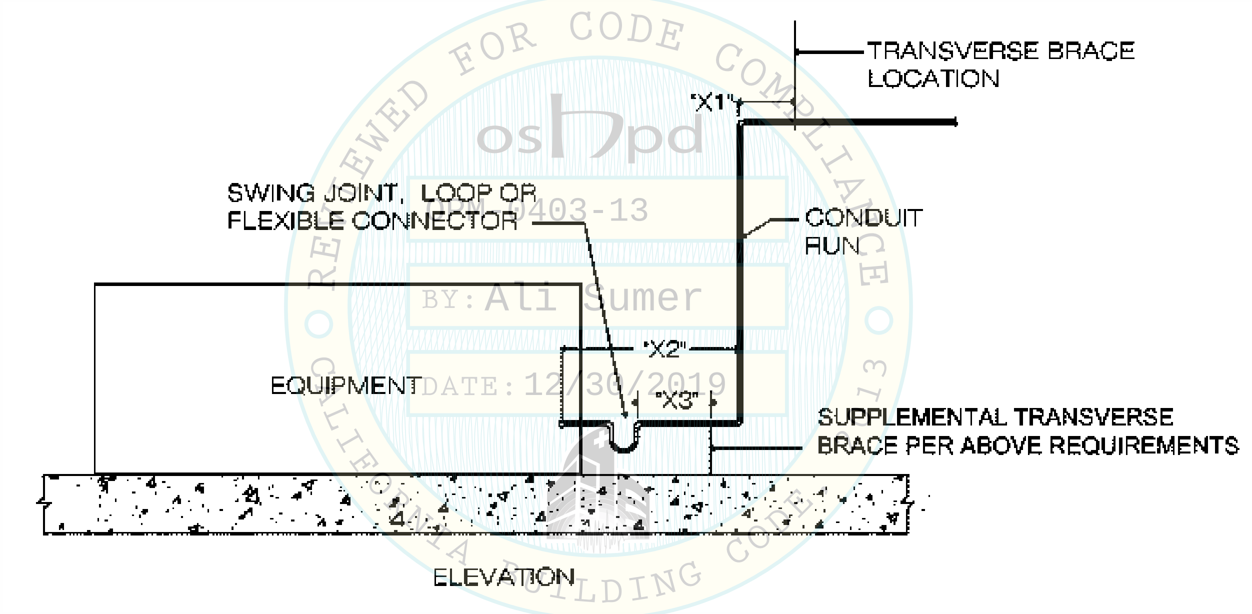
## GENERAL LAYOUT GUIDELINES

## SINGLE HUNG CONDUIT (CONTINUED)

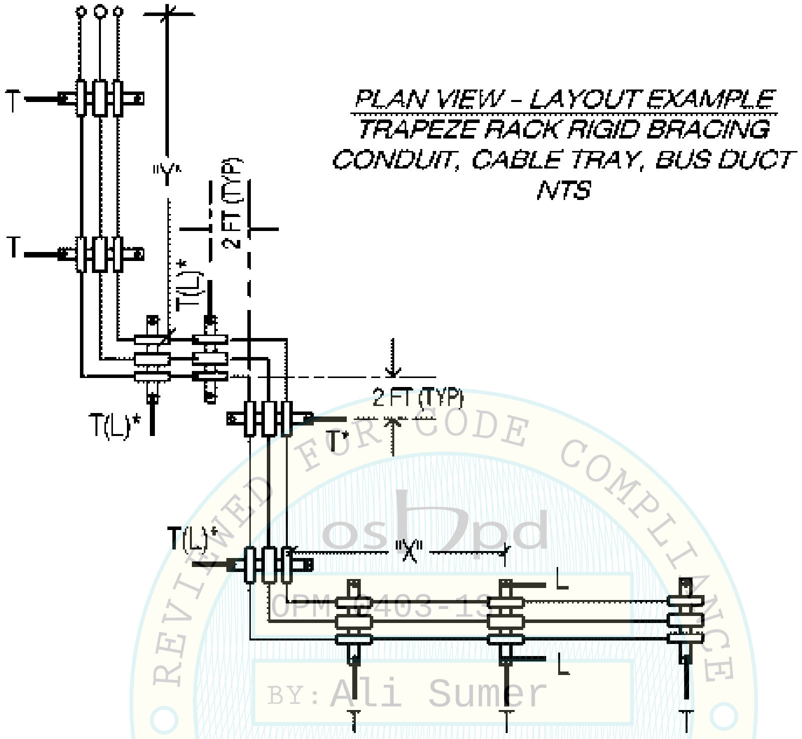
8. Where conduit runs drop vertically to floor mounted equipment, install a transverse brace on the last hanger before the drop. Last hanger (X1) must be within 2 feet of the drop for conduit up to 3” diameter or within 5 feet of the drop for larger conduit sizes. If the final length of conduit run (X2) leading up to connection to the equipment after the vertical drop exceeds 10 feet and the conduit is elevated 6 feet or less above the floor, install a transverse brace from the conduit to the floor. If the conduit is more than 6 feet above the floor, brace to the overhead structure. To minimize point of connection stress, conduit connections to equipment are to include a swing joint, flexible connector or loop.



ELEVATION

# GENERAL LAYOUT GUIDELINES

## TRAPEZE MOUNTED ELECTRICAL RACEWAYS



PLAN VIEW - LAYOUT EXAMPLE
TRAPEZE RACK RIGID BRACING
CONDUIT, CABLE TRAY, BUS DUCT
NTS

"X" AND "Y" ≤ MAX. ALLOWED LONGITUDINAL BRACE SPACING

T(L)* - BRACE ARM ASSEMBLY AND DECK ANCHORAGE SAME AS LONGITUDINAL BRACE. SUITABLE WHERE CONNECTION WITHIN 2 FEET OF CHANGE IN DIRECTION.

1. From the Engineered Bracing Table, C-Series pages, for the correct weight range of trapeze rack determine the Maximum Transverse and the Maximum Longitudinal Brace Spacing.

2. As you begin laying out bracing, every trapeze run which requires bracing shall have a minimum of two Transverse Braces and one Longitudinal Brace. For the purposes of this manual, a "run" or an "offset" is defined as suspended trapeze of 10 foot minimum straight length.

## GENERAL LAYOUT GUIDELINES

## TRAPEZE MOUNTED ELECTRICAL RACEWAYS (CONTINUED)

3. Begin at one end of the run and determine the length of the initial straight run. If the initial run is less than the required Transverse Brace spacing, install Transverse Bracing at the first and last hanger location. If the Transverse Brace on the last hanger is to also act as a Longitudinal Brace for the next run, ensure that the installed brace arm and anchorage meet the Engineered Bracing Table requirements for the Longitudinal Brace.

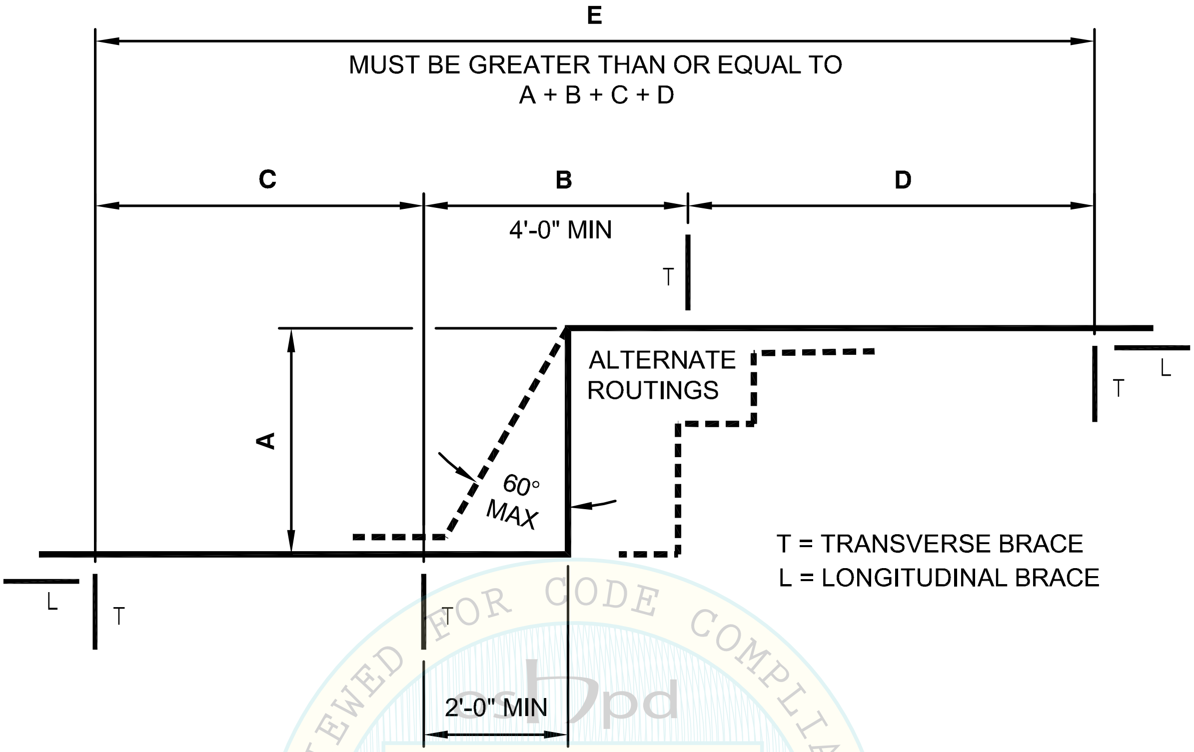
   If the initial straight run is greater than the Maximum Transverse Brace spacing but less than the Maximum Longitudinal Brace Spacing, the initial Transverse Brace may be installed beyond the start of the run at a maximum distance of 1/2 the allowed Transverse Brace spacing.

4. After installing the initial Transverse Brace, proceed along the run a distance equal to the Maximum Transverse Brace Spacing. Install Transverse and Longitudinal bracing at the nearest hanger not exceeding this distance.

5. Repeat this procedure to completion of the entire run.

6. The ultimate number of installed brace arms may be minimized by the judicious placement of bracing at changes in run direction. If a Transverse Brace is installed within 2 feet of a 90 degree change in run direction, it may also serve as the Longitudinal Brace for the next portion of the run provided that the brace arm and the deck anchorage have been sized to meet the requirements of the Longitudinal Brace.

7. Similarly, a Longitudinal Brace at a 90 degree change in direction may act as a Transverse Brace if it is located within 2 feet of the change in direction.



| MAXIMUM OFFSET DIMENSION CONDUIT (RMC) | |
|---|---|
| **A** | 1/2 OF MAX TRANSVERSE BRACE SPACING FROM C-SERIES BRACING TABLES. |
| **B** | 1/2 OF MAX TRANSVERSE BRACE SPACING FROM C-SERIES BRACING TABLES. |
| **C & D** | MAX TRANSVERSE BRACE SPACING FROM C-SERIES BRACING TABLES. |
| **E** | MAX LONGITUDINAL BRACE SPACING FROM C-SERIES BRACING TABLES. |

NOTES:

1. REFER TO C-SERIES BRACING TABLES FOR LONGITUDINAL AND TRANSVERSE BRACE SPACING AND BRACE LOADS.

# MAXIMUM OFFSET DIMENSION - CONDUIT (RMC)

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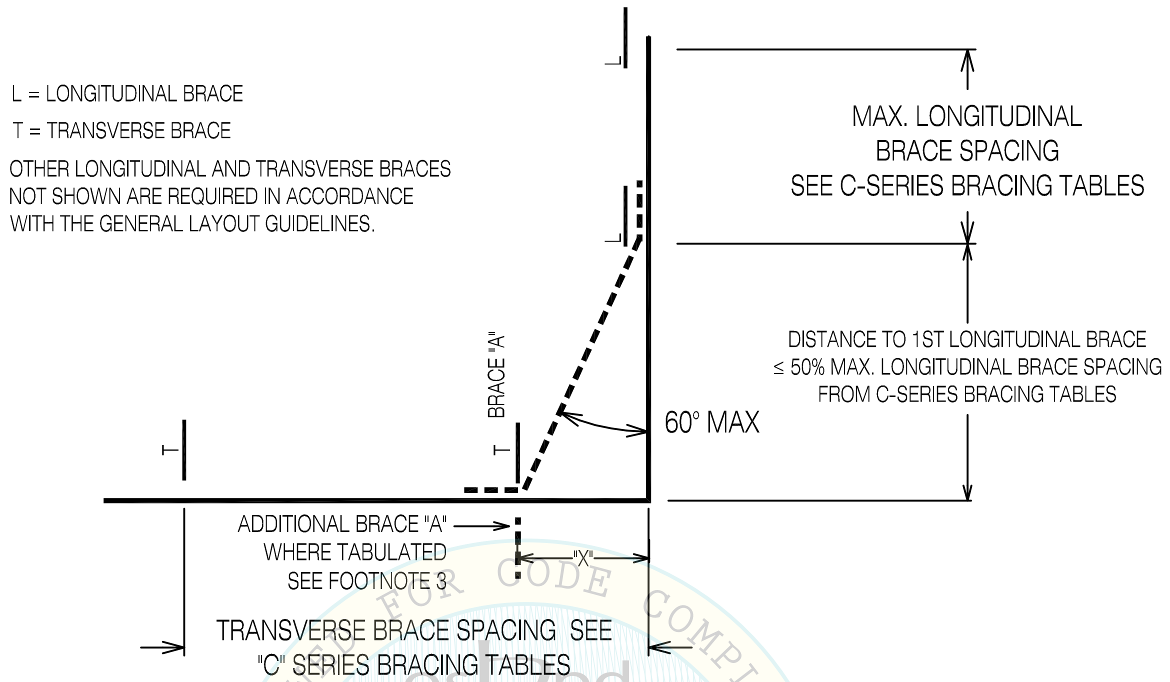

| MAXIMUM SET BACK DIMENSION, "X" | | | | |
|---|---|---|---|---|
| | RMC MAXIMUM SET BACK DIMENSION | | | |
| Trade Size Inch | 0.25 G's Maximum Allowable Set Back Ft | 0.50 G's Maximum Allowable Set Back Ft | 0.75 G's Maximum Allowable Set Back Ft | 1.00 G'S Maximum Allowable Set Back Ft |
| 3 | 10 | 8 | 6 | 6 |
| 3 1/2 | 10 | 10 | 8 | 6 |
| 4 | 10 | 10 | 8 | 6 |
| 5 | 10 | 10 | 10 | 8 |
| 6 | 10 | 10 | 10 | 10[3] |

1. BRACE "A" HAS THE SAME BRACE REACTION AND ANCHORAGE REQUIREMENTS AS A LONGITUDINAL BRACE AS DEFINED IN THE C-SERIES BRACING TABLES.
2. FOR 6" RMC AT 1.0G, PROVIDE AN ADDITIONAL TRANSVERSE BRACE (RIGID BRACE OR PAIR OF CABLE BRACES) WITH THE SAME MINIMUM BRACE ASSEMBLY AND ANCHORAGE AS TABULATED IN THE C-SERIES TABLES FOR THE G-FORCE AND TRADE SIZE.

# MAXIMUM SETBACK DIMENSION - CONDUIT (RMC)

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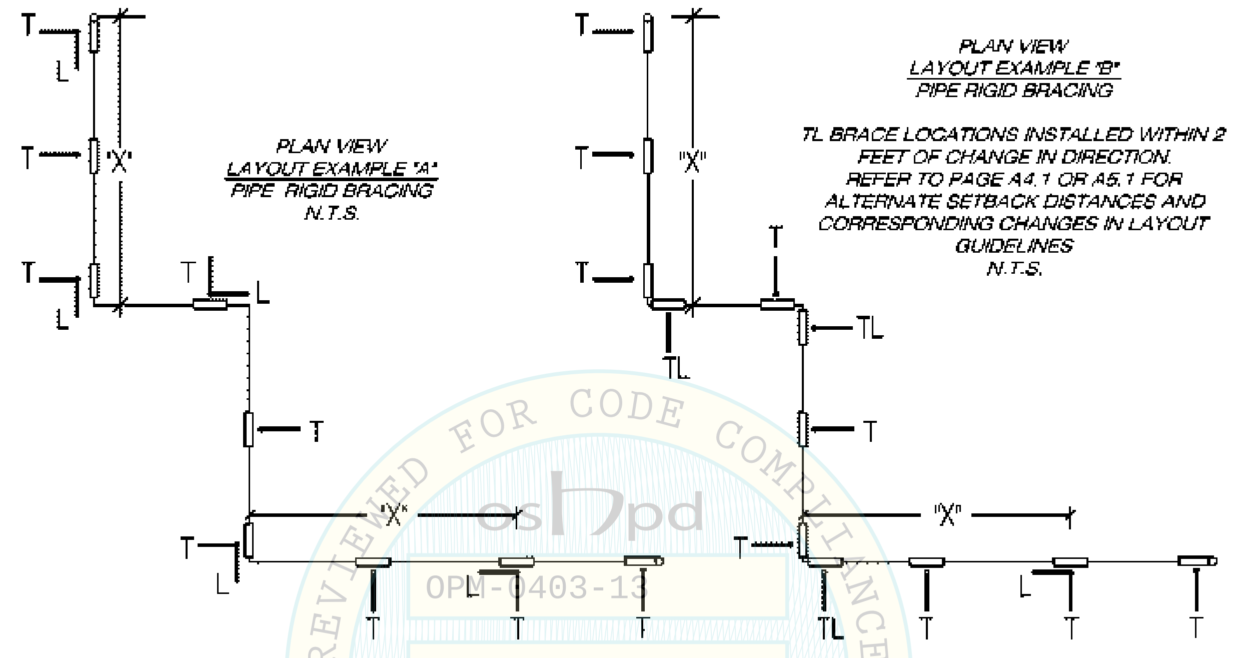
# GENERAL LAYOUT GUIDELINES

## SINGLE HUNG PIPE



"X" ≤ MAX. ALLOWED LONGITUDINAL BRACE SPACING PER C-SERIES BRACING TABLES
T = TRANSVERSE L = LONGITUDINAL
TL = BRACE ARM ASSEMBLY AND DECK ANCHORAGE SAME AS LONGITUDINAL BRACE.

1. From the Engineered Bracing Table, C-Series pages, for a specific size of pipe determine the allowable Maximum Transverse and Longitudinal Brace Spacing.

2. As you begin laying out bracing, every pipe run which requires bracing shall have a minimum of two Transverse Braces and one Longitudinal Brace. For the purposes of this manual, a "run" or an "offset" is defined as suspended pipe of 10 foot minimum straight length.

3. Beginning at one end of a straight run install a Transverse brace at the beginning and at the end of the run.

4. From the first hanger, proceed a distance equal to the Maximum Transverse Brace Spacing. Install Transverse Bracing at the nearest hanger not exceeding this distance. Continue from this hanger location repeating the procedure until the Transverse brace at the end of the run is arrived at.

## GENERAL LAYOUT GUIDELINES

## SINGLE HUNG PIPE (CONTINUED)

5. Determine the maximum allowable Longitudinal Brace spacing from the Engineered Bracing Table. Layouts “A” and “B” above, for ductile pipe, provide two examples of rational Longitudinal brace placement. Longitudinal Bracing is typically installed at twice the spacing of Transverse Bracing.

   As shown the number of hanger locations requiring bracing may be minimized by the judicious placement of bracing at changes in run direction. If a Transverse Brace is installed within 2 feet of a change in run direction or as shown on page A4.1, it may also serve as the Longitudinal Brace for the next portion of the run provided that the brace arm, brace attachments and the deck anchorage have been sized to meet the requirements of the Longitudinal Brace.

   Similarly, a Longitudinal Brace at a 90 degree change in direction may act as a Transverse Brace if it is located within 2 feet of the change in direction or spaced as shown on Page A4.1.

6. 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. For systems using cast iron pipe the seismic design forces are to be calculated utilizing $R_p$ = 3.0.

7. <u>Refer to Pages A4.0 thru A4.1 for additional offset and setback allowances.</u>

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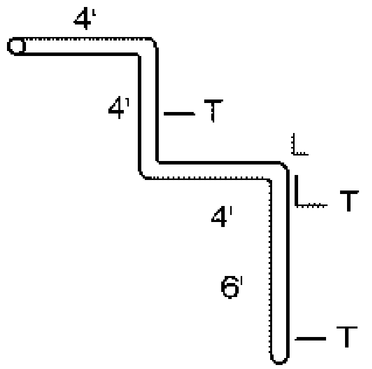
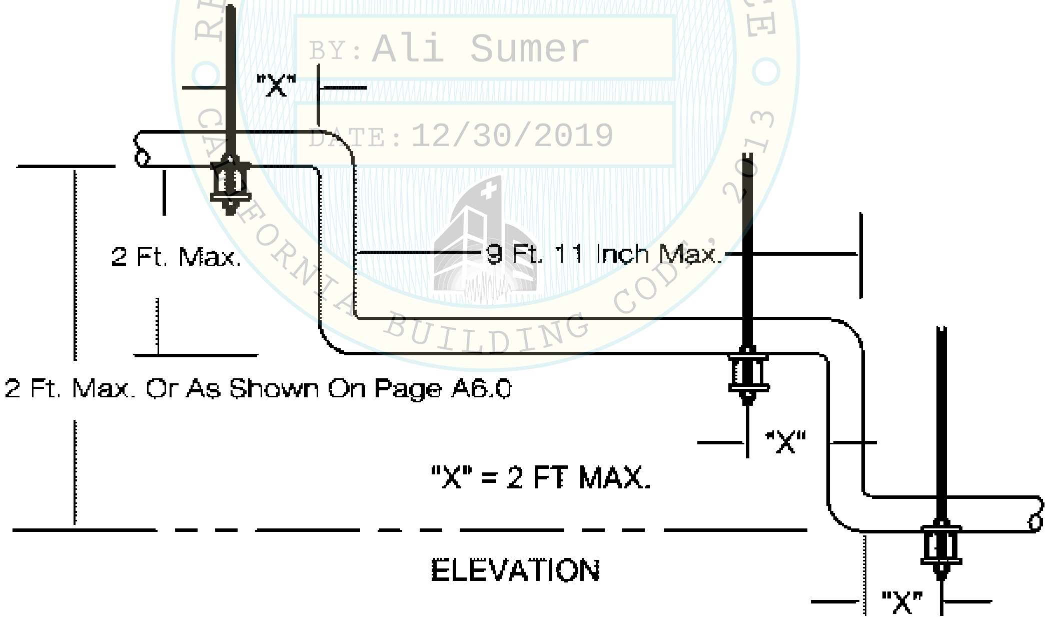
## GENERAL LAYOUT GUIDELINES

## SINGLE HUNG PIPE (CONTINUED)



***PLAN VIEW (N.T.S.)***

***BRACING LAYOUT GENERAL EXAMPLE***
***SHORT OFFSETS NOT EXCEEDING 10 FOOT CUMULATIVE LENGTH***
***T - TRANSVERSE BRACE ARM ASSEMBLY AND DECK ANCHORAGE***
***L - LONGITUDINAL BRACE ARM ASSEMBLY AND DECK ANCHORAGE***



***FOR SEISMIC RESTRAINT PURPOSES***
***WHERE CUMULATIVE VERTICAL RISE ≤ 2 FT OVER A HORIZONTAL SPAN NO GREATER THAN 9 FT. 11 IN., TREAT AS A CONTINUOUS RUN.***

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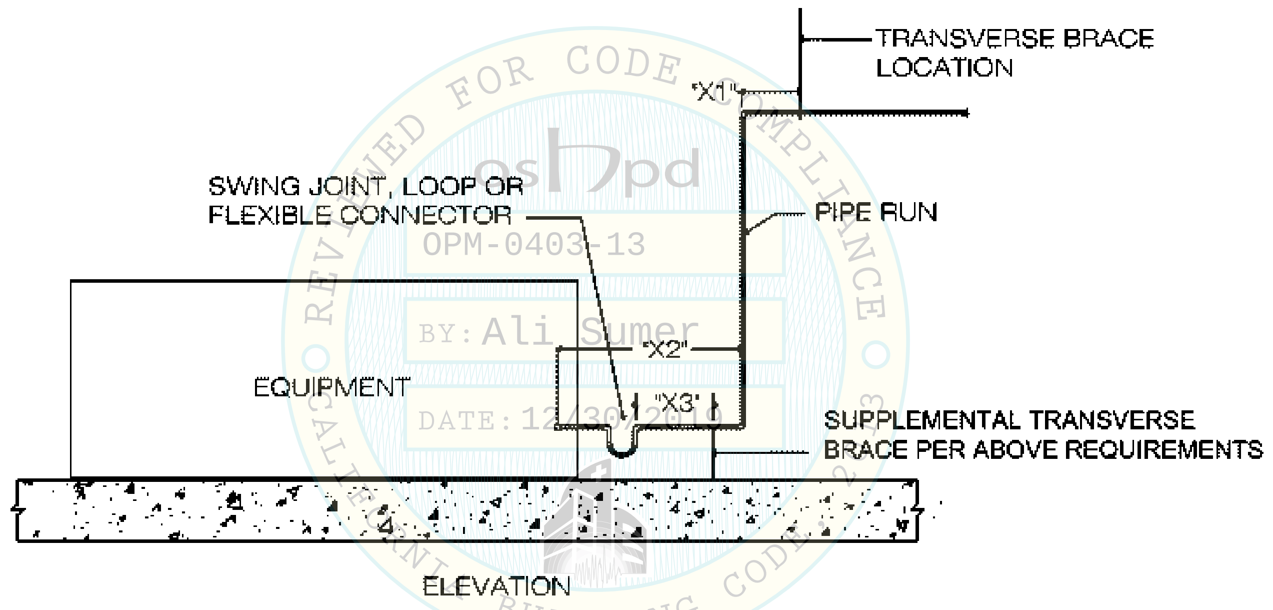
## GENERAL LAYOUT GUIDELINES

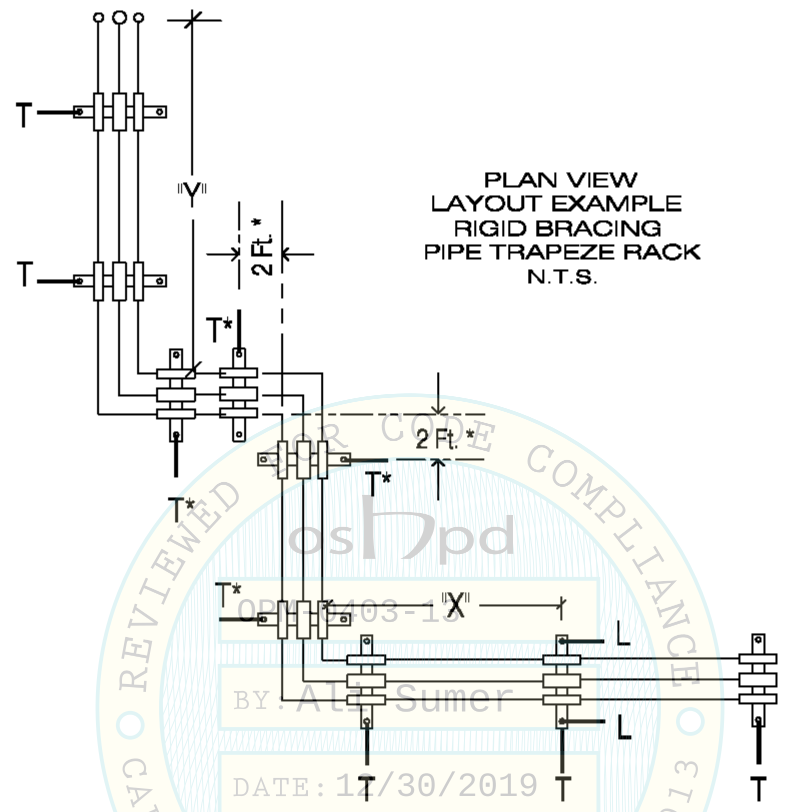
## SINGLE HUNG PIPE (CONTINUED)

8. Where pipe runs drop vertically to floor mounted equipment, install a transverse brace on the last hanger before the drop. Last hanger (X1) must be within 2 feet of the drop for pipe up to 3” diameter or within 5 feet of the drop for larger pipe sizes. If the final length of pipe run (X2) leading up to connection to the equipment after the vertical drop exceeds 10 feet and the pipe is elevated 6 feet or less above the floor, install a transverse brace from the pipe to the floor. If the pipe is more than 6 feet above the floor, brace to the overhead structure. To minimize point of connection stress, pipe connections to equipment are to include a swing joint, flexible connector or loop.



# GENERAL LAYOUT GUIDELINES

## TRAPEZE MOUNTED PIPE



"X" and "Y" ≤ Max. Allowed Longitudinal Brace Spacing

T* – Brace Arm Assembly and Deck Anchorage Same As Longitudinal Brace. Suitable Where Connection Within 2 Feet of Change In Direction.

1. From the Engineered Bracing Table, C-Series pages, for the correct weight range of trapeze rack determine the Maximum Transverse and the Maximum Longitudinal Brace Spacing.

2. As you begin laying out bracing, every trapeze run which requires bracing shall have a minimum of two Transverse Braces and one Longitudinal Brace. For the purposes of this manual, a "run" or an "offset" is defined as suspended trapeze of 10 foot minimum straight length.

## GENERAL LAYOUT GUIDELINES

### TRAPEZE MOUNTED PIPE (CONTINUED)

3. Begin at one end of the run and determine the length of the initial straight run. If the initial run is less than the required Transverse Brace spacing, install Transverse Bracing at the first and last hanger location. If the Transverse Brace on the last hanger is to also act as a Longitudinal Brace for the next run, ensure that the installed brace arm and anchorage meet the Engineered Bracing Table requirements for the Longitudinal Brace.

   If the initial straight run is greater than the Maximum Transverse Brace spacing but less than the Maximum Longitudinal Brace Spacing, the initial Transverse Brace may be installed beyond the start of the run at a maximum distance of 1/2 the allowed Transverse Brace spacing.

4. After installing the initial Transverse Brace, proceed along the run a distance equal to the Maximum Transverse Brace Spacing. Install Transverse and Longitudinal bracing at the nearest hanger not exceeding this distance.

5. Repeat this procedure to completion of the entire run.

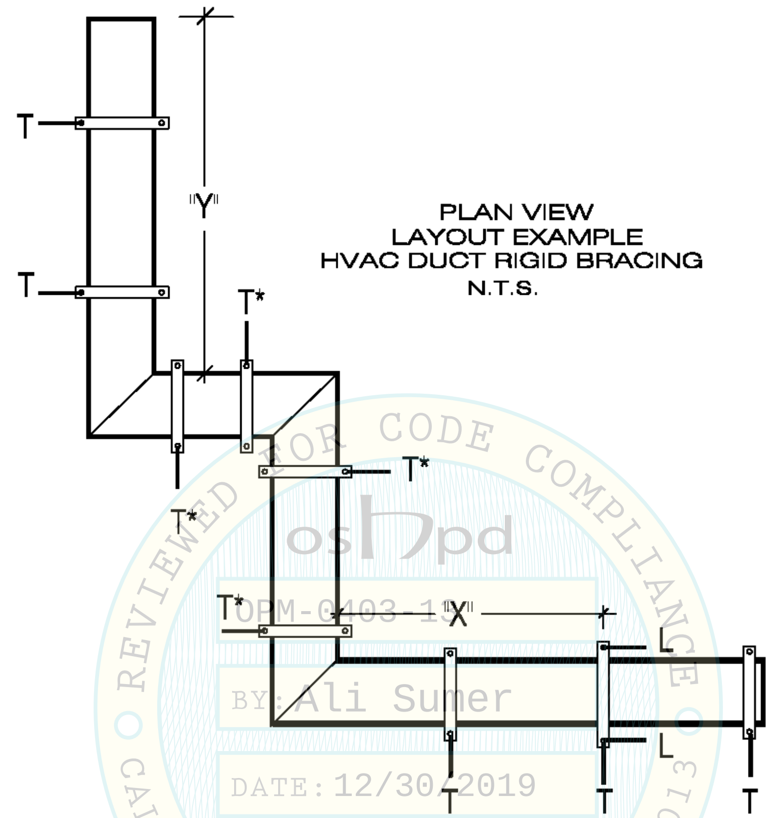
6. The ultimate number of installed brace arms may be minimized by the judicious placement of bracing at changes in run direction. If a Transverse Brace is installed within 2 feet of a 90 degree change in run direction, it may also serve as the Longitudinal Brace for the next portion of the run provided that the brace arm and the deck anchorage have been sized to meet the requirements of the Longitudinal Brace.

7. Similarly, a Longitudinal Brace at a 90 degree change in direction may act as a Transverse Brace if it is located within 2 feet of the change in direction.

8. The above layout guidelines are not applicable to piping systems engineered on the basis of thermal pipe stress analysis.

# GENERAL LAYOUT GUIDELINES

## HVAC DUCT



PLAN VIEW
LAYOUT EXAMPLE
HVAC DUCT RIGID BRACING
N.T.S.

"X" and "Y" ≤ Max. Longitudinal Brace Spacing
T* – Brace Arm Size and Deck Anchorage Same As Longitudinal Brace

1. From the Engineered Bracing Table, C-Series pages, for the correct weight range of HVAC duct determine the Maximum Transverse and the Maximum Longitudinal Brace Spacing.

2. As you begin laying out bracing, every duct run which requires bracing shall have a minimum of two Transverse Braces and one Longitudinal Brace. For the purposes of this manual, a “run” or an “offset” is defined as suspended duct of 10 foot minimum straight length.

## GENERAL LAYOUT GUIDELINES

## HVAC DUCT (CONTINUED)

3. Begin at one end of the run and determine the length of the initial straight run. If the initial run is less than the required Transverse Brace spacing, install Transverse Bracing at the first and last hanger location. If the Transverse Brace on the last hanger is to also act as a Longitudinal Brace for the next run, ensure that the installed brace arm, brace attachment and anchorage meet the Engineered Bracing Table requirements for the Longitudinal Brace.

   If the initial straight run is greater than the Maximum Transverse Brace spacing but less than the Maximum Longitudinal Brace Spacing, the initial Transverse Brace may be installed beyond the start of the run at a maximum distance of 1/2 the allowed Transverse Brace spacing.

4. After installing the initial Transverse Brace, proceed along the run a distance equal to the Maximum Transverse Brace Spacing. Install Transverse and Longitudinal bracing at the nearest hanger not exceeding this distance. Repeat this procedure to completion of the entire run.

5. Install a Transverse Brace within 2 duct widths on one side or the other of every 90 degree change in duct direction.

6. The ultimate number of installed brace arms may be minimized by the judicious placement of bracing at changes in run direction. If a Transverse Brace is installed within 2 feet or a maximum of 2 x the duct width of a 90 degree change in run direction, it may also serve as the Longitudinal Brace for the next portion of the run provided that the brace arm and the deck anchorage have been sized to meet the requirements of the Longitudinal Brace.

7. Similarly, a Longitudinal Brace at a 90 degree change in direction may act as a Transverse Brace if it is located within 2 feet or a maximum of 2 x the duct width of the change in direction.

8. Where a straight duct run transitions in size from one requiring bracing to a smaller size that does not require bracing, install Transverse Bracing on the smaller duct at the first hanger after the transition.

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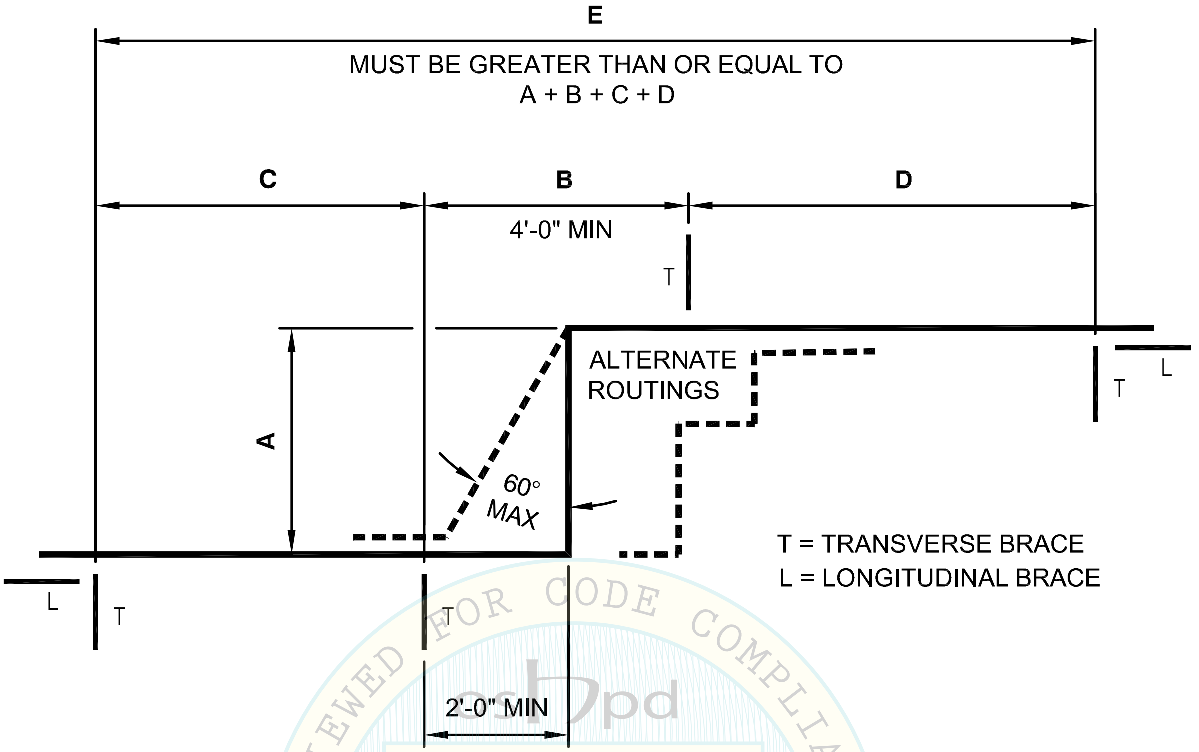

| MAXIMUM OFFSET DIMENSION WELDED STEEL PIPES | |
|---|---|
| A | 1/2 OF MAX TRANSVERSE BRACE SPACING FROM C-SERIES BRACING TABLES. |
| B | 1/2 OF MAX TRANSVERSE BRACE SPACING FROM C-SERIES BRACING TABLES |
| C & D | MAX TRANSVERSE BRACE SPACING FROM C-SERIES BRACING TABLES. |
| E | MAX LONGITUDINAL BRACE SPACING FROM C-SERIES BRACING TABLES. |

NOTES:

1. REFER TO C-SERIES BRACING TABLES FOR LONGITUDINAL AND TRANSVERSE BRACE SPACING AND BRACE LOADS.

# MAXIMUM OFFSET DIMENSION - WELDED STEEL PIPE

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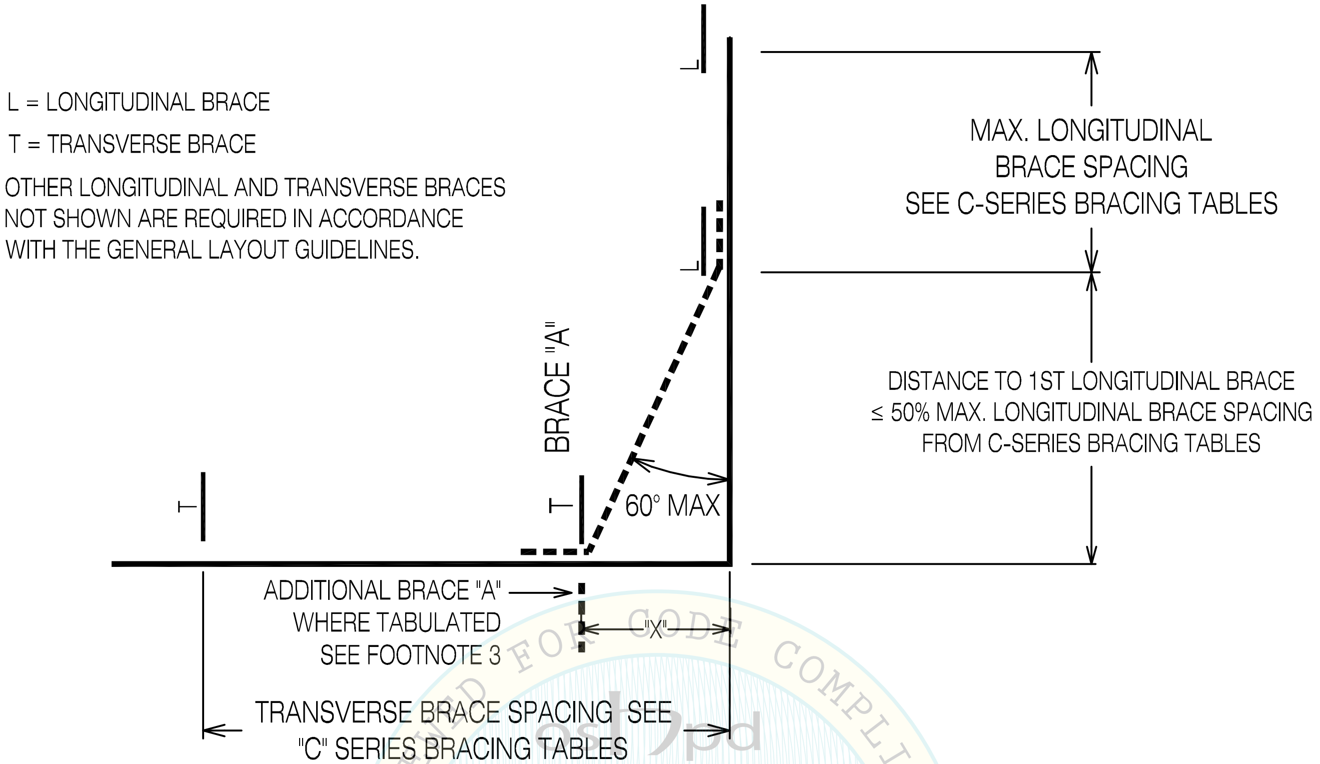

L = LONGITUDINAL BRACE

T = TRANSVERSE BRACE

OTHER LONGITUDINAL AND TRANSVERSE BRACES NOT SHOWN ARE REQUIRED IN ACCORDANCE WITH THE GENERAL LAYOUT GUIDELINES.

**MAXIMUM SET BACK DIMENSION**
**WELDED STEEL PIPE**

| | | **MAXIMUM SET BACK DIMENSION** | | | |
|---|---|---|---|---|---|
| Size In | Schedule | 0.25 G's Maximum Allowable Offset Ft | 0.50 G's Maximum Allowable Offset Ft | 0.75 G's Maximum Allowable Offset Ft | 1.00 G's Maximum Allowable Offset Ft |
| 2 | 40 | 6 | 6 | 4 | 2 |
| 3 | 40 | 10 | 8 | 6 | 4 |
| 4 | 40 | 10 | 10 | 6 | 6 |
| 6 | 40 | 10 | 10 | 10[3] | 10[3] |
| 8 | 40 | 10 | 10[3] | 10[3] | 10[3] |
| 10 | 40 | 10 | 10[3] | 10[3] | --- |

1. BRACE “A” HAS THE SAME BRACE REACTION AND ANCHORAGE REQUIREMENTS AS A LONGITUDINAL BRACE AS DEFINED IN THE C-SERIES BRACING TABLES.
2. WHERE NOTED ON THE CHART, PROVIDE AN ADDITIONAL TRANSVERSE BRACE (RIGID BRACE OR PAIR OF CABLE BRACES) WITH THE SAME MINIMUM BRACE ASSEMBLY AND ANCHORAGE AS TABULATED IN THE C-SERIES TABLES FOR THE G-FORCE AND PIPE SIZE.

## For Transverse Brace "A" Also Acting As Longitudinal Brace For Adjacent Run With Setback

## MAXIMUM SET BACK DIMENSION - STEEL PIPE

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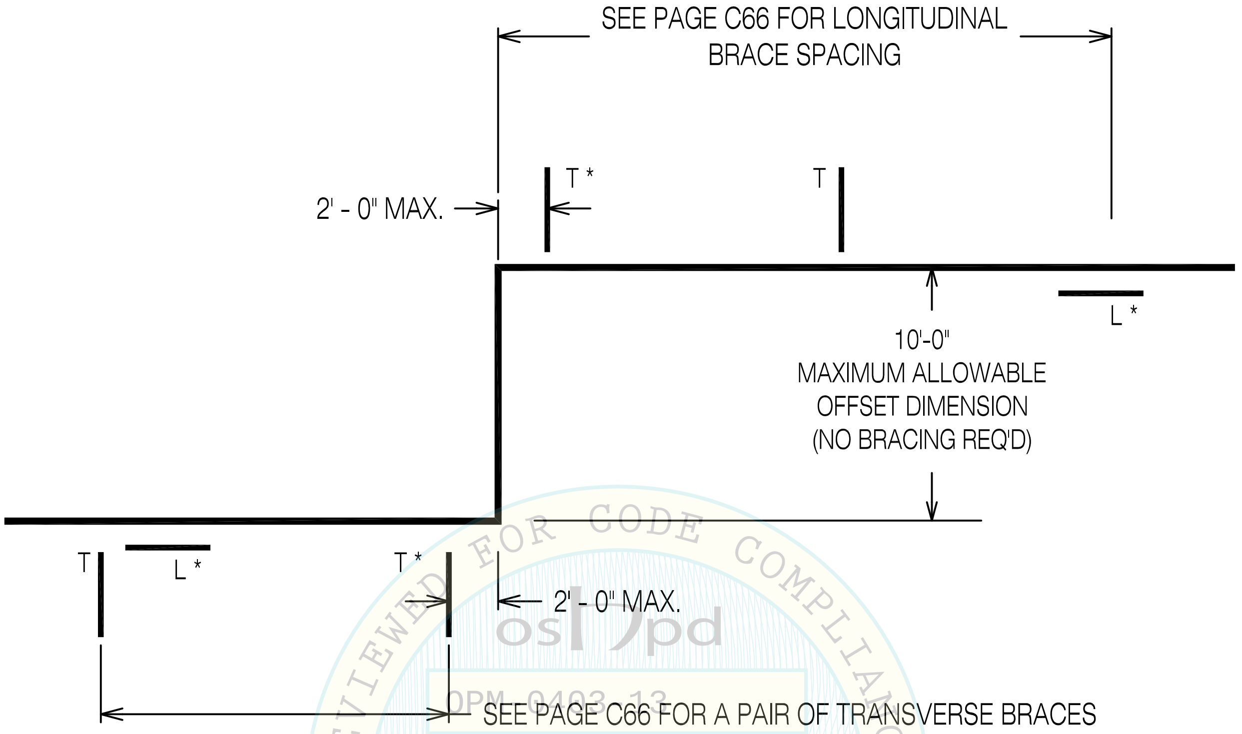

T * = TRANSVERSE BRACE DESIGN FORCE FOR BRACE ADJACENT TO OFFSET IS INCREASED BY x% (SEE TABLE).

L * = LONGITUDINAL BRACE DESIGN FORCE IN THE RUN ADJACENT TO THE OFFSET IS TO BE INCREASED BY x% (SEE TABLE). 2'-0" SECTION CONSIDERED IN CALCULATIONS.

ADDITIONAL TRANSVERSE BRACE NOT SHOWN FOR CLARITY.

DESIGN CRITERIA SHOWN CAN BE USED FOR ALL PROJECTS.

| SPACING (ft) | TRANSVERSE INCREASE | LONGITUDINAL INCREASE |
|---|---|---|
| 10 | 80% | 40% |
| 15 | 60% | 30% |
| 20 | 45% | 23% |
| 25 | N/A | 20% |
| 30 | N/A | 16% |
| 35 | N/A | 14% |
| 40 | N/A | 12% |

# OFFSET DIMENSION, N0-HUB CAST IRON PIPE

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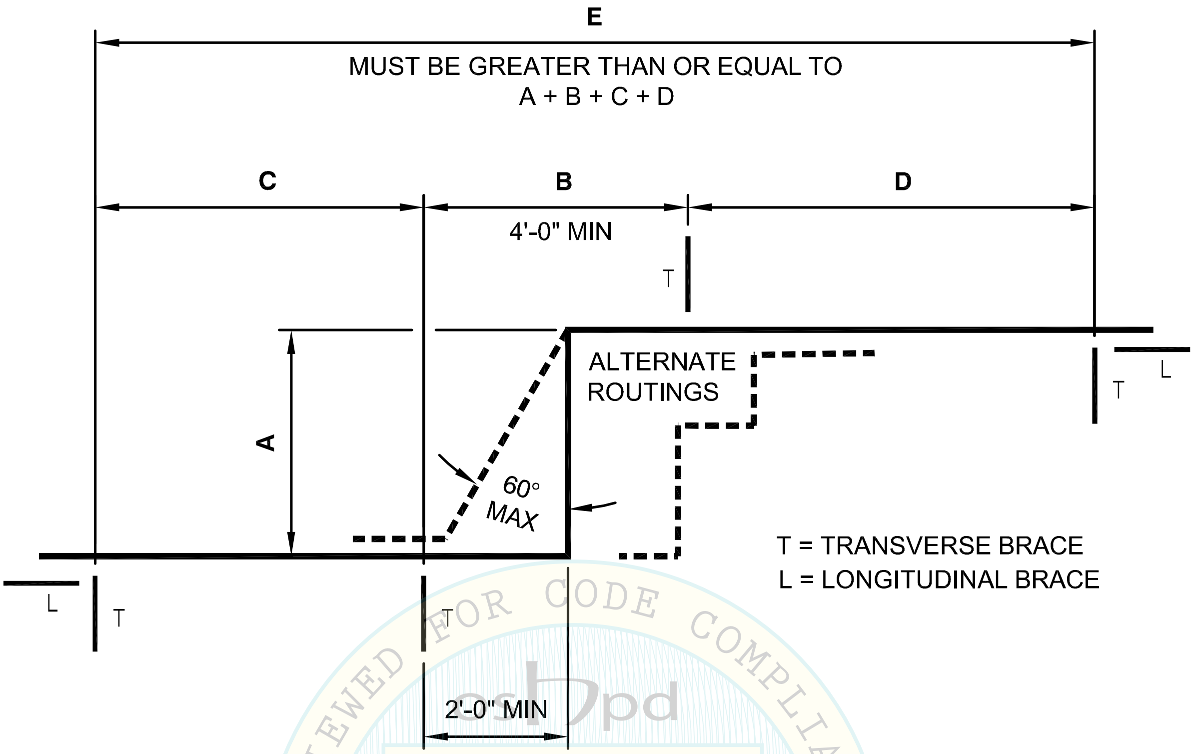

| MAXIMUM OFFSET DIMENSION BRAZED COPPER PIPES | |
|---|---|
| **A** | 1/2 OF MAX TRANSVERSE BRACE SPACING FROM C-SERIES BRACING TABLES. |
| **B** | 1/2 OF MAX TRANSVERSE BRACE SPACING FROM C-SERIES BRACING TABLES. |
| **C & D** | MAX TRANSVERSE BRACE SPACING FROM C-SERIES BRACING TABLES. |
| **E** | MAX LONGITUDINAL BRACE SPACING FROM C-SERIES BRACING TABLES. |

NOTES:
1. REFER TO C-SERIES BRACING TABLES FOR LONGITUDINAL AND TRANSVERSE BRACE SPACING AND BRACE LOADS.

# MAXIMUM OFFSET DIMENSION - BRAZED COPPER TUBING

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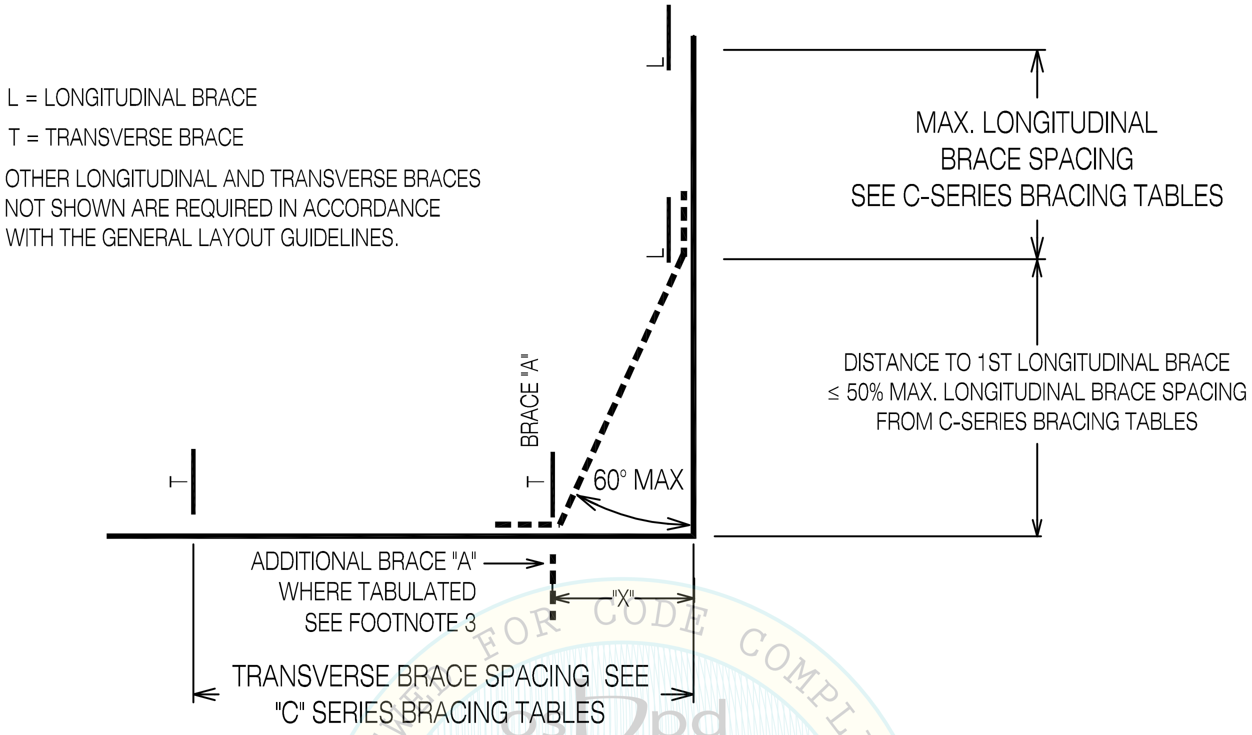

**MAXIMUM SET BACK DIMENSION**
**BRAZED COPPER TUBING**

| | | MAXIMUM SET BACK DIMENSION | | | |
|---|---|---|---|---|---|
| **Size Inch** | **Schedule** | **0.25 G's Maximum Allowable Set Back Ft** | **0.50 G's Maximum Allowable Set Back Ft** | **0.75 G's Maximum Allowable Set Back Ft** | **1.00 G'S Maximum Allowable Set Back Ft** |
| 2 | K or L | 4 | 2 | 2 | 2 |
| 3 | K or L | 6 | 3 | 2 | 2 |
| 4 | K or L | 8 | 3 | 3 | 2 |
| 6 | K or L | 10 | 6 | 4 | 3 |
| 8 | K or L | 10 | 10 | 10 [3] | 10 [3] |

1. BRACE "A" HAS THE SAME BRACE REACTION AND ANCHORAGE REQUIREMENTS AS A LONGITUDINAL BRACE AS DEFINED IN THE C-SERIES BRACING TABLES.
2. AS SHOWN IN THE CHART ABOVE FOR 8", PROVIDE AN ADDITIONAL TRANSVERSE BRACE (RIGID BRACE OR PAIR OF CABLE BRACES) WITH THE SAME MINIMUM BRACE ASSEMBLY AND ANCHORAGE AS TABULATED IN THE C-SERIES TABLES FOR THE G-FORCE AND PIPE SIZE.
3. TABULATED VALUES ARE BASED ON SERVICE TEMPREATURE OF 100° F.

# MAXIMUM SET BACK DIMENSION - BRAZED COPPER TUBING

## For Transverse Brace "A" Also Acting As Longitudinal Brace For Adjacent Run

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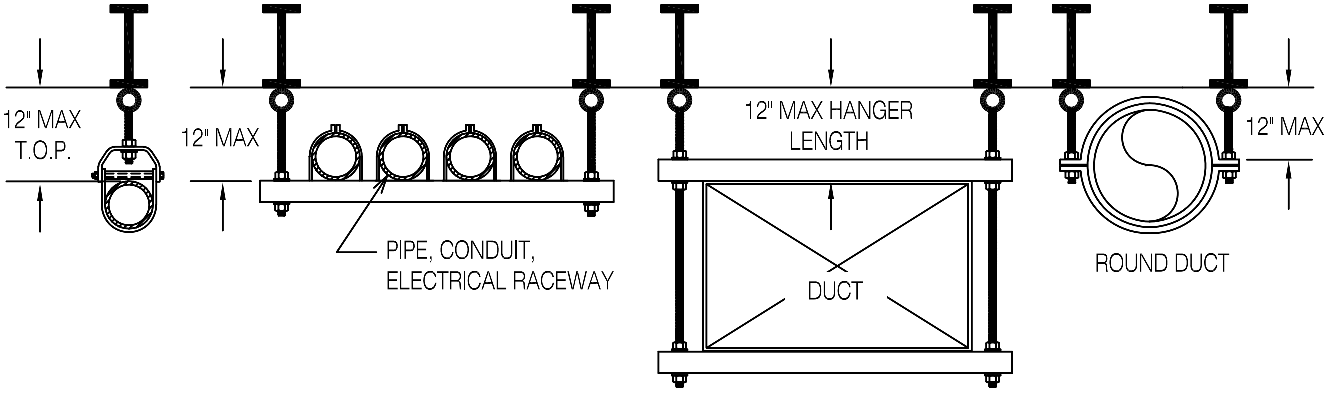
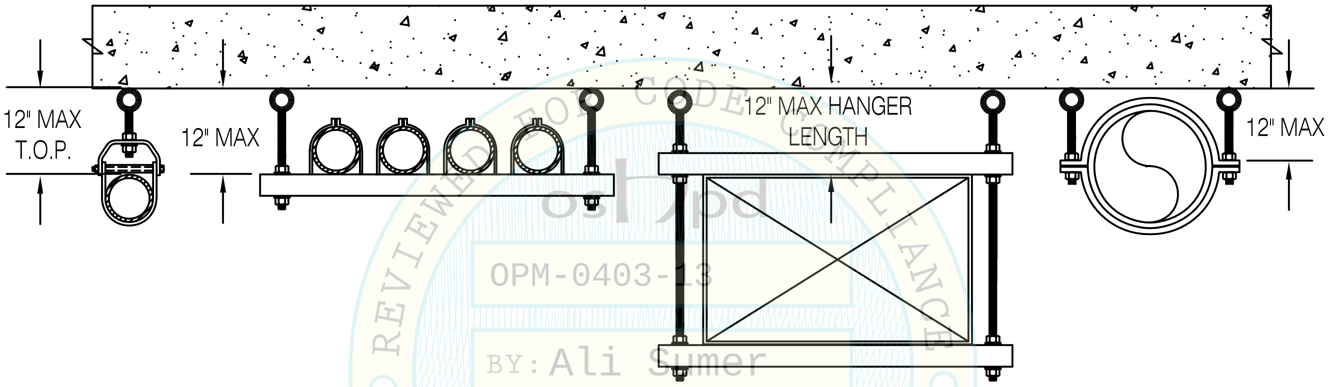


SECTION



SECTION

SEISMIC BRACING IS ALLOWED TO BE EXCLUDED UNDER THE FOLLOWING INSTALLATION CONDITIONS:

1. PIPING, DUCT OR ELECTRICAL RACEWAYS ARE SUPPORTED BY HANGERS.
2. EACH HANGER IN THE RUN IS 12 INCHES OR LESS IN LENGTH FROM THE SUPPORTING STRUCTURE TO:
   - TOP OF PIPE .
   - DUCT SUPPORT POINT. SUPPORT POINT IS BOTTOM OF DUCT AT LOCATIONS WITHOUT CROSS-TOP STRUT.
   - ELECTRICAL RACEWAY SUPPORT POINT.
3. WHERE ROD HANGERS ARE USED, CONNECTION TO STRUCTURE MUST BE EQUIPPED WITH SWIVELS TO PREVENT INELASTIC ROD BENDING. EXCEPTION: SWIVELS OR EYE NUTS NOT REQUIRED FOR INSTALLATIONS WITH ROD HANGERS 3/8" DIAMETER OR LESS.
4. PROVISIONS ARE MADE TO ELIMINATE SEISMIC IMPACT FOR COMPONENTS VULNERABLE TO IMPACT.

# DROP LENGTH EXCLUSIONS - SECTION

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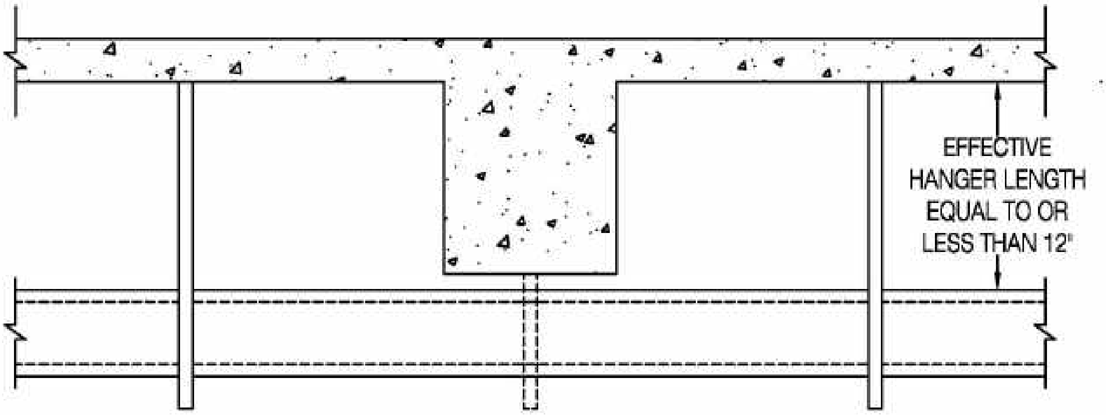

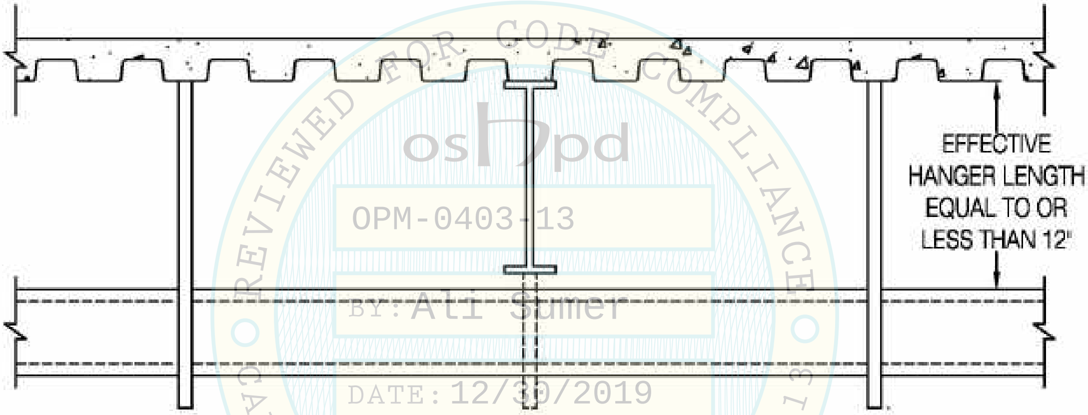

WHERE BRACING IS OMITTED DUE TO THE 12" EXCEPTION:

1. FOR ALL THE HANGERS IN THE RUN THE EFFECTIVE HANGER LENGTH MUST BE EQUAL TO OR LESS THAN 12" AS SHOWN.
2. A SNUG FIT TO THE BEAM DOES NOT MEET THE REQUIREMENT.

## DROP LENGTH EXCLUSIONS - LONGITUDINAL SECTION

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## *INDEX - MEP SYSTEMS SEISMIC BRACING CONSTRUCTION DETAILS*

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### SINGLE HUNG PIPE

*RIGID BRACING*

*CABLE BRACING*

ANTHONY A. RUBALCAVA
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# *INDEX - MEP SYSTEMS SEISMIC BRACING CONSTRUCTION DETAILS (CONTINUED)*

*PAGE* *DESCRIPTION*

## TRAPEZE SUPPORTED PIPE

*RIGID BRACING*

*CABLE BRACING*

## *INDEX - MEP SYSTEMS SEISMIC BRACING CONSTRUCTION DETAILS (CONTINUED)*

*PAGE* *DESCRIPTION*

### SINGLE HUNG CONDUIT

*RIGID BRACING*

*CABLE BRACING*

### TRAPEZE SUPPORTED CONDUIT

*RIGID BRACING*

*CABLE BRACING*

ANTHONY A. RUBALCAVA
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## *INDEX - MEP SYSTEMS SEISMIC BRACING CONSTRUCTION DETAILS (CONTINUED)*

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### TRAPEZE SUPPORTED RECTANGULAR HVAC DUCT

*RIGID BRACING*

*CABLE BRACING*

### 2-ROD ROUND HVAC DUCT

*RIGID BRACING*

*CABLE BRACING*

### SUSPENDED EQUIPMENT

*RIGID BRACING*

*CABLE BRACING*

## *INDEX - MEP SYSTEMS SEISMIC BRACING CONSTRUCTION DETAILS (CONTINUED)*

*PAGE* *DESCRIPTION*

### TRAPEZE SUPPORTED CABLE TRAYS

*RIGID BRACING*

*CABLE BRACING*

### BUS DUCT TRAPEZE

*RIGID BRACING*

*CABLE BRACING*

## *INDEX - MEP SYSTEMS SEISMIC BRACING CONSTRUCTION DETAILS (CONTINUED)*

### ALTERNATE SINGLE HUNG PIPE & CONDUIT

RIGID BRACING

*CABLE BRACING*

### ALTERNATE TRAPEZE SUPPORTED

### ALTERNATE BRACE ARM CONNECTIONS TO ROD STIFFENERS

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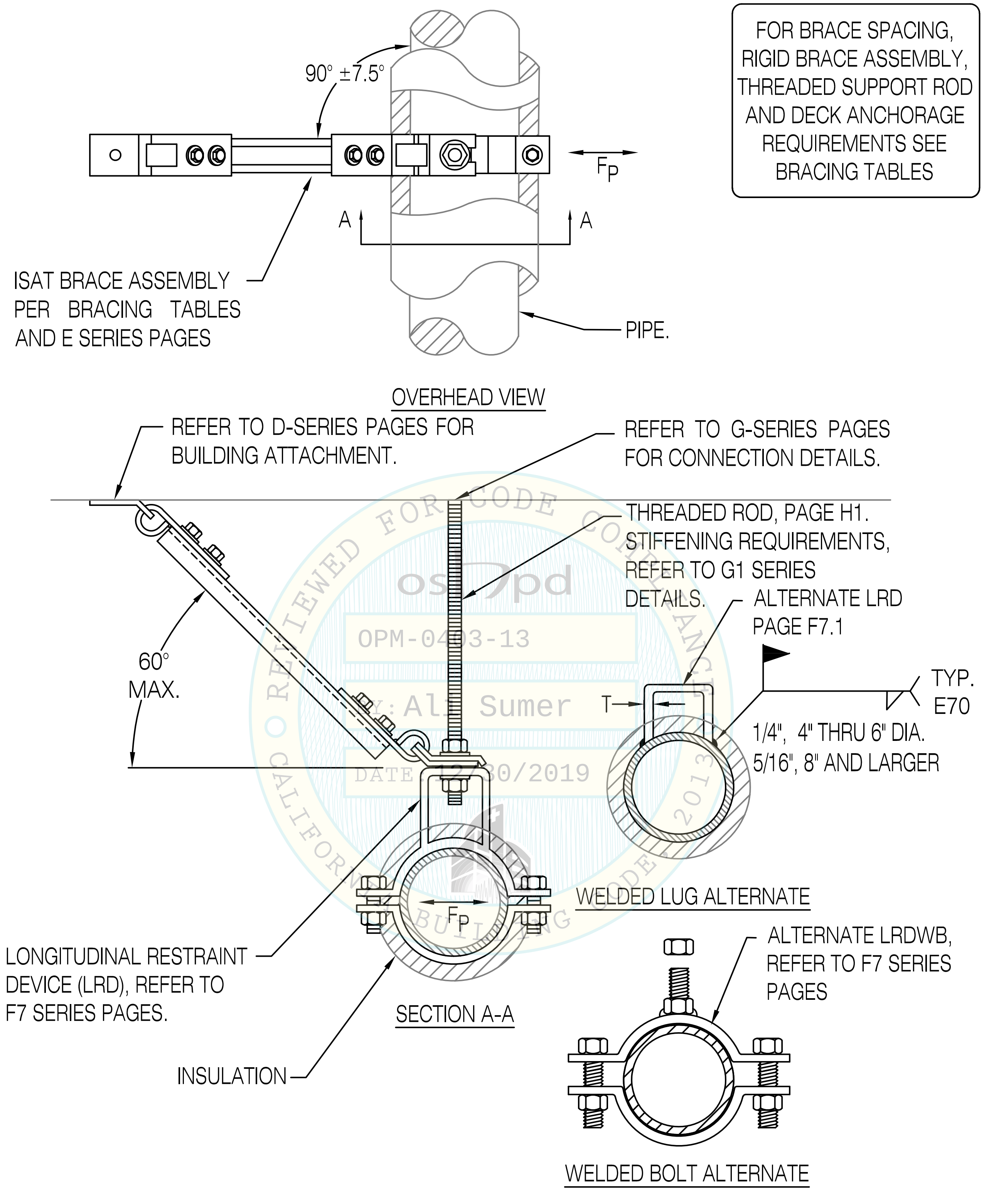

## SINGLE HUNG PIPE, WITH LRD
## 1-WAY TRANSVERSE, RIGID BRACING

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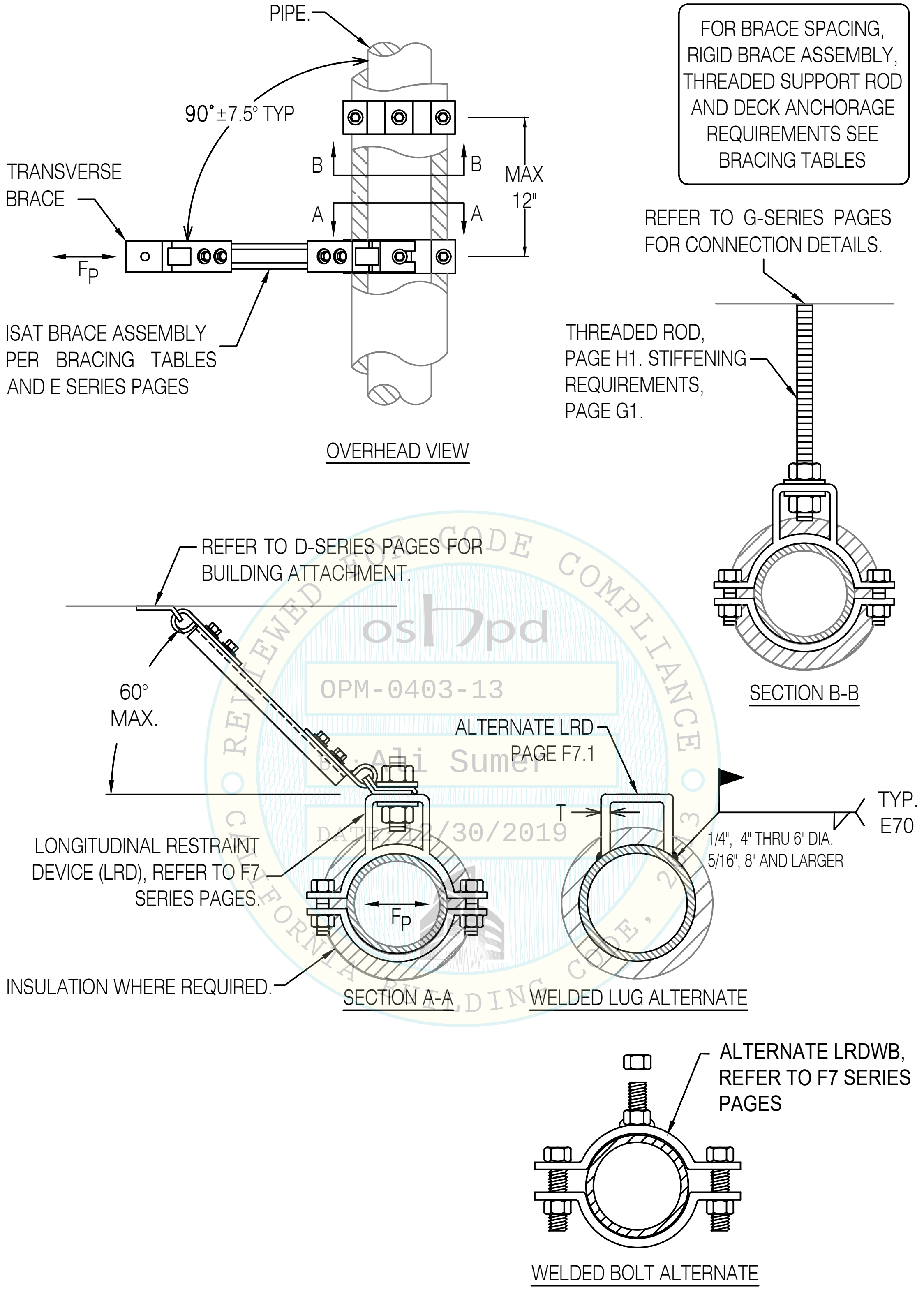

# SINGLE HUNG PIPE, WITH TWO LRDs
# 1-WAY TRANSVERSE RIGID BRACING

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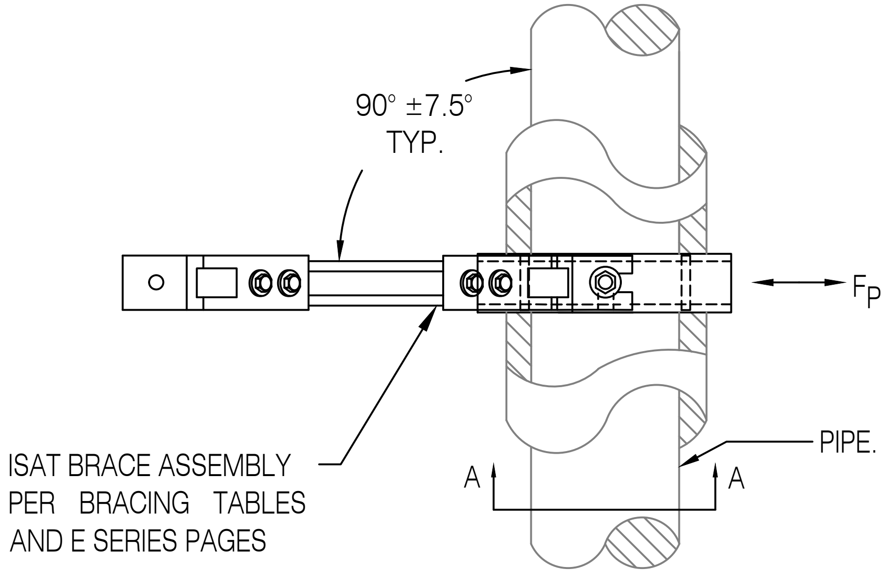
FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



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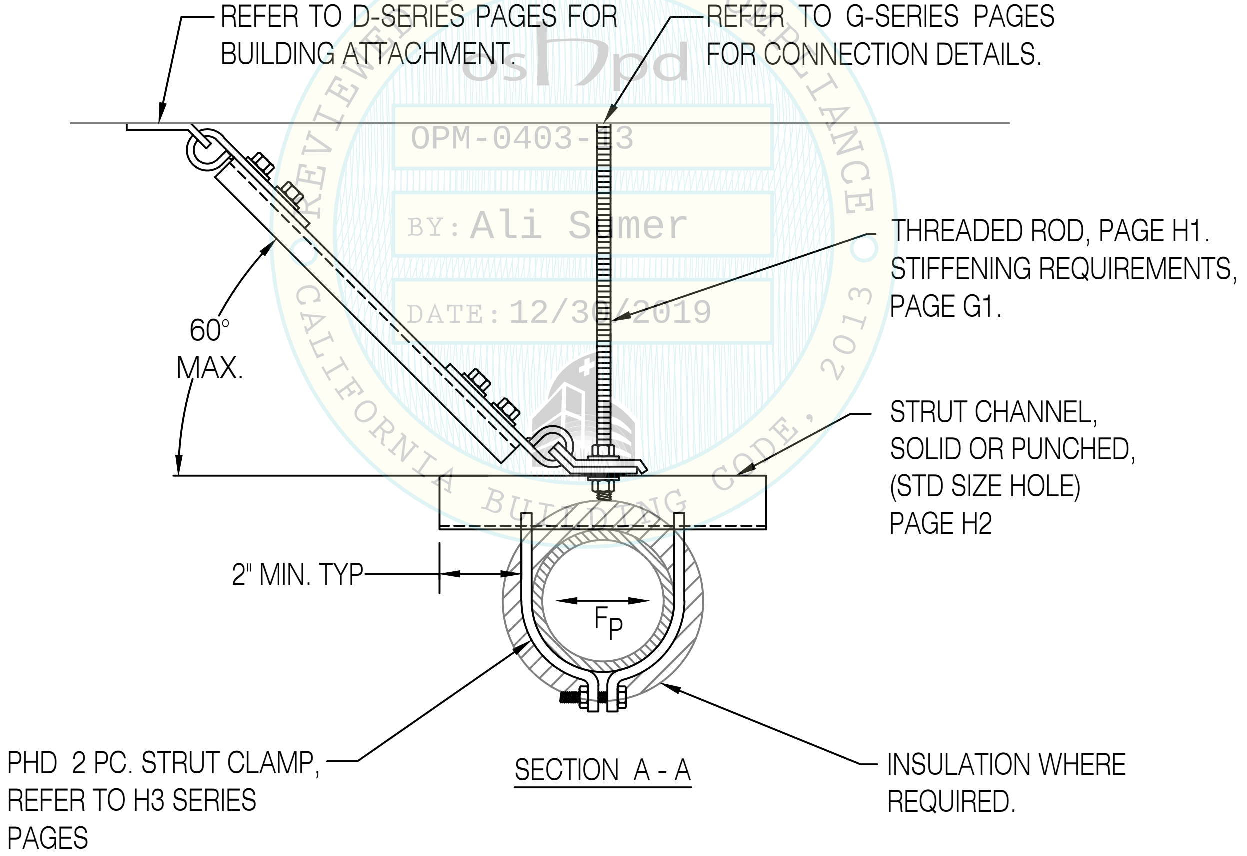

SECTION A - A

## SINGLE HUNG PIPE, STRUT CLAMP
## 1-WAY TRANSVERSE, RIGID BRACING

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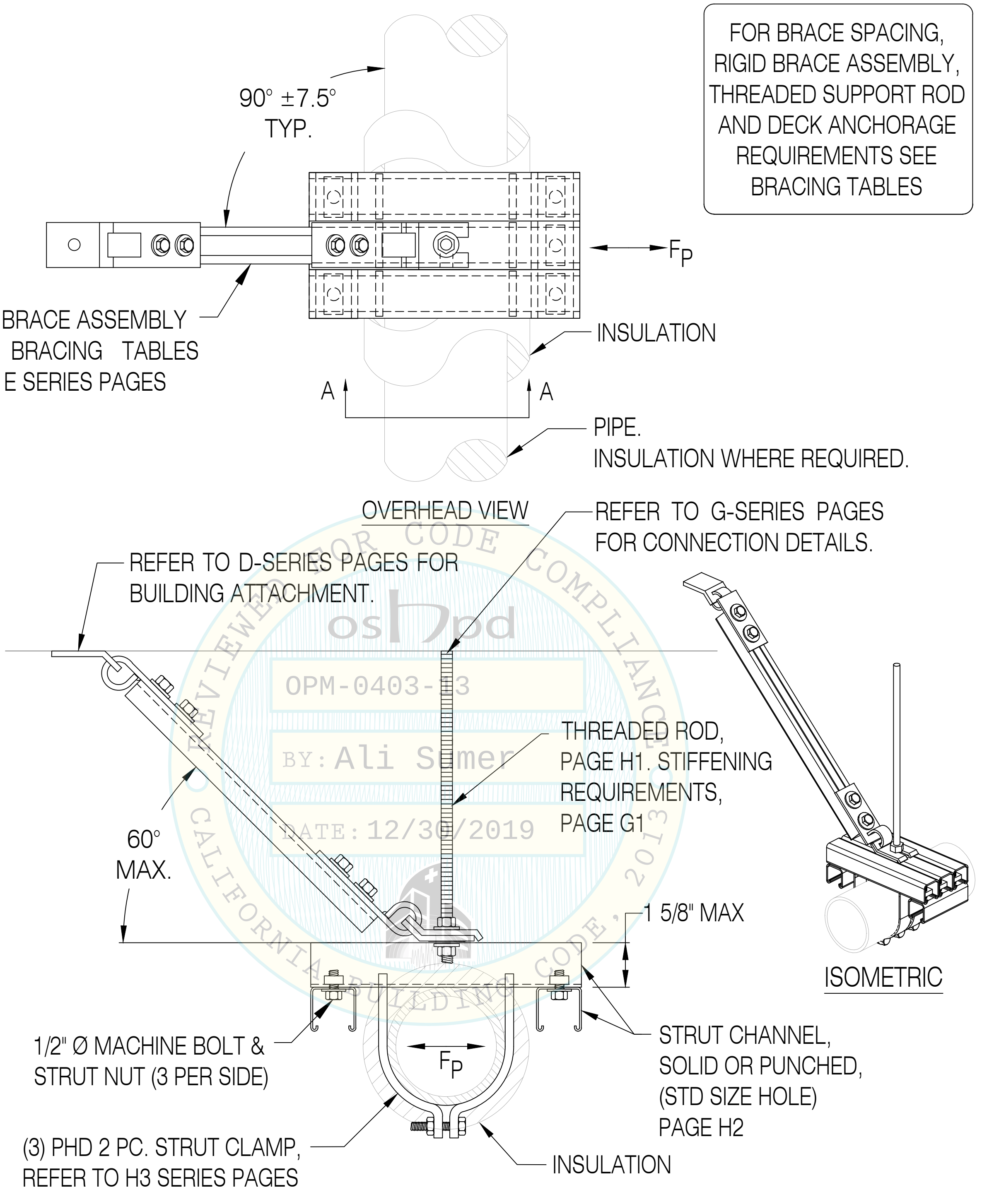

## SINGLE HUNG PIPE, TRIPLE STRUT CLAMP
## 1-WAY TRANSVERSE, RIGID BRACING

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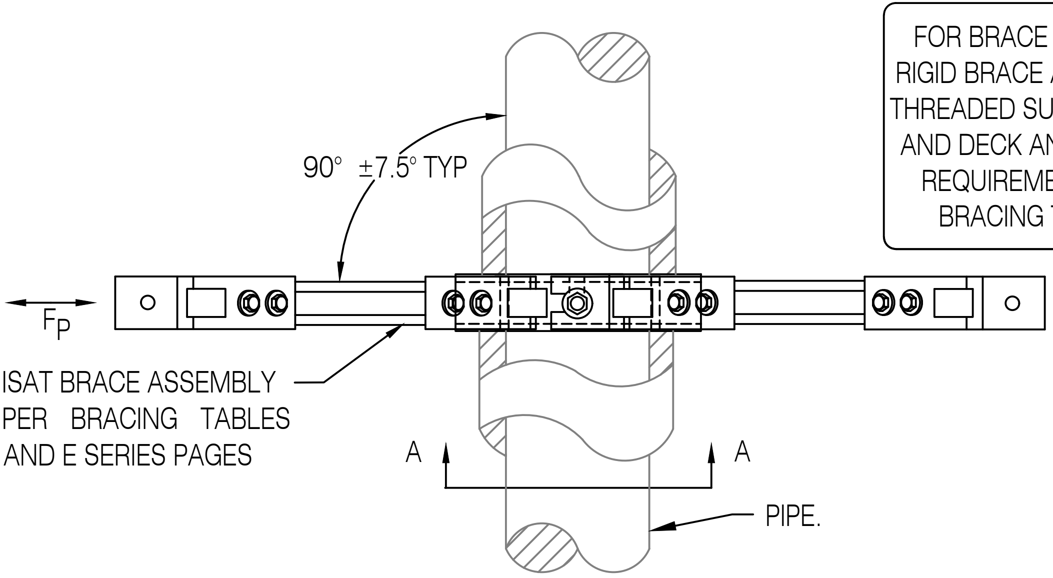
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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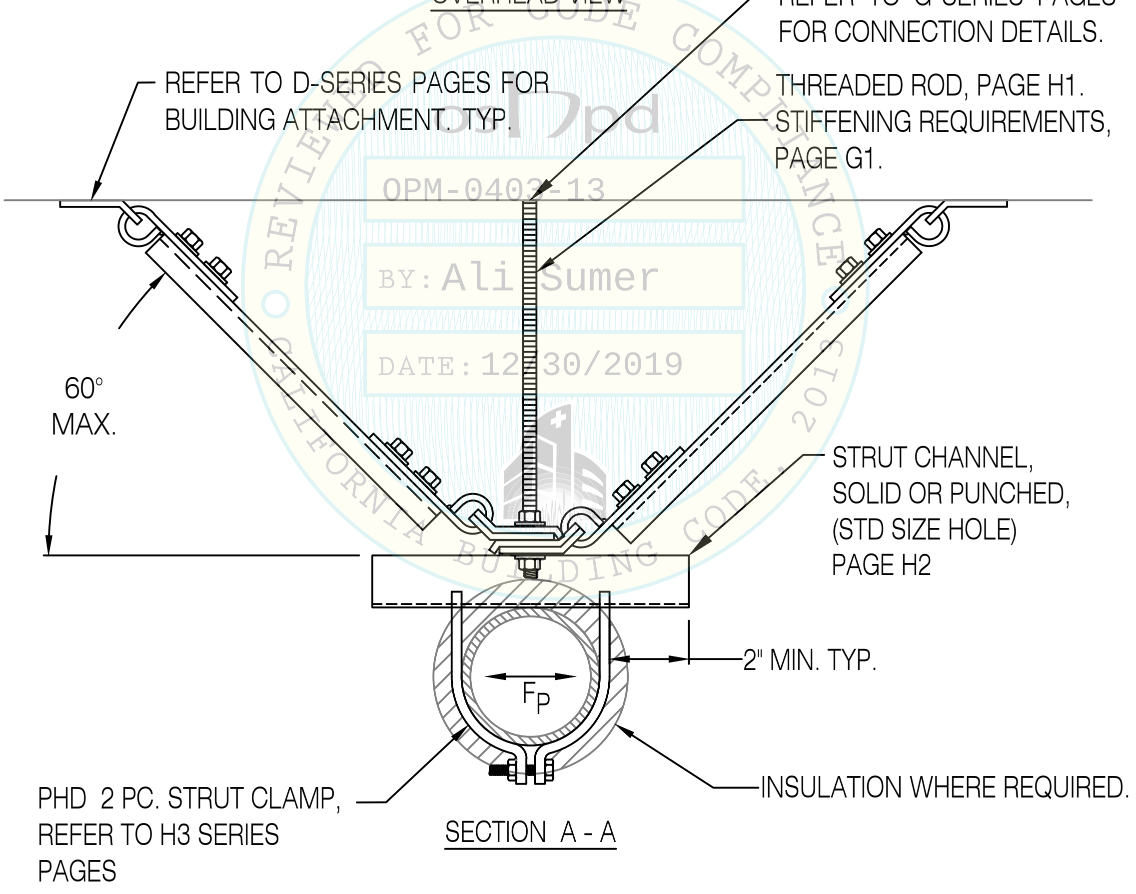

SECTION A - A

# SINGLE HUNG PIPE, STRUT CLAMP 2-WAY TRANSVERSE, RIGID BRACING

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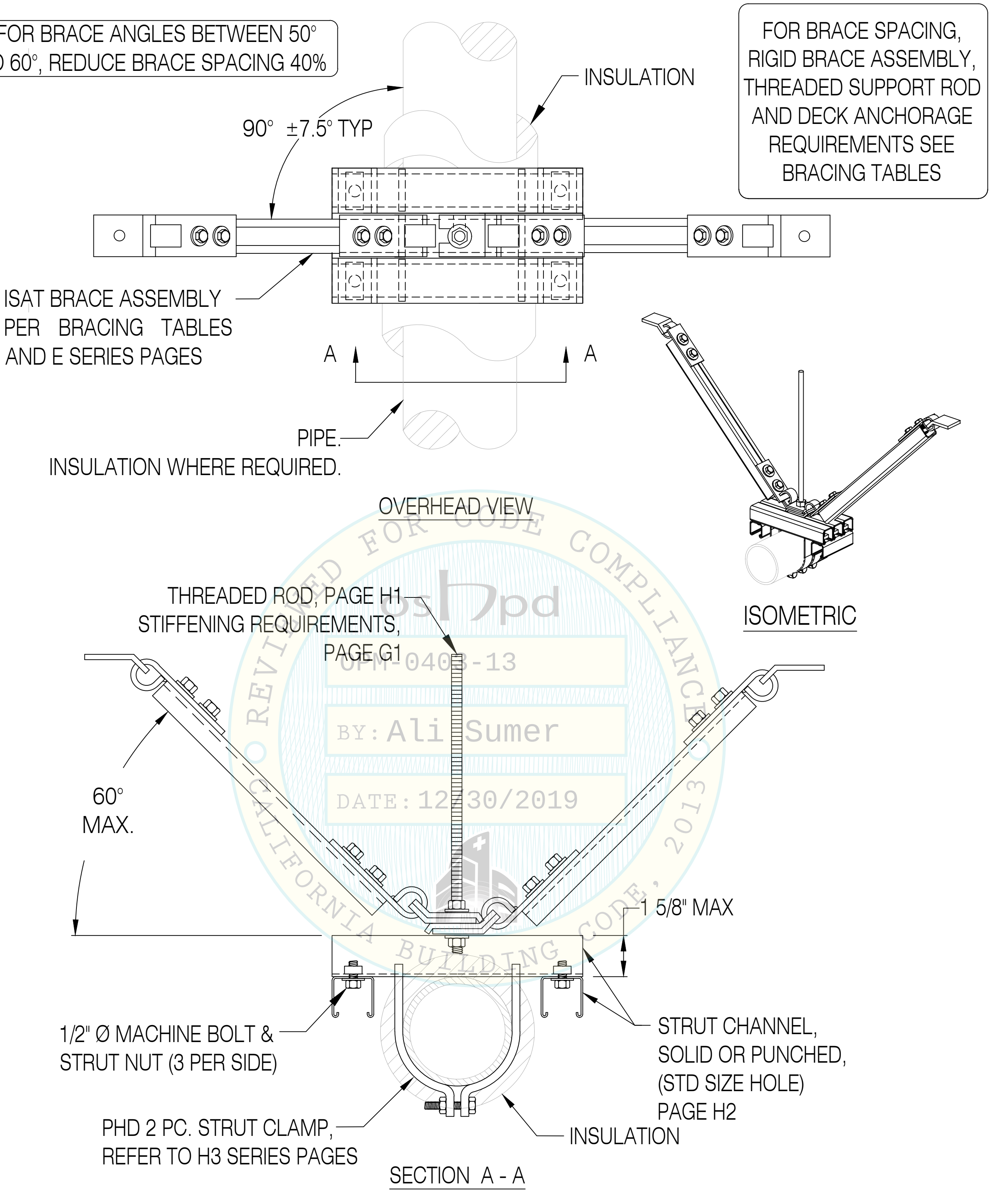
*FOR BRACE ANGLES BETWEEN 50° TO 60°, REDUCE BRACE SPACING 40%

FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



## SINGLE HUNG PIPE, TRIPLE STRUT CLAMP
## 2-WAY TRANSVERSE, RIGID BRACING

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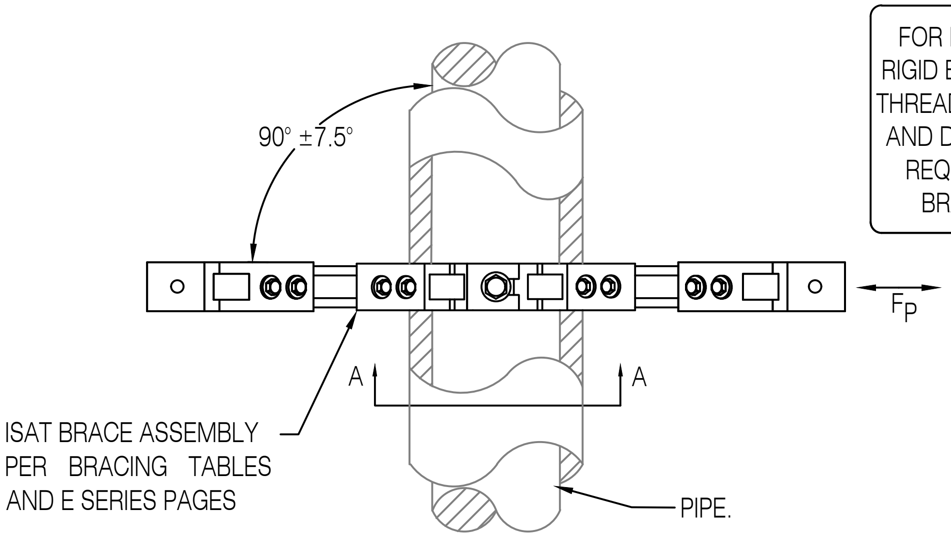

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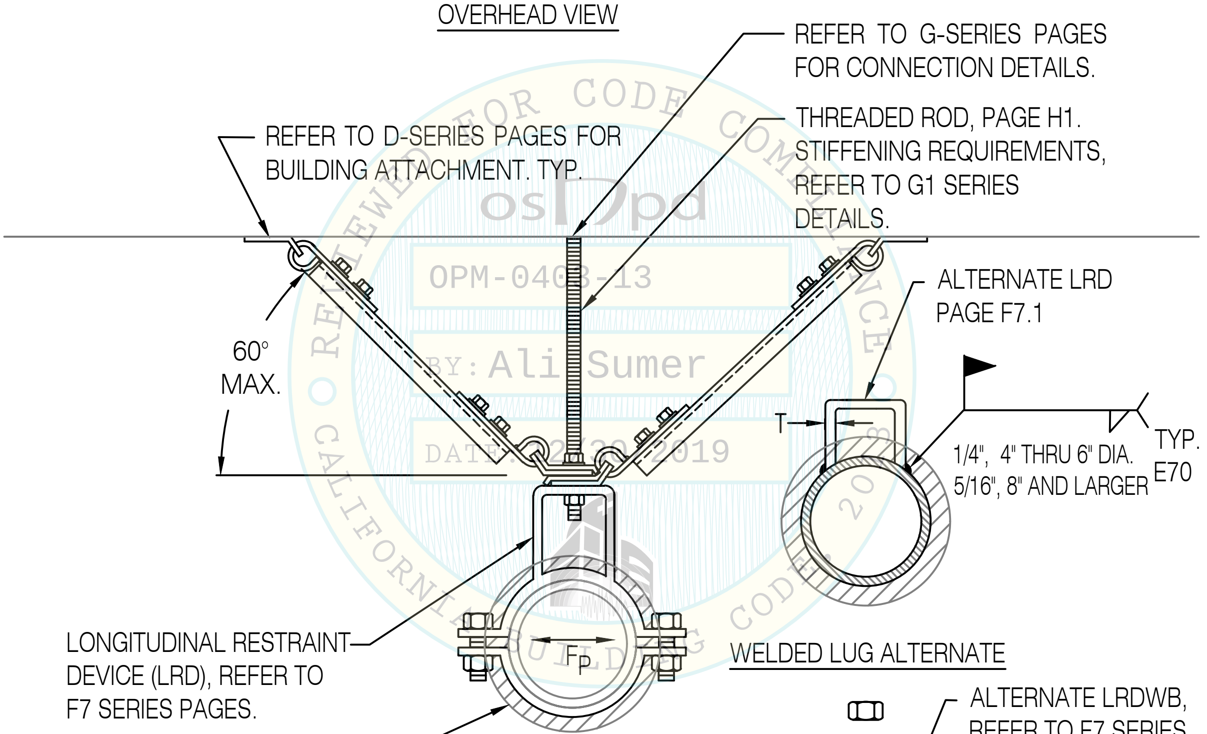
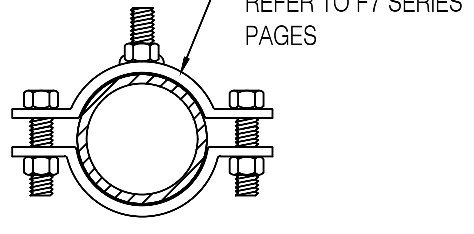


WELDED LUG ALTERNATE

SECTION A-A



WELDED BOLT ALTERNATE

# SINGLE HUNG PIPE, WITH LRD
# 2-WAY TRANSVERSE, RIGID BRACING

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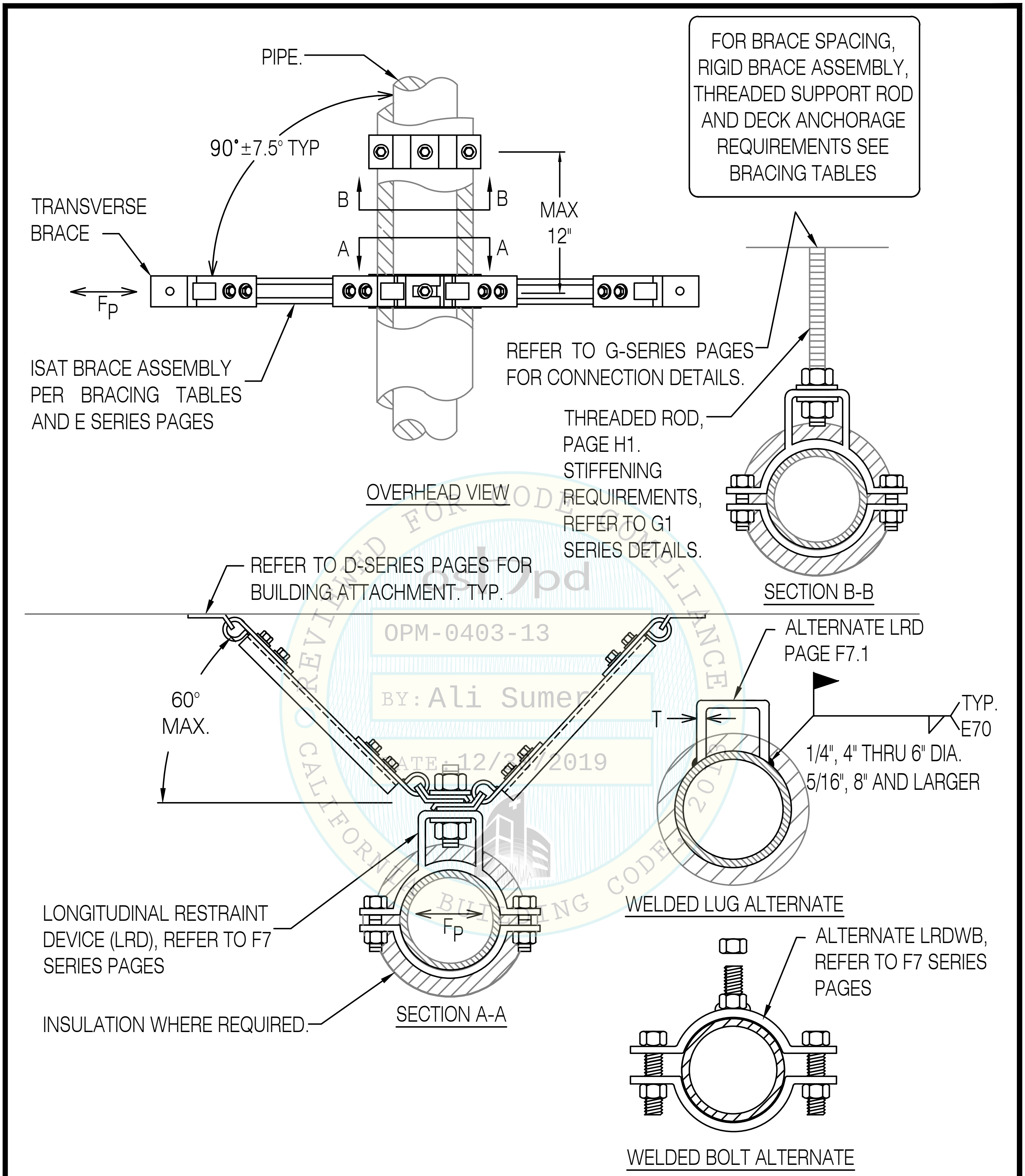

## SINGLE HUNG PIPE, WITH TWO LRDs
## 2-WAY TRANSVERSE, RIGID BRACING

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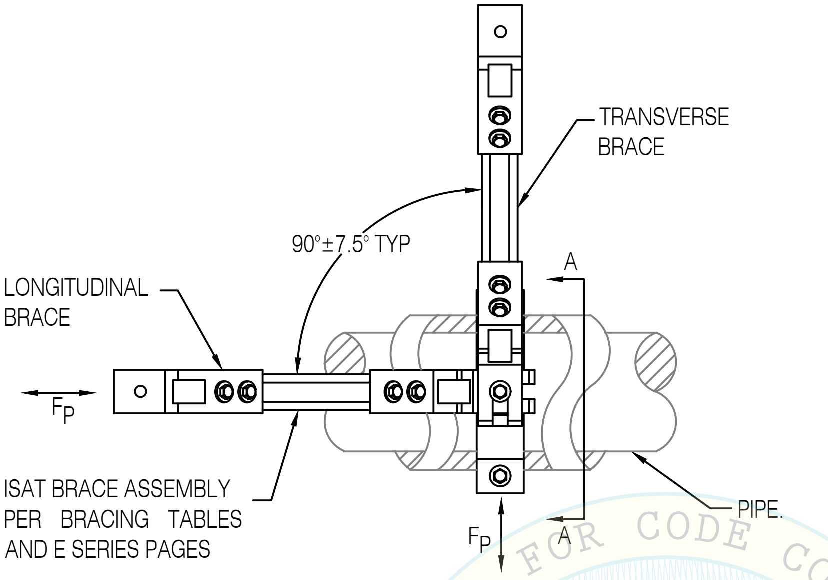
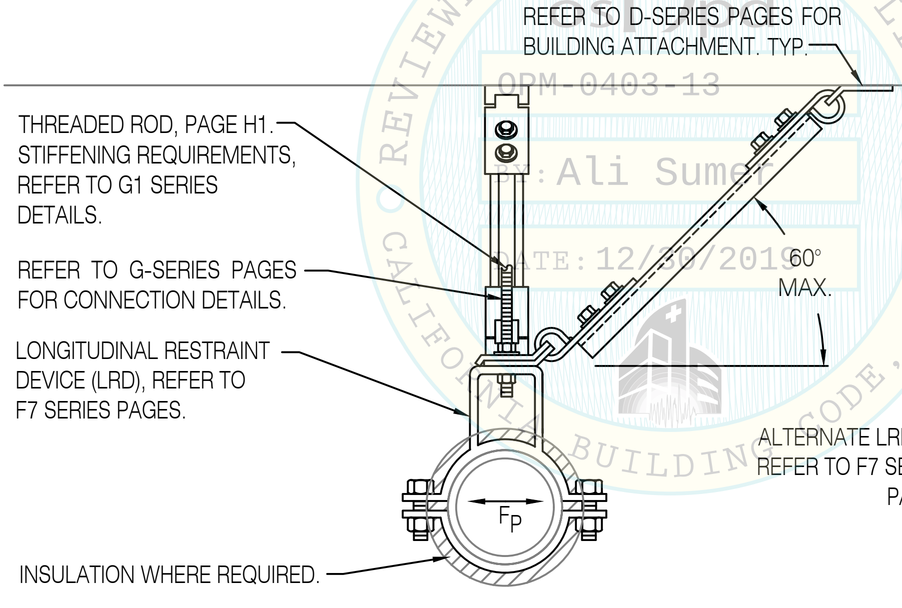


OVERHEAD VIEW

FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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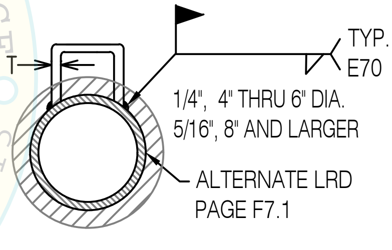

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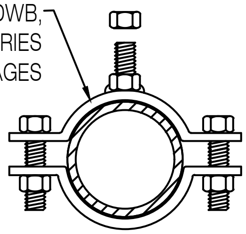

WELDED BOLT ALTERNATE

# SINGLE HUNG PIPE, WITH LRD
# 2-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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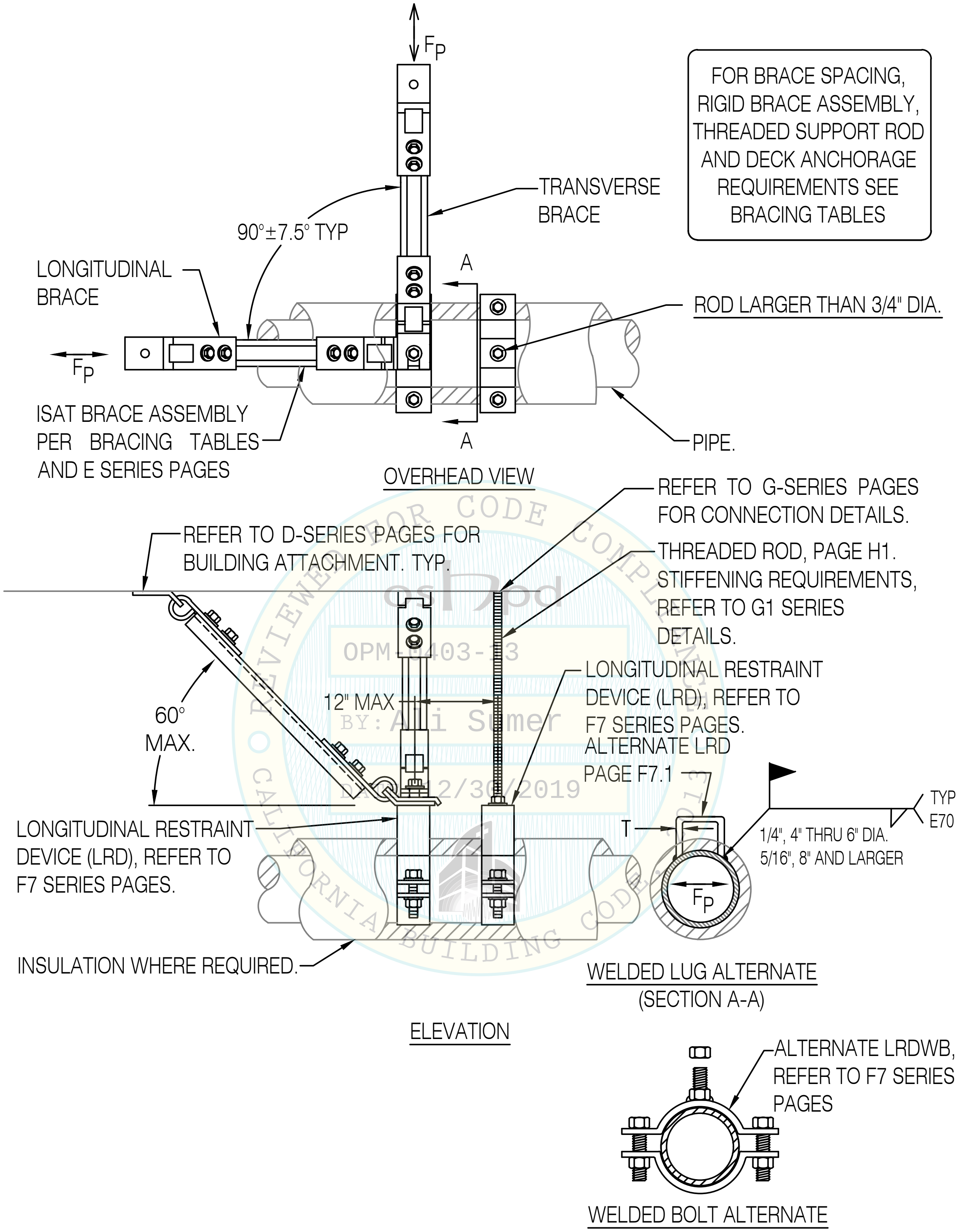

# SINGLE HUNG PIPE, WITH LRD
# 2-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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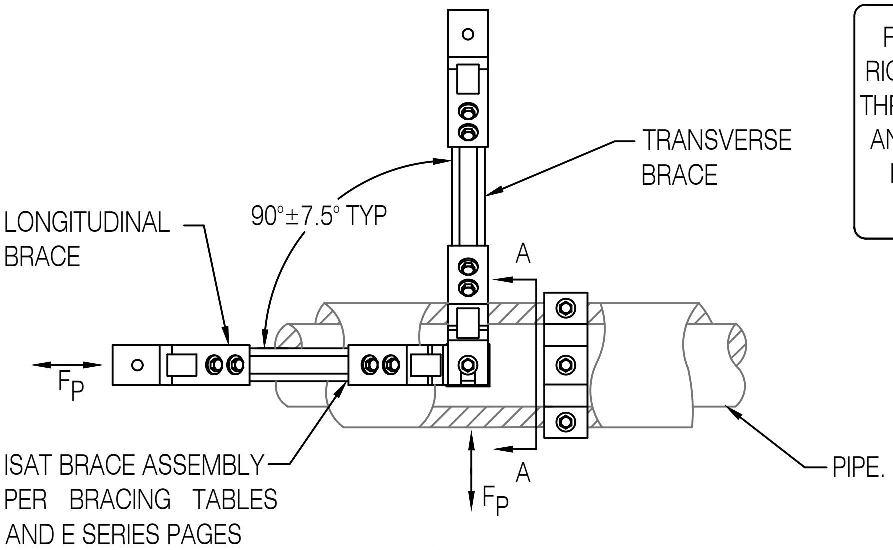

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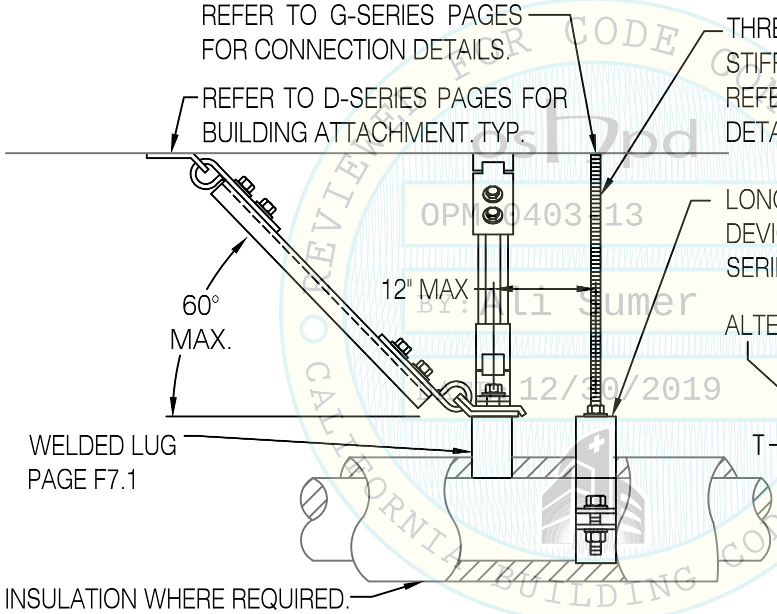

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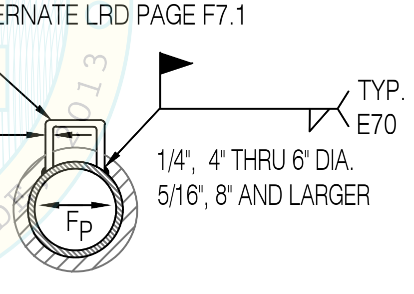
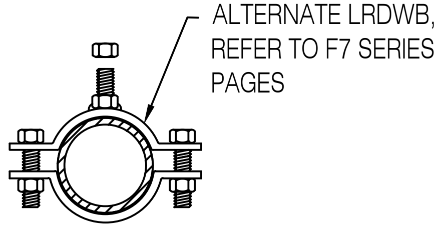


SECTION A-A



WELDED BOLT ALTERNATE

## SINGLE HUNG PIPE, WITH LRD & WELDED LUG
## 2-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

REGISTERED PROFESSIONAL ENGINEER
ANTHONY A. RUBALCAVA
S 4710
STRUCTURAL
STATE OF CALIFORNIA

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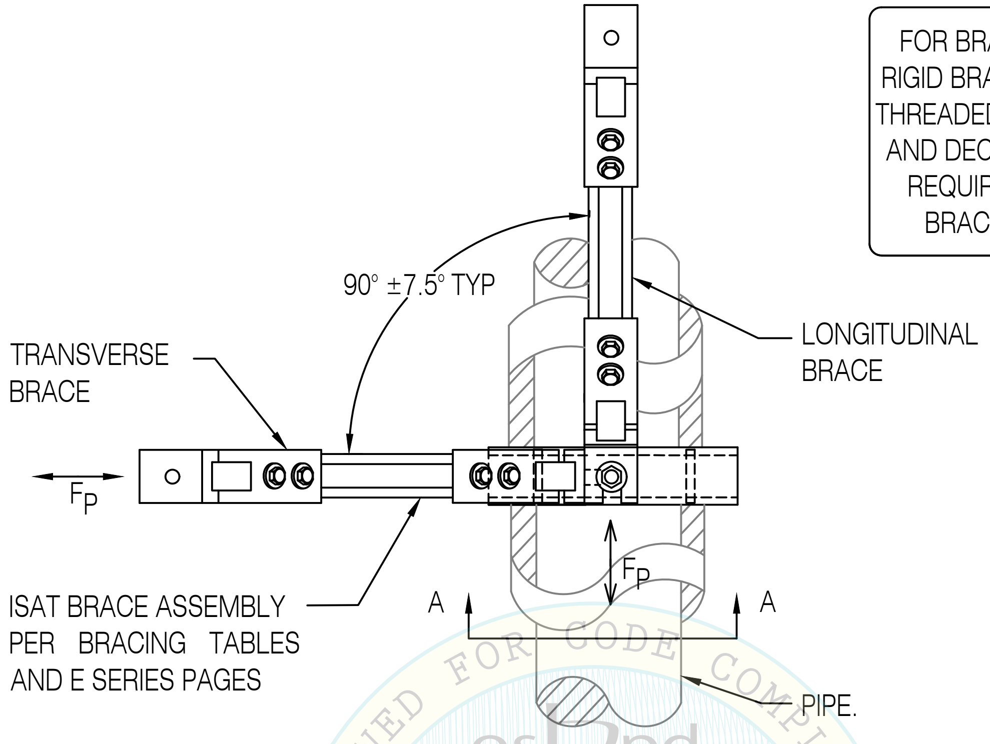
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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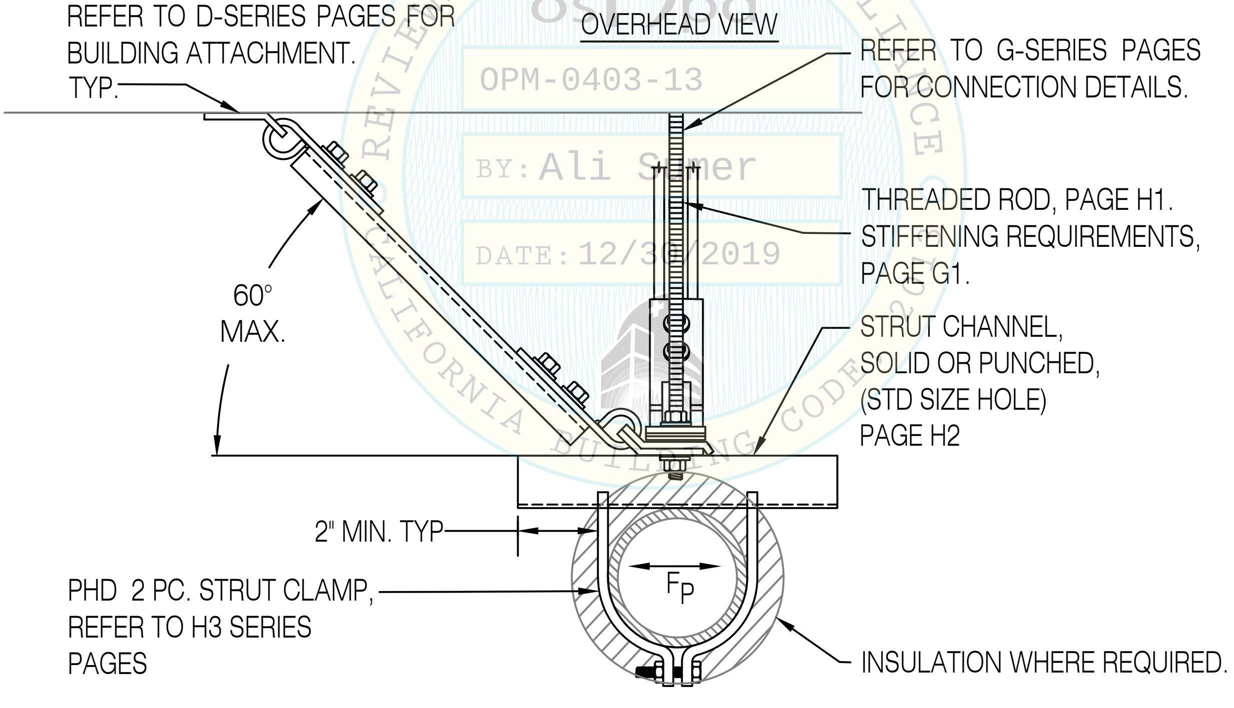

SECTION A - A

## SINGLE HUNG PIPE, STRUT CLAMP
## 2-WAY TRANSVERSE LONGITUDINAL, RIGID BRACING

ANTHONY A. RUBALCAVA
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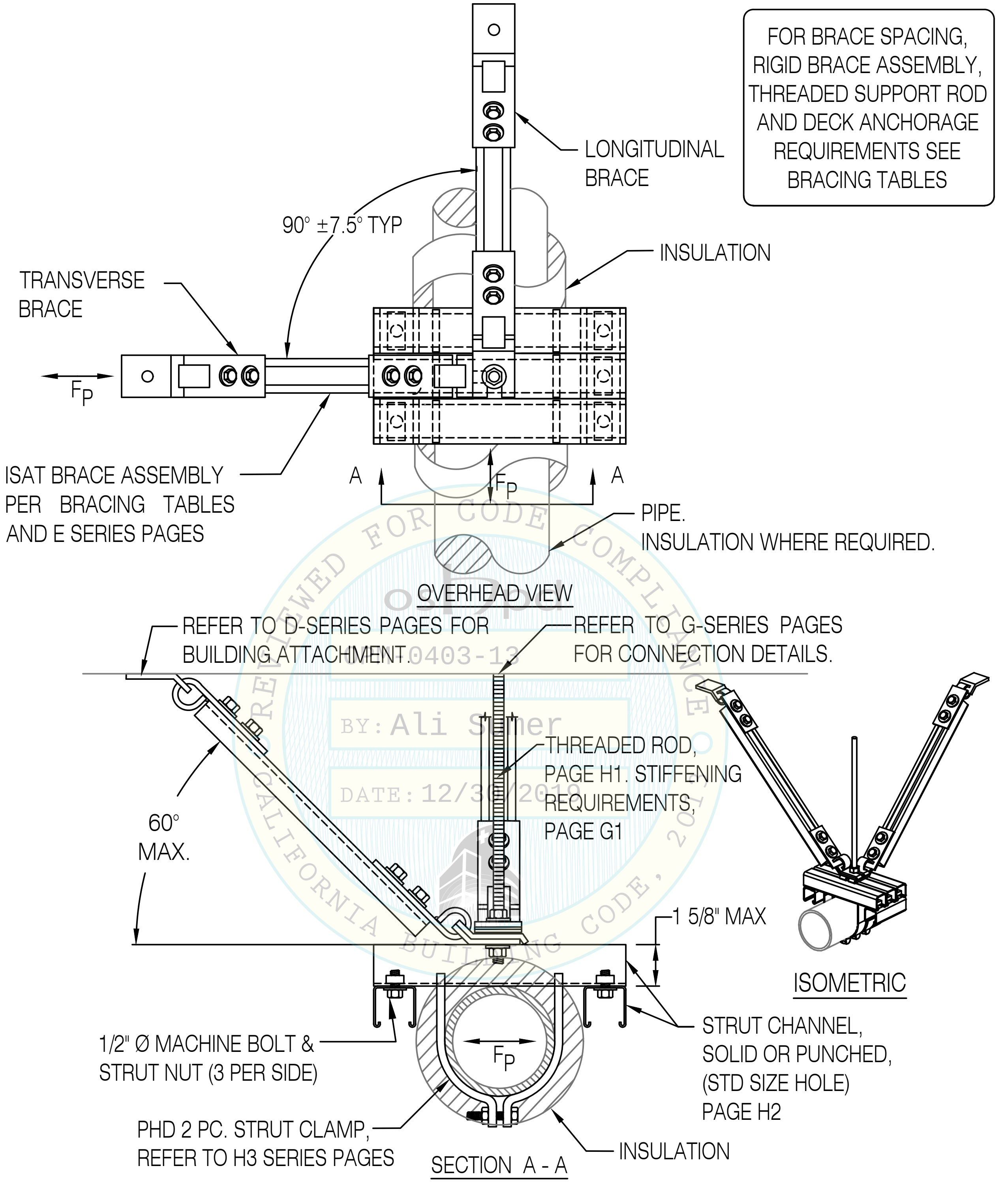

FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

# SINGLE HUNG PIPE, TRIPLE STRUT CLAMP
# 2-WAY TRANSVERSE LONGITUDINAL, RIGID BRACING

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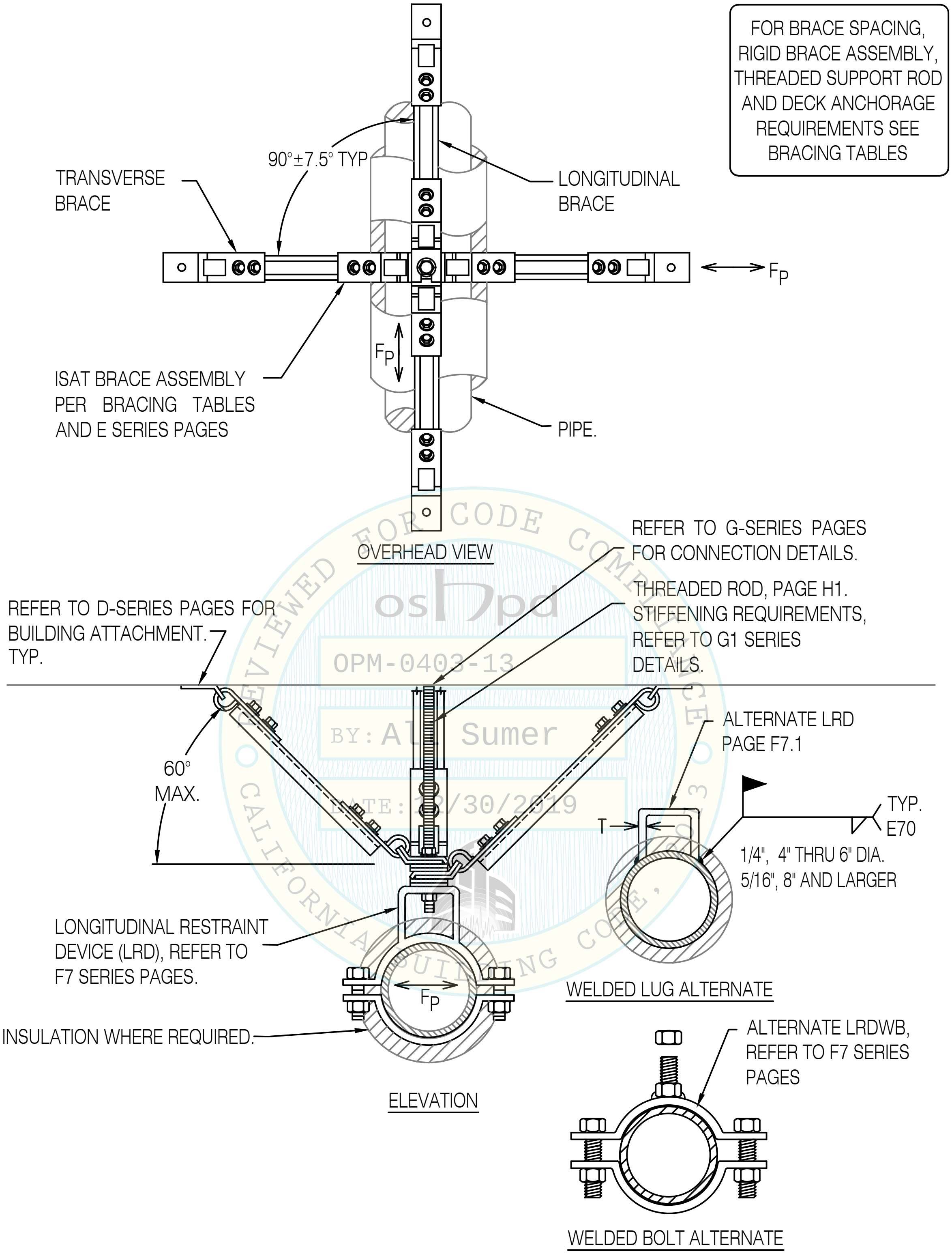

## SINGLE HUNG PIPE, WITH LRD
## 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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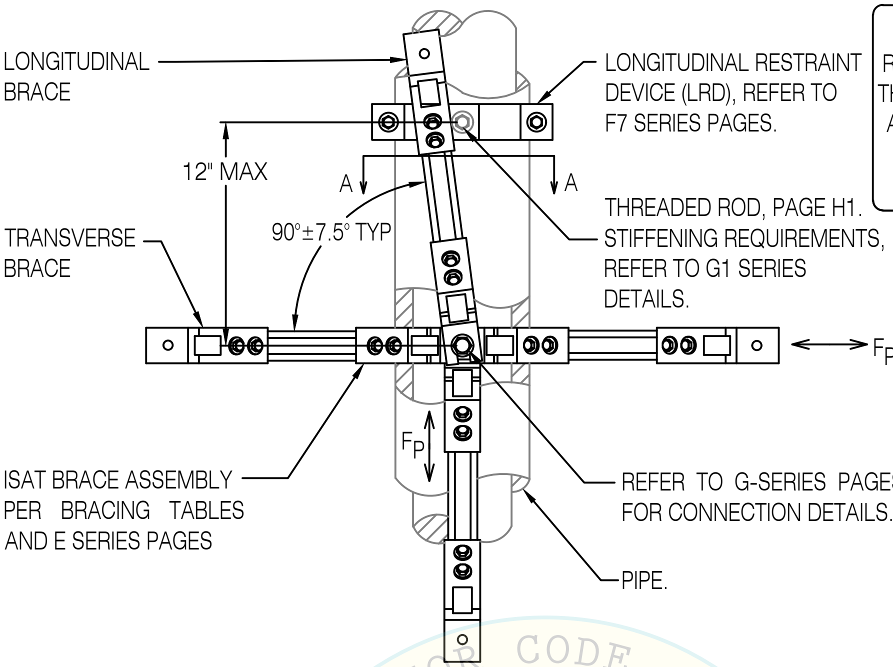
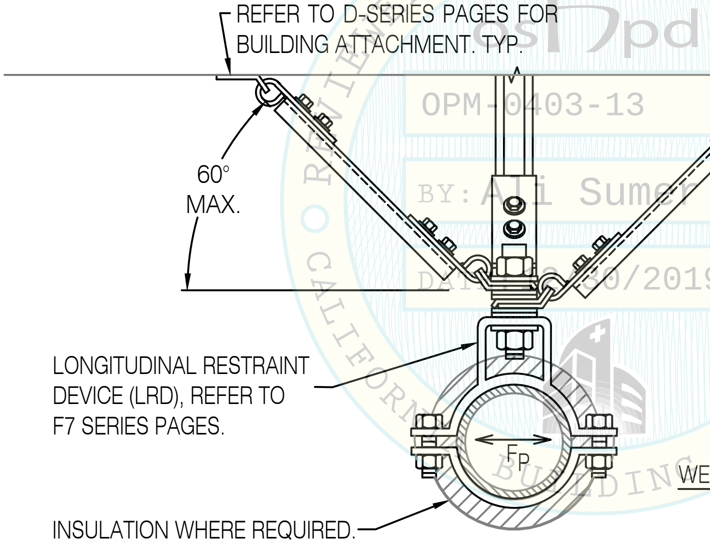
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



OVERHEAD VIEW



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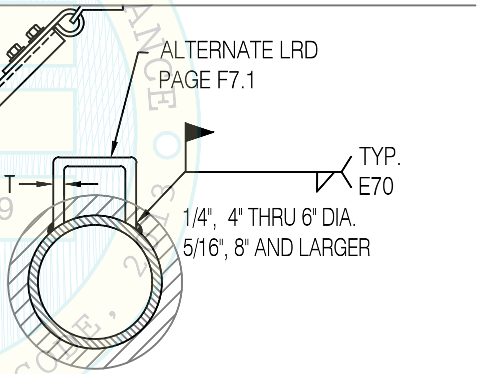
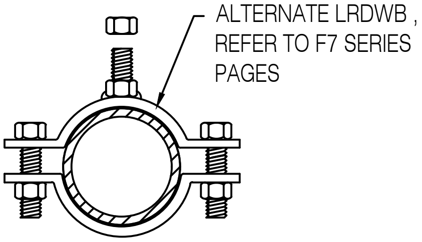


WELDED LUG ALTERNATE
(SECTION A-A)



WELDED BOLT ALTERNATE

# SINGLE HUNG PIPE, WITH LRD
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

ANTHONY A. RUBALCAVA
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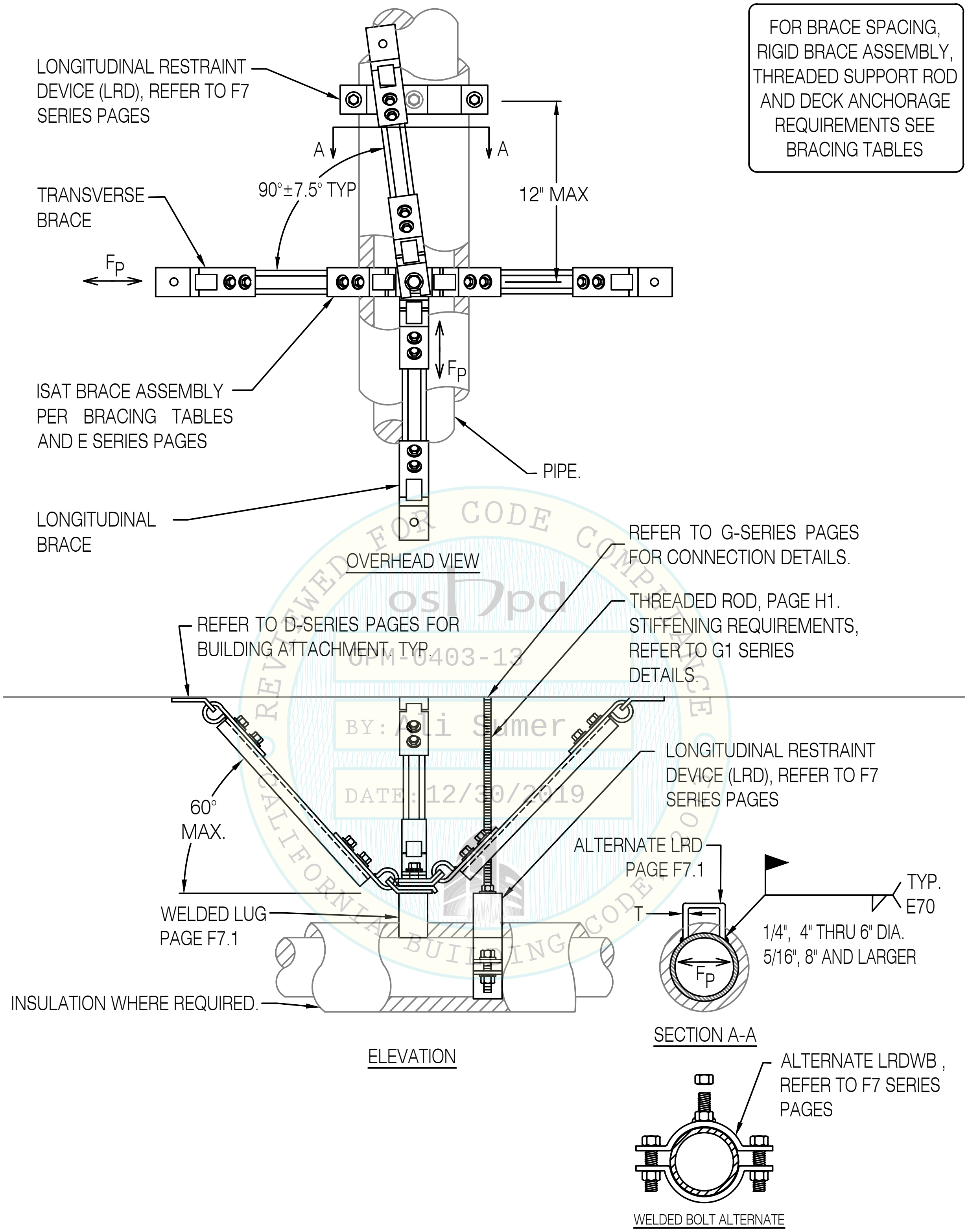
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



OVERHEAD VIEW

ELEVATION

SECTION A-A

WELDED BOLT ALTERNATE

# SINGLE HUNG PIPE, WITH LRD & WELDED LUG 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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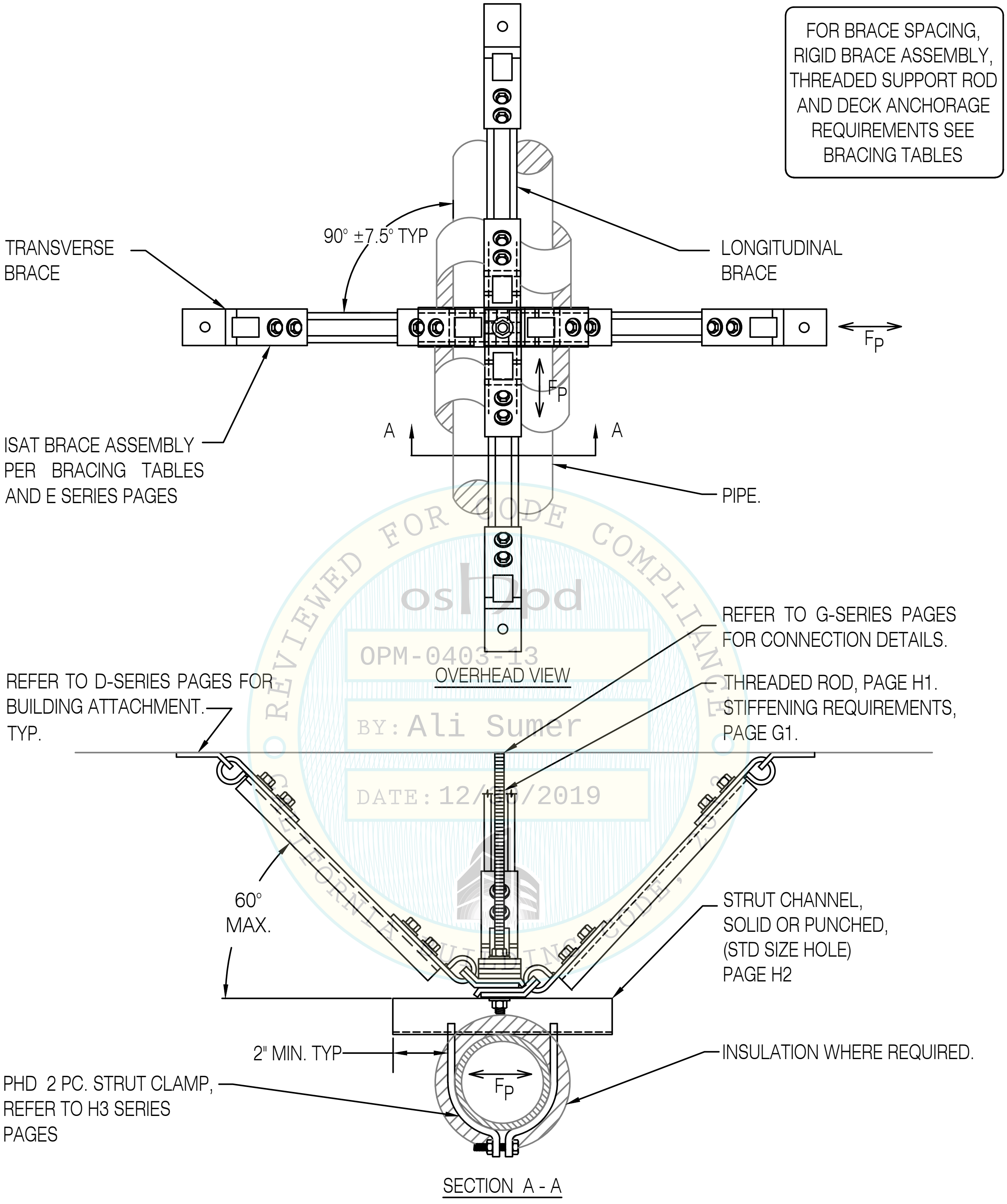

# SINGLE HUNG PIPE, STRUT CLAMP
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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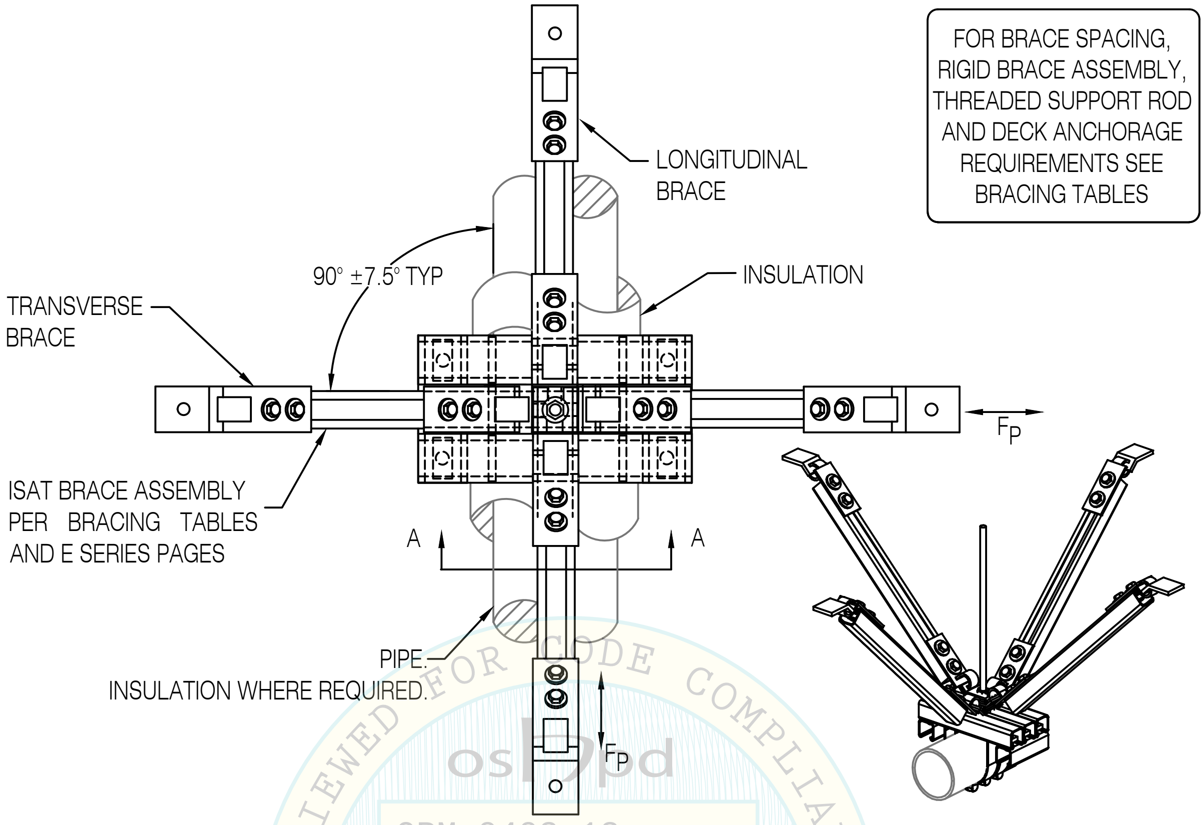
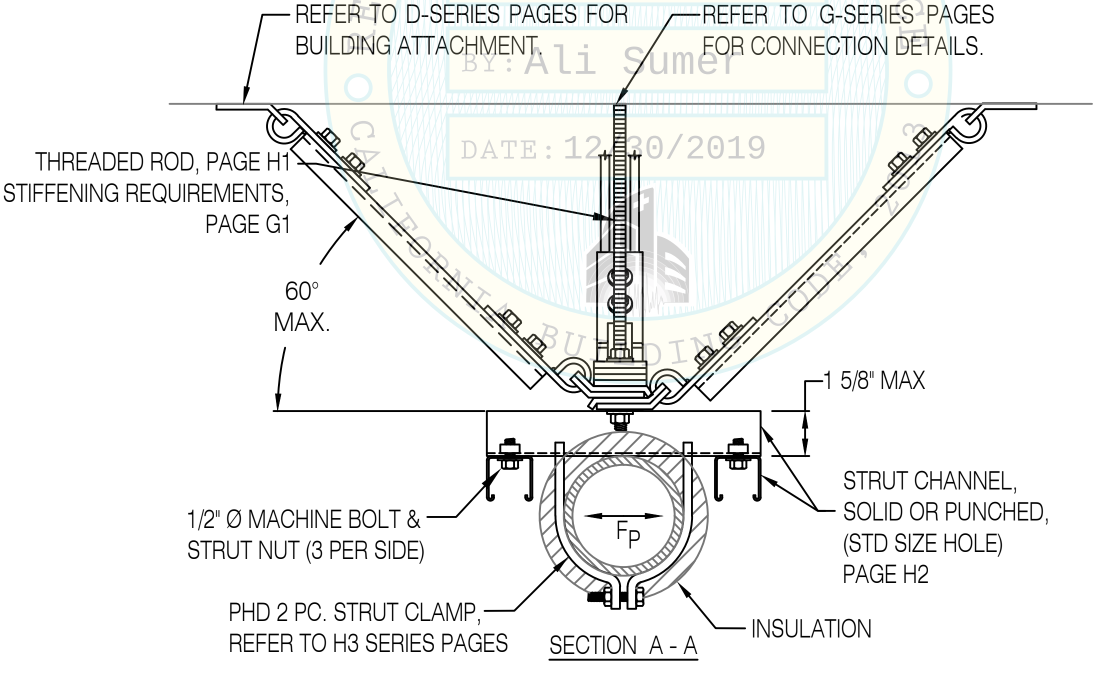
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



OVERHEAD VIEW

ISOMETRIC



SECTION A - A

# SINGLE HUNG PIPE, TRIPLE STRUT CLAMP
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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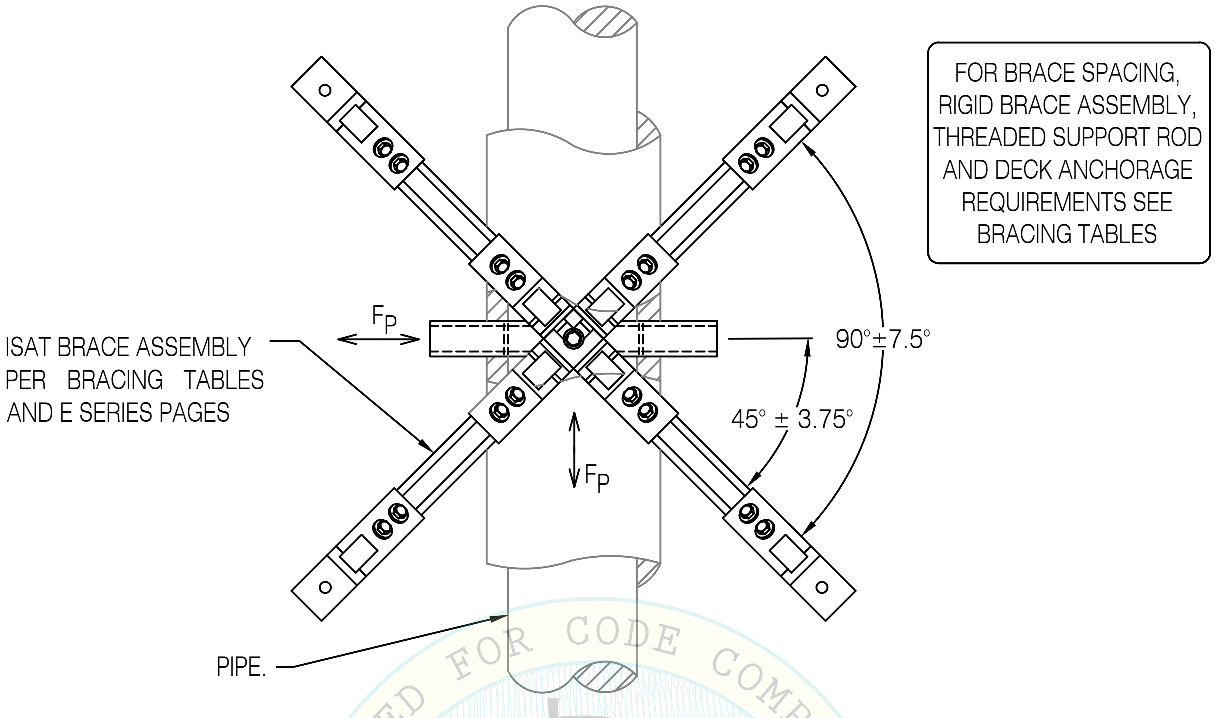
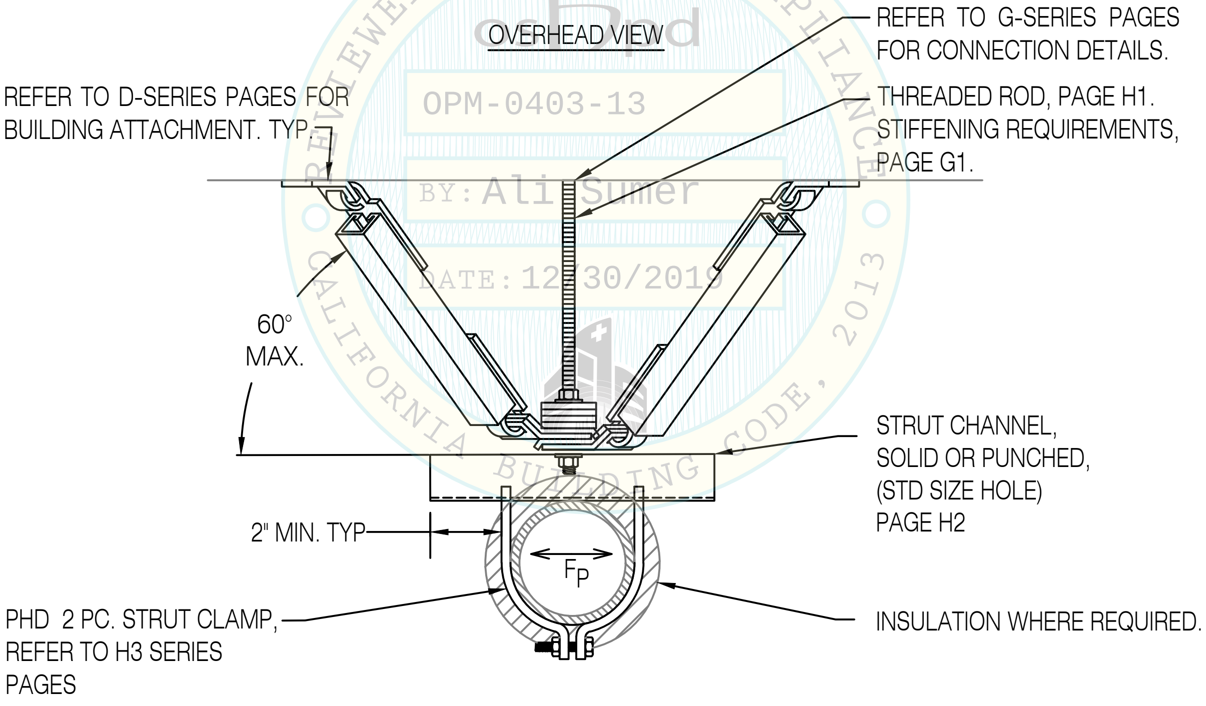


FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

ISAT BRACE ASSEMBLY PER BRACING TABLES AND E SERIES PAGES

PIPE.

OVERHEAD VIEW



REFER TO G-SERIES PAGES FOR CONNECTION DETAILS.

REFER TO D-SERIES PAGES FOR BUILDING ATTACHMENT. TYP.

THREADED ROD, PAGE H1. STIFFENING REQUIREMENTS, PAGE G1.

STRUT CHANNEL, SOLID OR PUNCHED, (STD SIZE HOLE) PAGE H2

PHD 2 PC. STRUT CLAMP, REFER TO H3 SERIES PAGES

INSULATION WHERE REQUIRED.

ELEVATION

# SINGLE HUNG PIPE, STRUT CLAMP
# 4-WAY SPLAYED, RIGID BRACING

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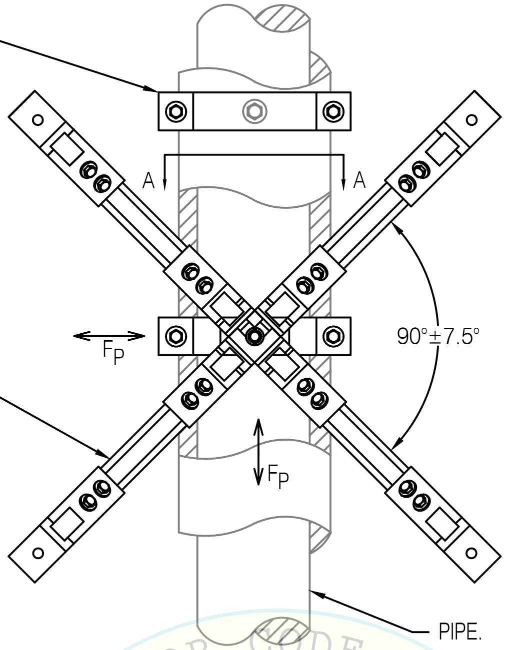
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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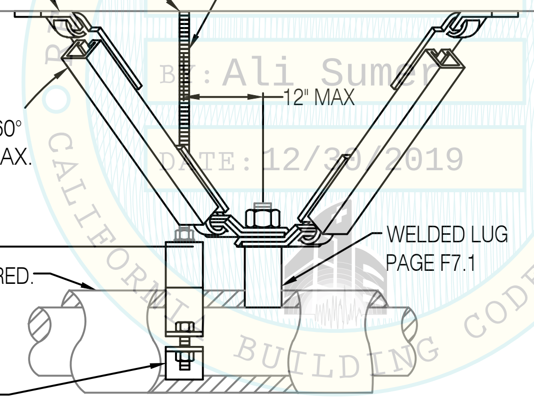

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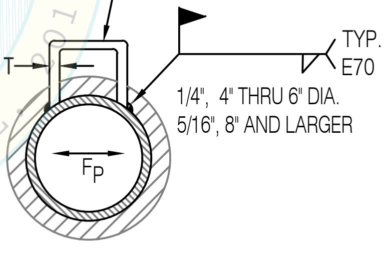
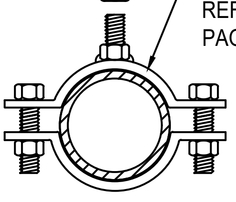


SECTION A-A



WELDED BOLT ALTERNATE

# SINGLE HUNG PIPE, WITH LRD & WELDED LUG 4-WAY SPLAYED, RIGID BRACING

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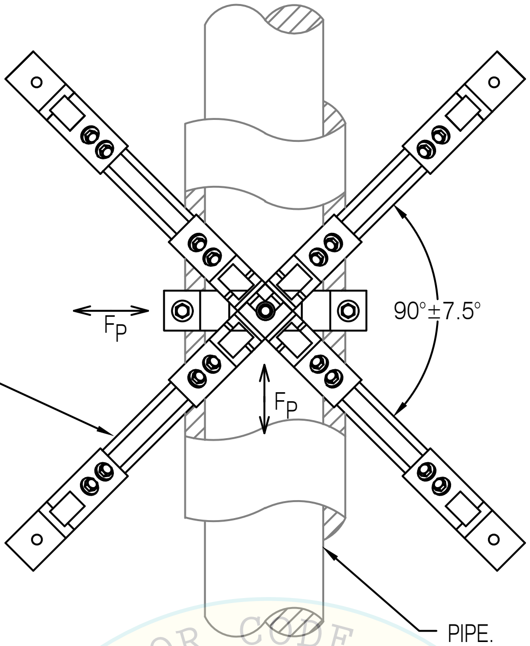


ISAT BRACE ASSEMBLY PER BRACING TABLES AND E SERIES PAGES

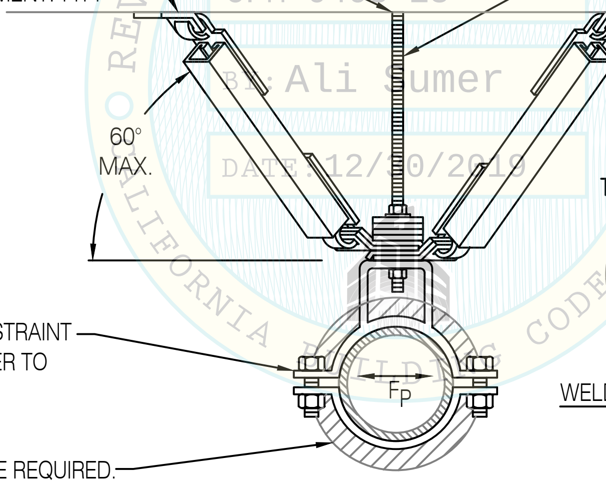
PIPE.

OVERHEAD VIEW

REFER TO G-SERIES PAGES FOR CONNECTION DETAILS.

REFER TO D-SERIES PAGES FOR BUILDING ATTACHMENT. TYP.

THREADED ROD, PAGE H1. STIFFENING REQUIREMENTS, REFER TO G1 SERIES DETAILS.

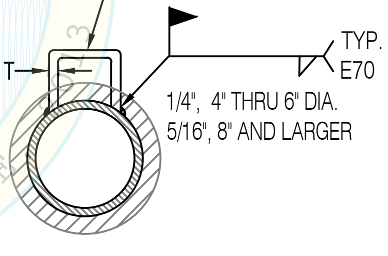


LONGITUDINAL RESTRAINT DEVICE (LRD), REFER TO F7 SERIES PAGES.

INSULATION WHERE REQUIRED.

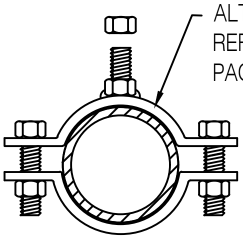
ELEVATION

ALTERNATE LRD PAGE F7.1



WELDED LUG ALTERNATE

ALTERNATE LRDWB , REFER TO F7 SERIES PAGES



WELDED BOLT ALTERNATE

# SINGLE HUNG PIPE, WITH LRD
# 4-WAY SPLAYED, RIGID BRACING

ANTHONY A. RUBALCAVA
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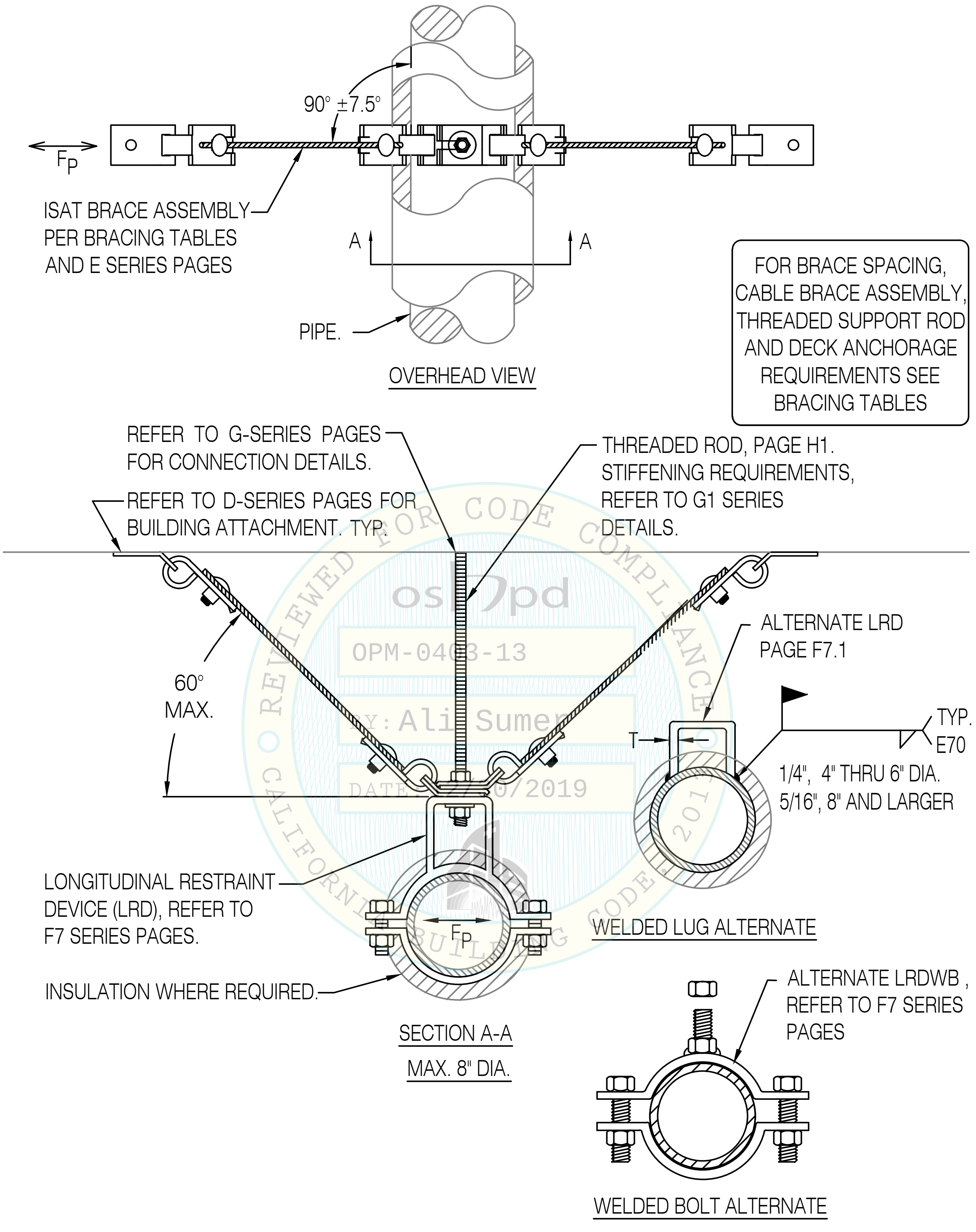

ISAT BRACE ASSEMBLY PER BRACING TABLES AND E SERIES PAGES

PIPE.

OVERHEAD VIEW

FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

REFER TO G-SERIES PAGES FOR CONNECTION DETAILS.

REFER TO D-SERIES PAGES FOR BUILDING ATTACHMENT. TYP.

THREADED ROD, PAGE H1. STIFFENING REQUIREMENTS, REFER TO G1 SERIES DETAILS.

ALTERNATE LRD PAGE F7.1

1/4", 4" THRU 6" DIA.
5/16", 8" AND LARGER

LONGITUDINAL RESTRAINT DEVICE (LRD), REFER TO F7 SERIES PAGES.

INSULATION WHERE REQUIRED.

WELDED LUG ALTERNATE

SECTION A-A

MAX. 8" DIA.

ALTERNATE LRDWB , REFER TO F7 SERIES PAGES

WELDED BOLT ALTERNATE

# SINGLE HUNG PIPE, WITH LRD
# 2-WAY TRANSVERSE, CABLE BRACING

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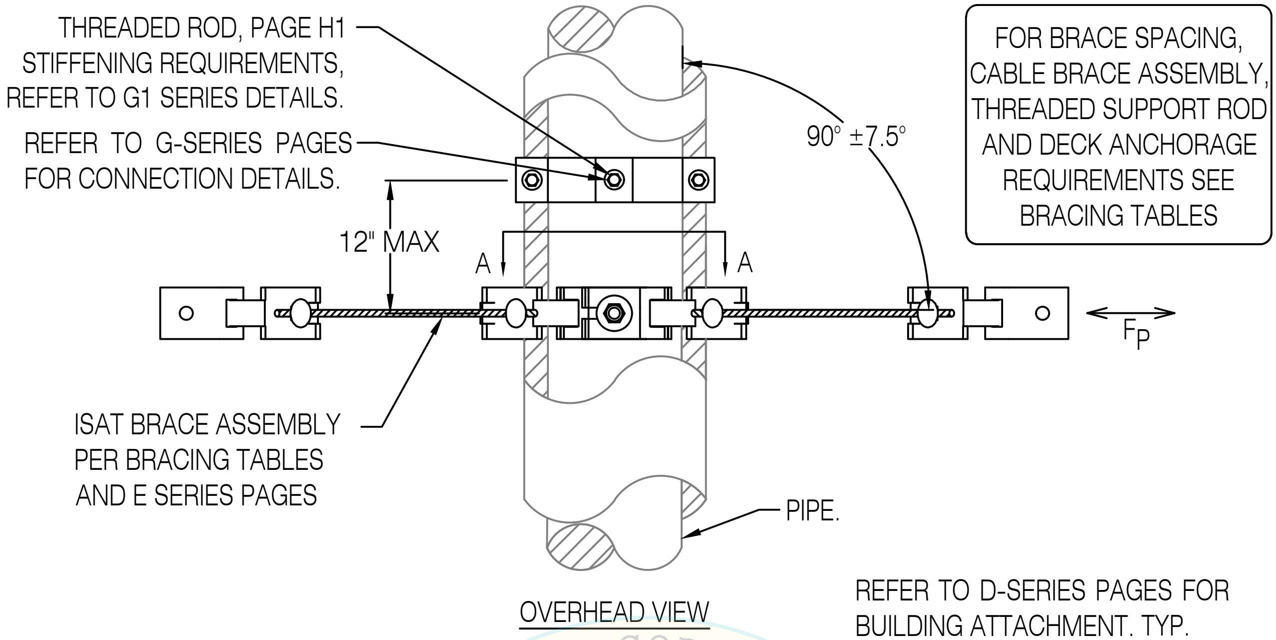
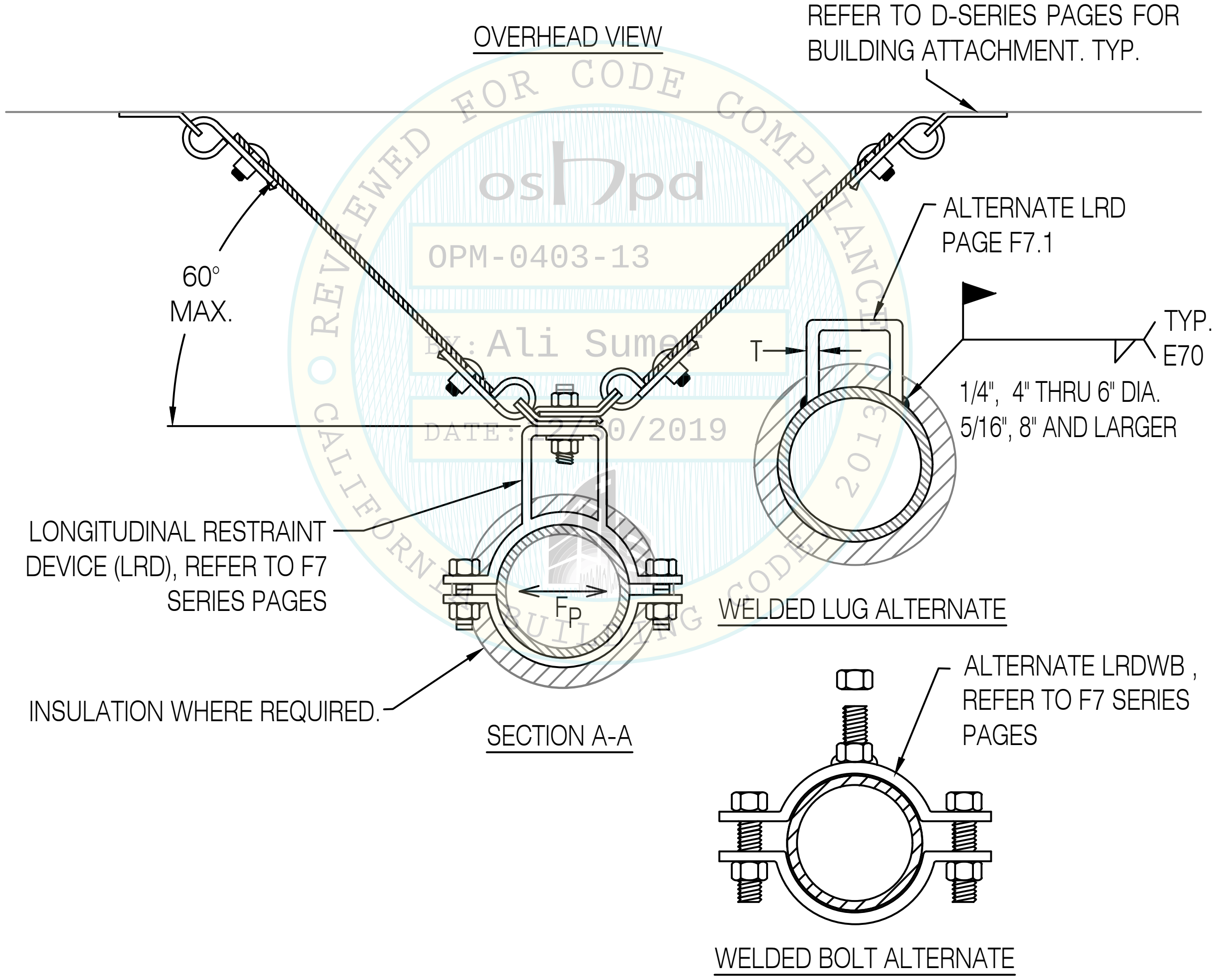


OVERHEAD VIEW



SECTION A-A

WELDED LUG ALTERNATE

WELDED BOLT ALTERNATE

# SINGLE HUNG PIPE, WITH TWO LRDs
# 2-WAY TRANSVERSE, CABLE BRACING

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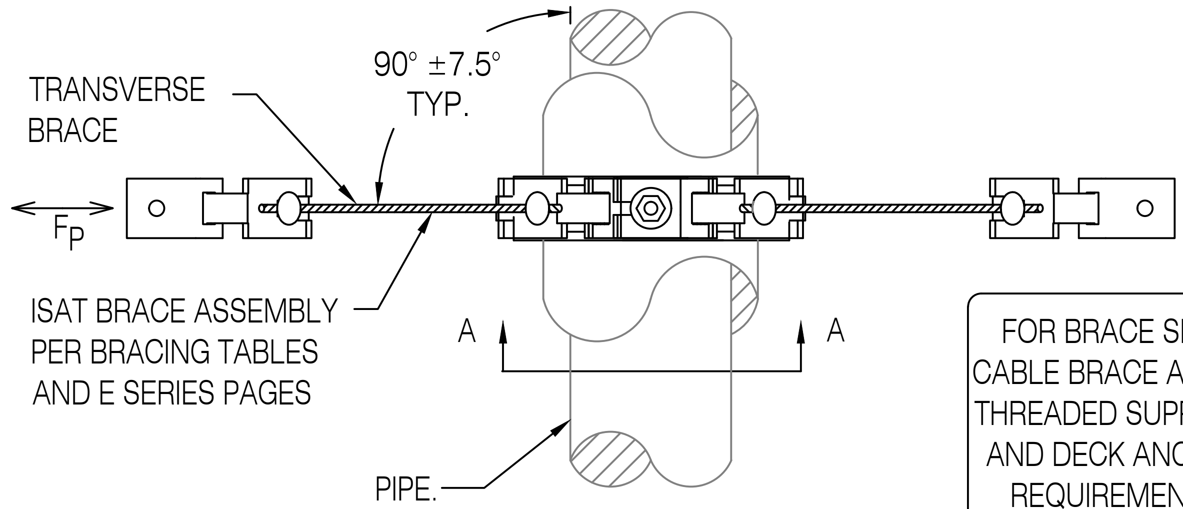
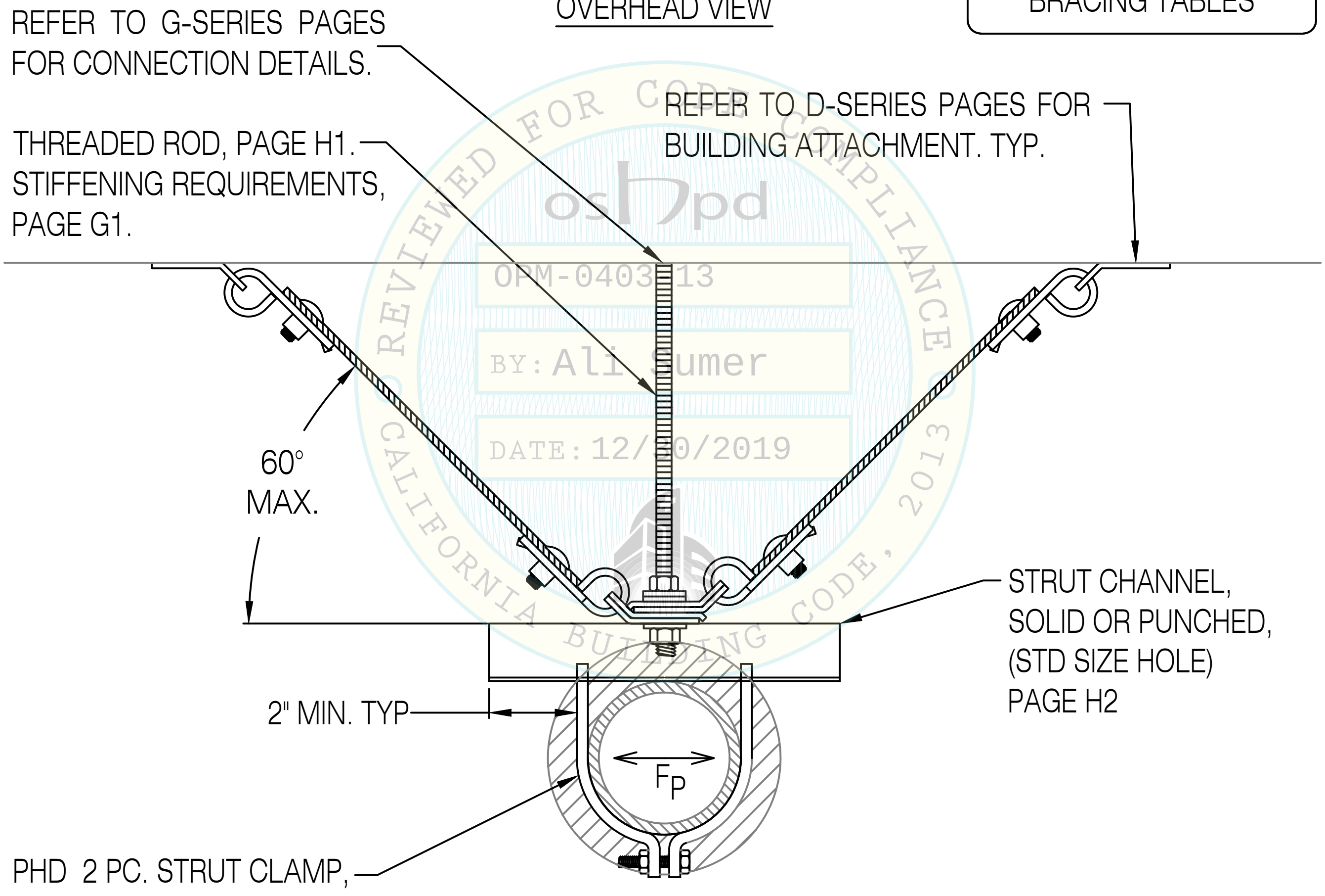


OVERHEAD VIEW

FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



SECTION A - A

# SINGLE HUNG PIPE, STRUT CLAMP 2-WAY TRANSVERSE, CABLE BRACING

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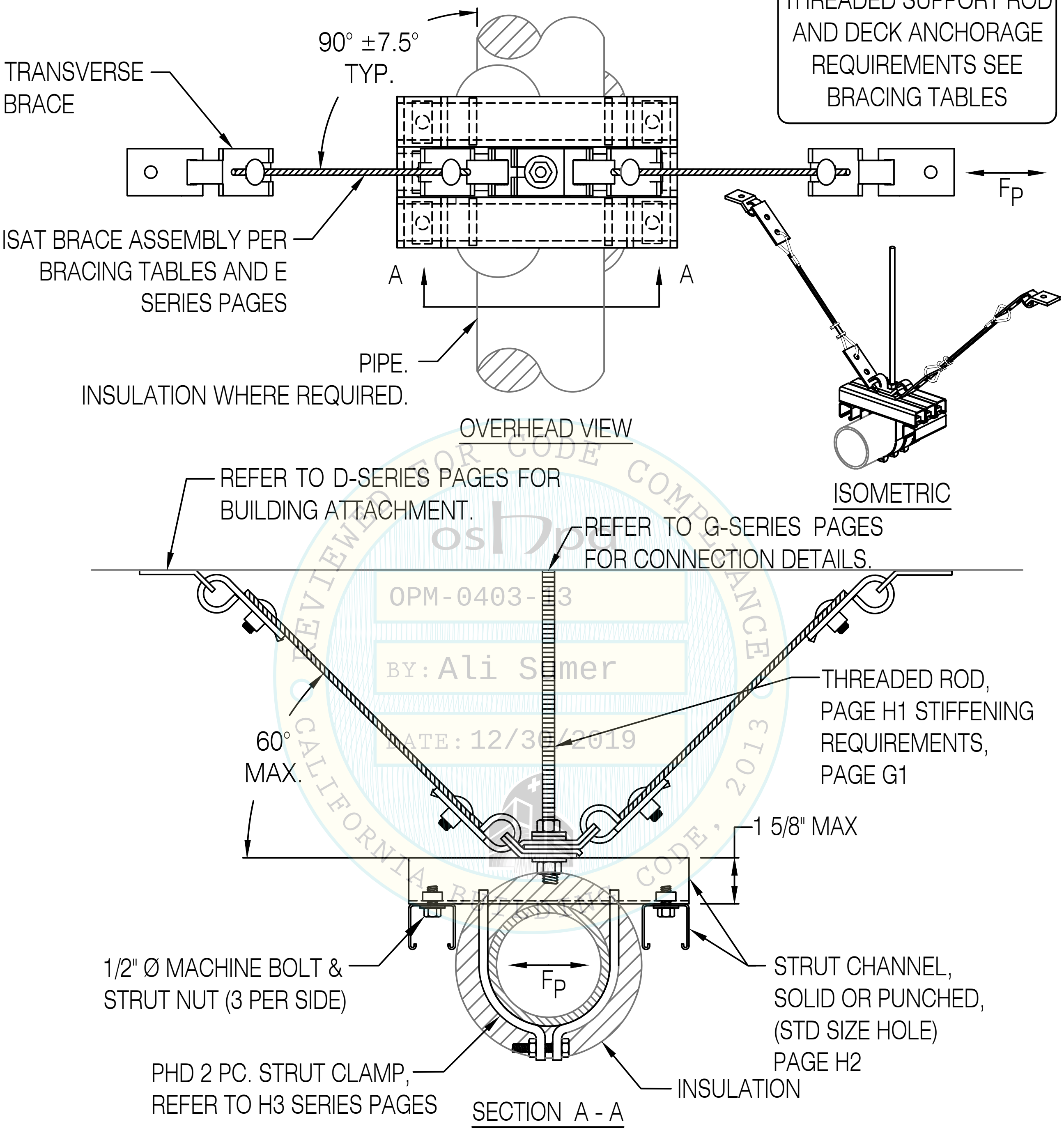
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



## SINGLE HUNG PIPE, TRIPLE STRUT CLAMP
## 2-WAY TRANSVERSE, CABLE BRACING

ANTHONY A. RUBALCAVA
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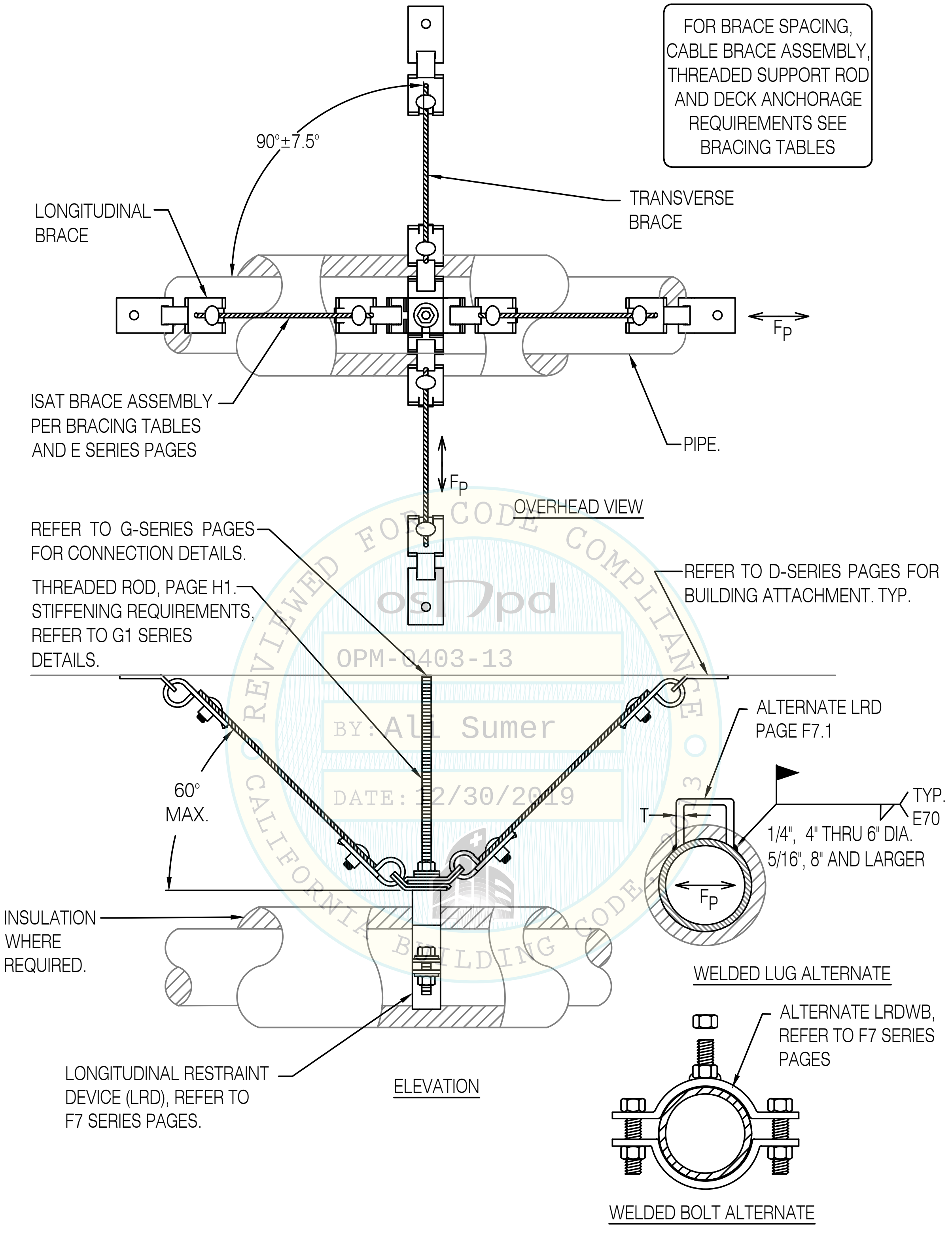

# SINGLE HUNG PIPE, WITH LRD
# 4-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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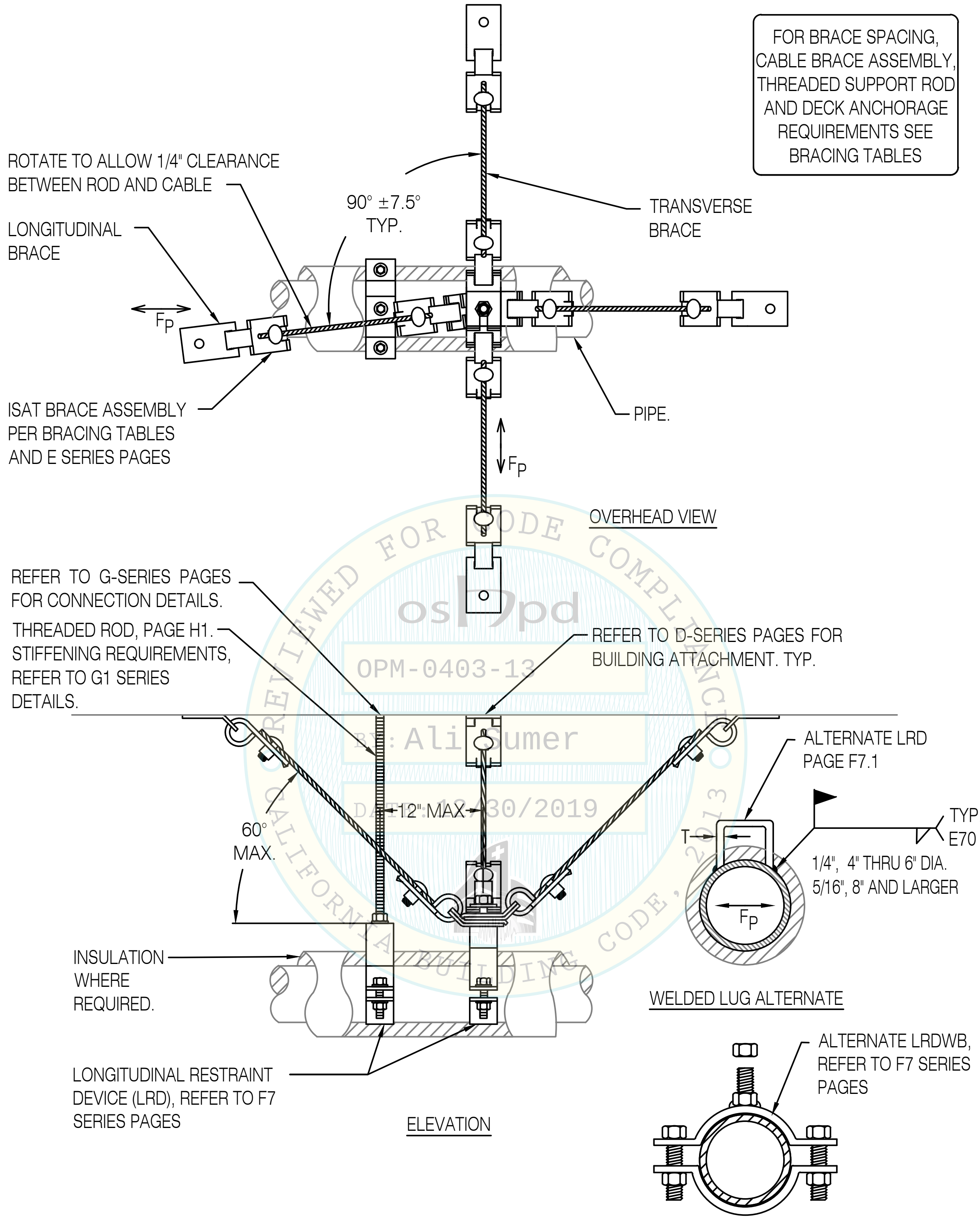

# SINGLE HUNG PIPE WITH TWO LRDs
# 4-WAY TRANSVERSE - LONGITUDINAL, CABLE BRACING

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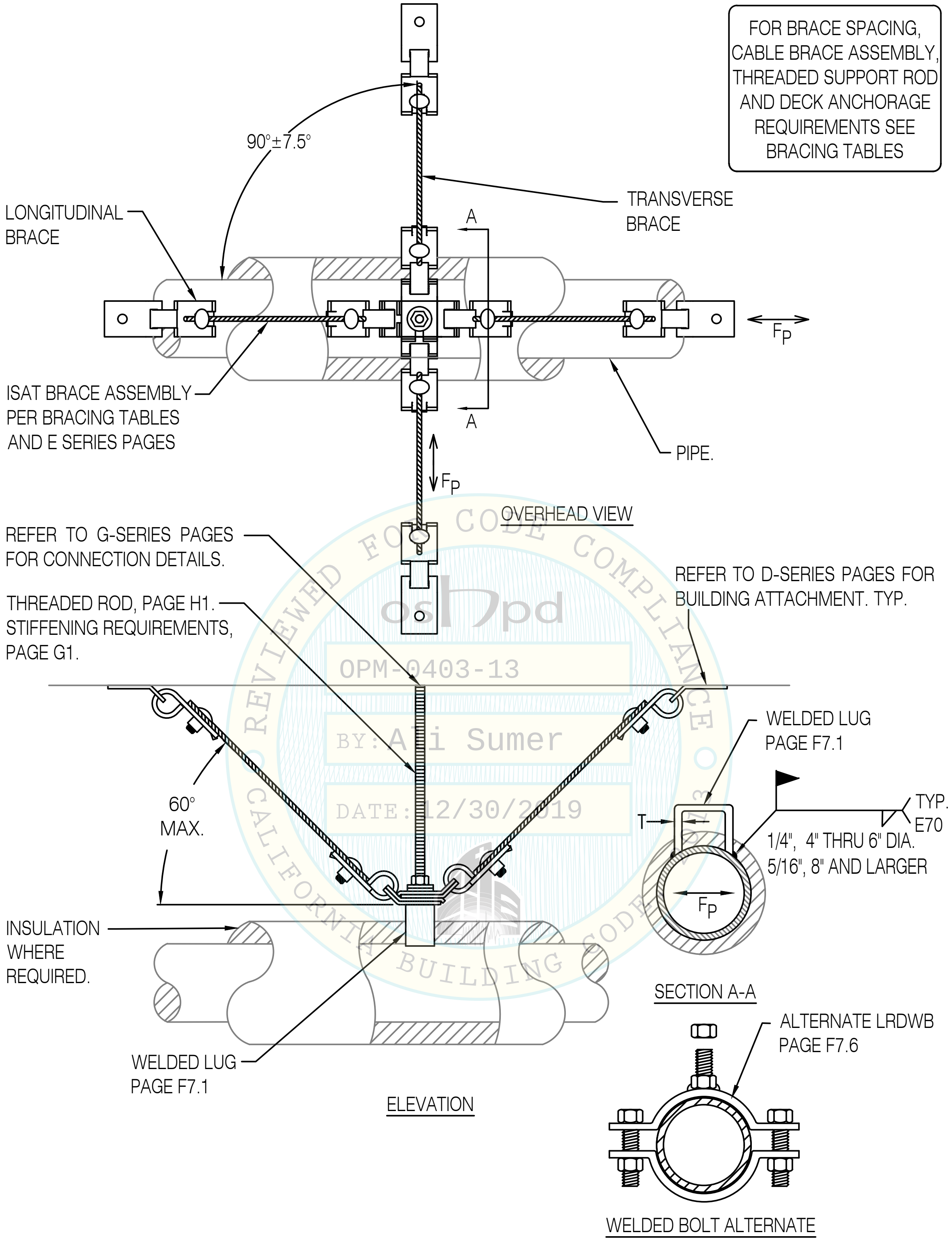

## SINGLE HUNG PIPE, WITH WELDED LUG
## 4-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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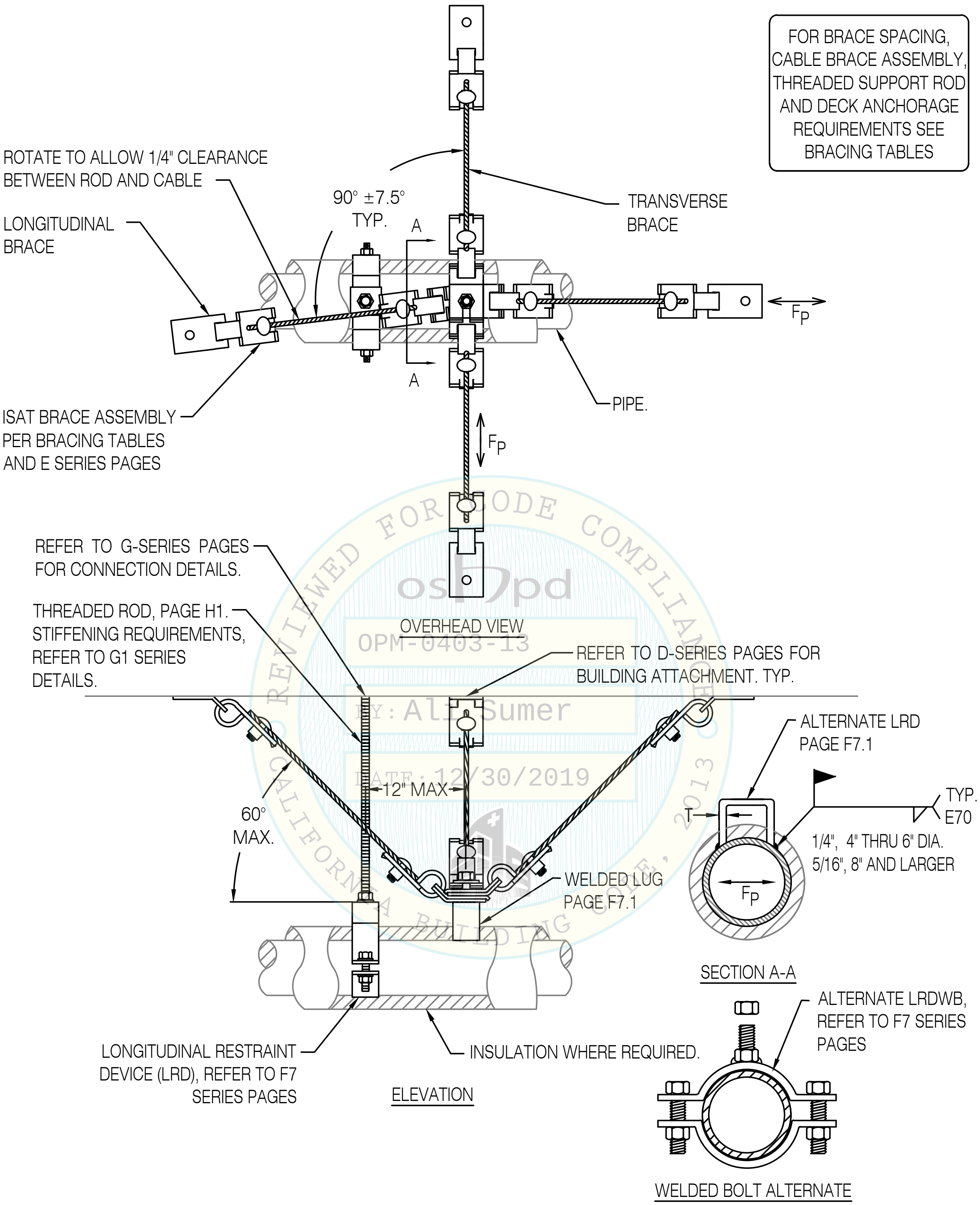
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



## SINGLE HUNG PIPE, WITH LRD & WELDED LUG
## 4-WAY TRANSVERSE - LONGITUDINAL, CABLE BRACING

ANTHONY A. RUBALCAVA
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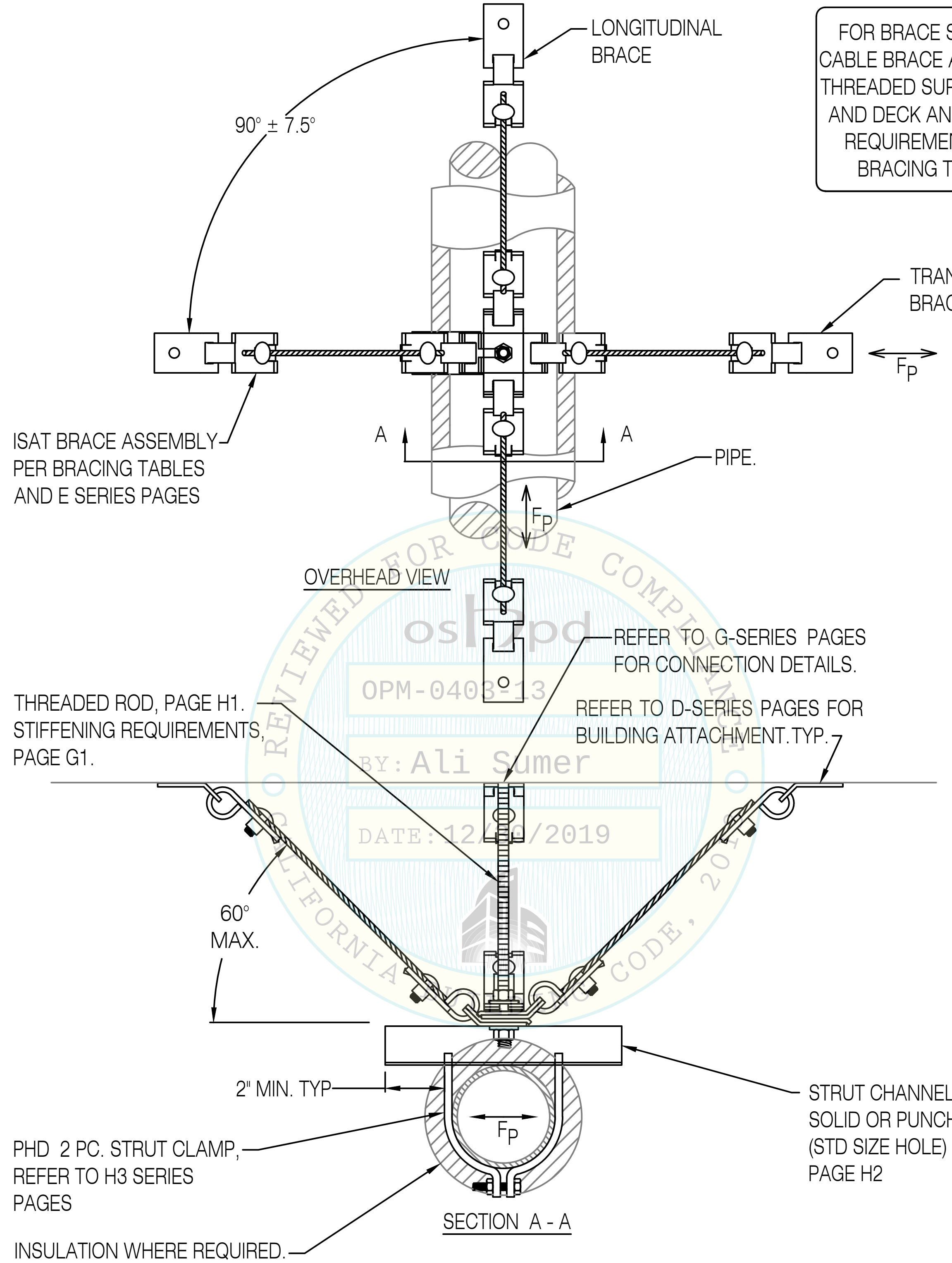
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



# SINGLE HUNG PIPE, STRUT CLAMP
# 4-WAY TRANSVERSE - LONGITUDINAL , CABLE BRACING

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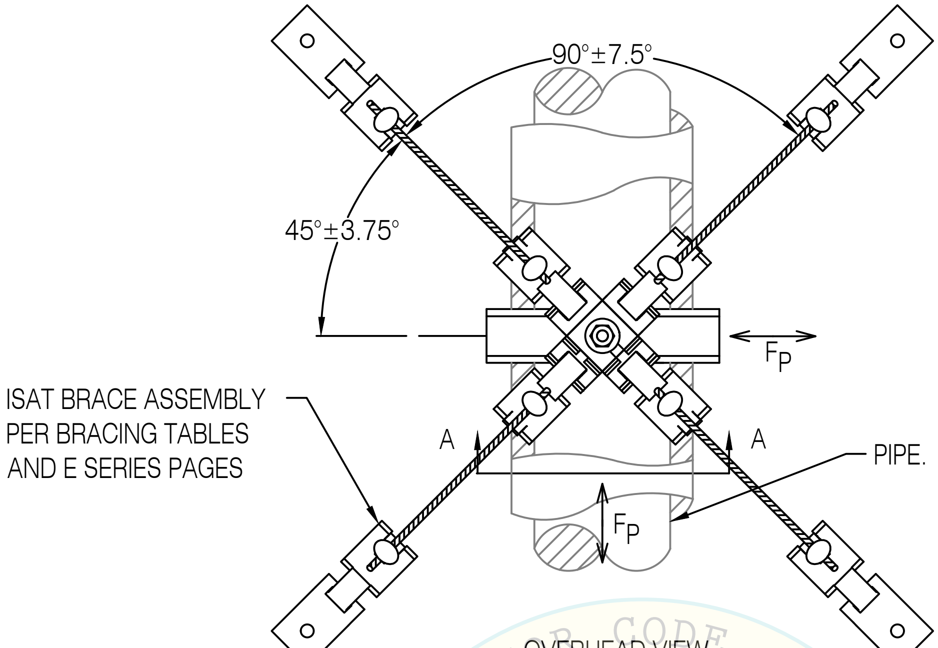
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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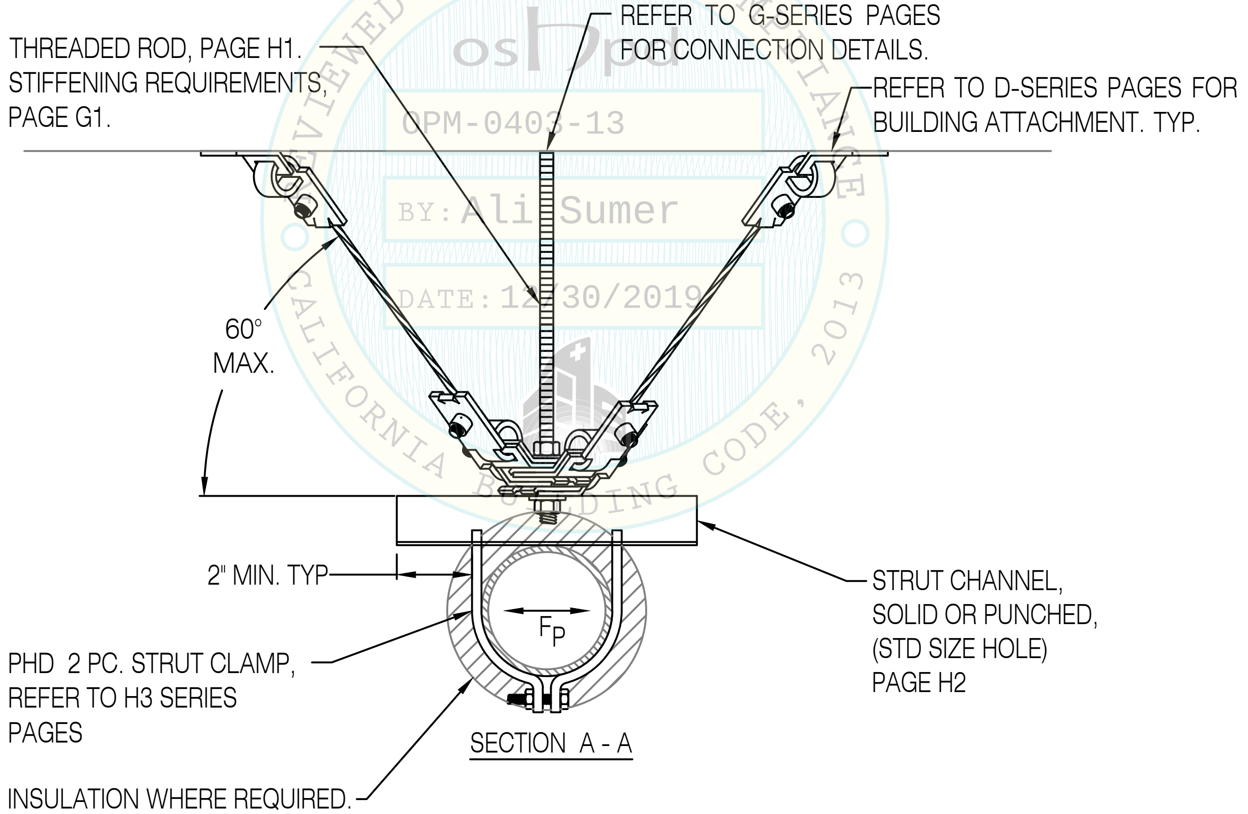

SECTION A - A

# SINGLE HUNG PIPE, STRUT CLAMP
# 4-WAY SPLAY, CABLE BRACING

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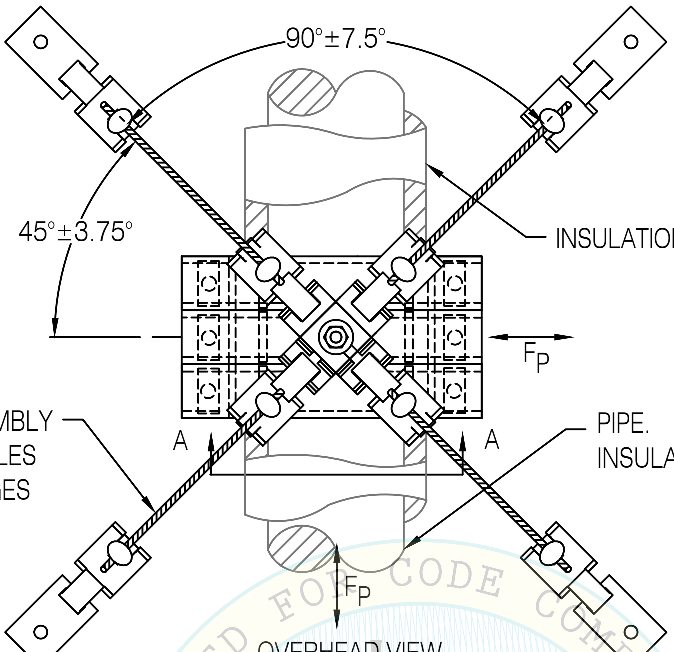
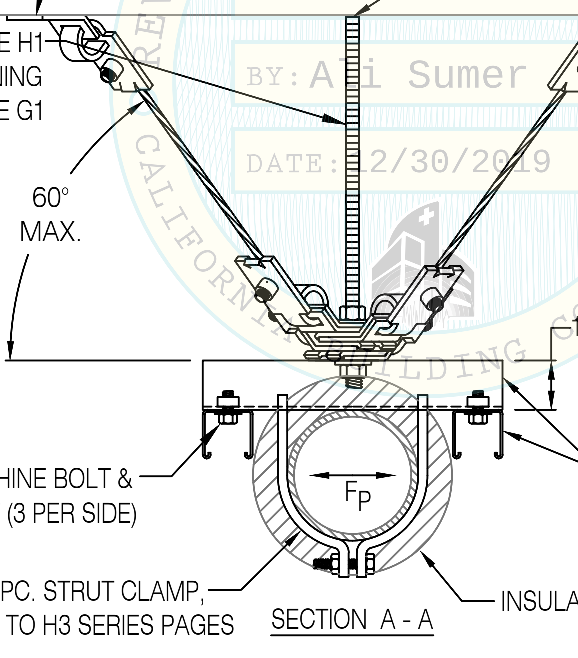
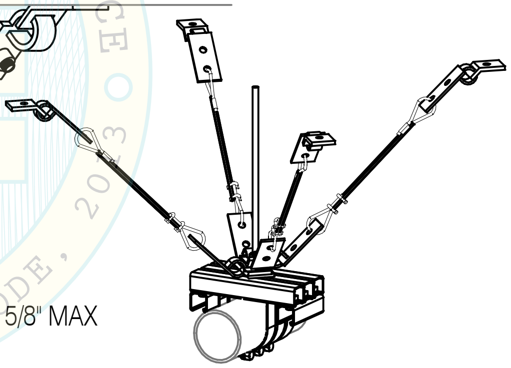
FOR BRACE SPACING,
CABLE BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



OVERHEAD VIEW



SECTION A - A



ISOMETRIC

# SINGLE HUNG PIPE, TRIPLE STRUT CLAMP
# 4-WAY SPLAY, CABLE BRACING

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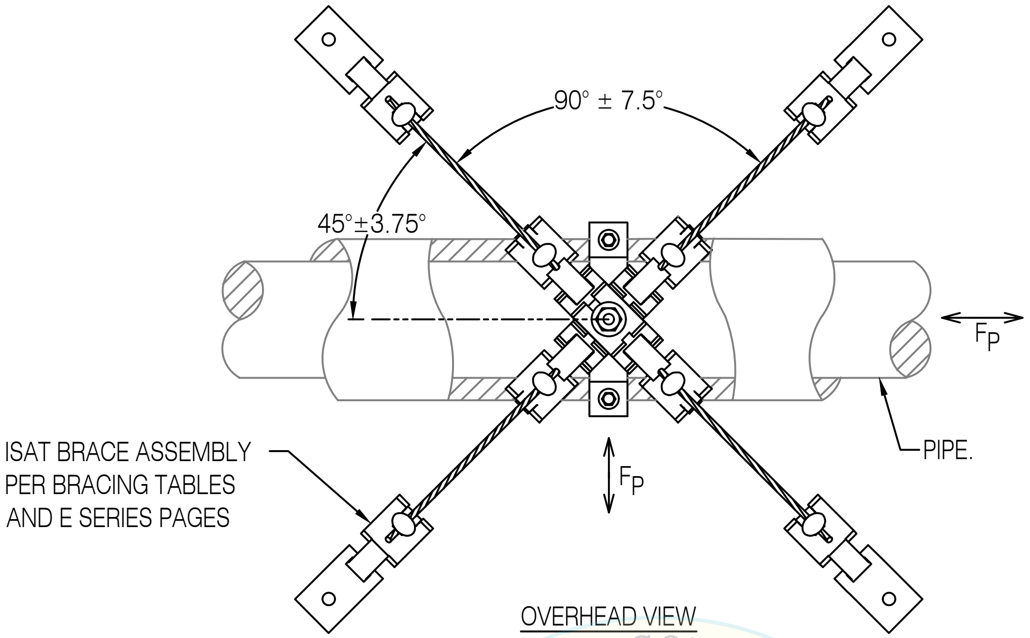
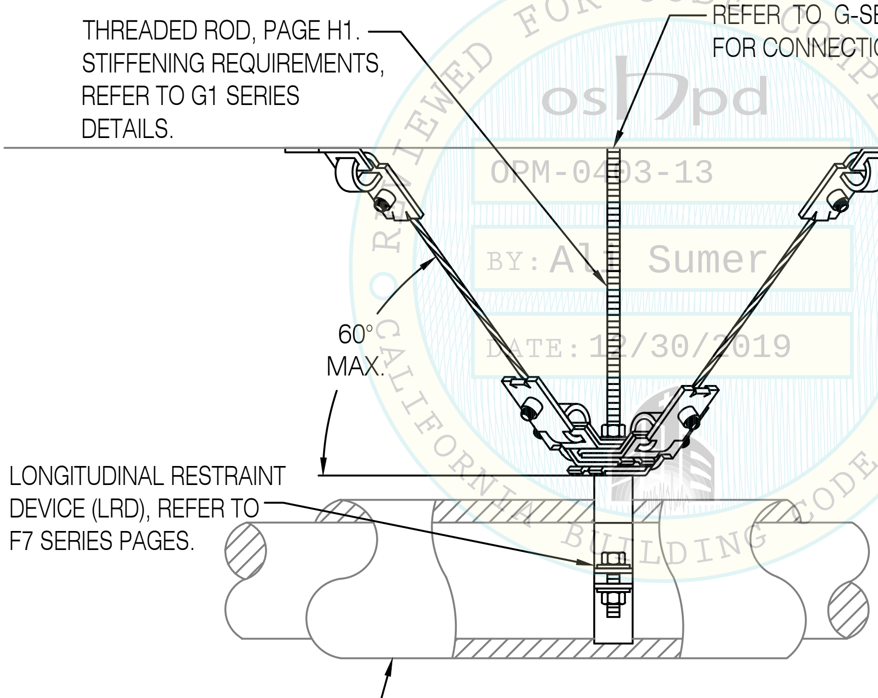


OVERHEAD VIEW



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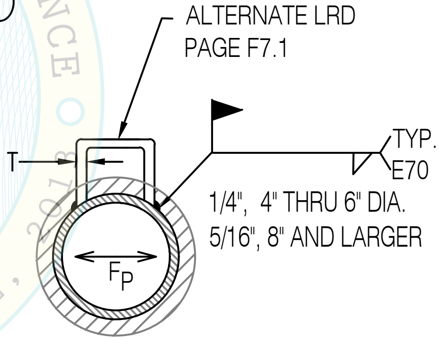
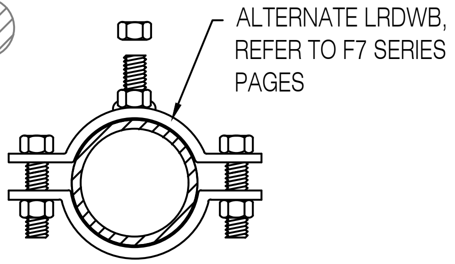


WELDED LUG ALTERNATE



WELDED BOLT ALTERNATE

## SINGLE HUNG PIPE, WITH LRD HANGER
## 4-WAY SPLAYED, CABLE BRACING

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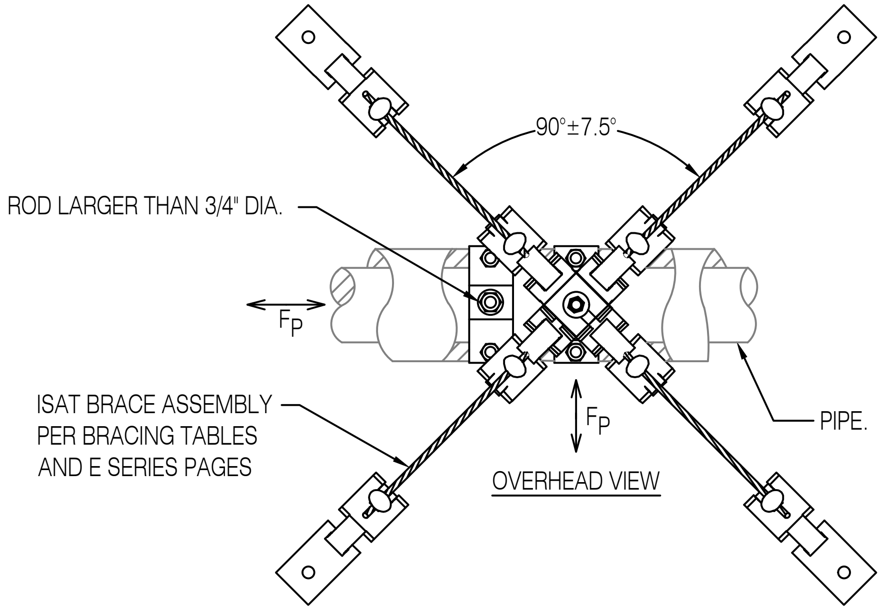
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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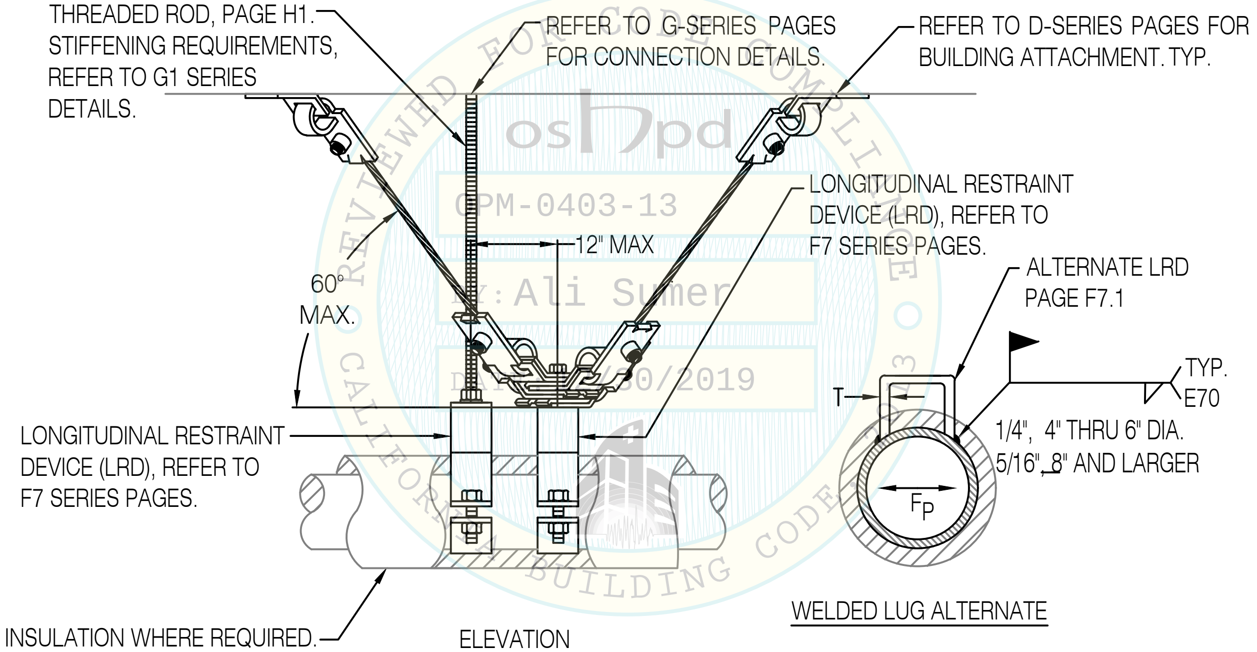
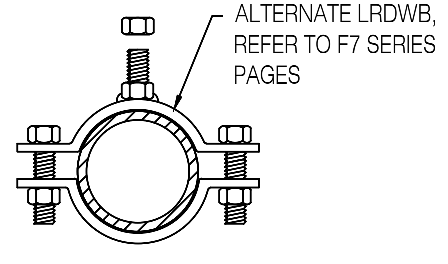


ELEVATION

WELDED LUG ALTERNATE



WELDED BOLT ALTERNATE

# SINGLE HUNG PIPE, WITH TWO LRDs
# 4-WAY SPLAYED , CABLE BRACING

ANTHONY A. RUBALCAVA
S 4710

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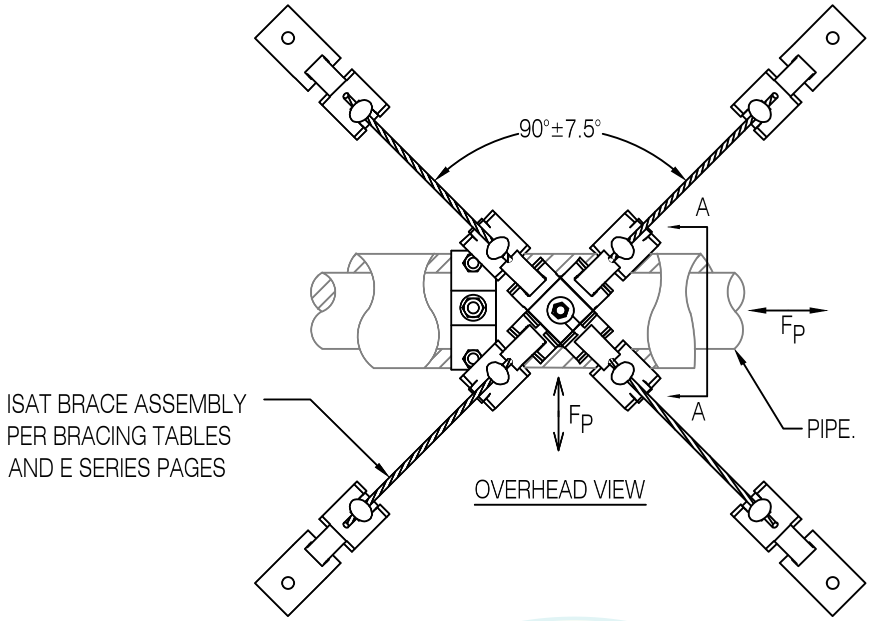
FOR BRACE SPACING,
CABLE BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



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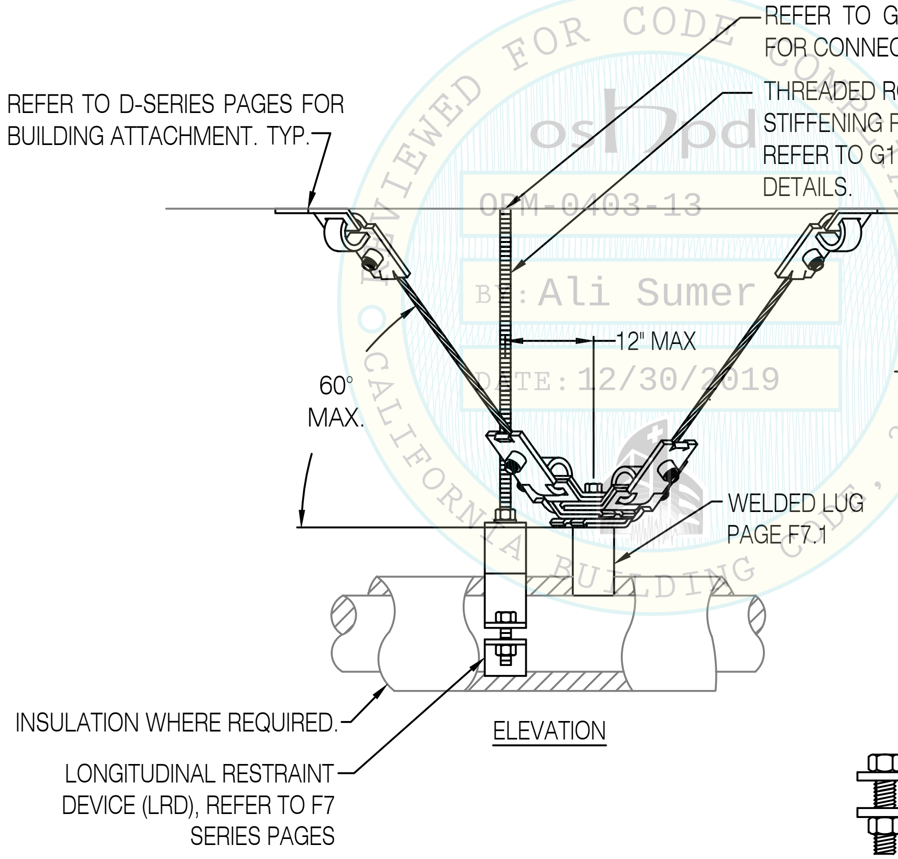

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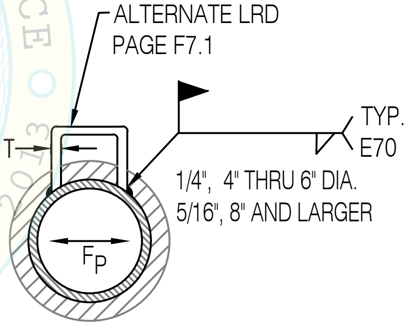

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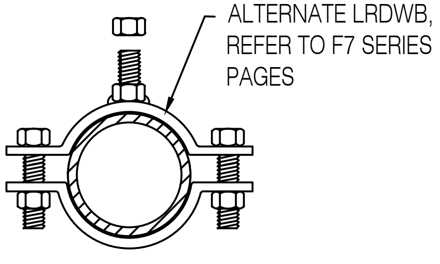

WELDED BOLT ALTERNATE

# SINGLE HUNG PIPE, WITH LRD & WELDED LUG
# 4-WAY SPLAYED , CABLE BRACING

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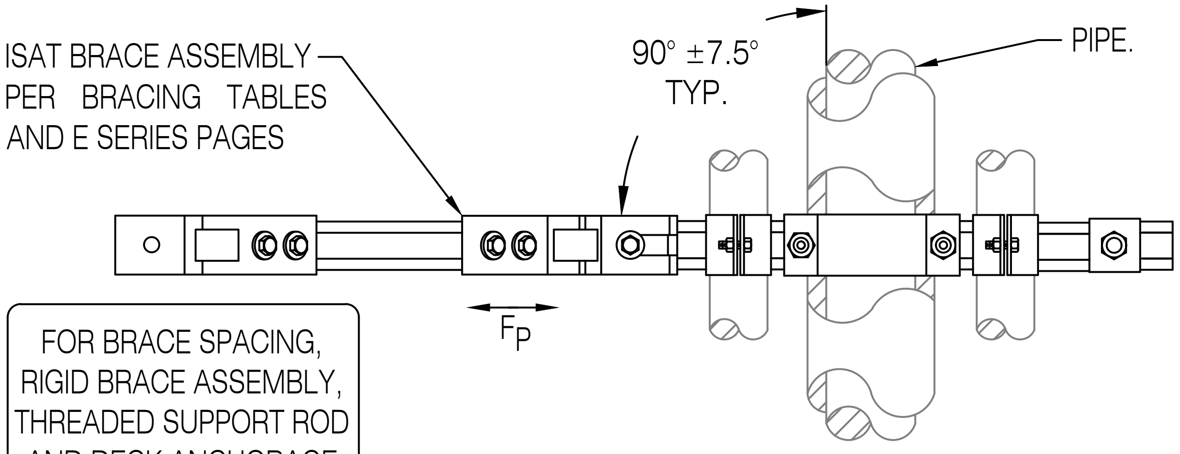
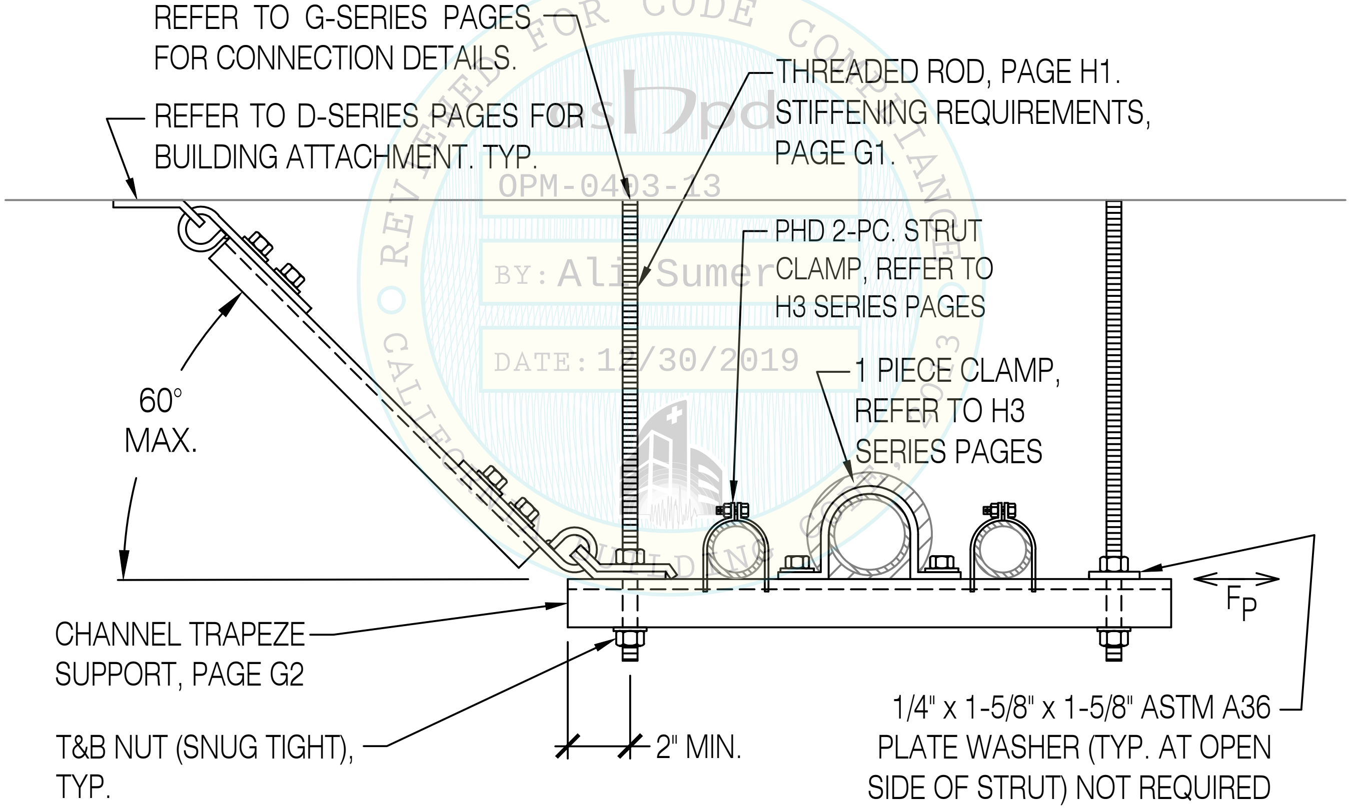


FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

OVERHEAD VIEW



SECTION THRU PIPE TRAPEZE RACK

# PIPE TRAPEZE RACK
# 1-WAY TRANSVERSE, RIGID BRACING

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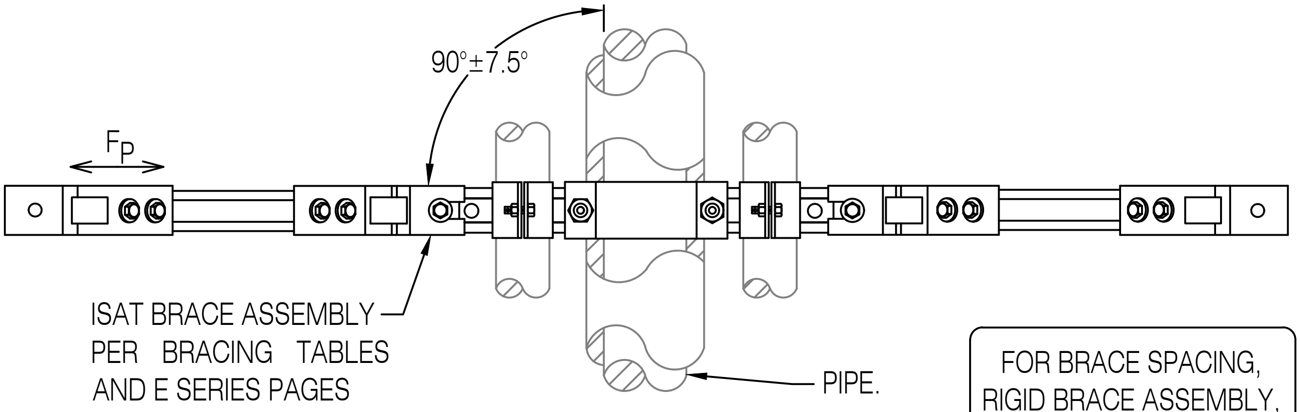
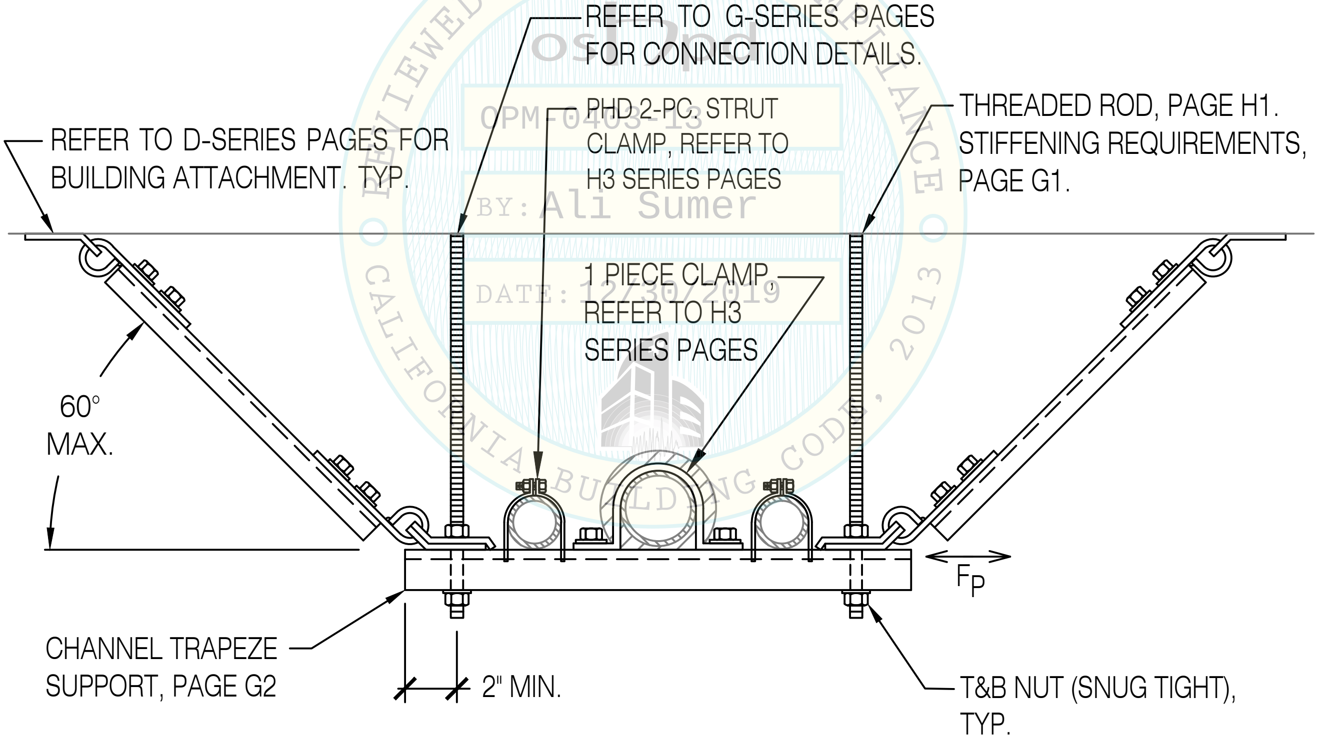


FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

OVERHEAD VIEW



SECTION THRU PIPE TRAPEZE RACK

# PIPE TRAPEZE RACK
# 2-WAY TRANSVERSE, RIGID BRACING

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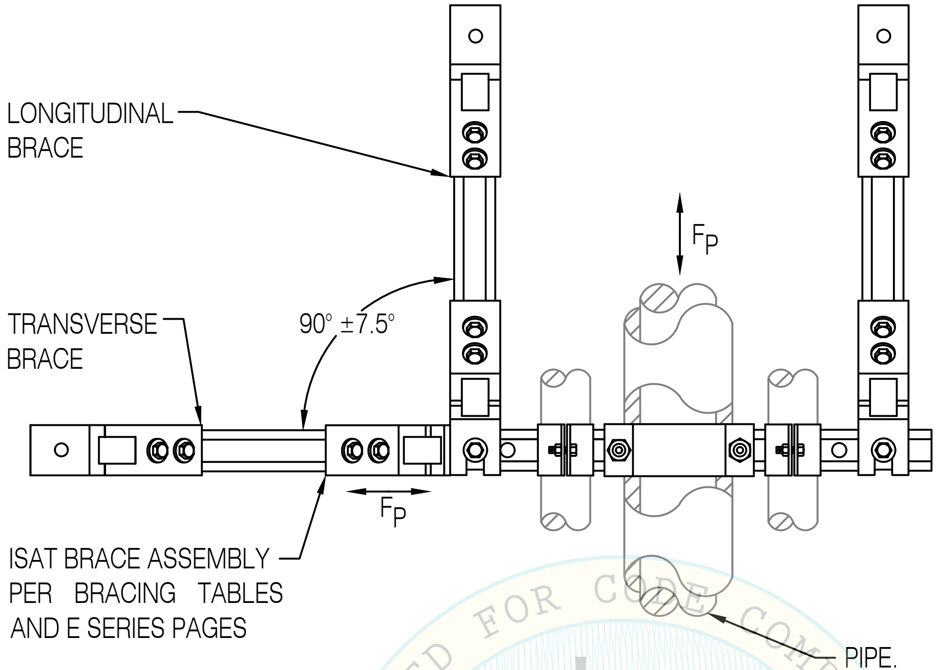
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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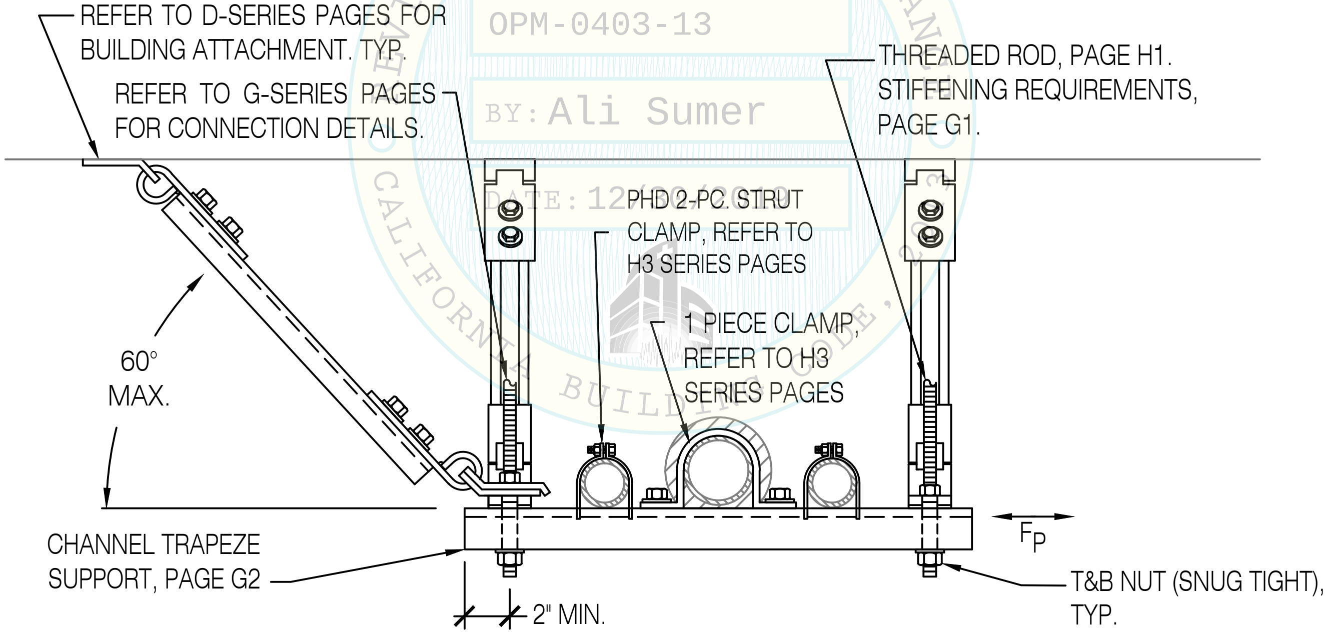

SECTION THRU PIPE TRAPEZE RACK

# PIPE TRAPEZE RACK
# 3-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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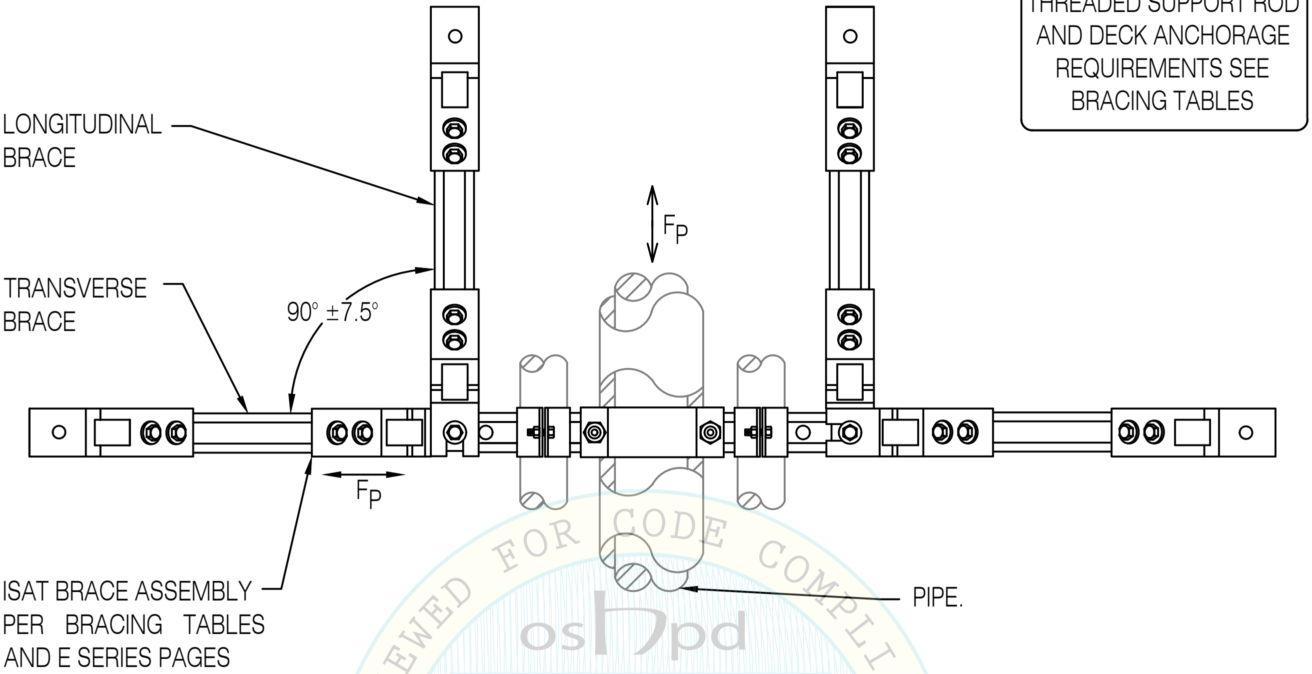
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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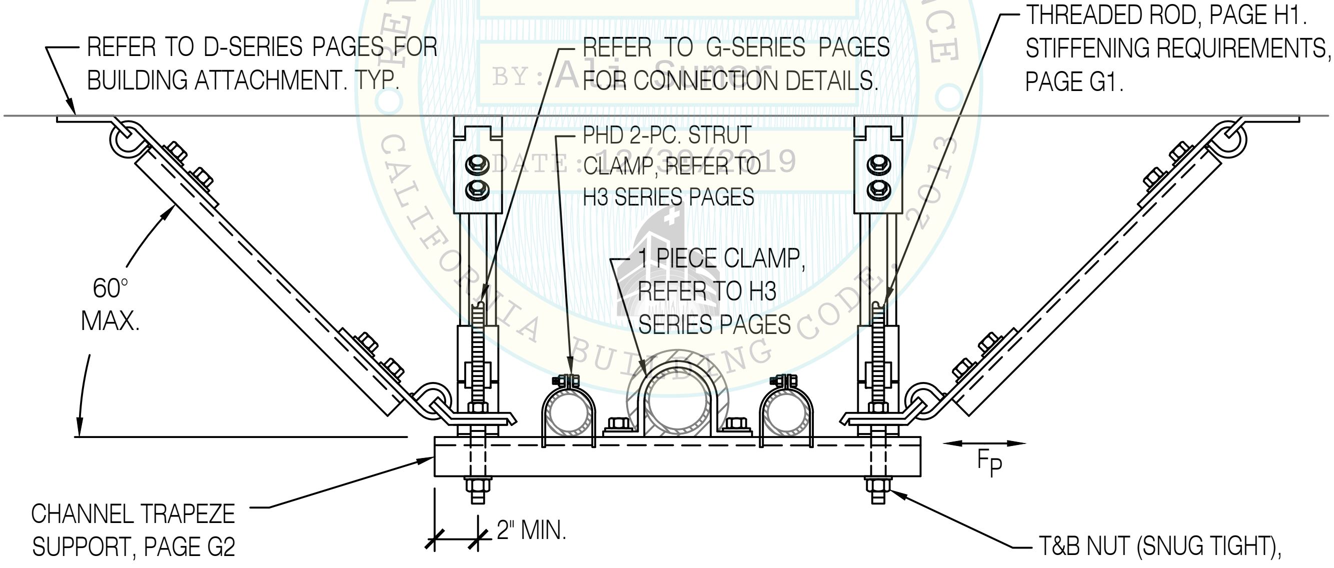

SECTION THRU PIPE TRAPEZE RACK

# PIPE TRAPEZE RACK
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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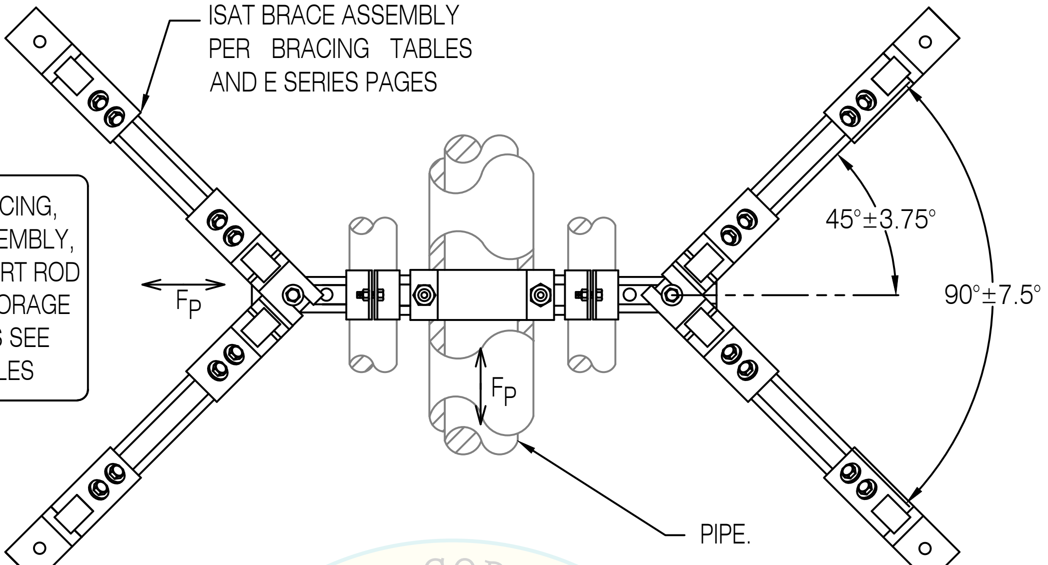
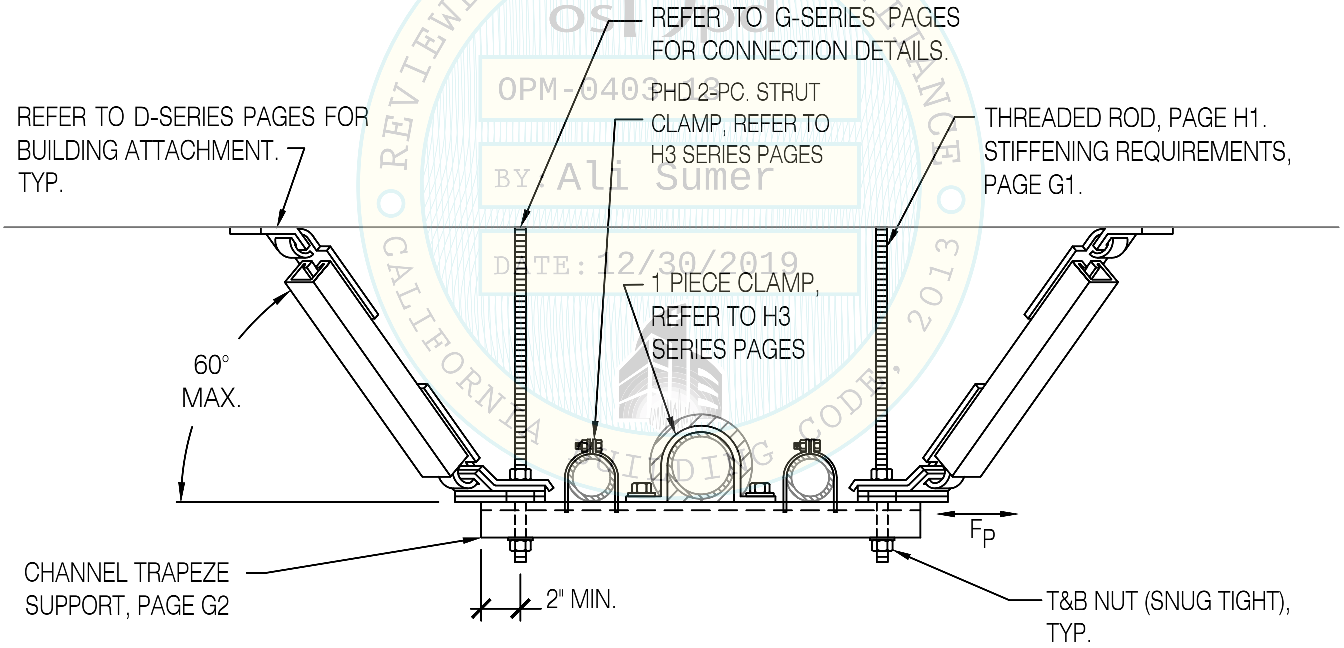


FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

OVERHEAD VIEW



SECTION THRU PIPE TRAPEZE RACK

REVIEWED FOR CODE COMPLIANCE
OPM-0403-13
BY: Ali Sumer
DATE: 12/30/2019
CALIFORNIA BUILDING CODE, 2013

# PIPE TRAPEZE RACK
# 4-WAY SPLAYED, RIGID BRACING

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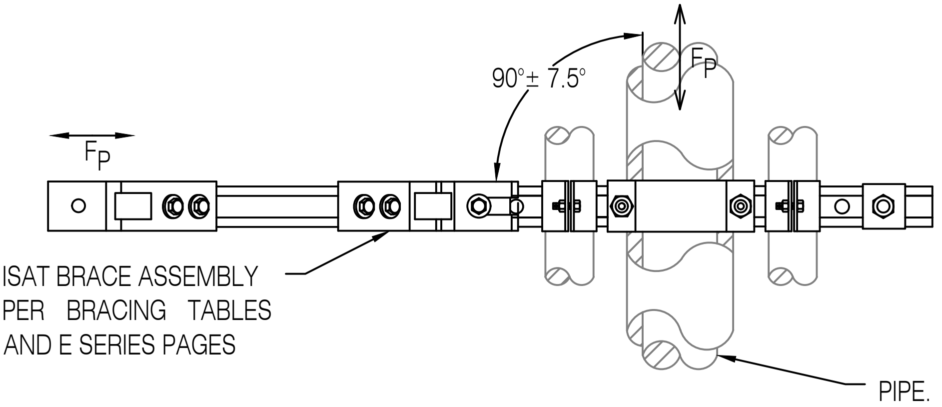
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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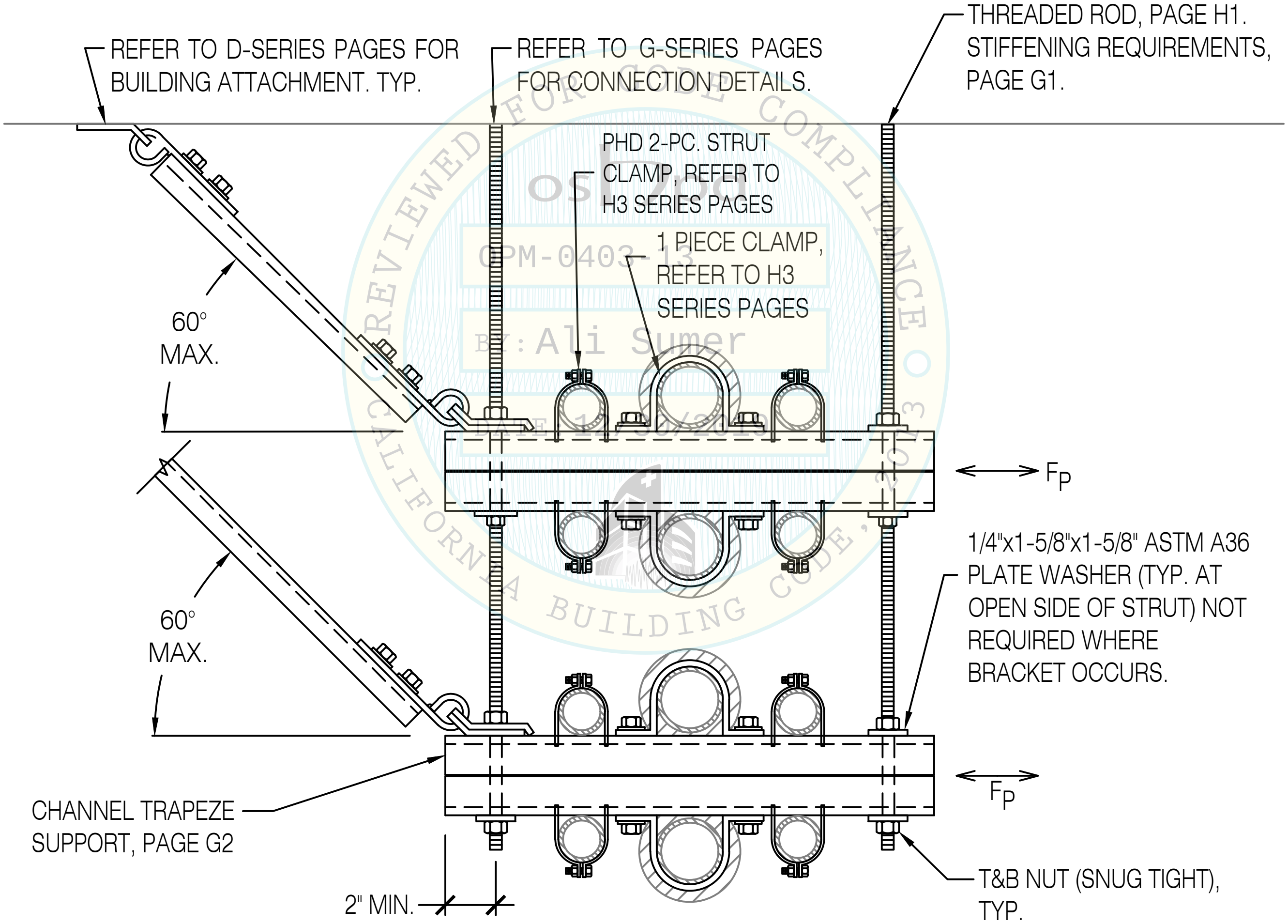

SECTION THRU PIPE TRAPEZE RACK

# 2-TIERED PIPE TRAPEZE RACK
# 1-WAY TRANSVERSE, RIGID BRACING

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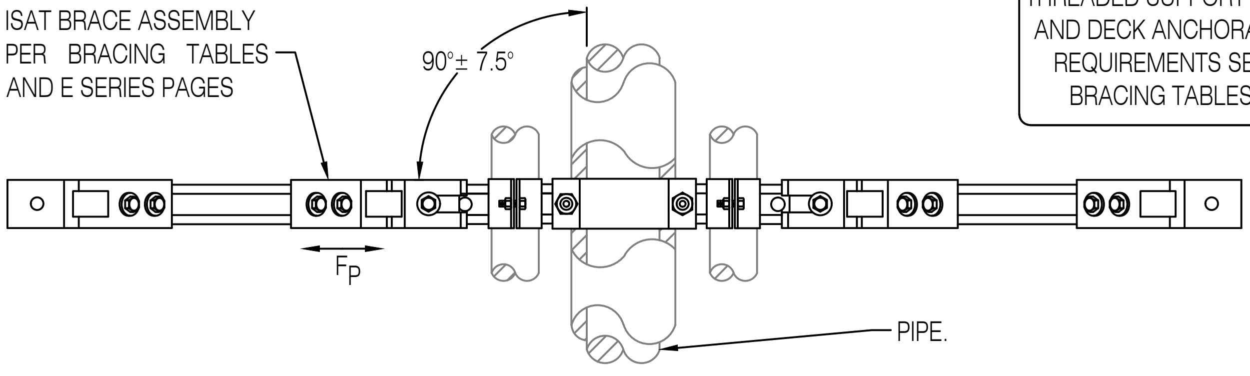
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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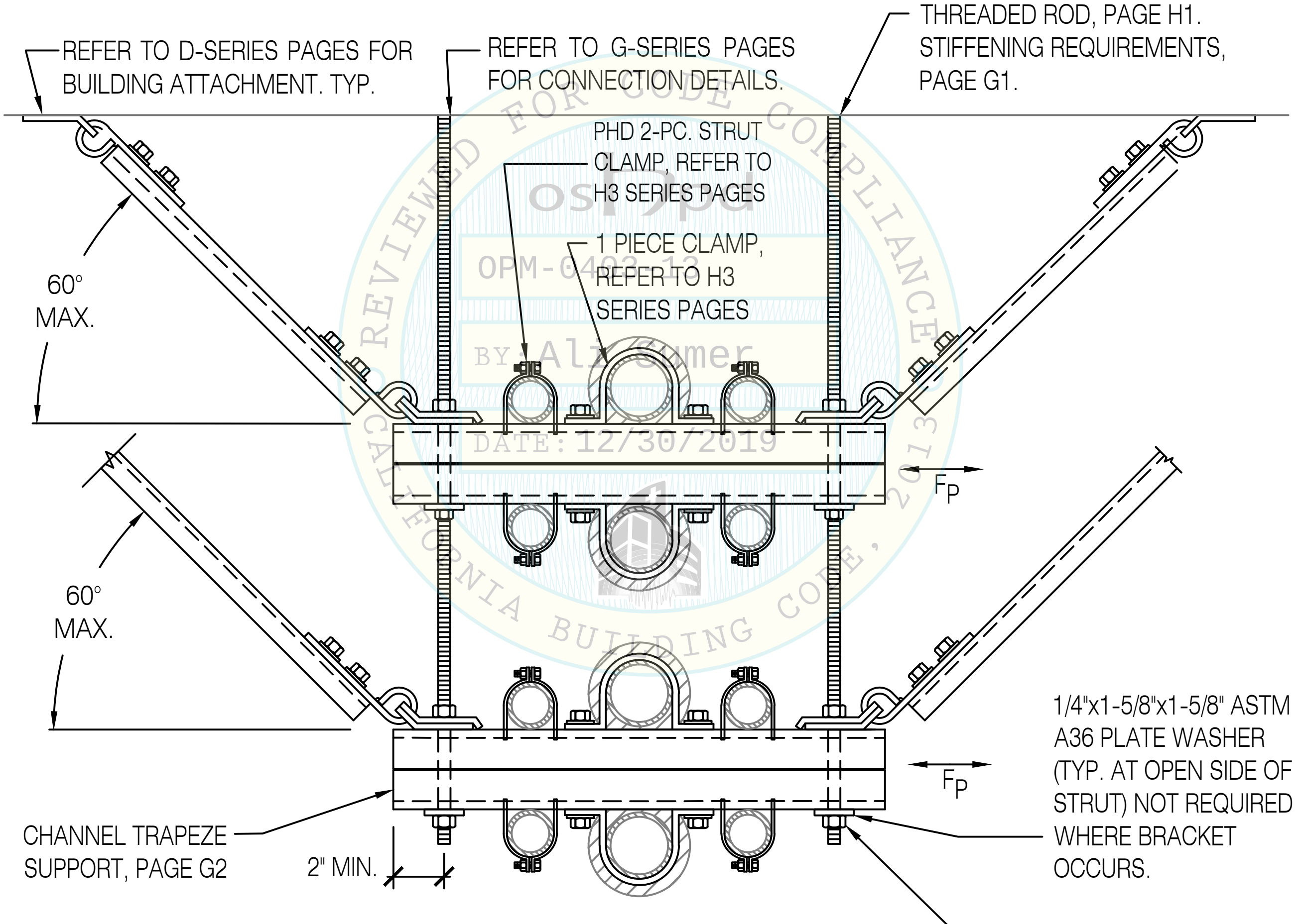

SECTION THRU PIPE TRAPEZE RACK

# 2-TIERED PIPE TRAPEZE RACK
# 2-WAY TRANSVERSE, RIGID BRACING

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FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
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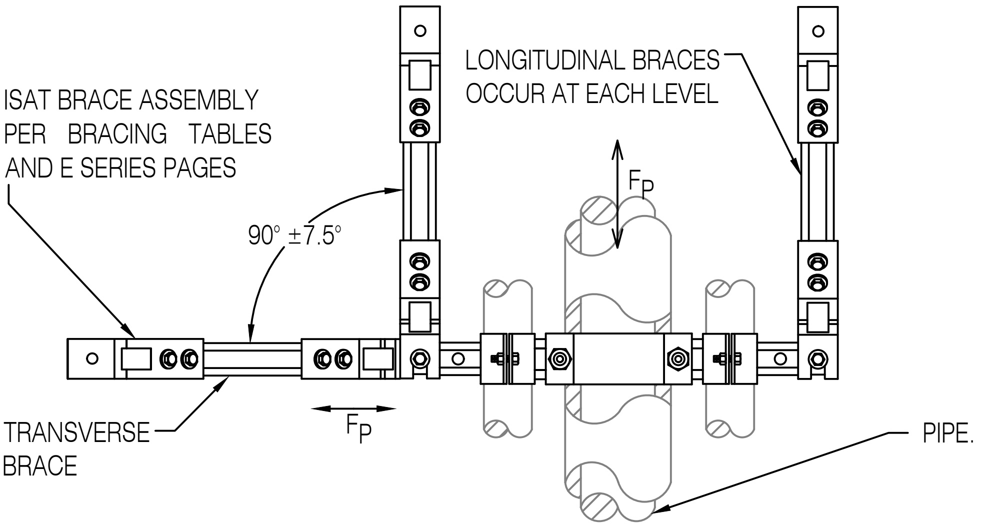

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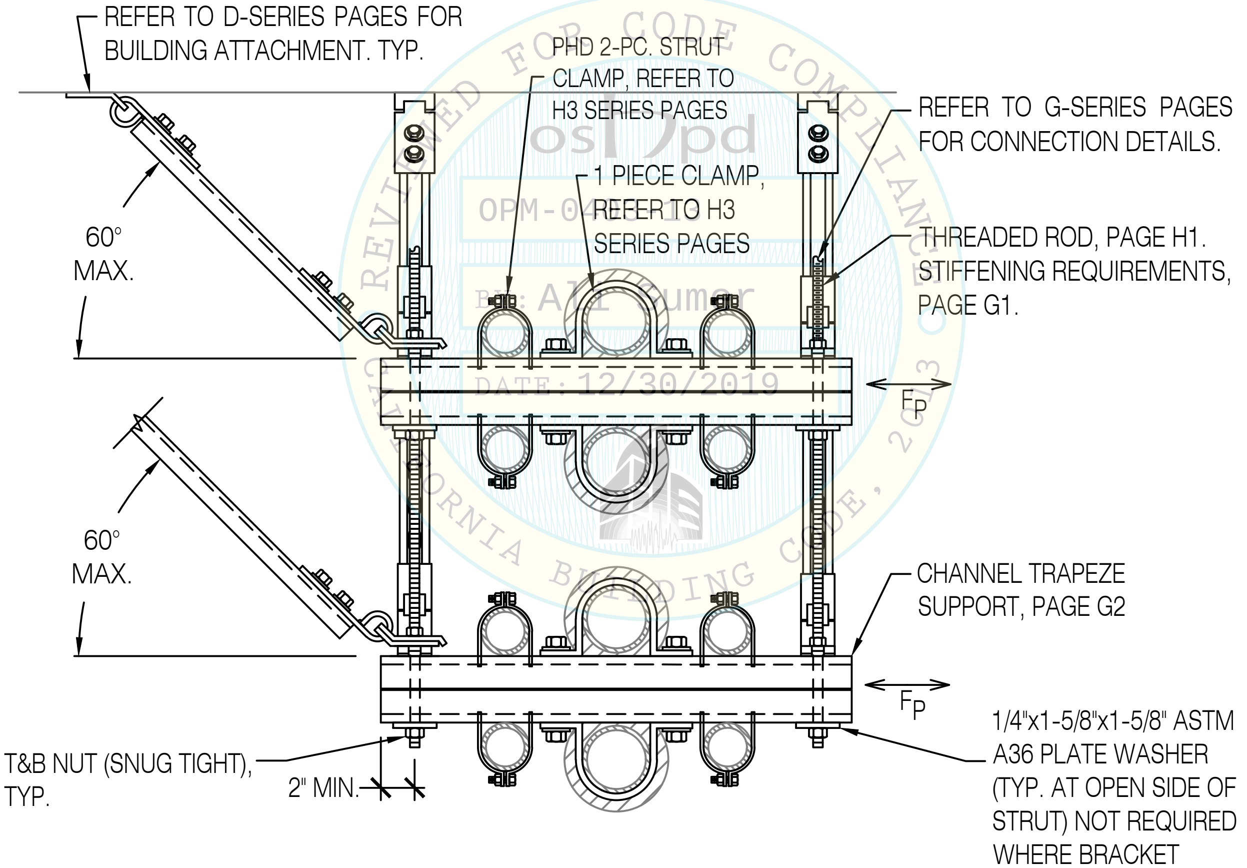

SECTION THRU PIPE TRAPEZE RACK

# 2-TIERED PIPE TRAPEZE RACK
# 3-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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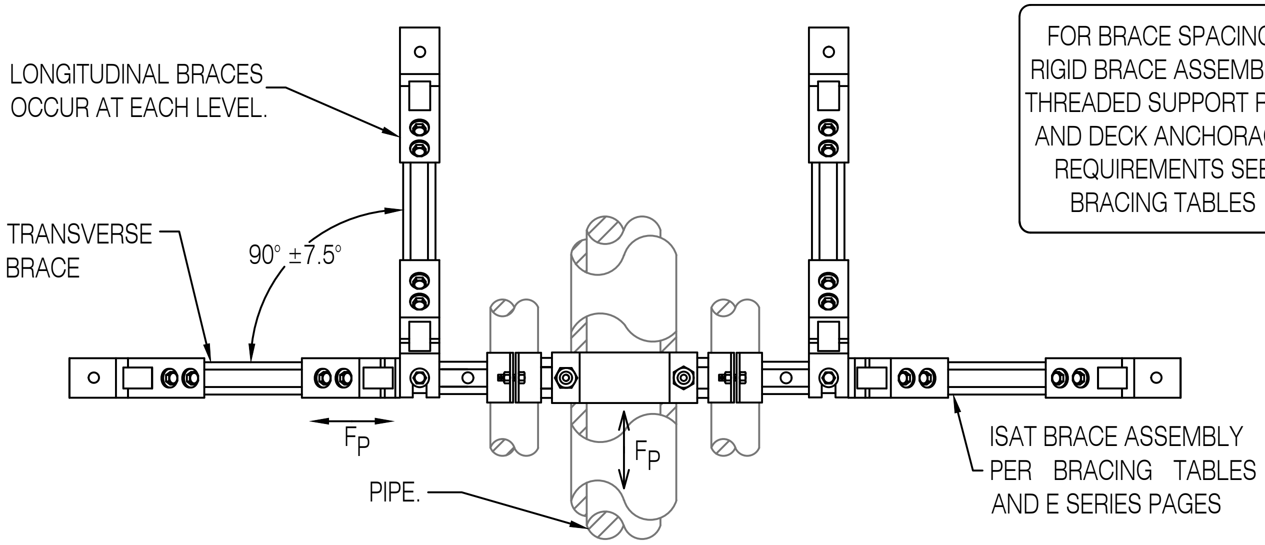
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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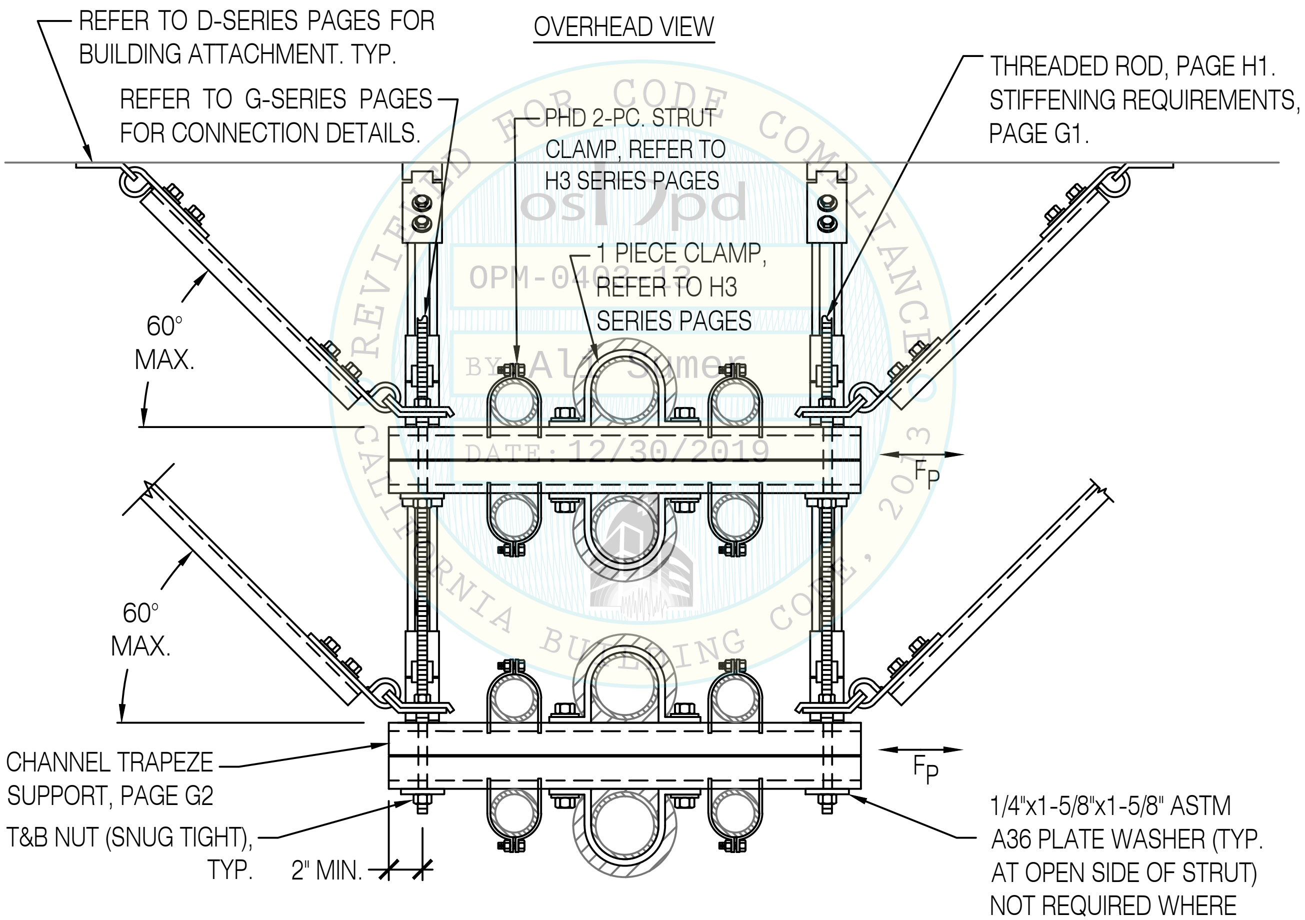

SECTION THRU PIPE TRAPEZE RACK

## 2-TIERED PIPE TRAPEZE RACK
## 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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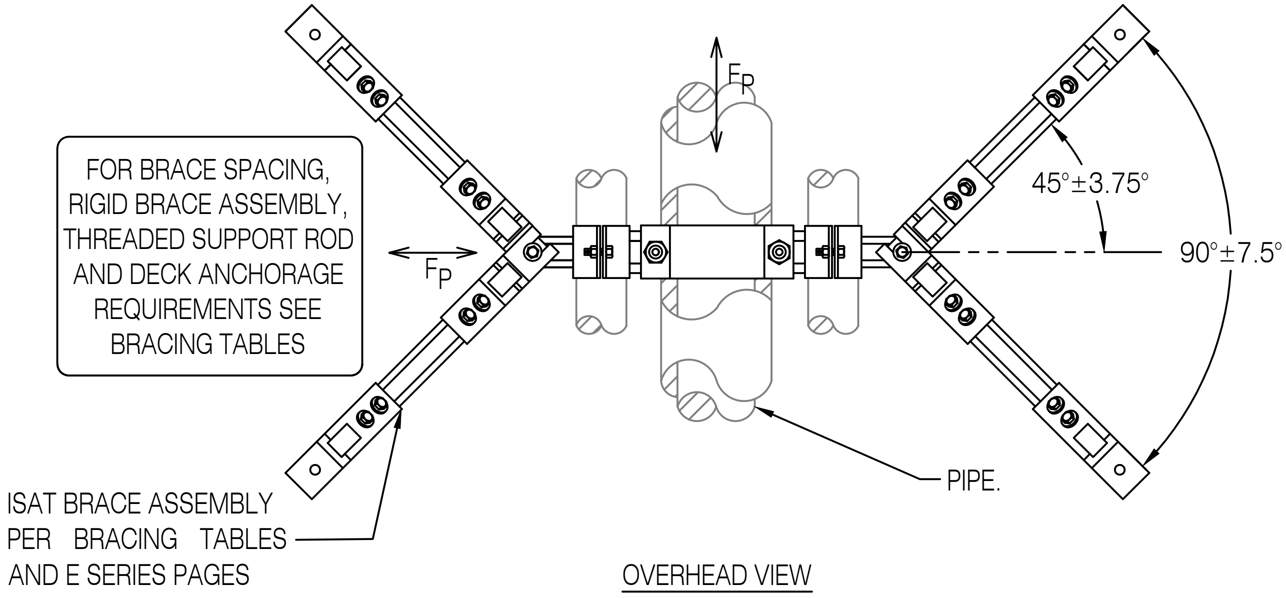

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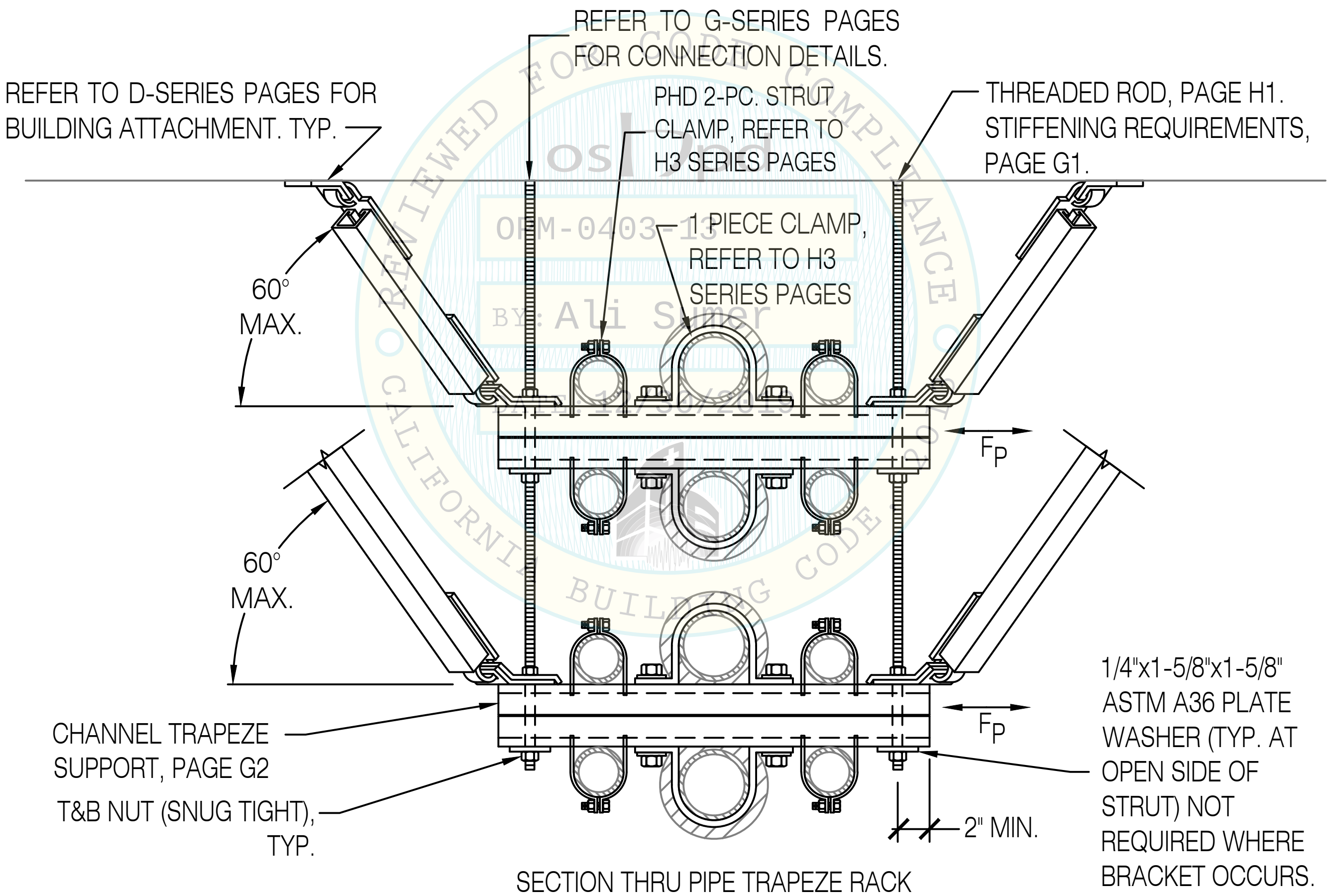

SECTION THRU PIPE TRAPEZE RACK

# 2-TIERED PIPE TRAPEZE RACK
# 4-WAY SPLAYED, RIGID BRACING

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FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
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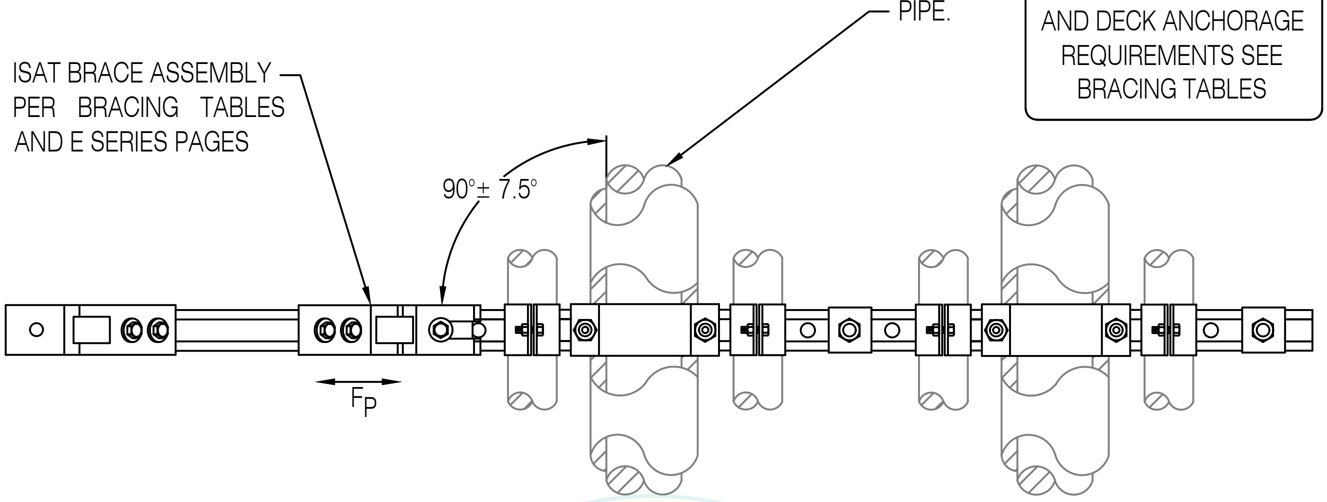
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



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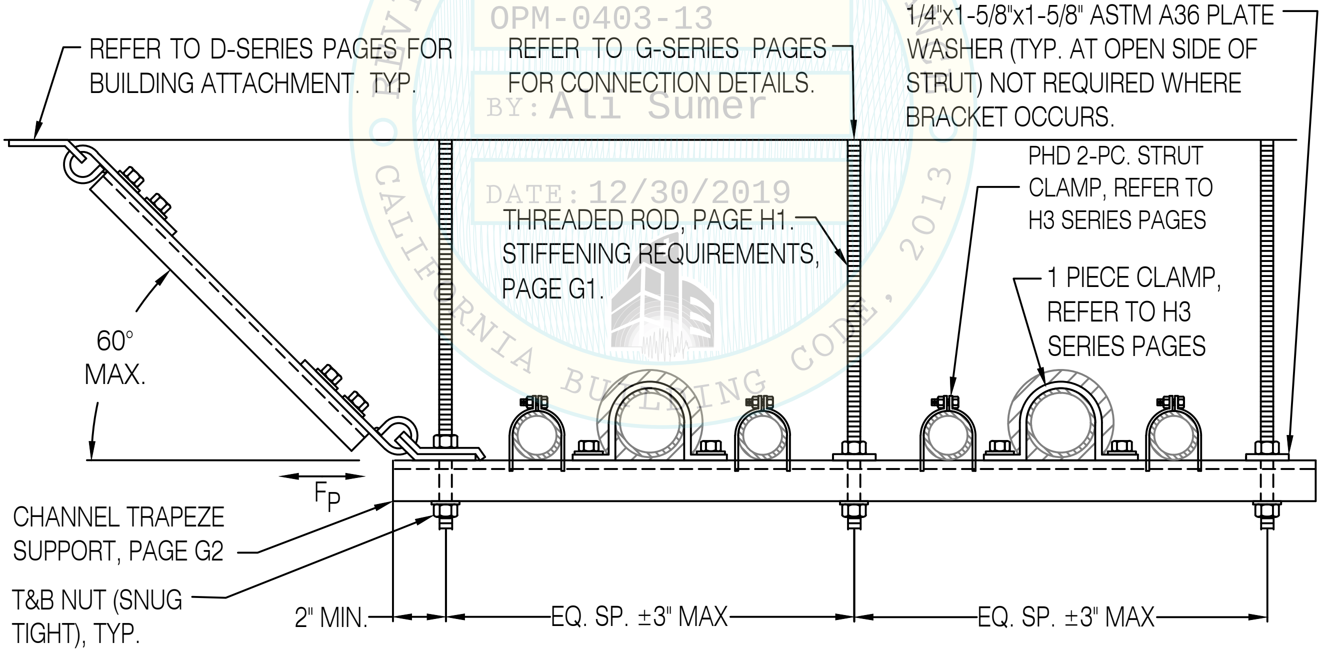

SECTION THRU PIPE TRAPEZE RACK

# 3-ROD PIPE TRAPEZE RACK
# 1-WAY TRANSVERSE, RIGID BRACING

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FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
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REQUIREMENTS SEE
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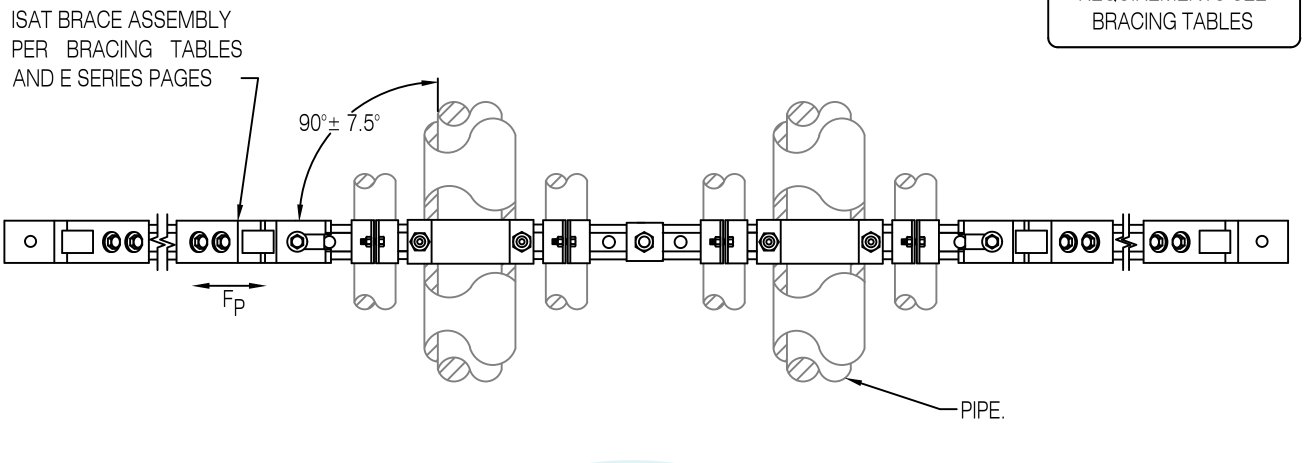

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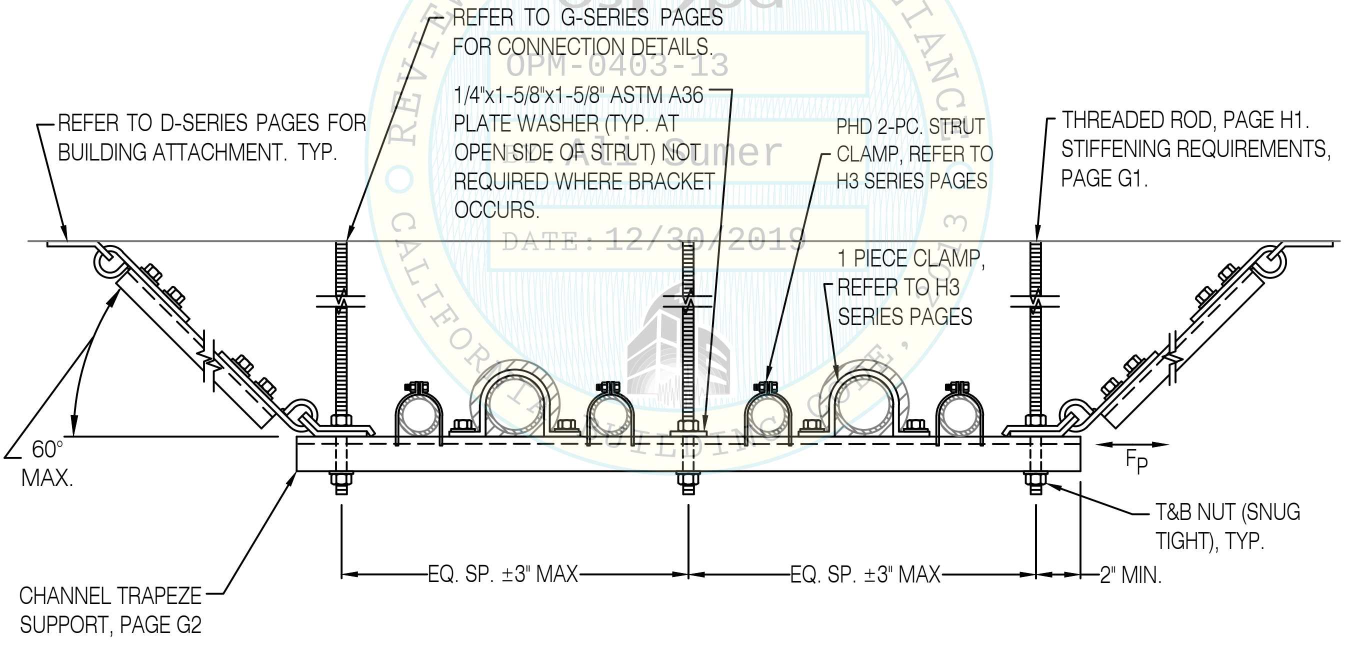

SECTION THRU PIPE TRAPEZE RACK

# 3-ROD PIPE TRAPEZE RACK
# 2-WAY TRANSVERSE, RIGID BRACING

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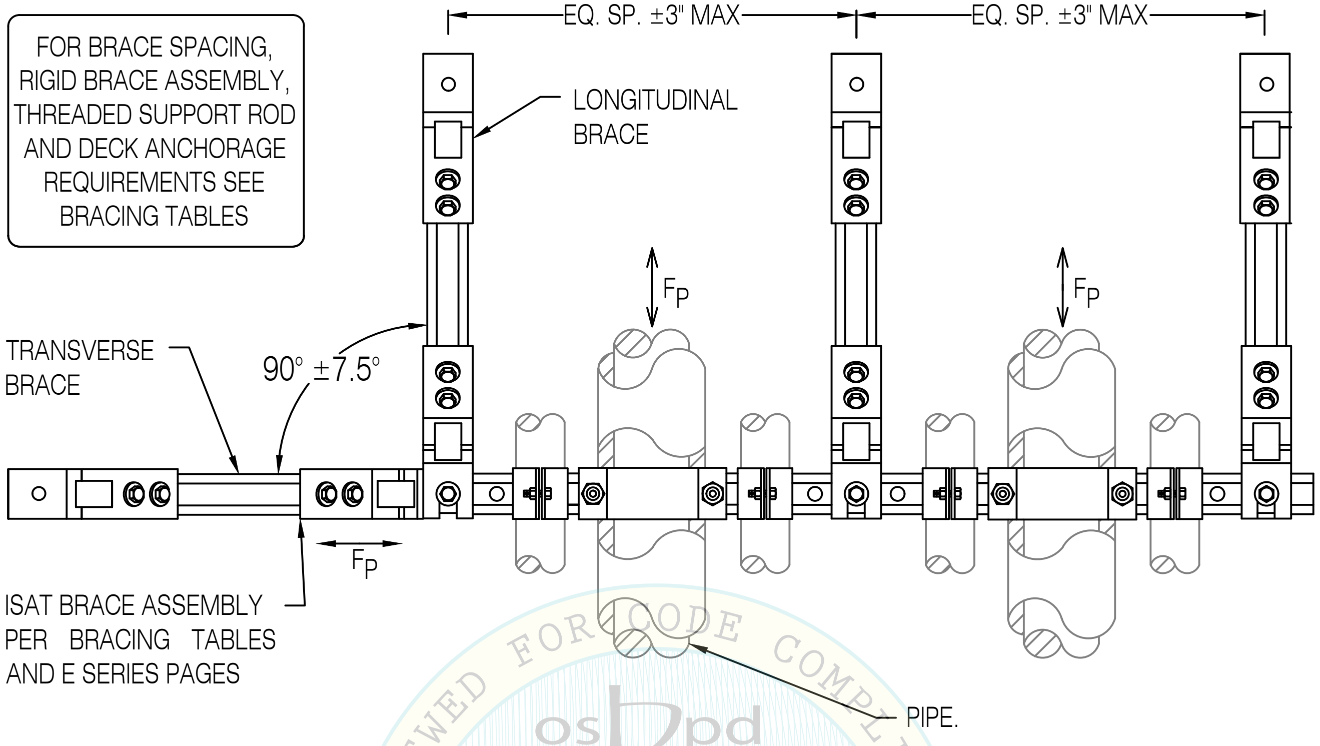

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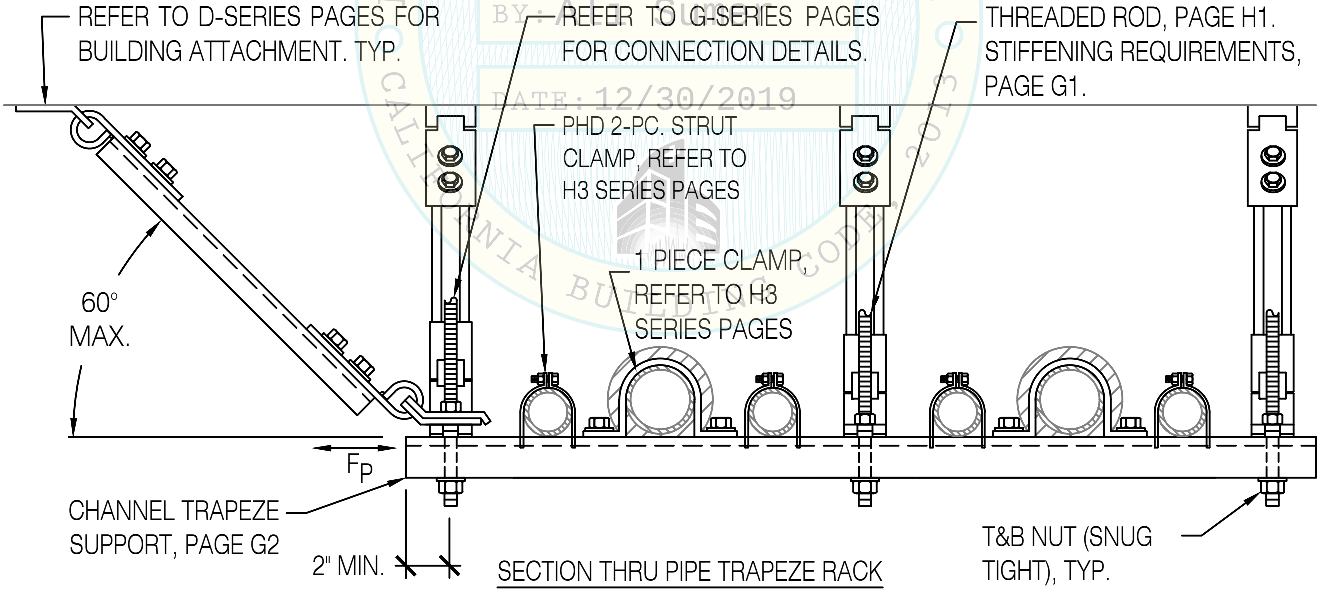

SECTION THRU PIPE TRAPEZE RACK

# 3-ROD PIPE TRAPEZE RACK
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

ANTHONY A. RUBALCAVA
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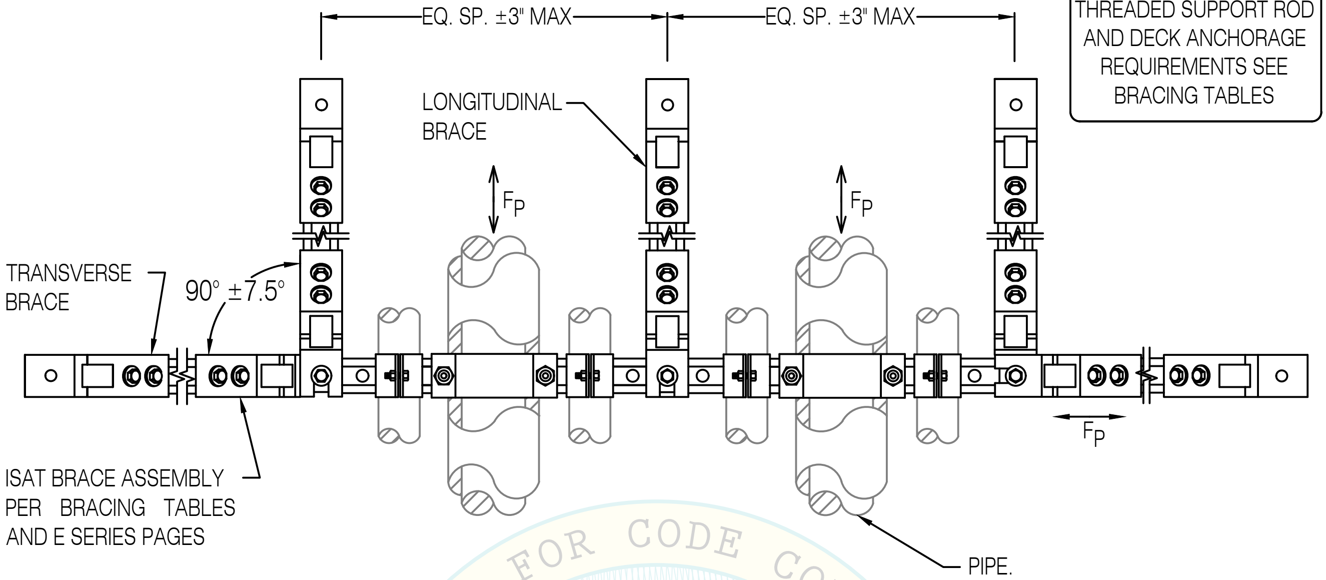
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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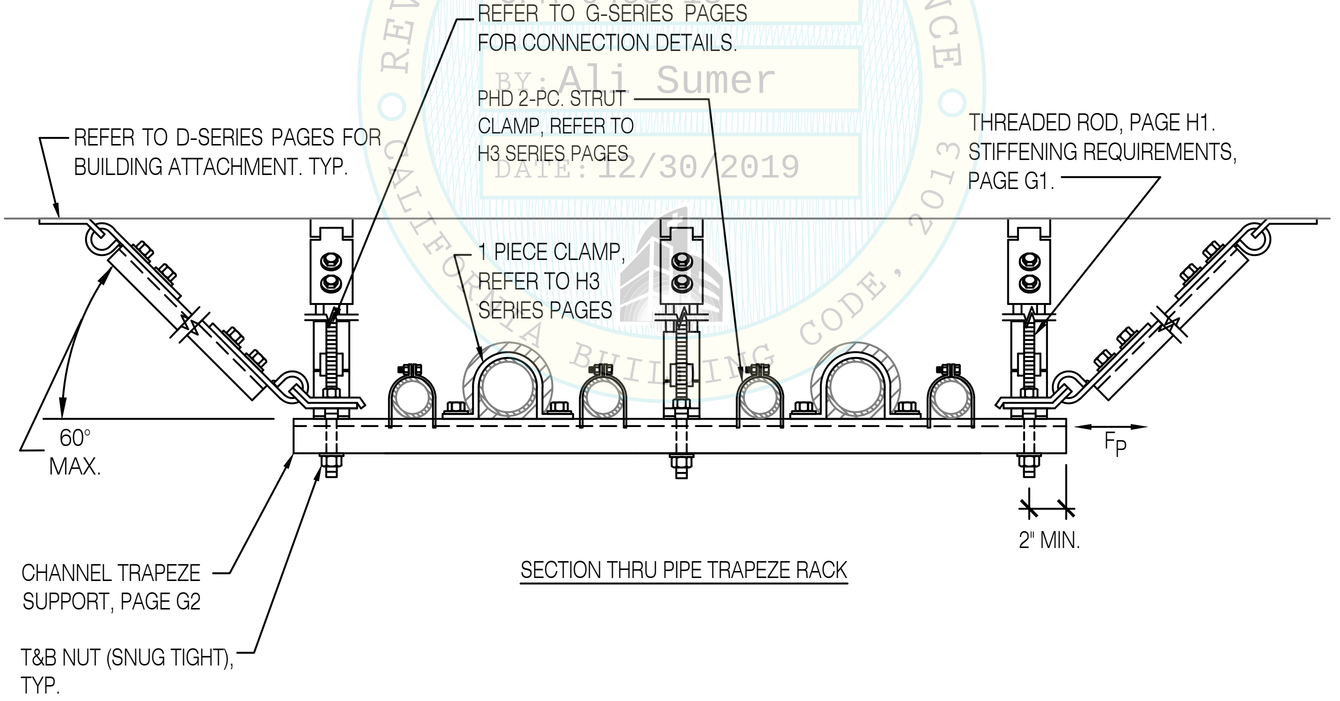

SECTION THRU PIPE TRAPEZE RACK

# 3-ROD PIPE TRAPEZE RACK
# 5-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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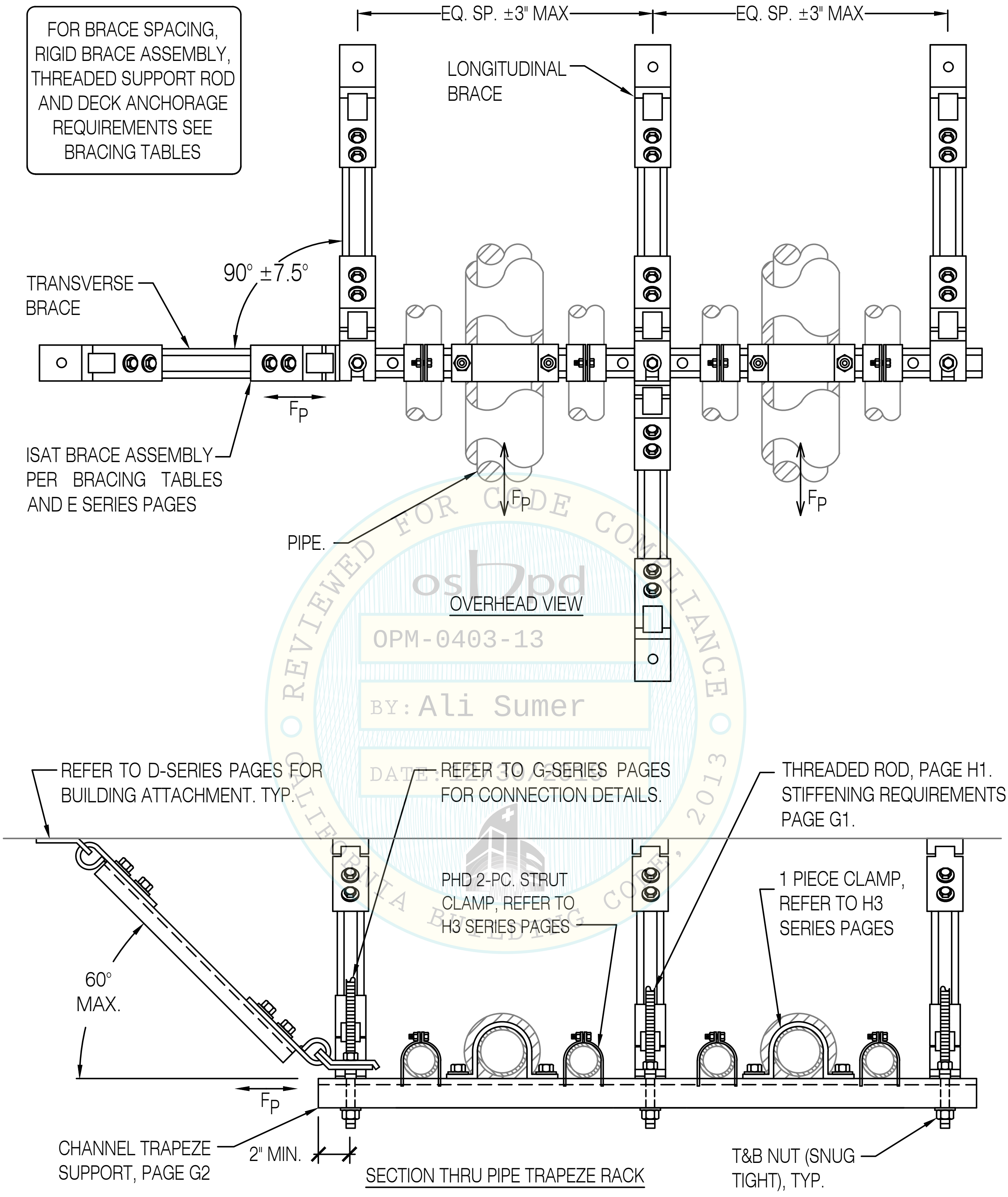

OPM-0403-13
BY: Ali Sumer
DATE: 12/30/2019

# 3-ROD PIPE TRAPEZE RACK
# 5-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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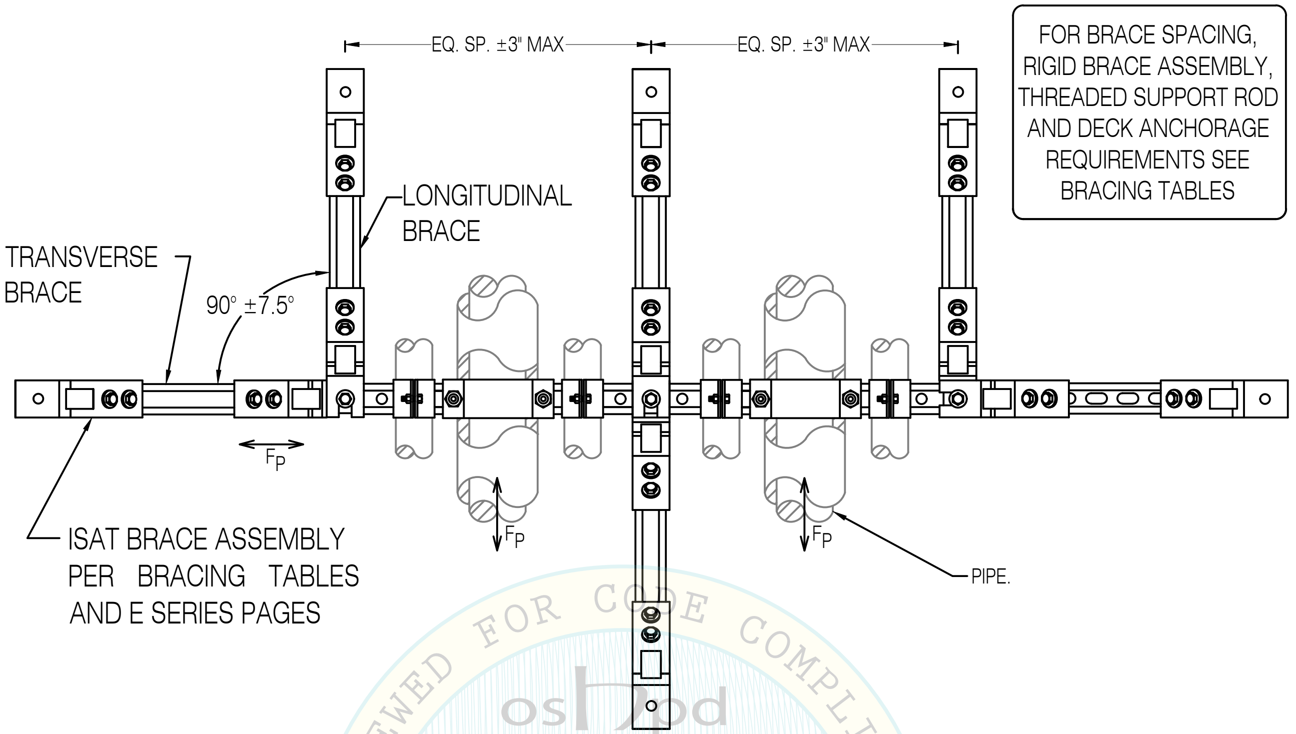
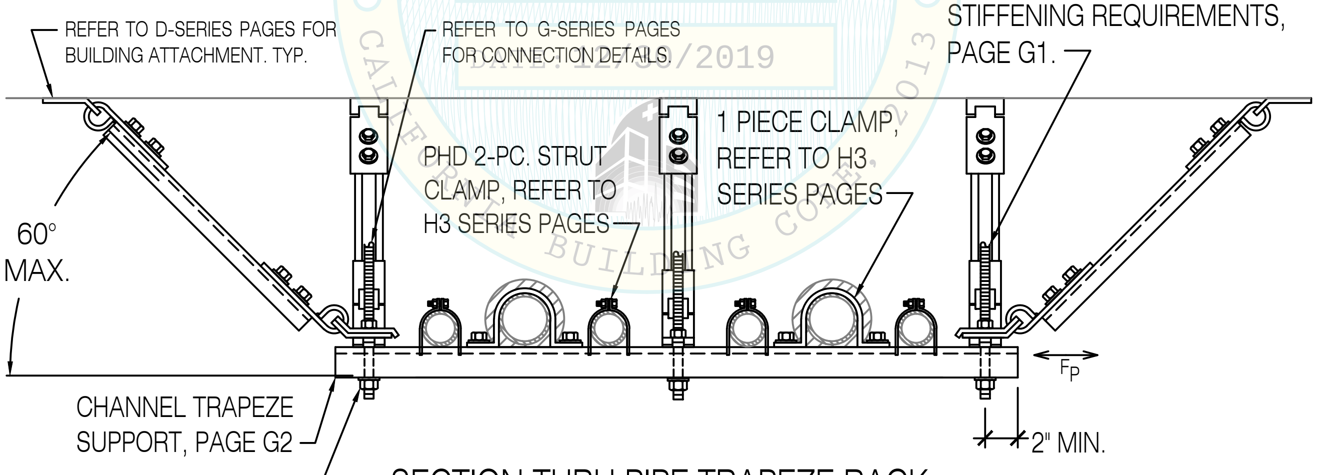
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



OVERHEAD VIEW



SECTION THRU PIPE TRAPEZE RACK

# 3-ROD PIPE TRAPEZE RACK
# 6-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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FOR BRACE SPACING,
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REQUIREMENTS SEE
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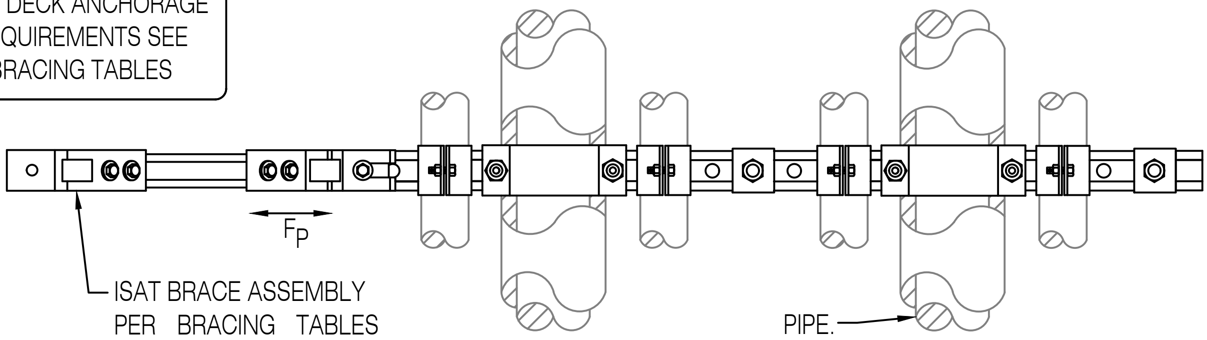
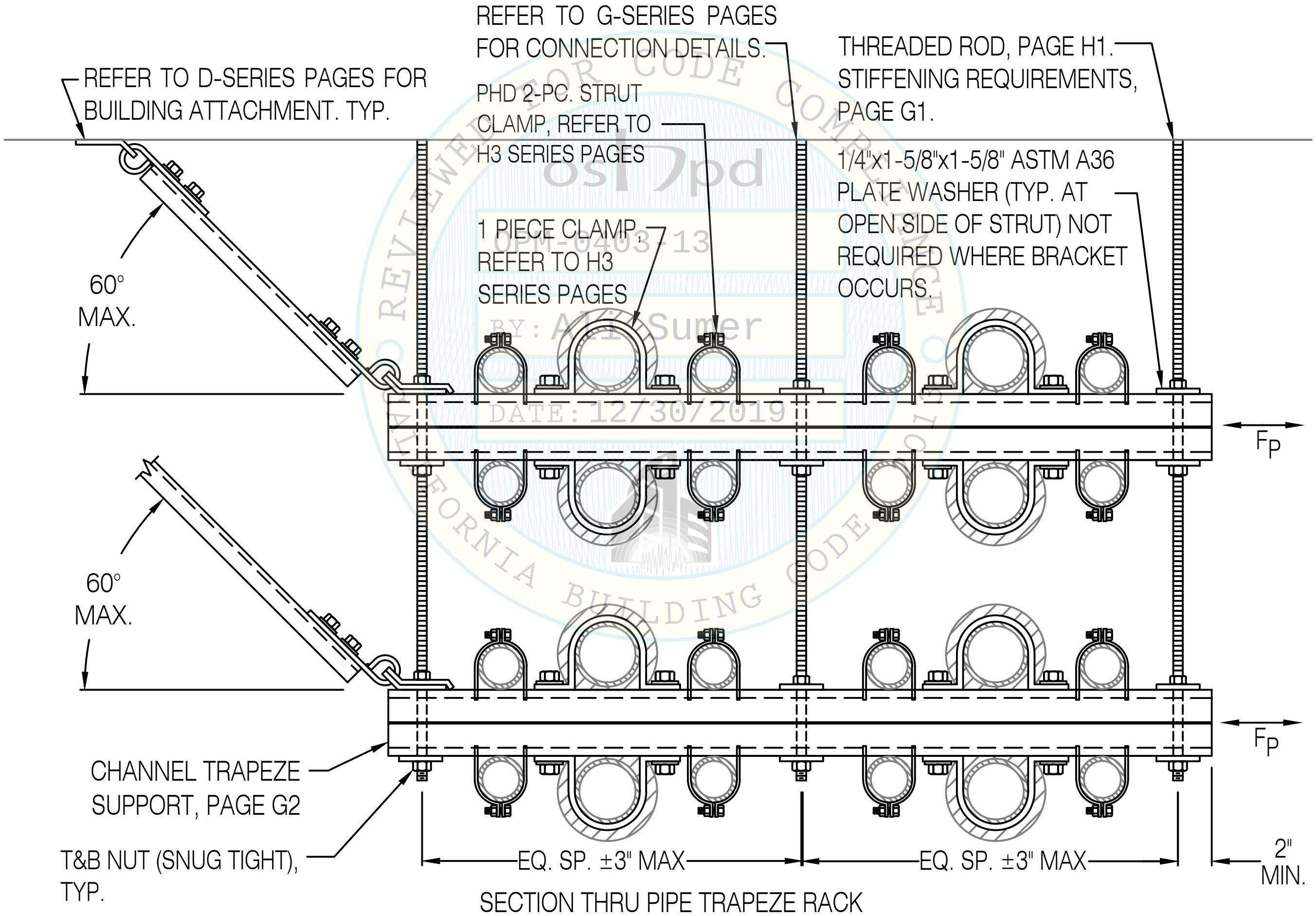


OVERHEAD VIEW



SECTION THRU PIPE TRAPEZE RACK

# 3-ROD, 2-TIERED PIPE TRAPEZE RACK
# 1-WAY TRANSVERSE, RIGID BRACING

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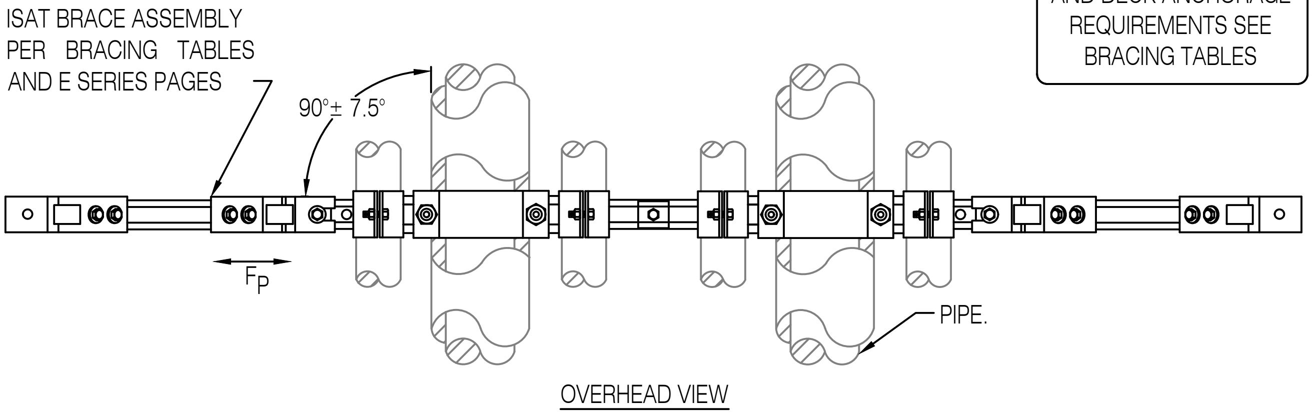
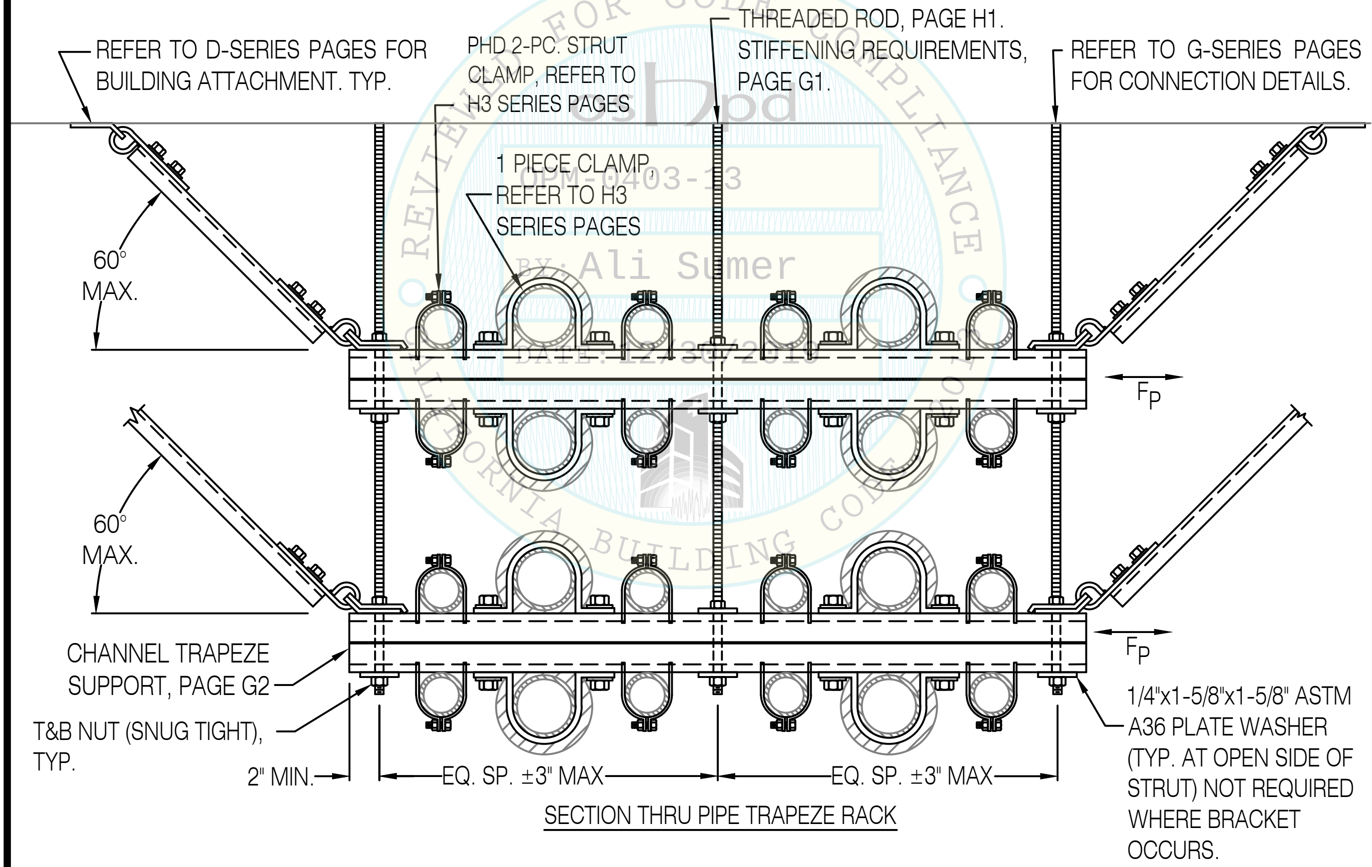
FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES





# 3-ROD, 2-TIERED PIPE TRAPEZE RACK
# 2-WAY TRANSVERSE, RIGID BRACING

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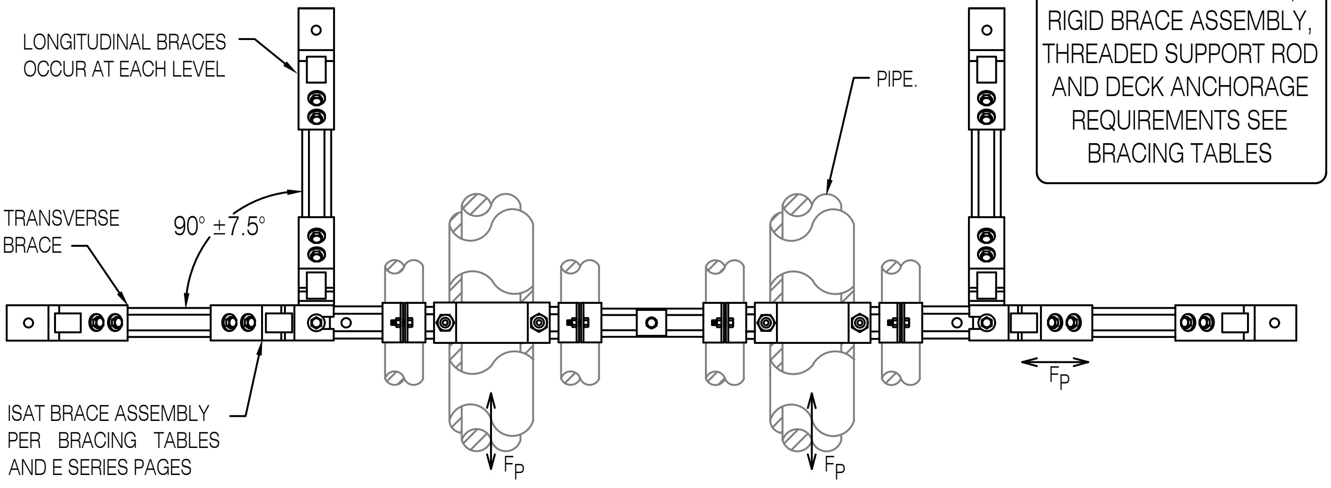
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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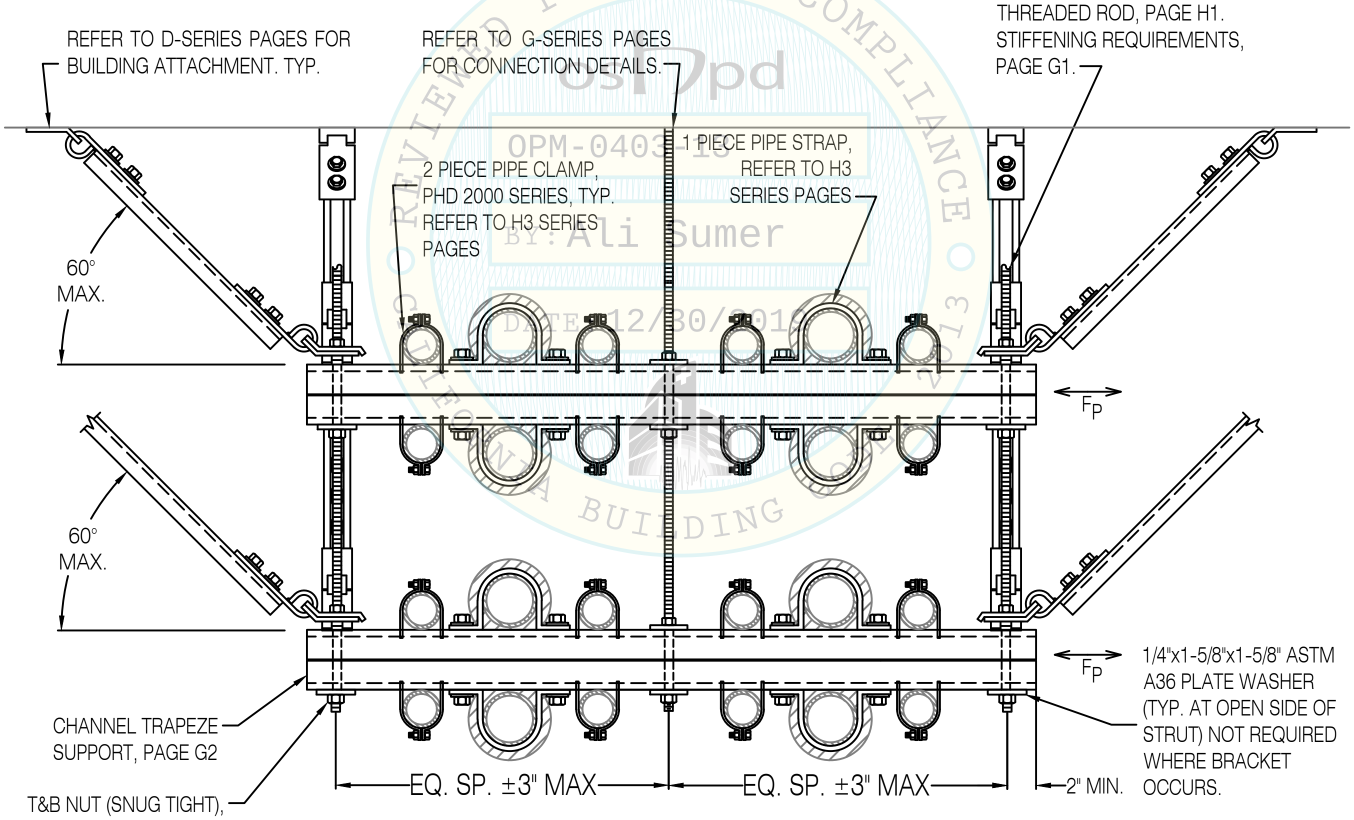

SECTION THRU PIPE TRAPEZE RACK

# 3-ROD, 2-TIERED PIPE TRAPEZE RACK
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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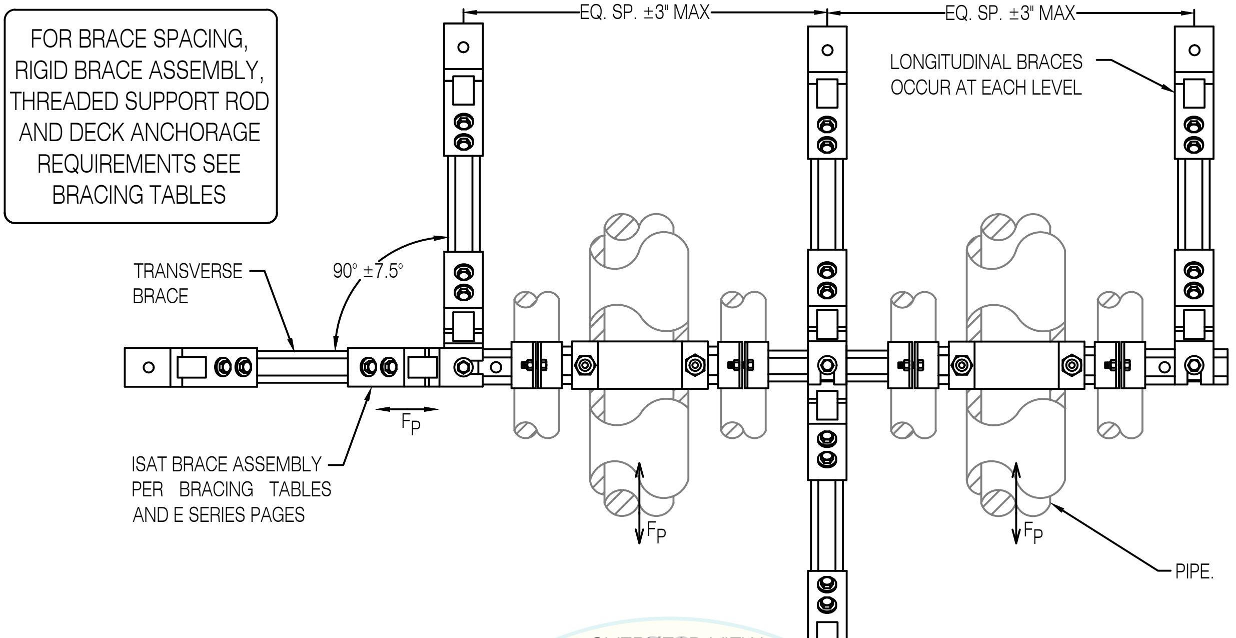

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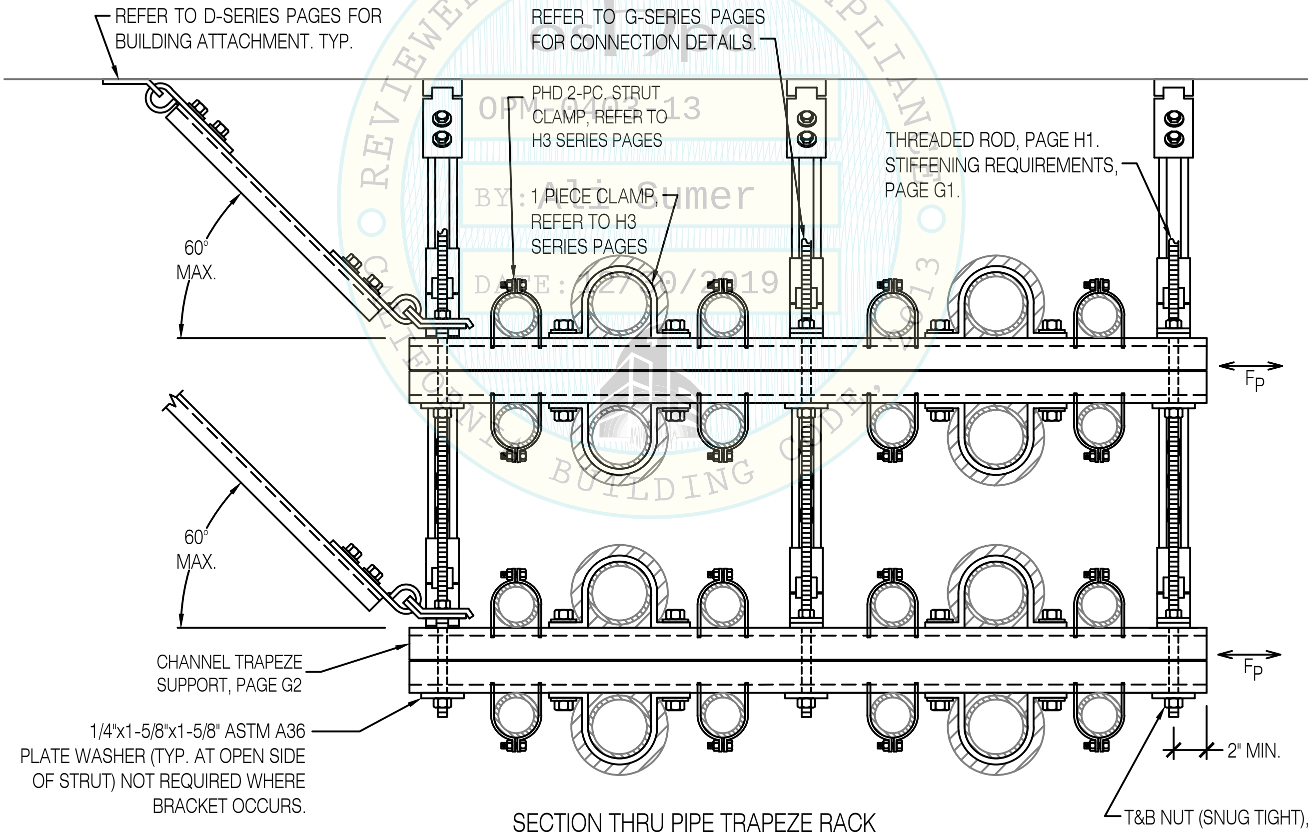

SECTION THRU PIPE TRAPEZE RACK

# 3-ROD, 2-TIERED PIPE TRAPEZE RACK
# 5-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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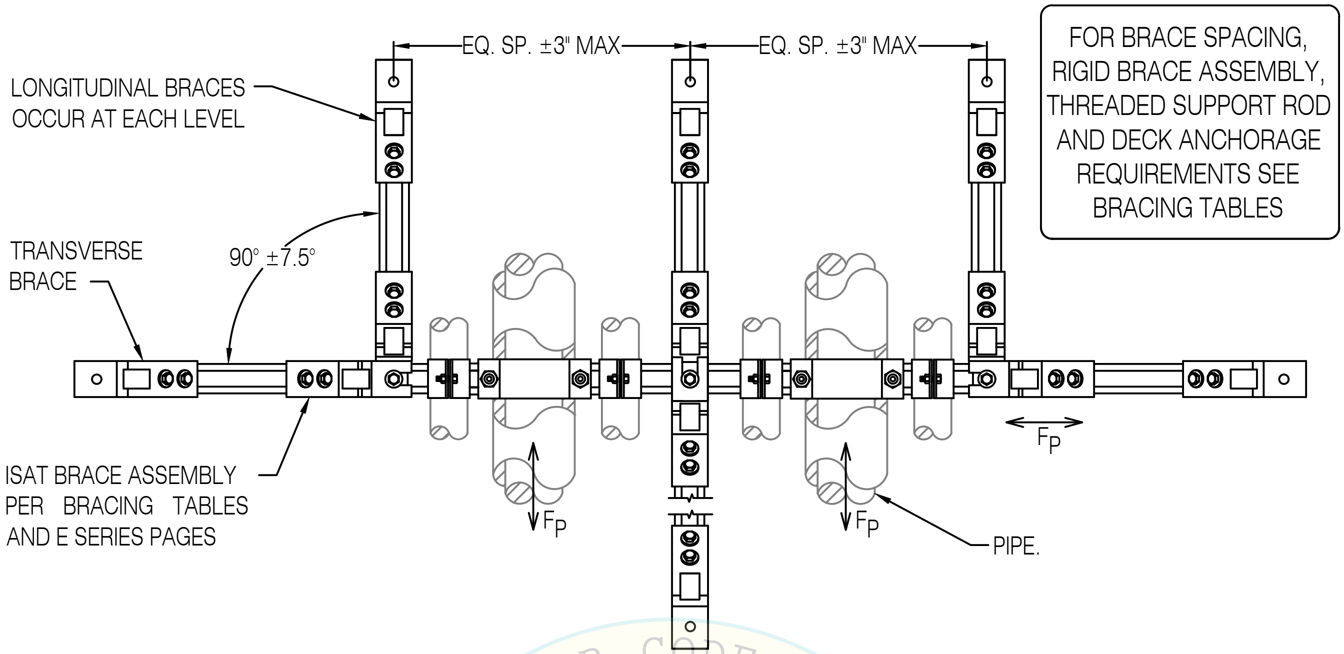
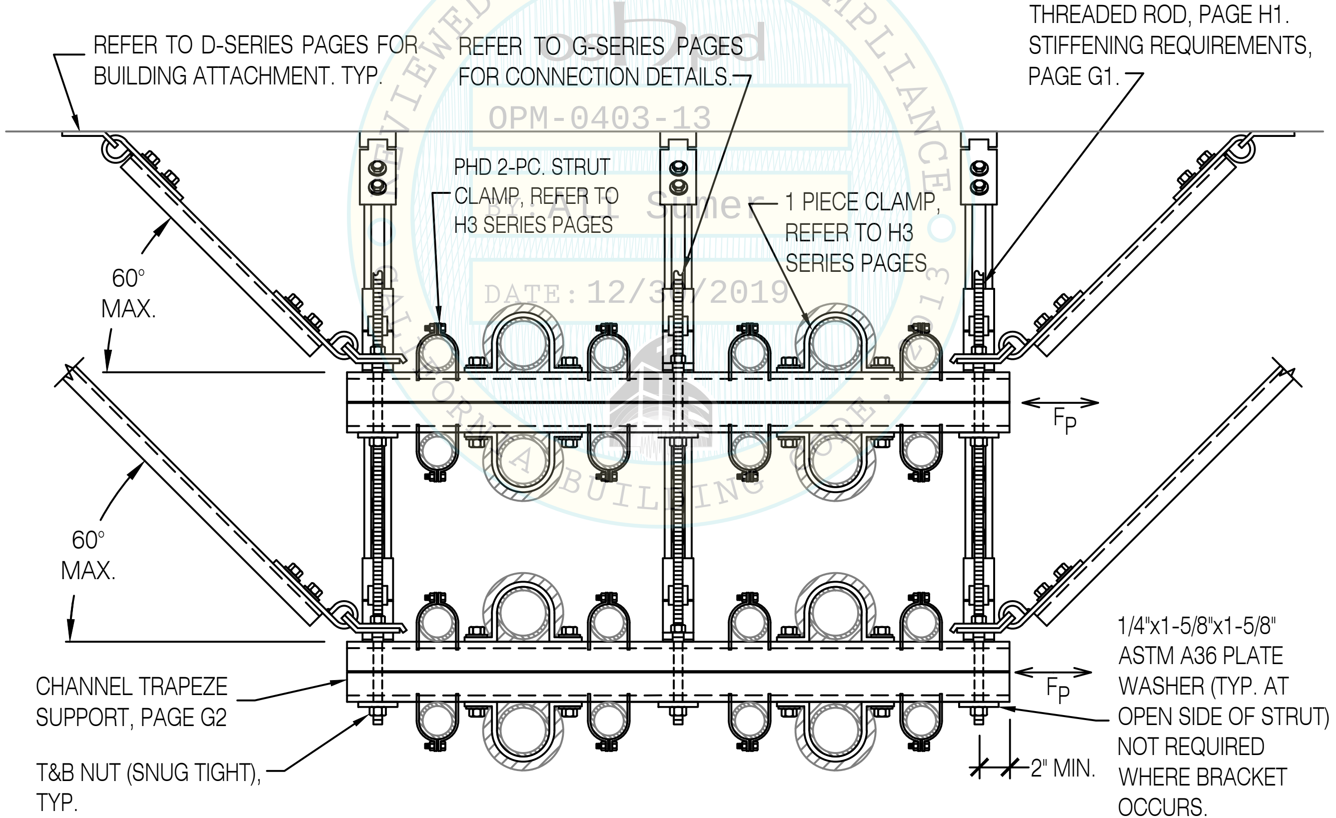


OVERHEAD VIEW



SECTION THRU PIPE TRAPEZE RACK

# 3-ROD, 2-TIERED PIPE TRAPEZE RACK
# 6-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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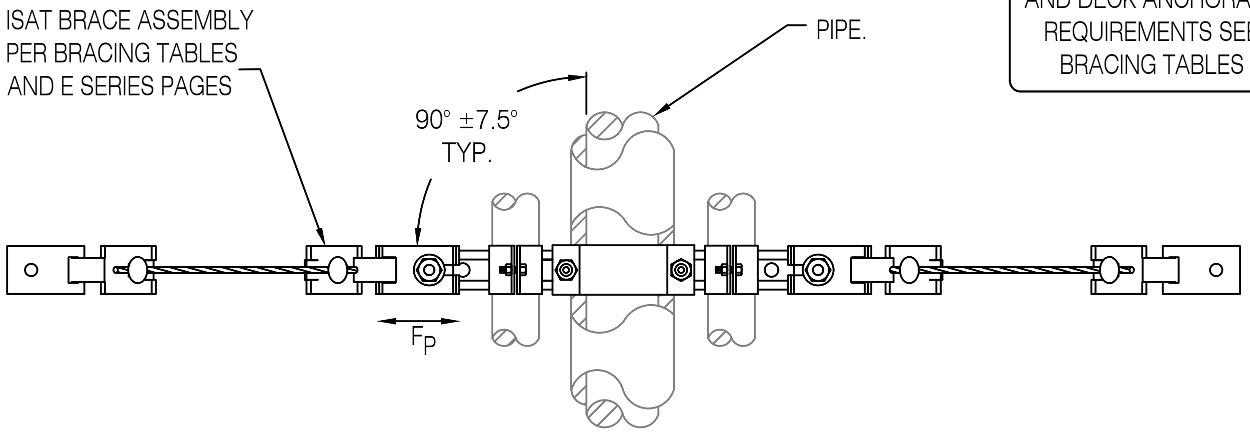

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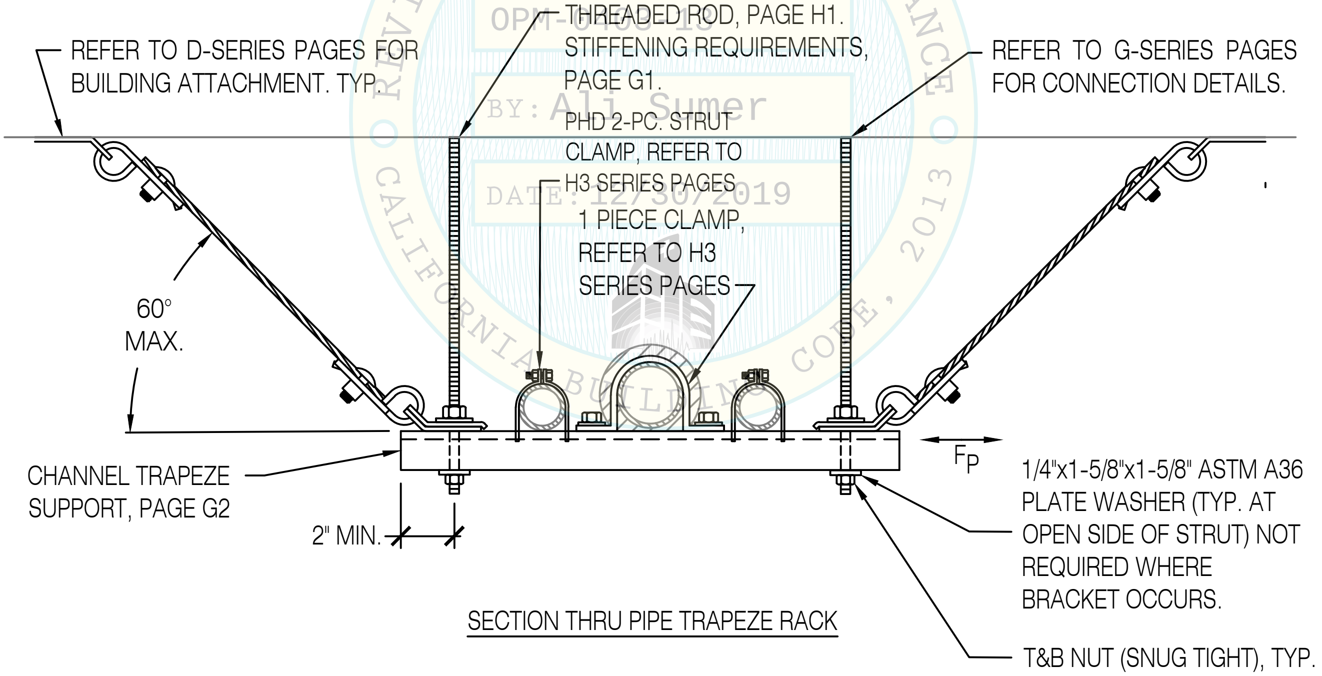

SECTION THRU PIPE TRAPEZE RACK

# PIPE TRAPEZE RACK
# 2-WAY TRANSVERSE, CABLE BRACING

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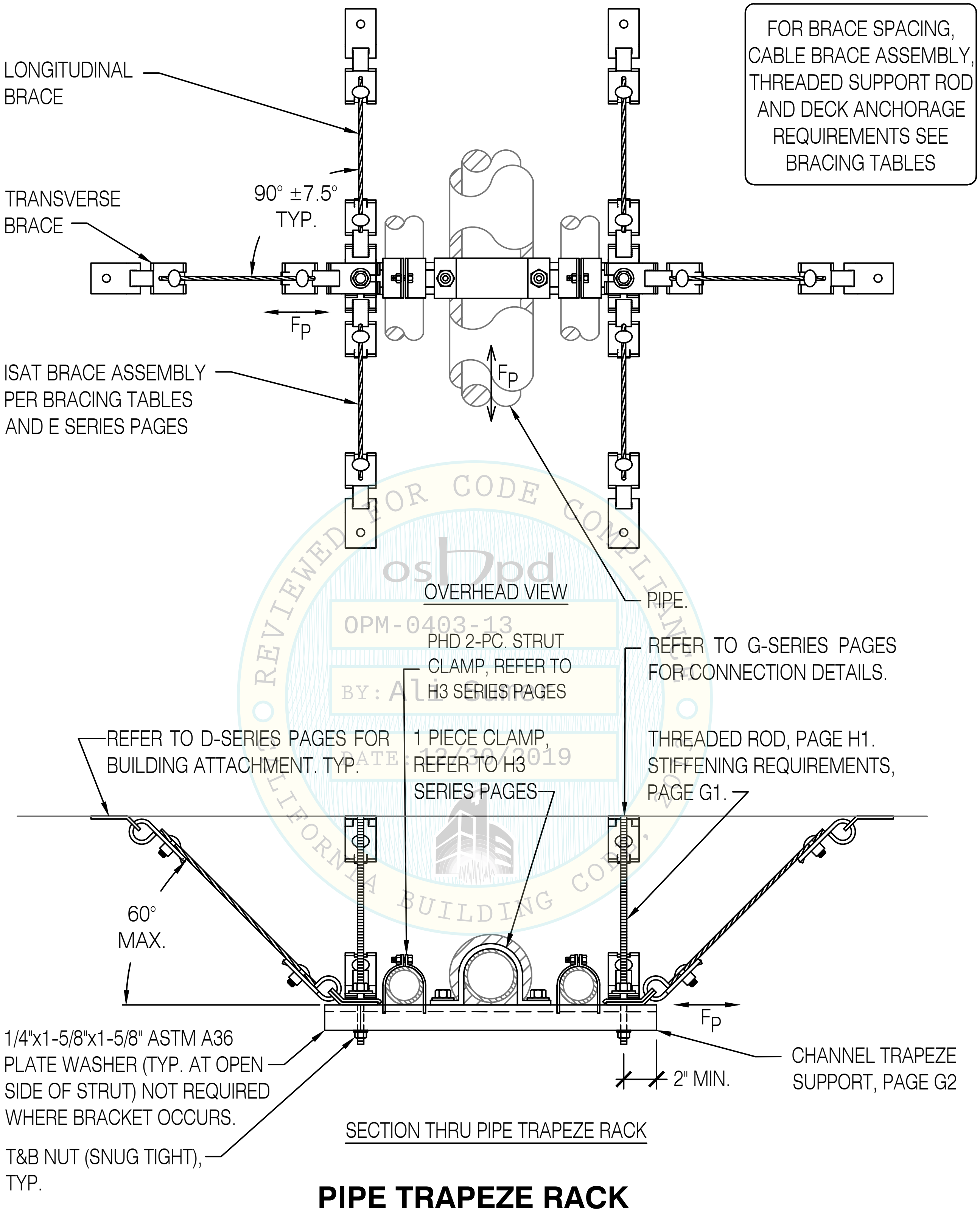

# PIPE TRAPEZE RACK
# 6-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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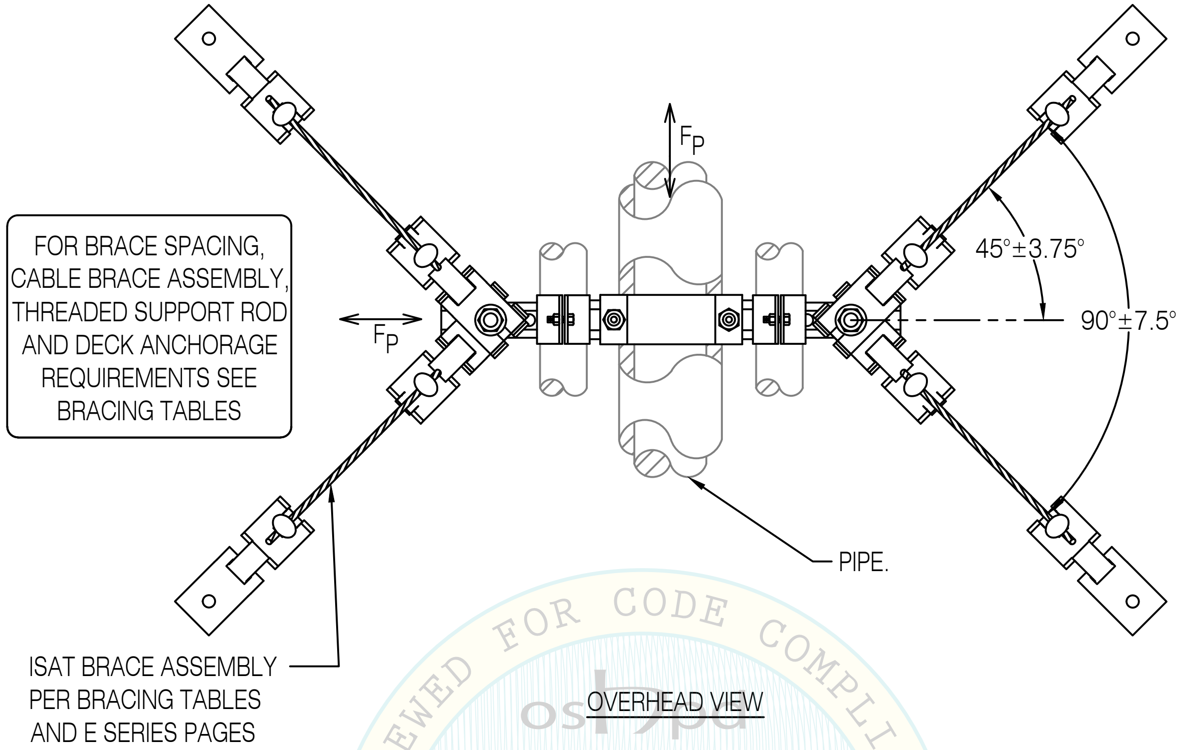

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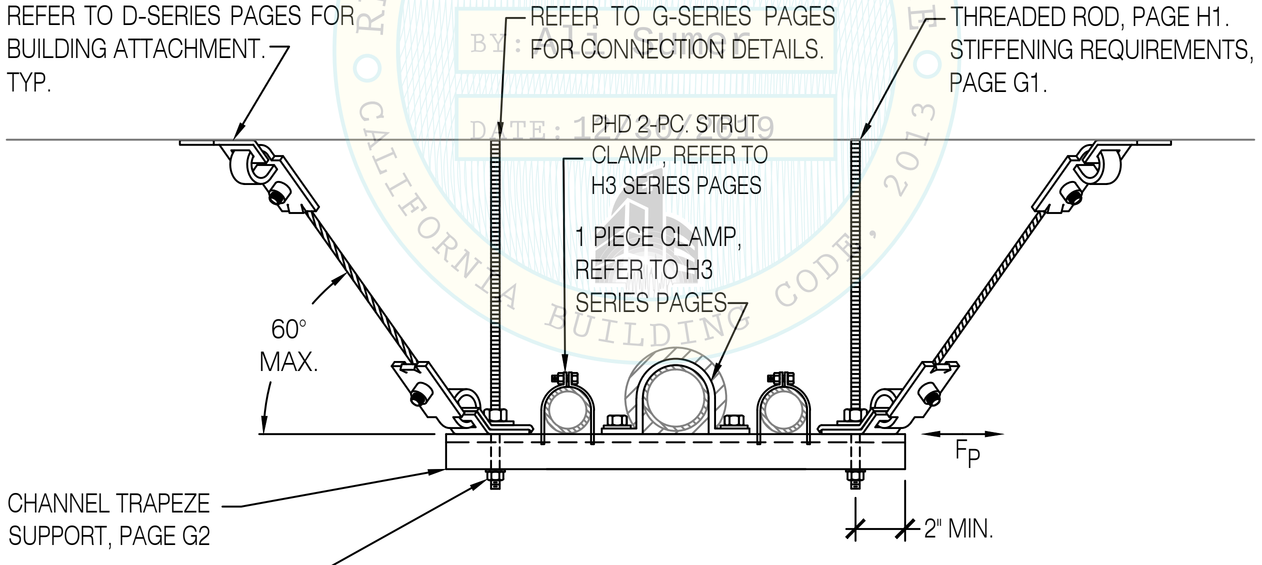

SECTION THRU PIPE TRAPEZE RACK

# PIPE TRAPEZE RACK
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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REQUIREMENTS SEE
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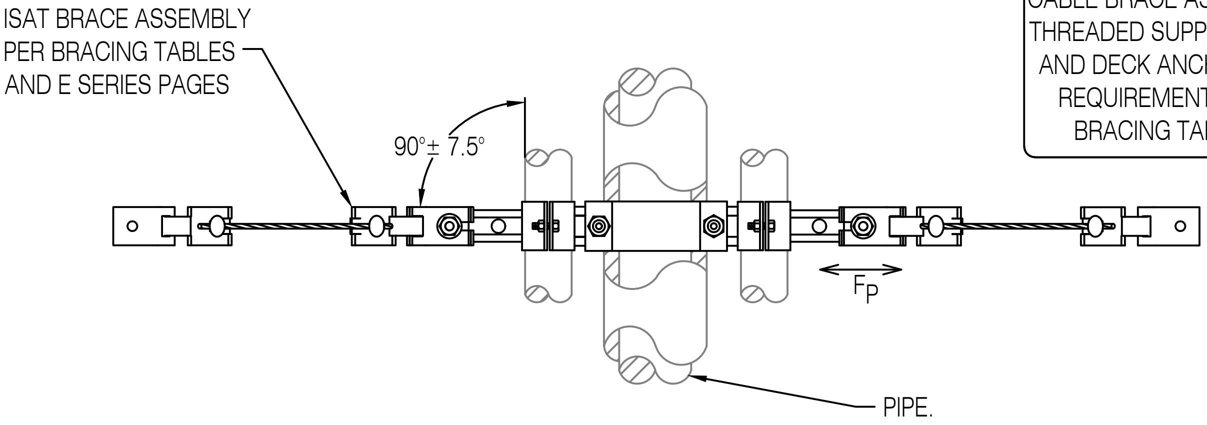

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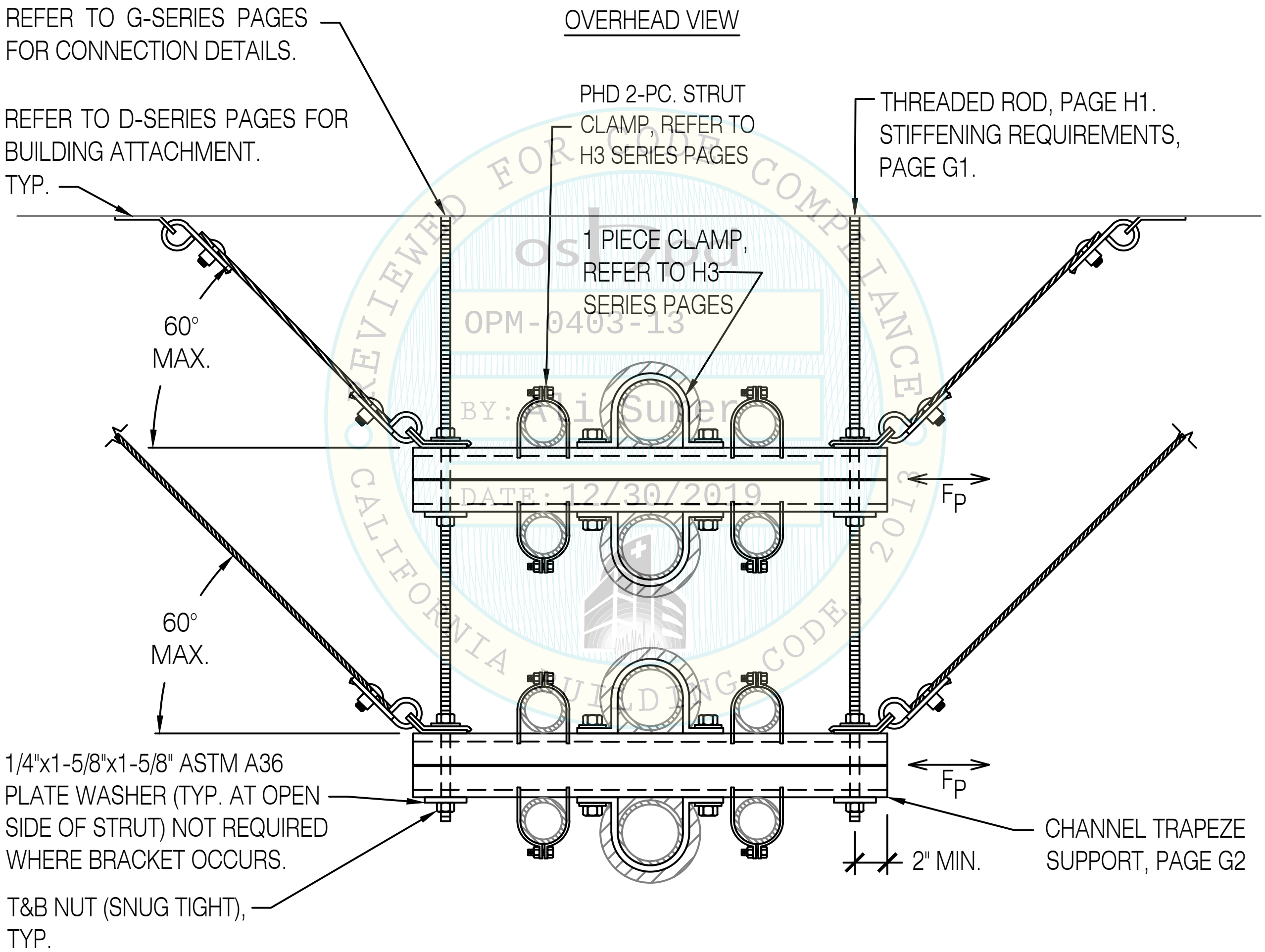

SECTION THRU PIPE TRAPEZE RACK

# 2-TIERED PIPE TRAPEZE RACK
# 2-WAY TRANSVERSE, CABLE BRACING

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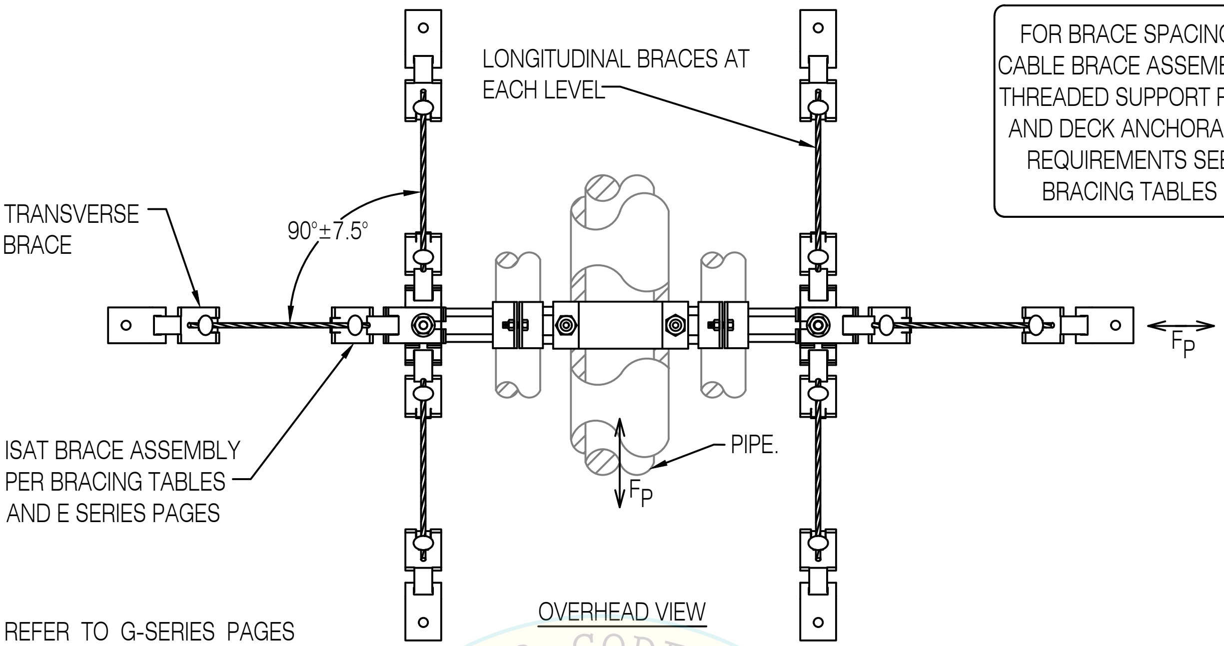

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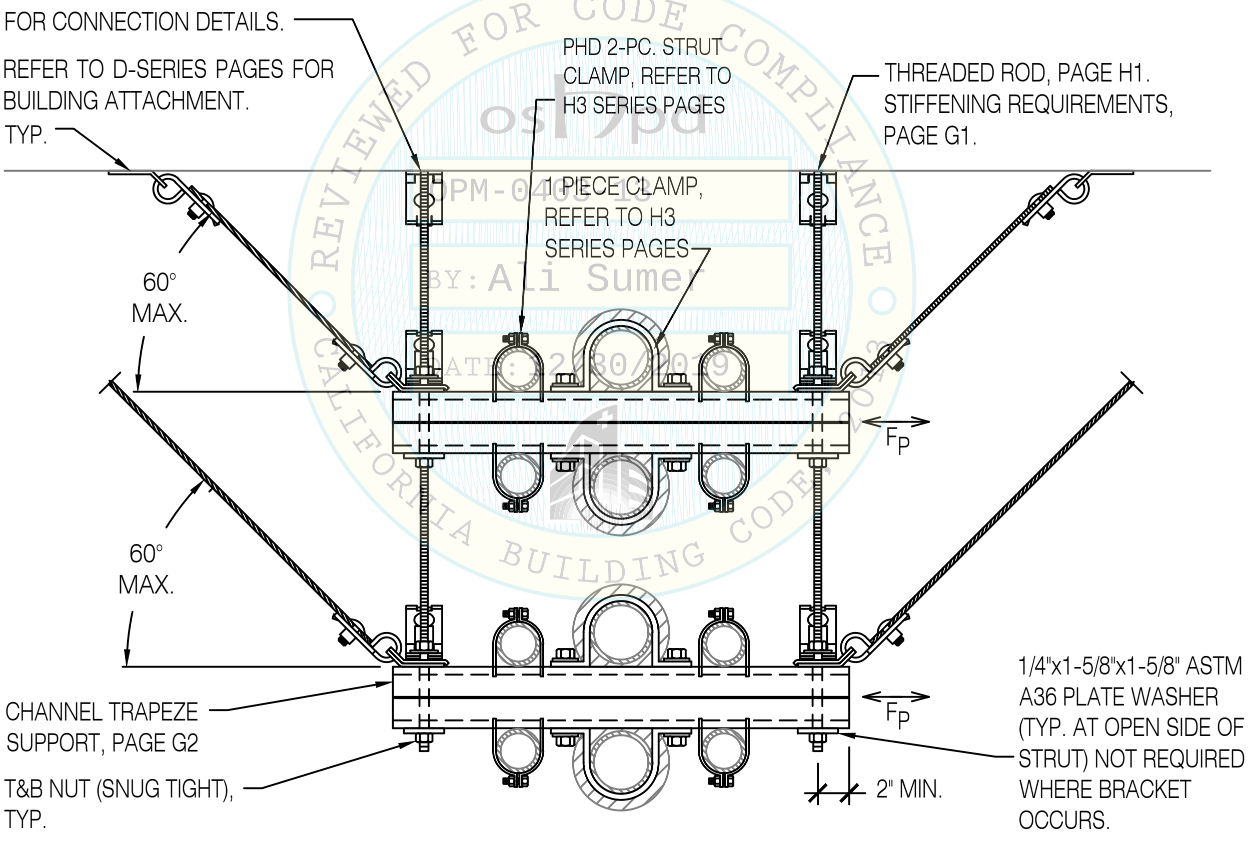

SECTION THRU PIPE TRAPEZE RACK

# 2-TIERED PIPE TRAPEZE RACK
# 6-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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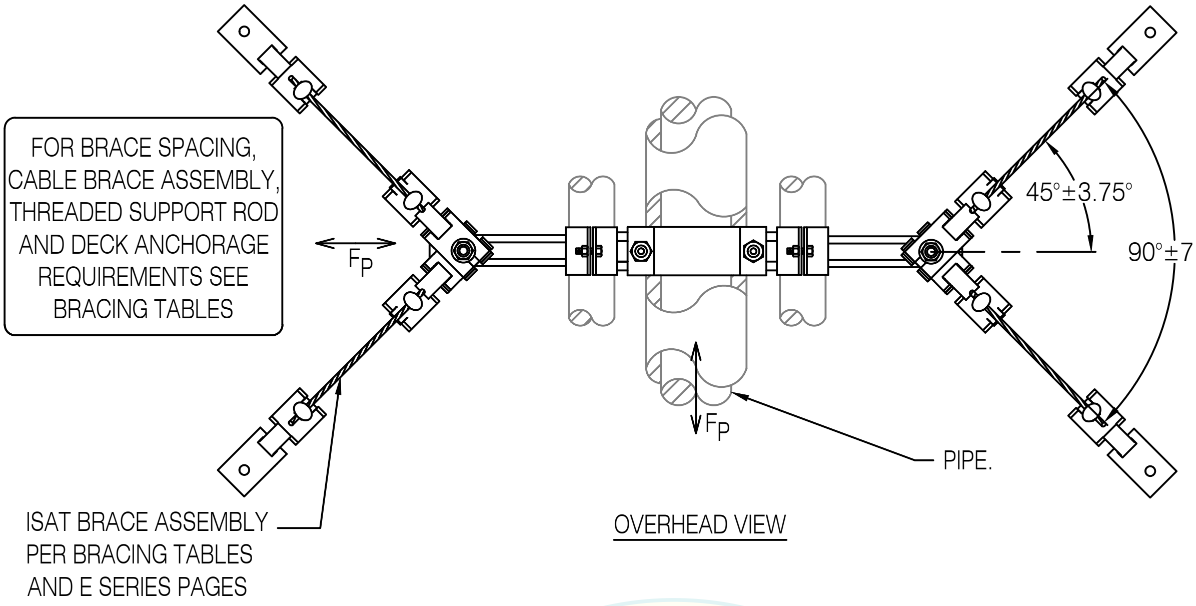

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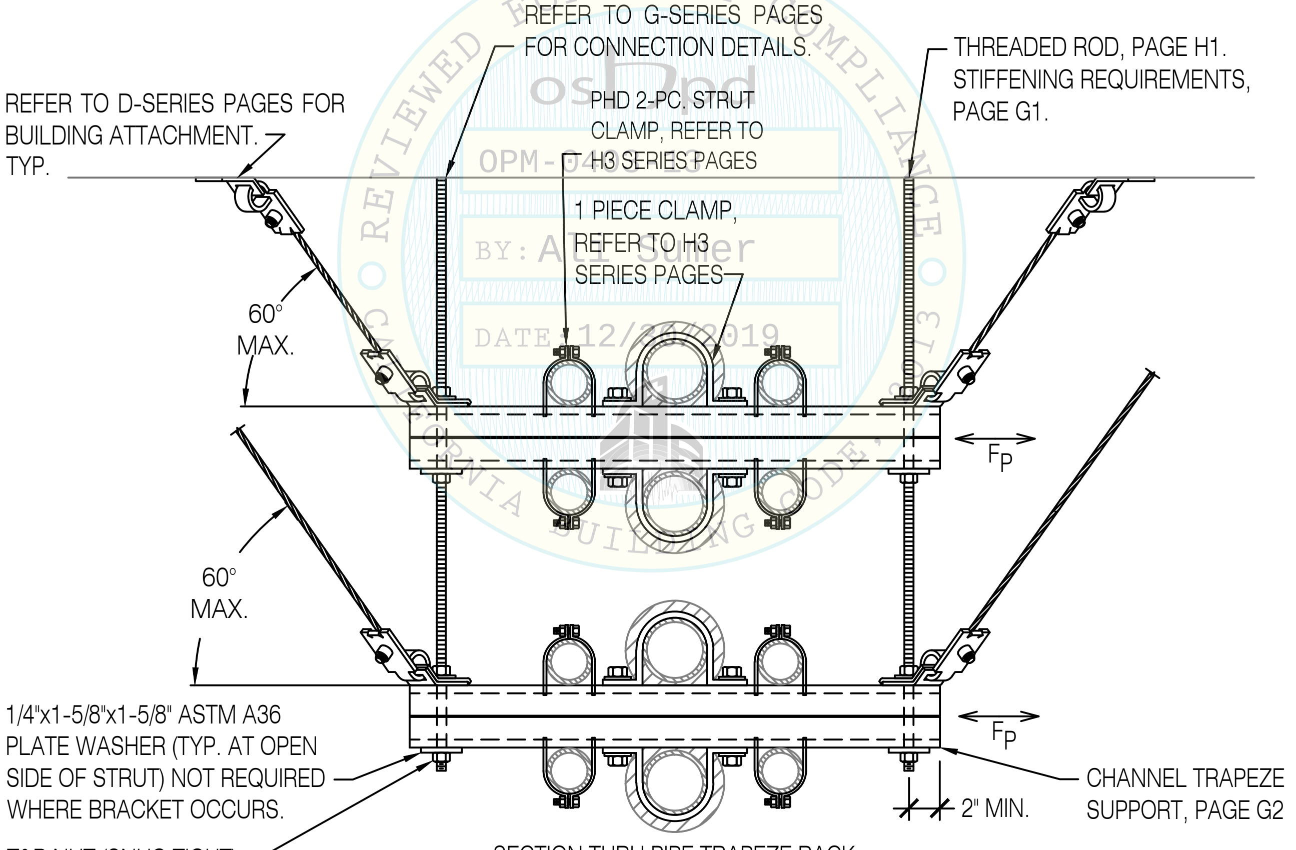

SECTION THRU PIPE TRAPEZE RACK

# 2-TIERED PIPE TRAPEZE RACK
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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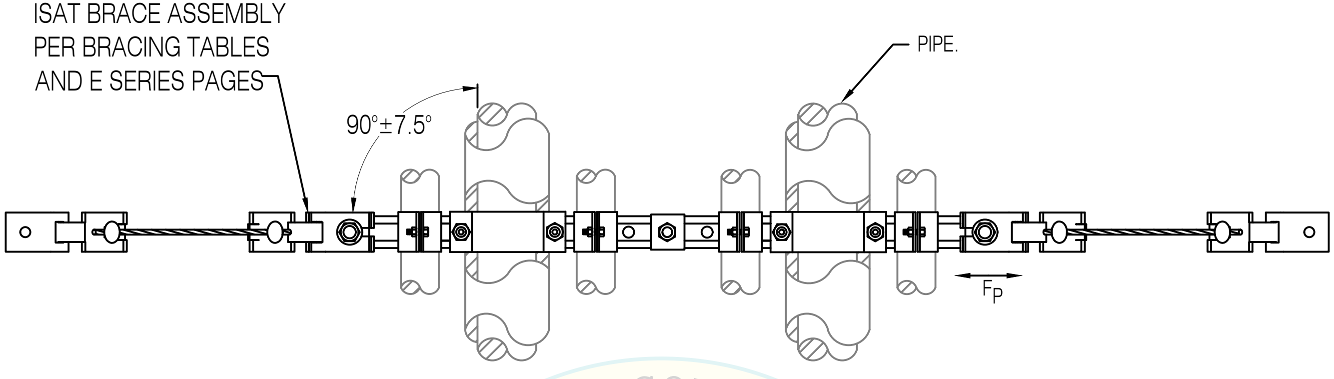

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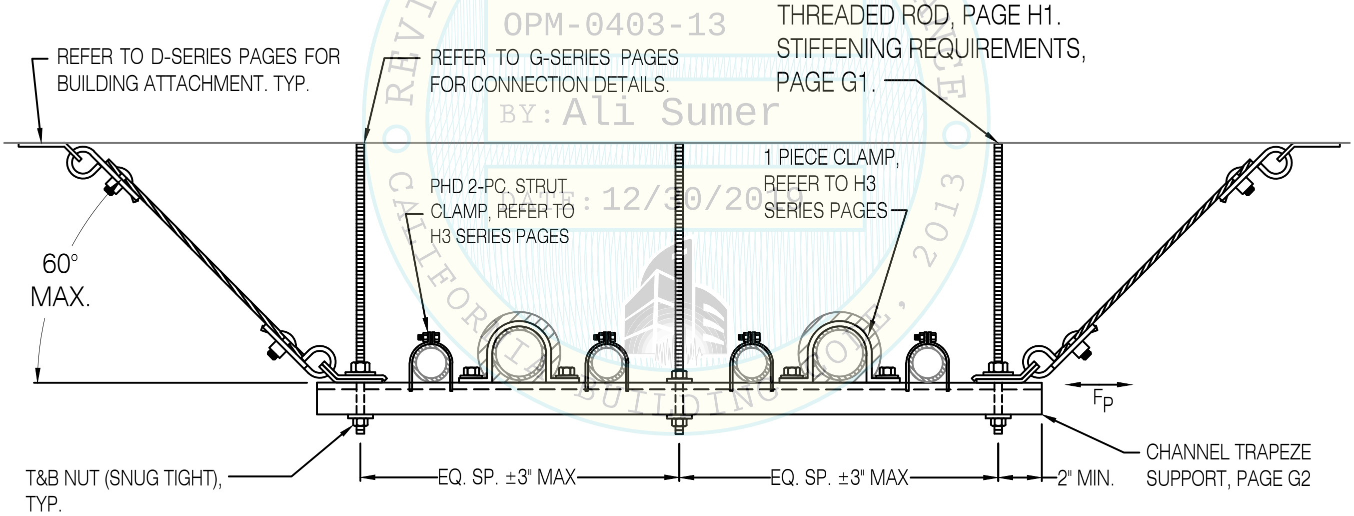

SECTION THRU PIPE TRAPEZE RACK

# 3-ROD PIPE TRAPEZE RACK
# 2-WAY TRANSVERSE, CABLE BRACING

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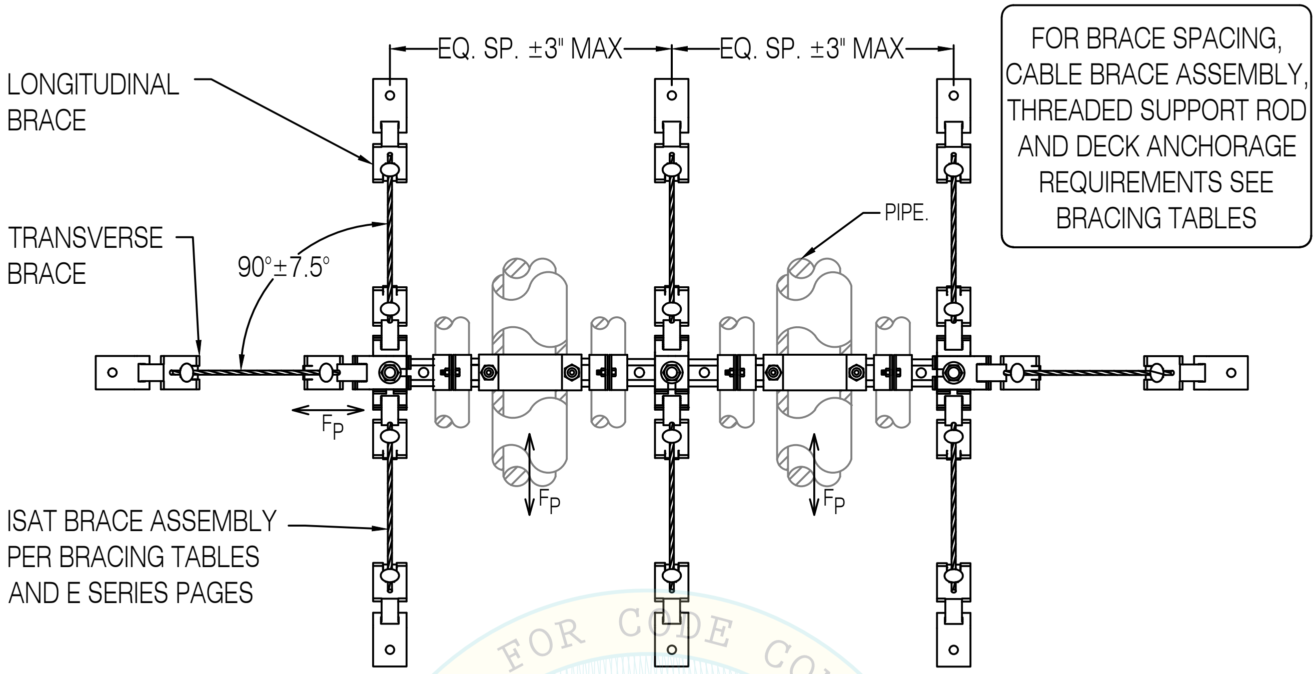
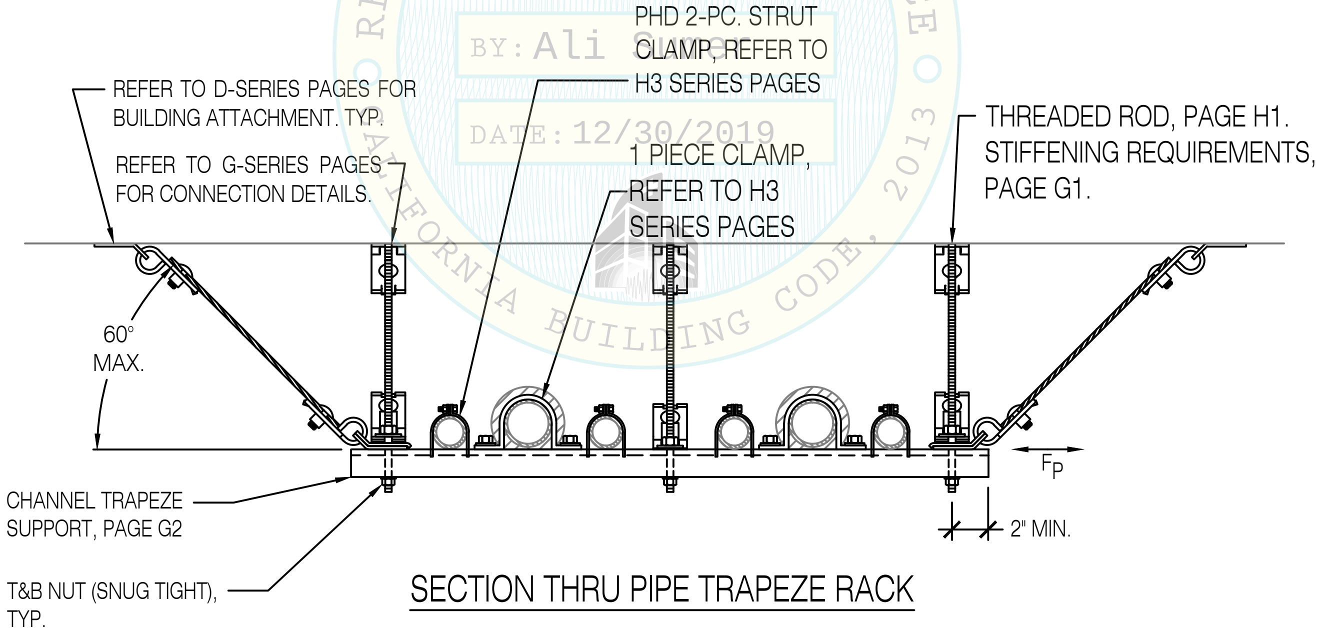


FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

OVERHEAD VIEW



SECTION THRU PIPE TRAPEZE RACK

# 3-ROD PIPE TRAPEZE RACK
# 8-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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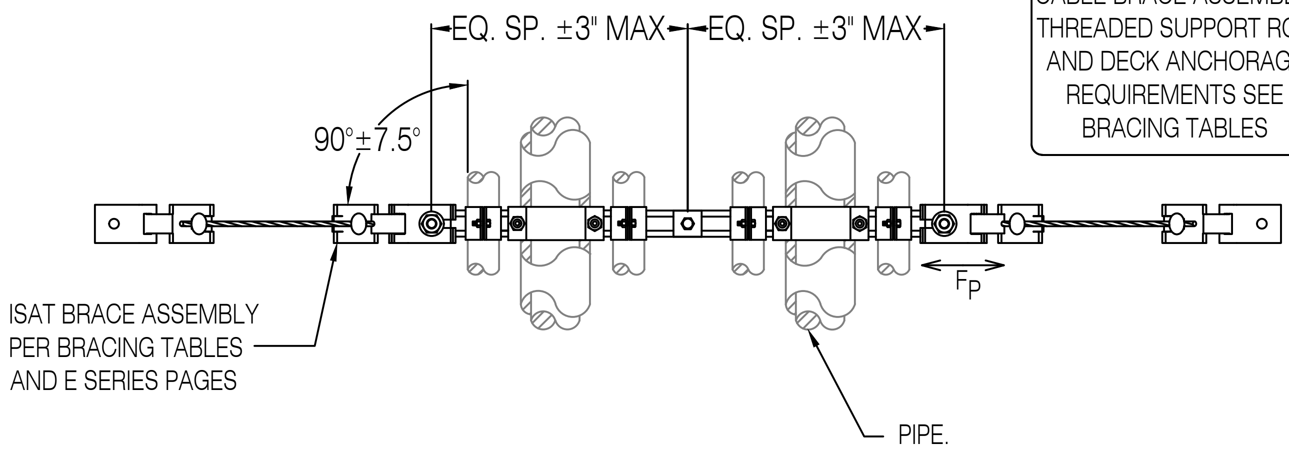

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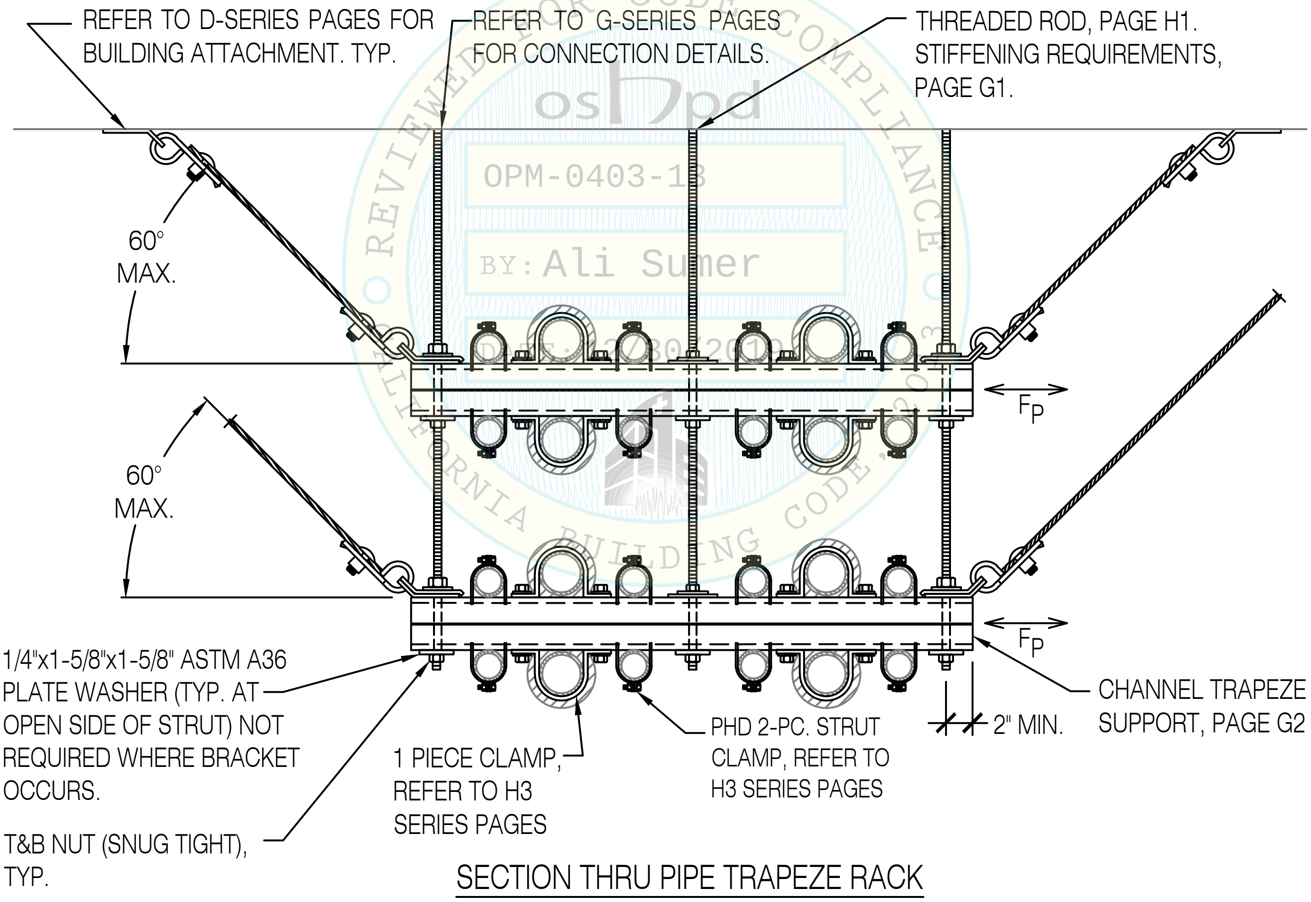

SECTION THRU PIPE TRAPEZE RACK

# 3-ROD, 2-TIERED PIPE TRAPEZE RACK
# 2-WAY TRANSVERSE, CABLE BRACING

ANTHONY A. RUBALCAVA
S 4710
REGISTERED PROFESSIONAL ENGINEER
STRUCTURAL
STATE OF CALIFORNIA

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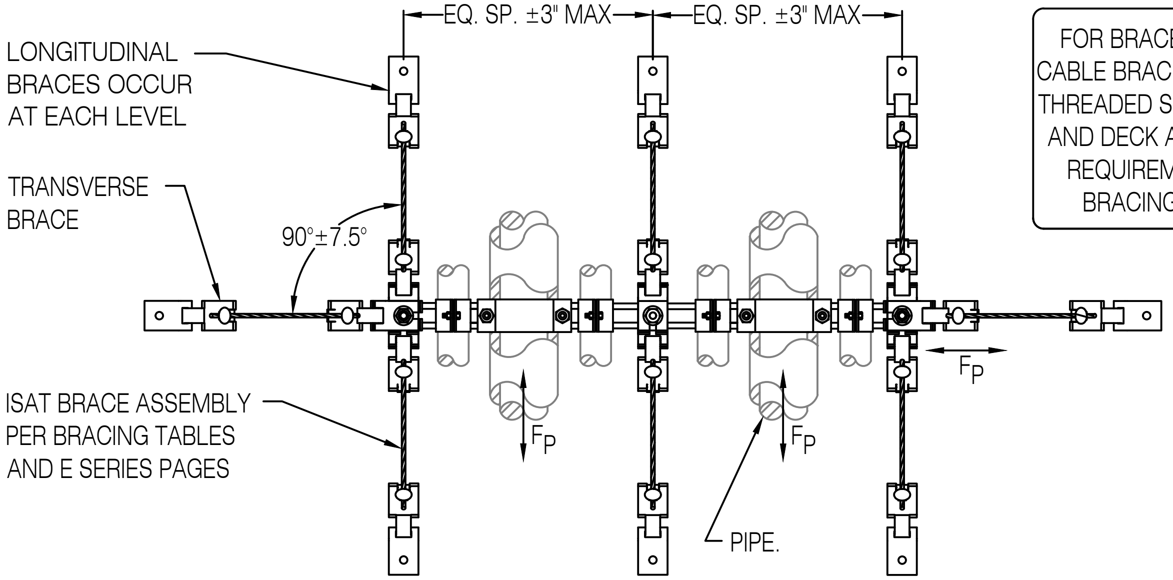

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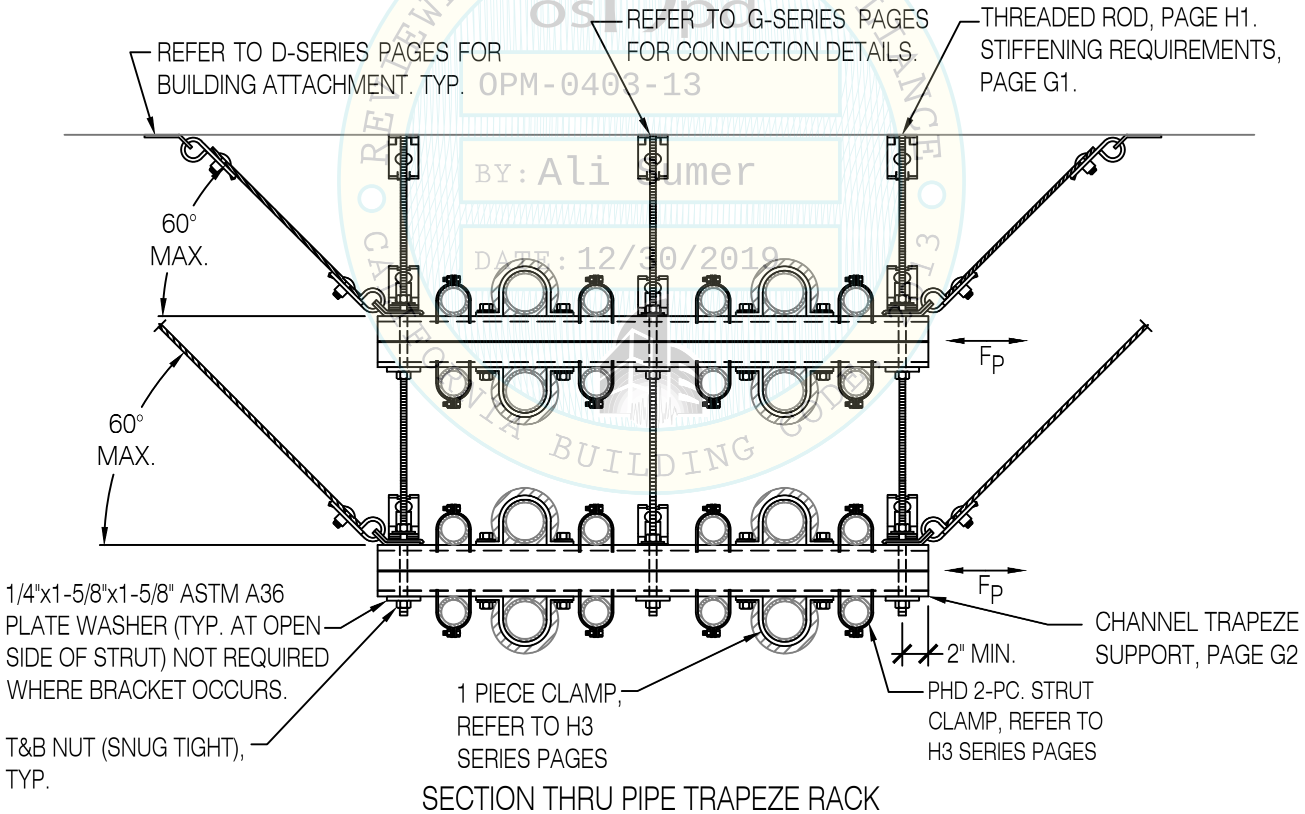

SECTION THRU PIPE TRAPEZE RACK

# 3-ROD, 2-TIERED PIPE TRAPEZE RACK
# 8-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
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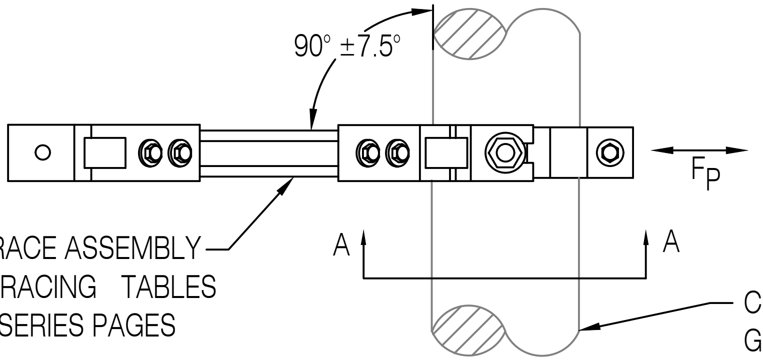


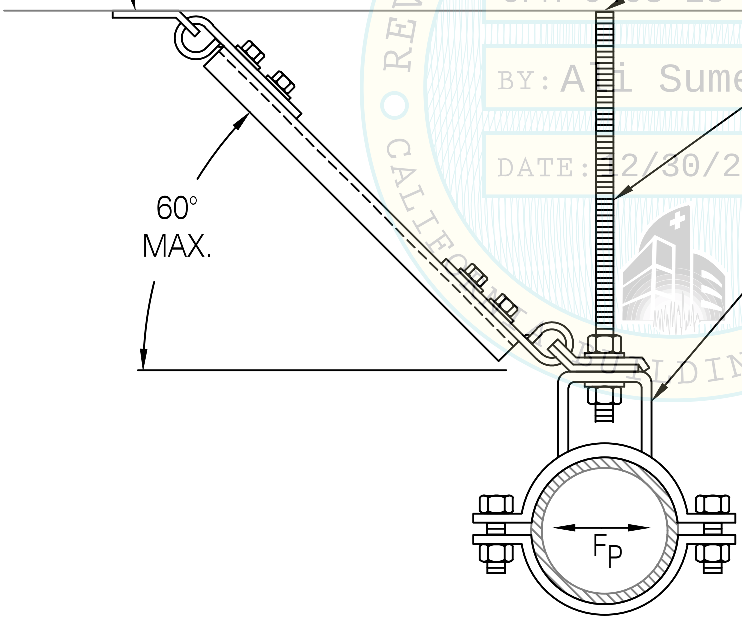
ISAT BRACE ASSEMBLY
PER BRACING TABLES
AND E SERIES PAGES

CONDUIT, EMT,
GRC, OR IMC

OVERHEAD VIEW

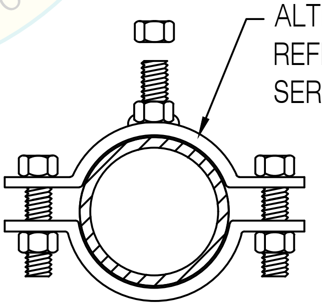
REFER TO D-SERIES PAGES FOR
BUILDING ATTACHMENT. TYP.

REFER TO G-SERIES PAGES
FOR CONNECTION DETAILS.



THREADED ROD, PAGE H1.
STIFFENING REQUIREMENTS,
REFER TO G1 SERIES
DETAILS.

LONGITUDINAL RESTRAINT
DEVICE (LRD), REFER TO
F7 SERIES PAGES.



ALTERNATE LRDWB,
REFER TO F7
SERIES PAGES

SECTION A-A

WELDED BOLT ALTERNATE

# SINGLE HUNG CONDUIT, WITH LRD
# 1-WAY TRANSVERSE, RIGID BRACE

ANTHONY A. RUBALCAVA
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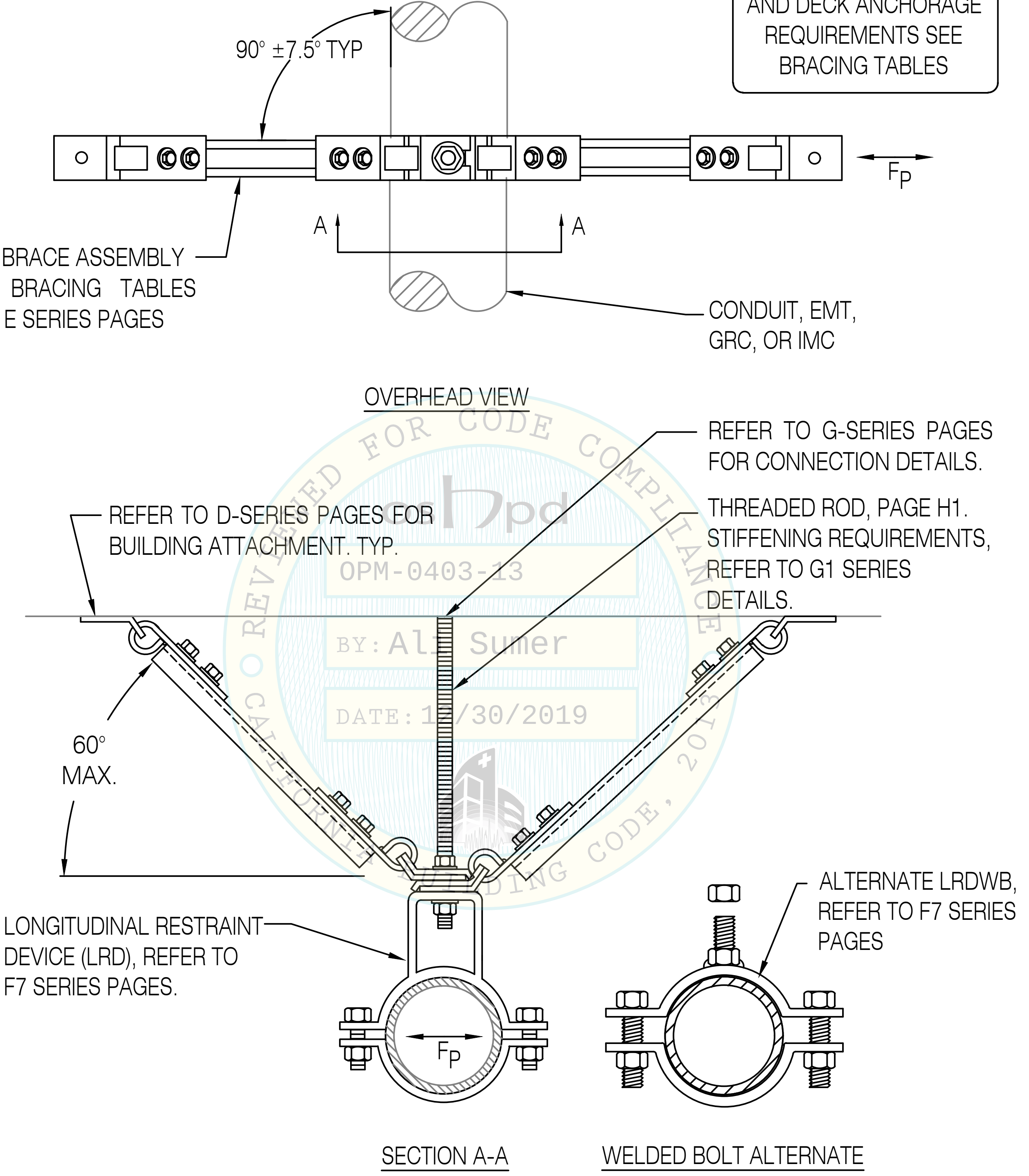

## SINGLE HUNG CONDUIT, WITH LRD
## 2-WAY TRANSVERSE, RIGID BRACING

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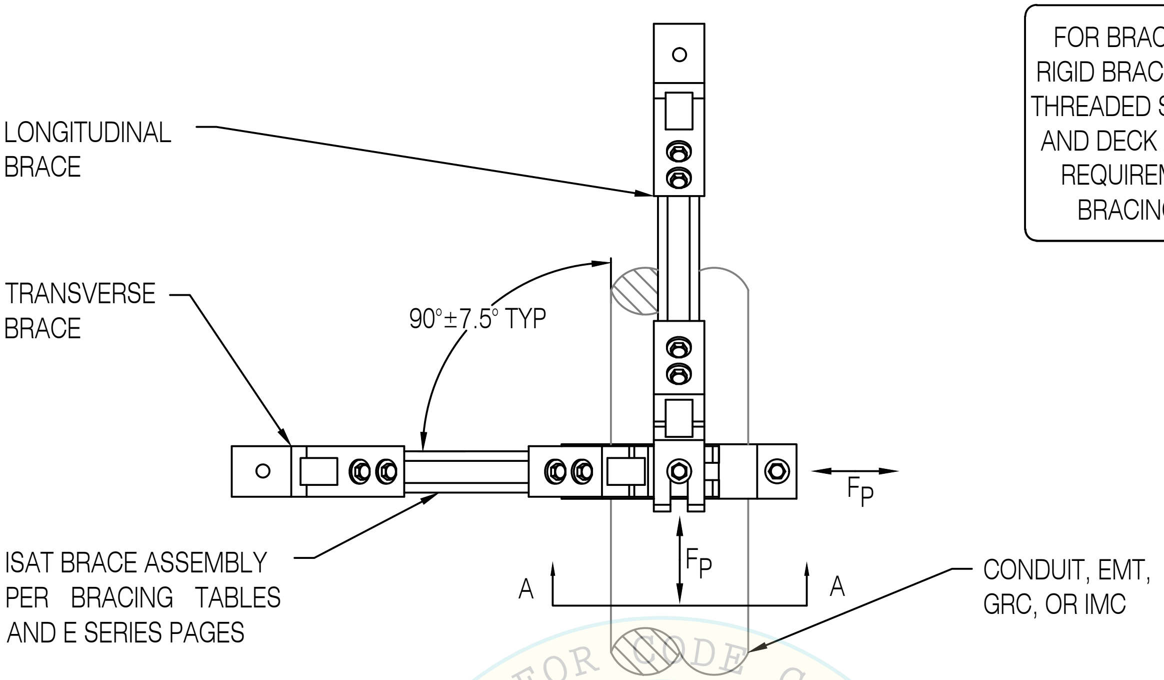
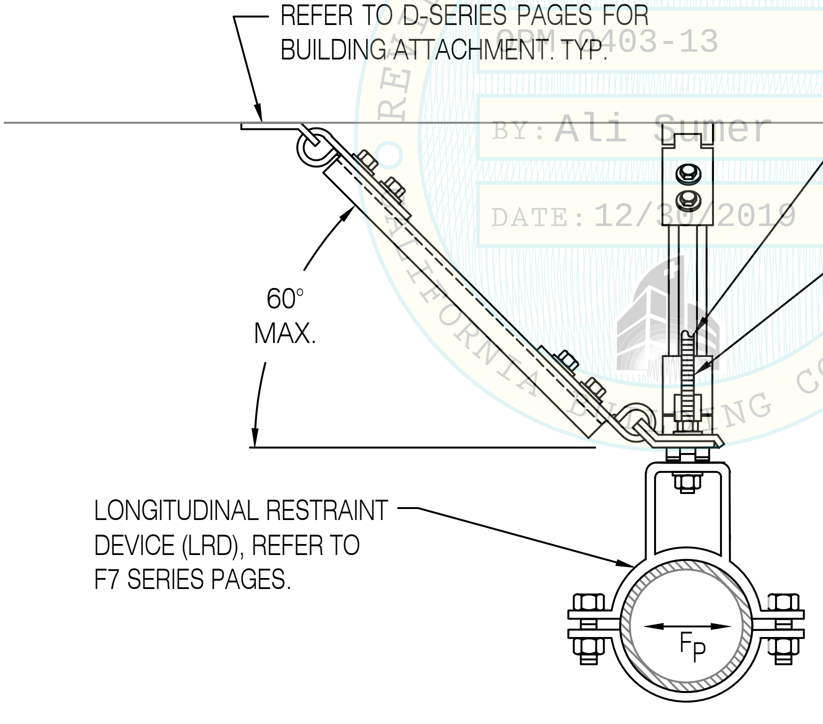
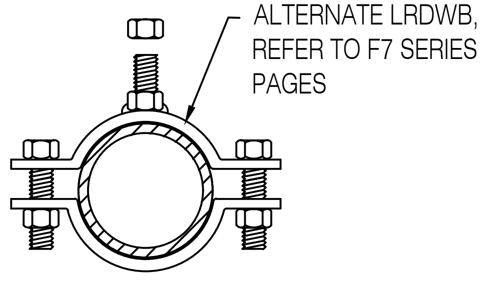


OVERHEAD VIEW



SECTION A-A



WELDED BOLT ALTERNATE

## SINGLE HUNG CONDUIT, WITH LRD
## 2-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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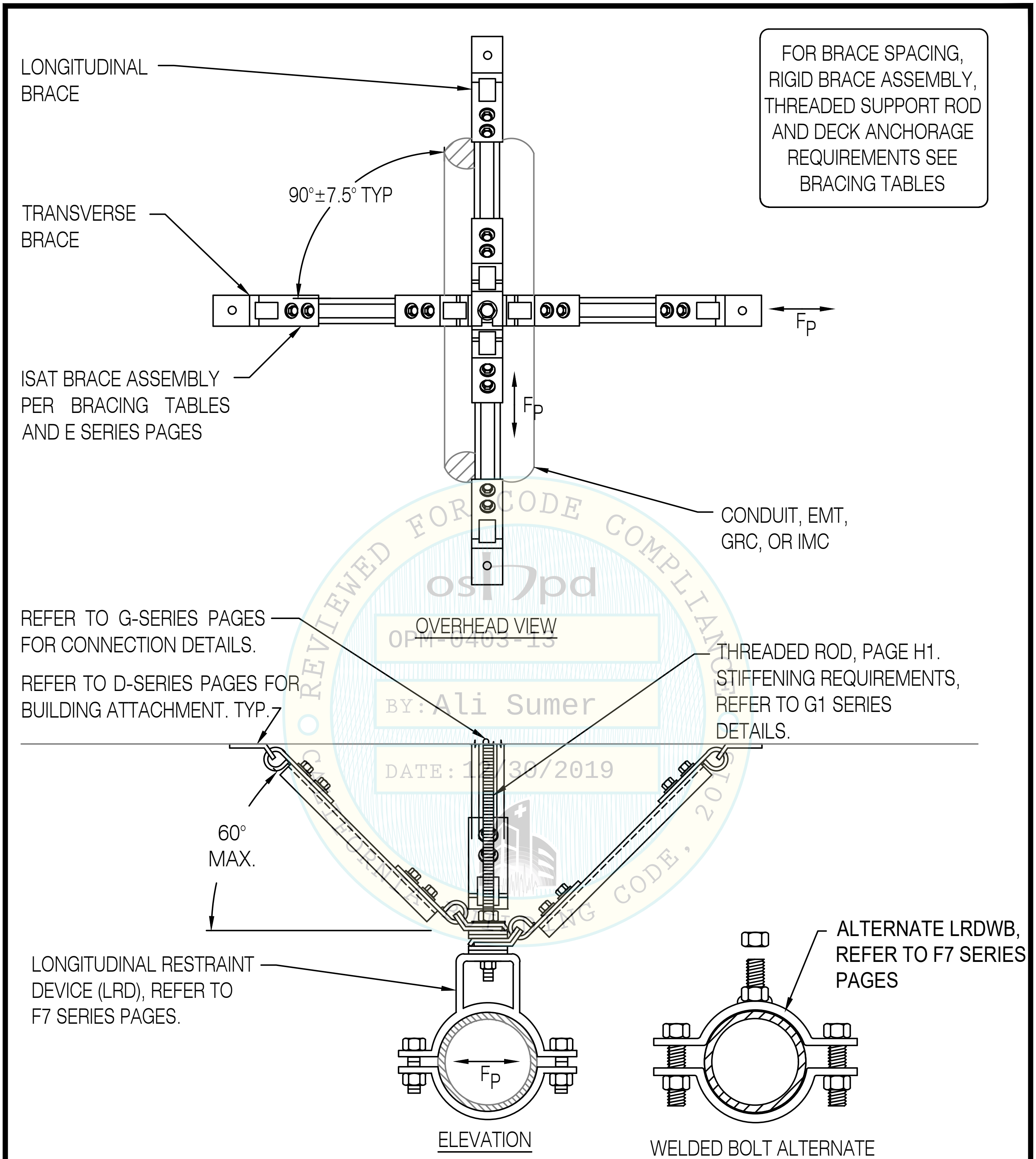

FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES

OVERHEAD VIEW

ELEVATION

WELDED BOLT ALTERNATE

# SINGLE HUNG CONDUIT, WITH LRD
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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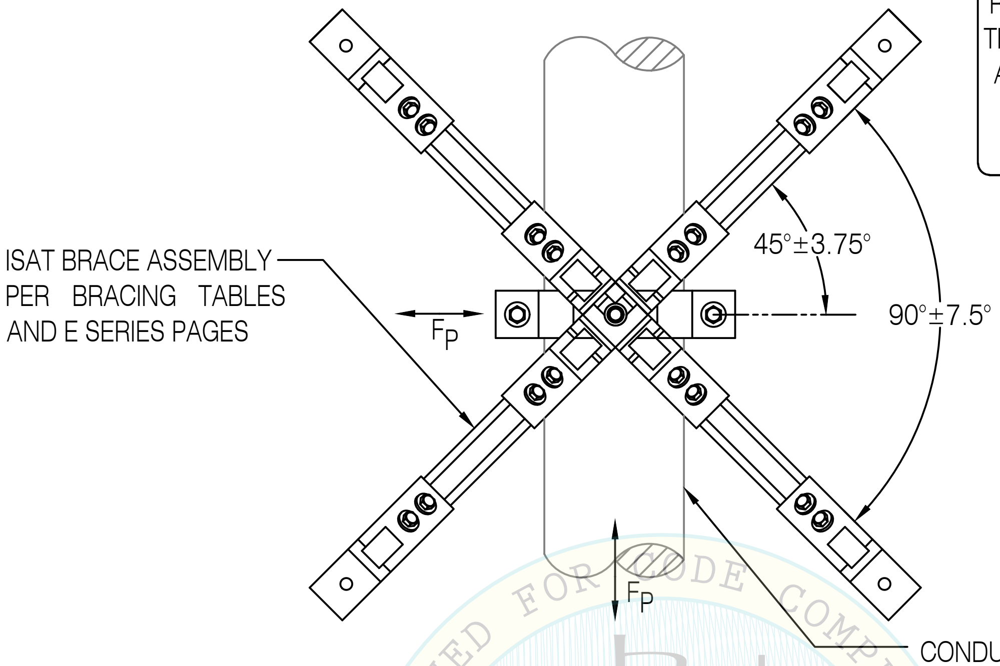
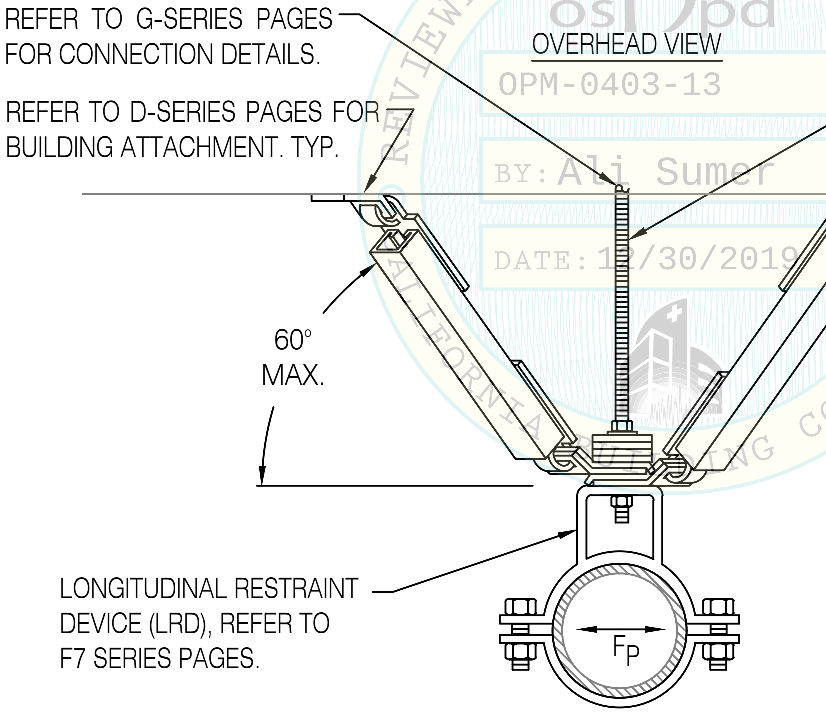
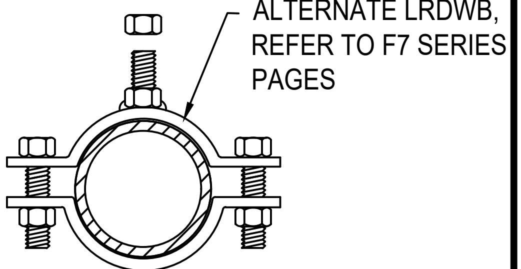
FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



OVERHEAD VIEW



ELEVATION



WELDED BOLT ALTERNATE

# SINGLE HUNG CONDUIT, WITH LRD
# 4-WAY SPLAYED, RIGID BRACING

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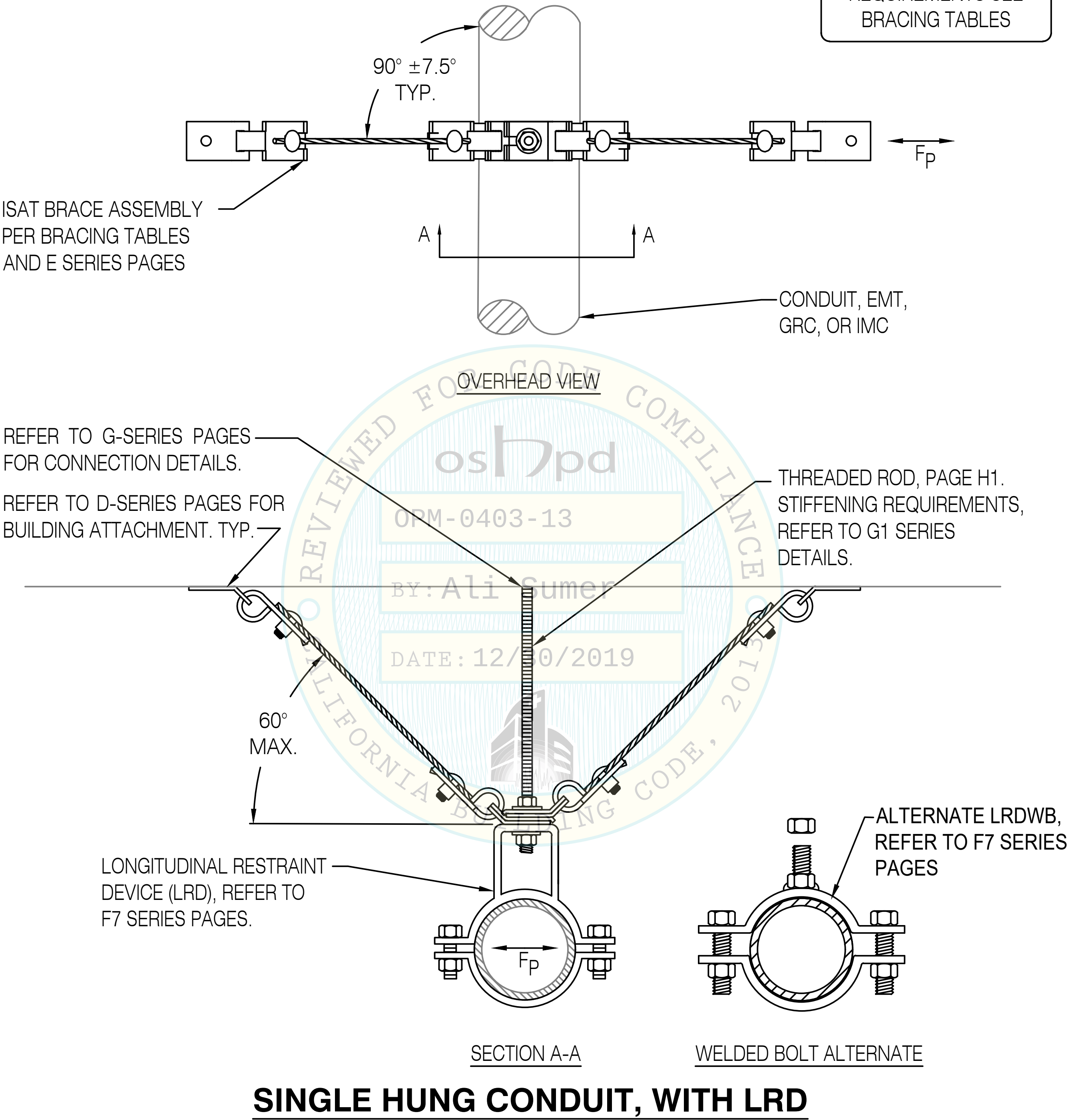
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



## SINGLE HUNG CONDUIT, WITH LRD
## 2-WAY TRANSVERSE, CABLE BRACING

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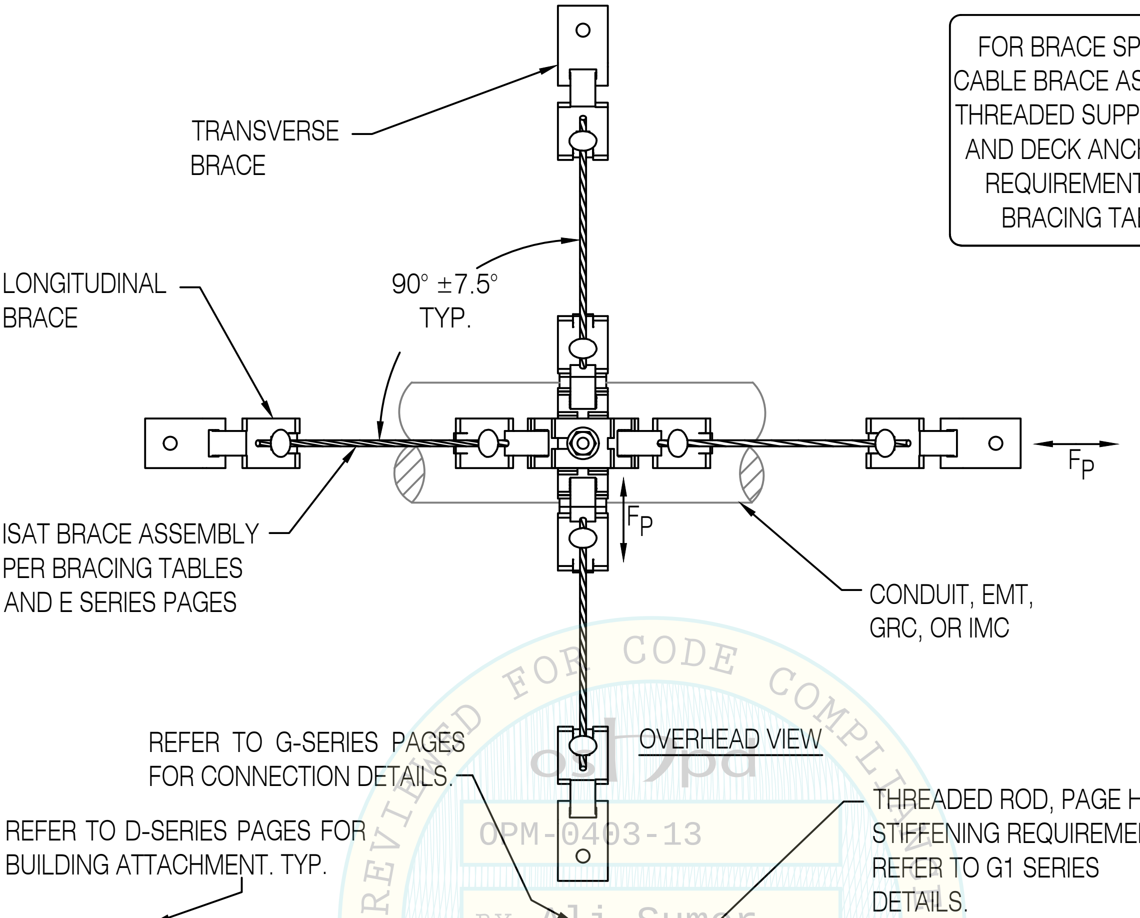

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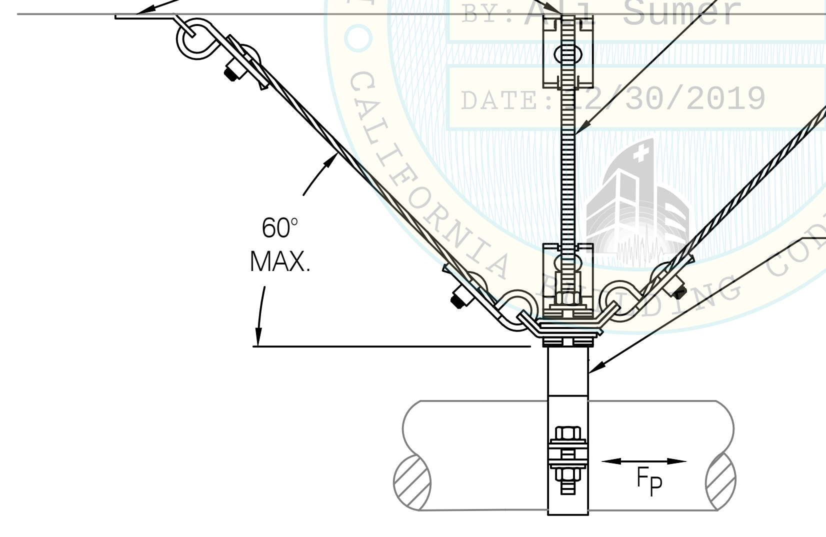

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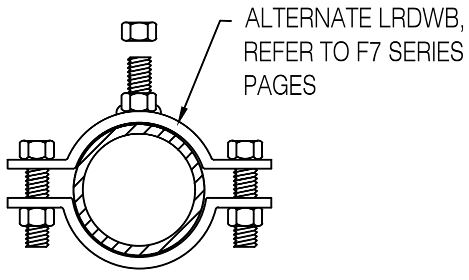

WELDED BOLT ALTERNATE

# SINGLE HUNG CONDUIT, WITH LRD
# 4-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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AND DECK ANCHORAGE
REQUIREMENTS SEE
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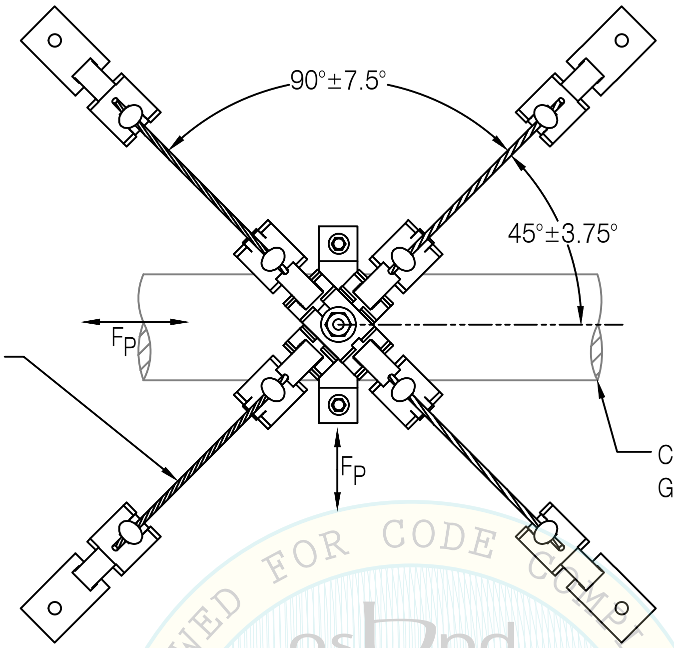

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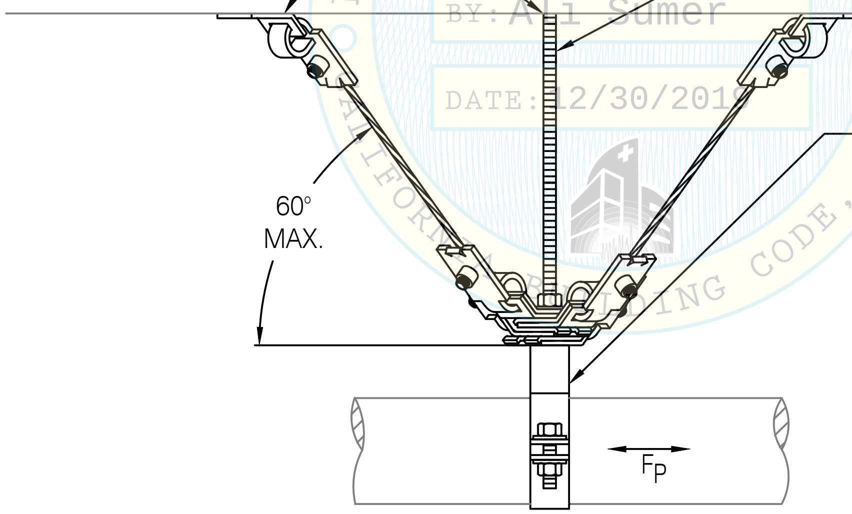

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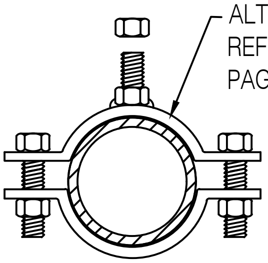

WELDED BOLT ALTERNATE

# SINGLE HUNG CONDUIT, WITH LRD
# 4-WAY SPLAYED, CABLE BRACING

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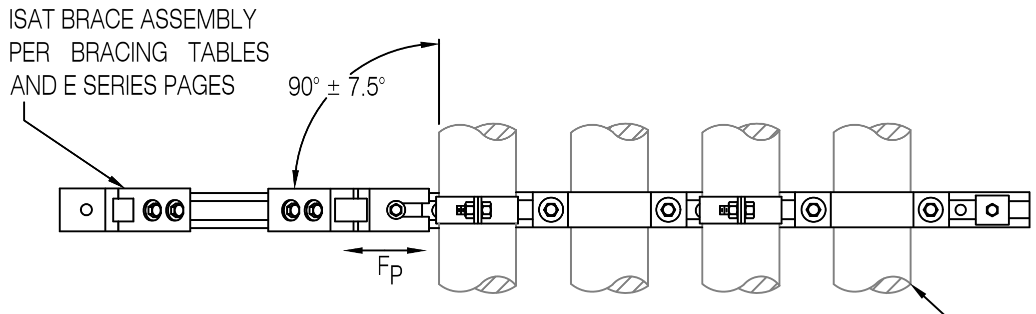

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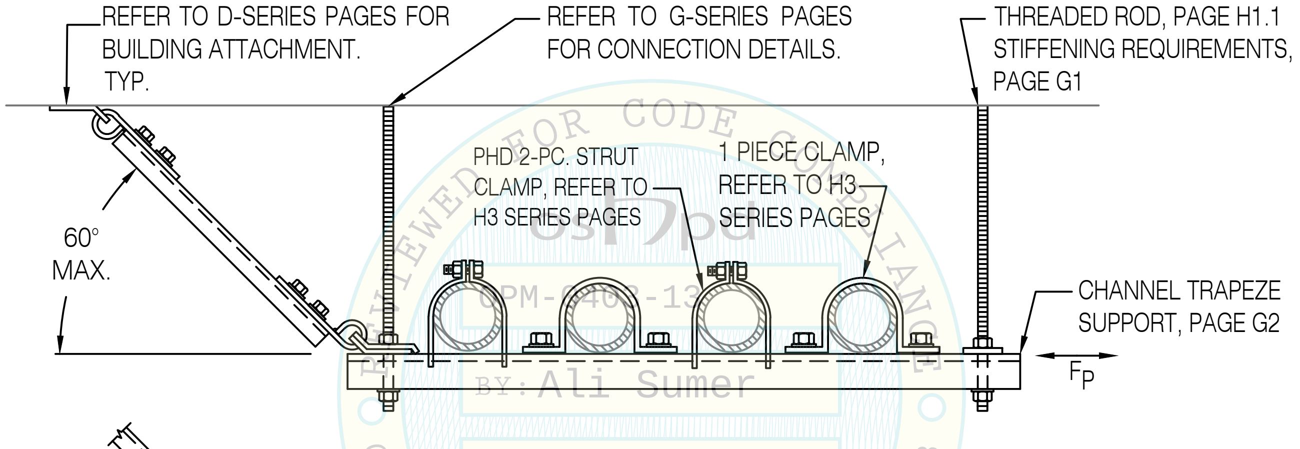
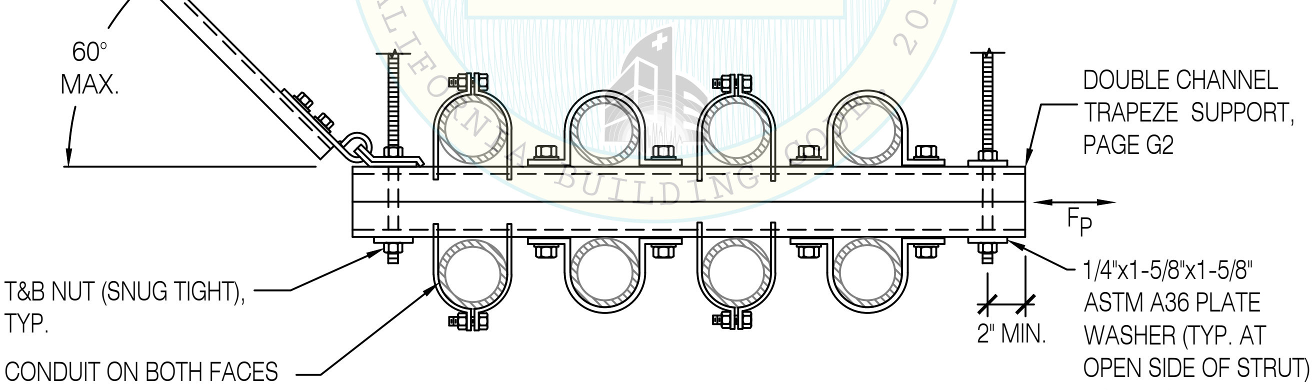


SECTION THRU CONDUIT TRAPEZE RACK - OPTION 1 CONDUIT TIER



SECTION THRU CONDUIT TRAPEZE RACK - OPTION 2 CONDUIT TIERS

# CONDUIT TRAPEZE RACK
# 1-WAY TRANSVERSE, RIGID BRACING

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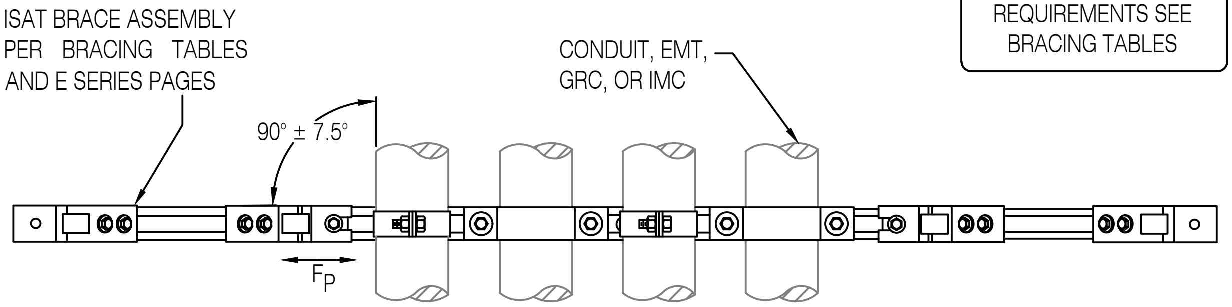

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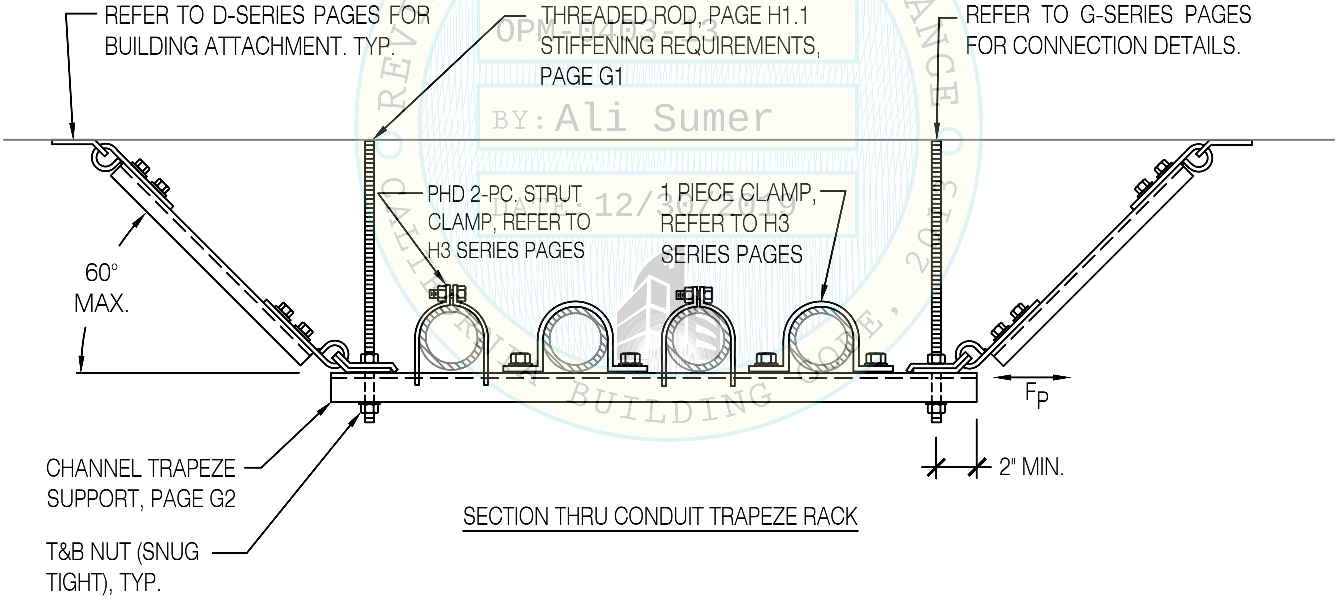

SECTION THRU CONDUIT TRAPEZE RACK

# CONDUIT TRAPEZE RACK
# 2-WAY TRANSVERSE, RIGID BRACING

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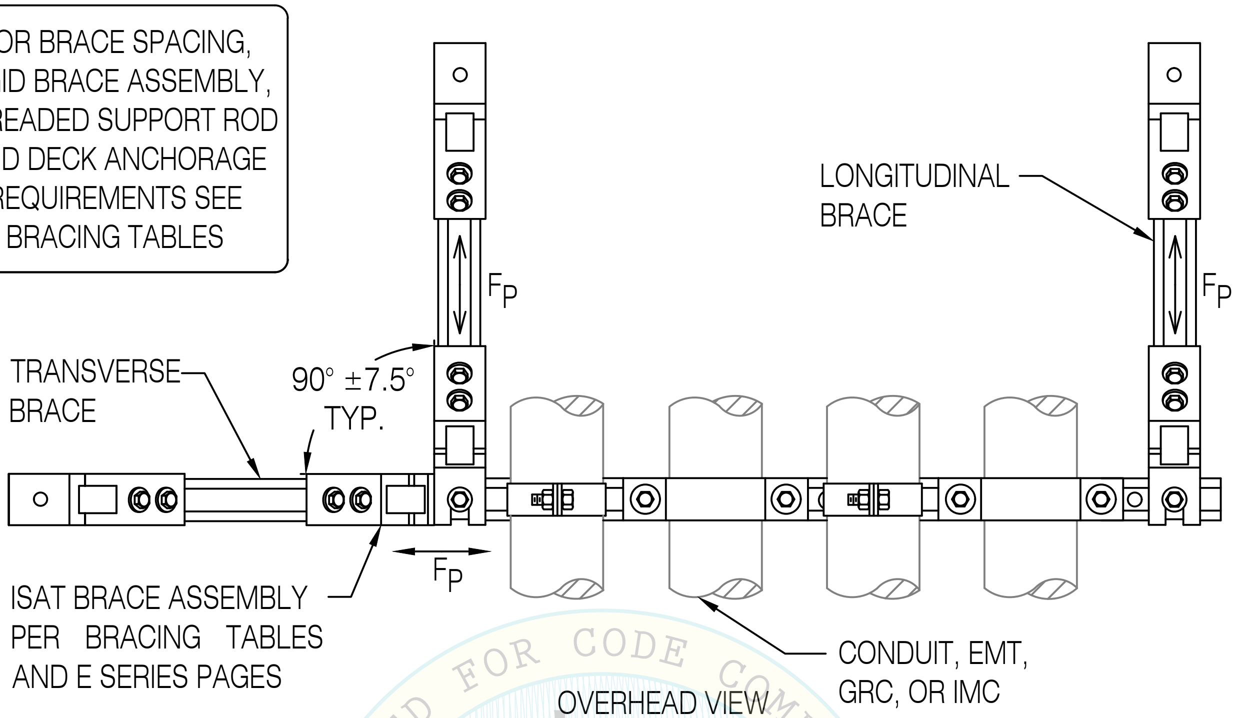

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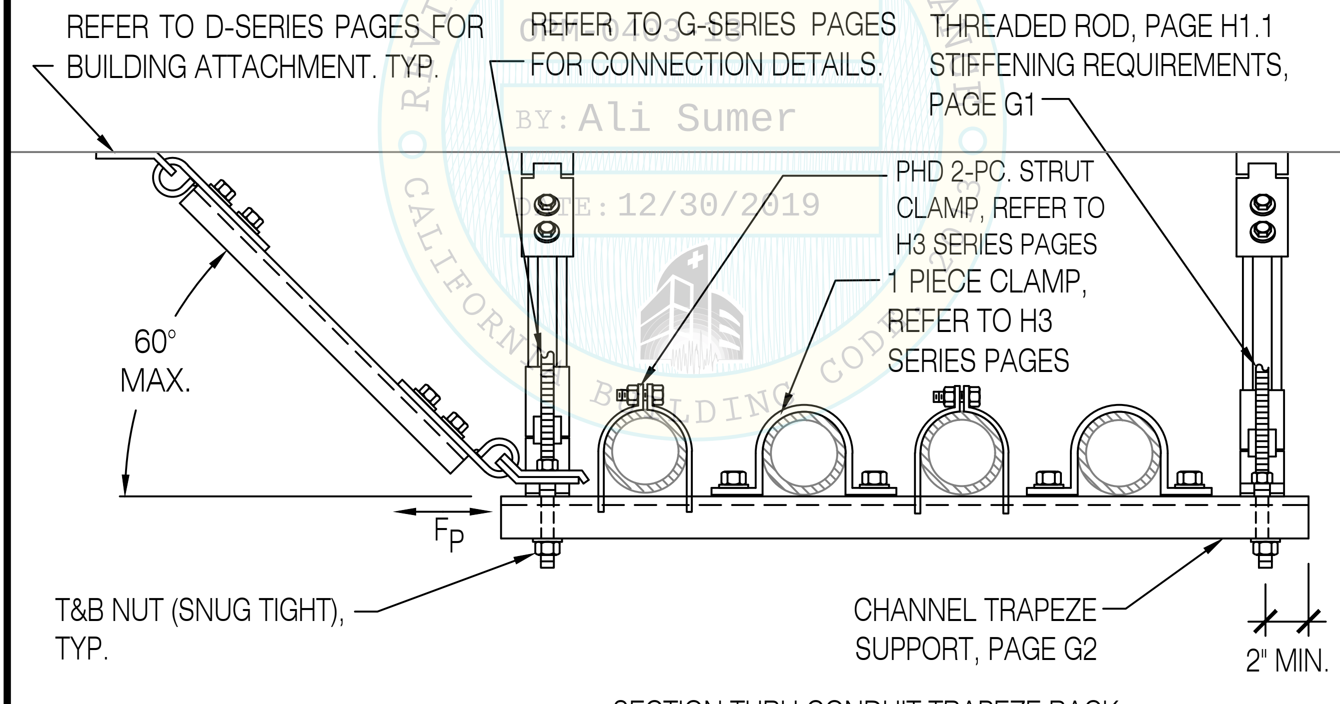

SECTION THRU CONDUIT TRAPEZE RACK

## CONDUIT TRAPEZE RACK
## 3-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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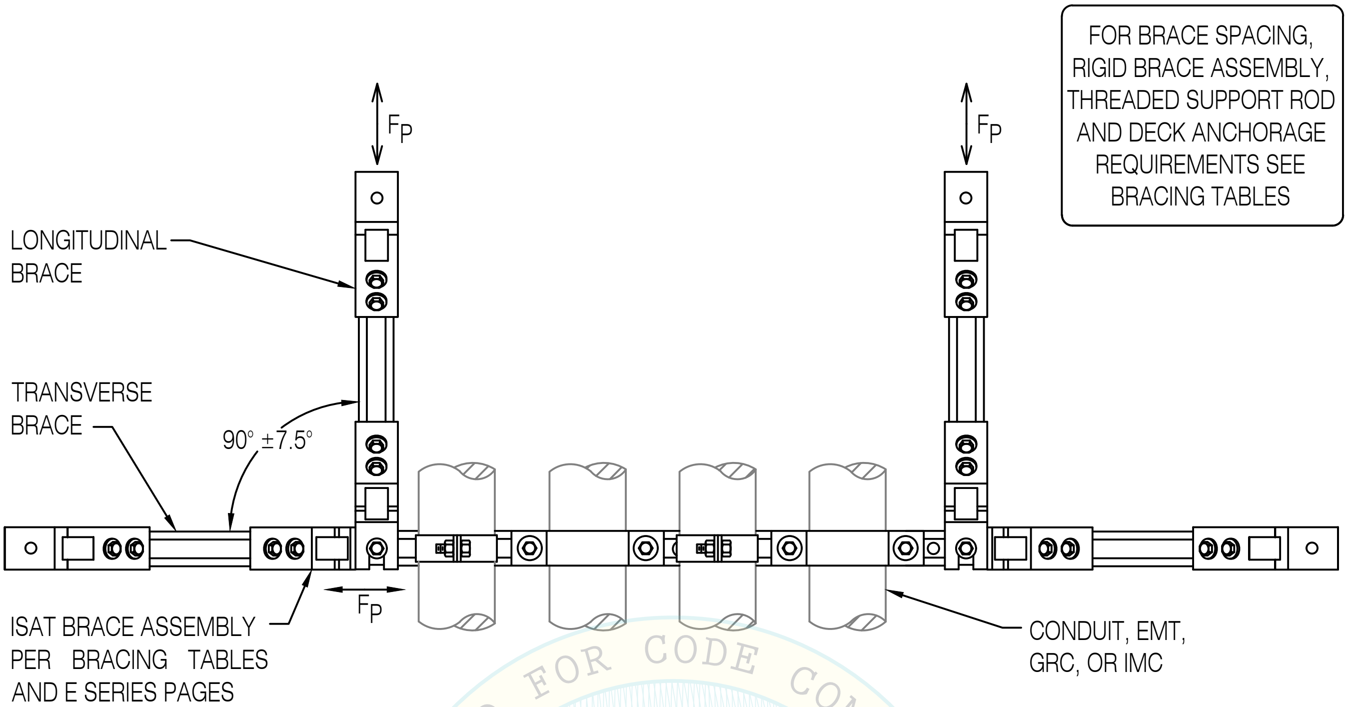
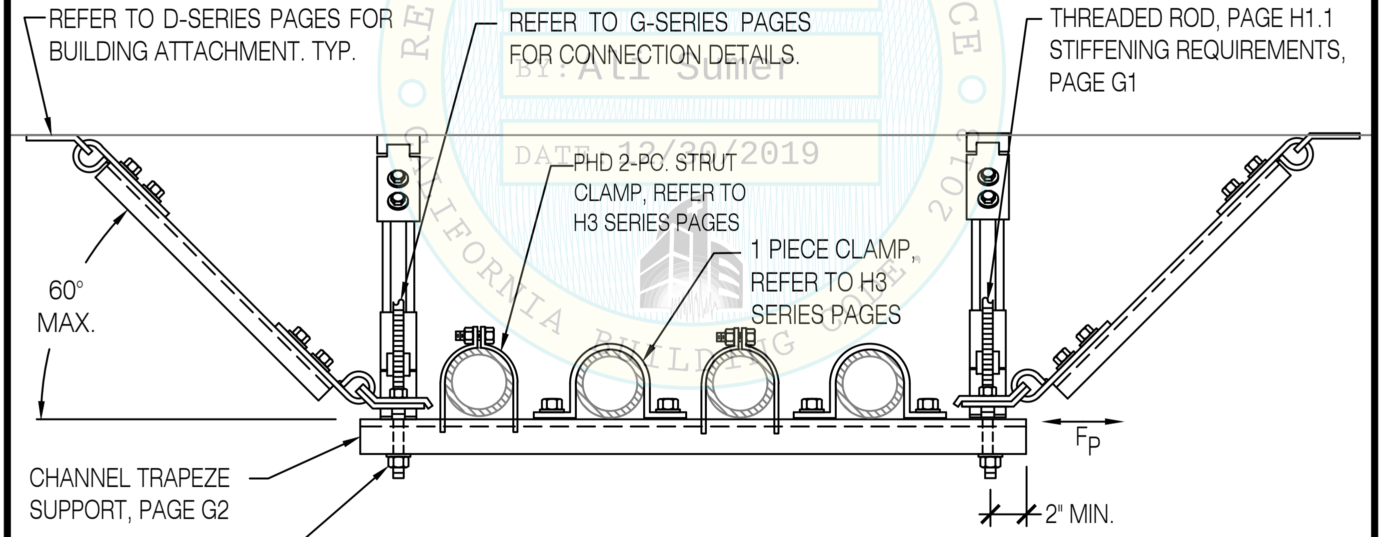

FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

OVERHEAD VIEW



SECTION THRU CONDUIT TRAPEZE RACK

# CONDUIT TRAPEZE RACK
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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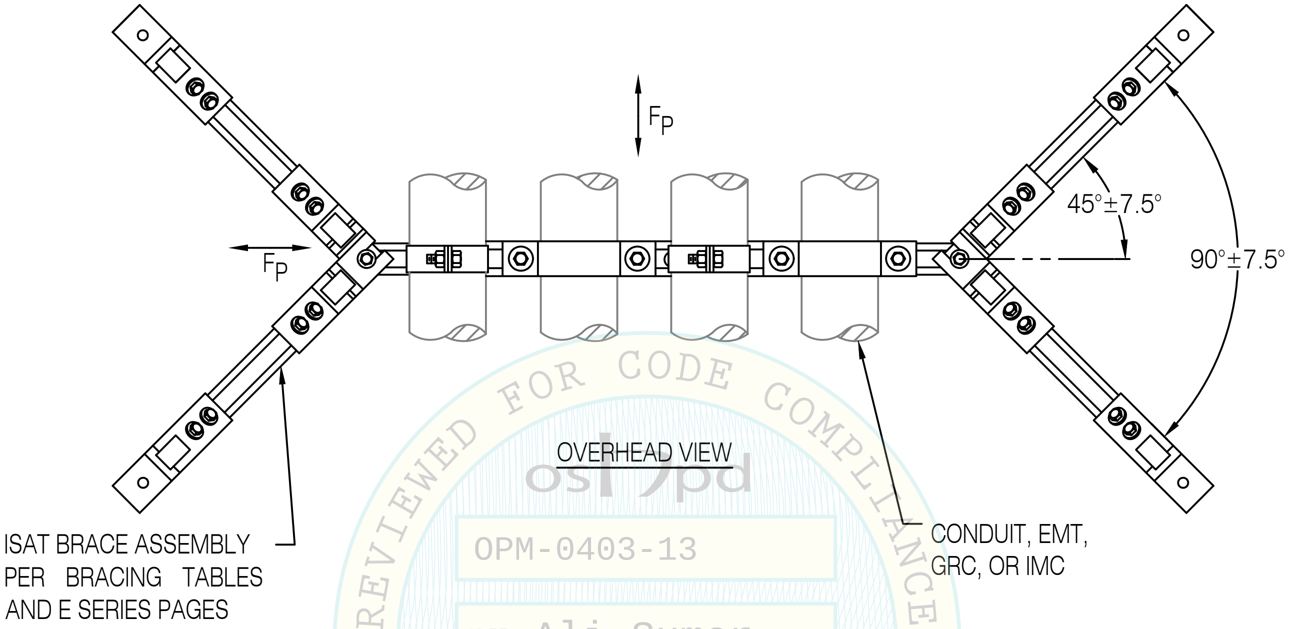

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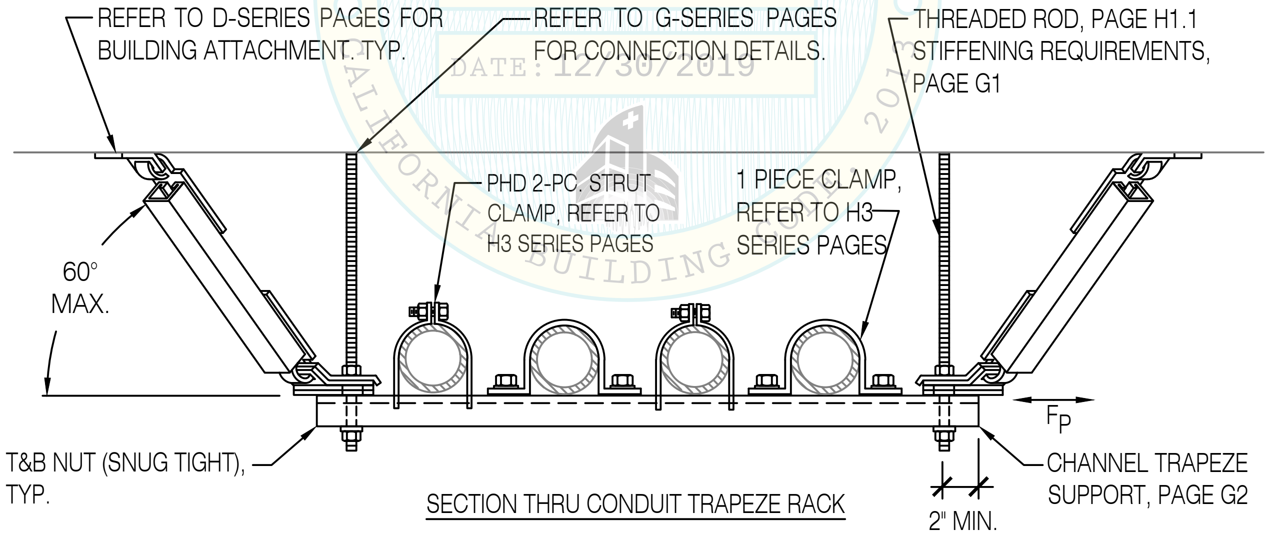

SECTION THRU CONDUIT TRAPEZE RACK

# CONDUIT TRAPEZE RACK
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, RIGID BRACING

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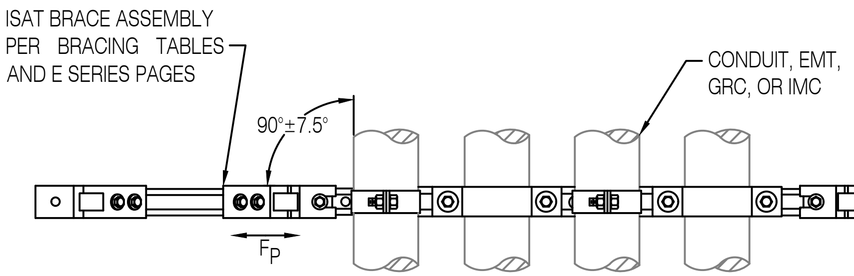

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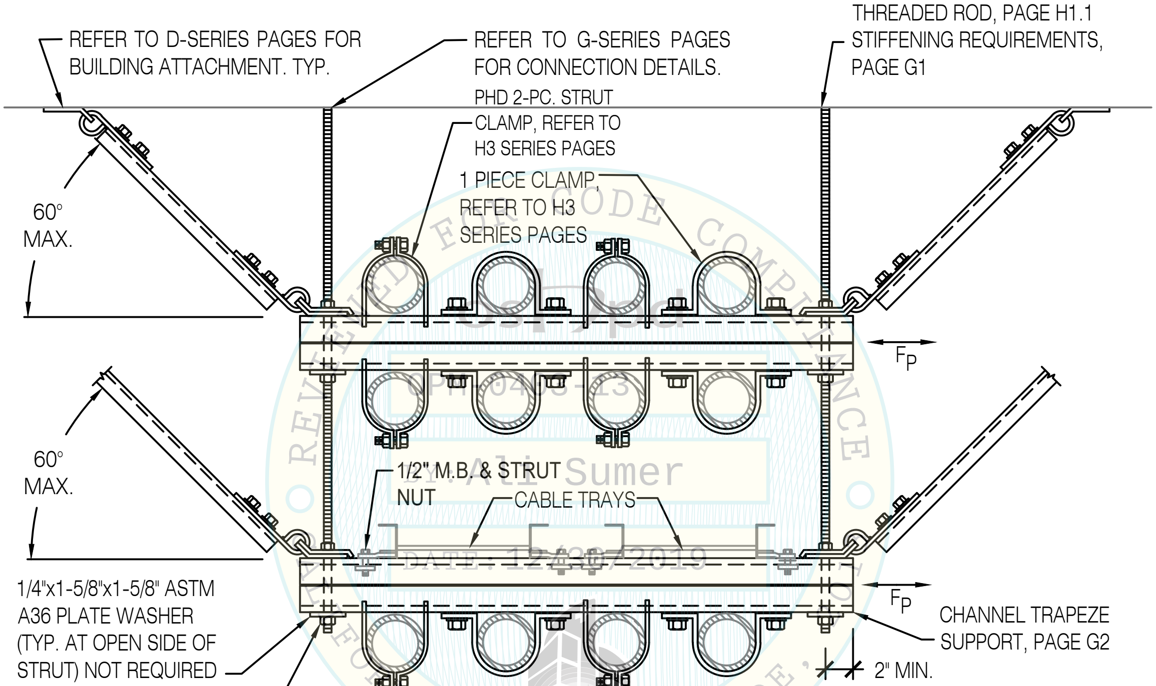
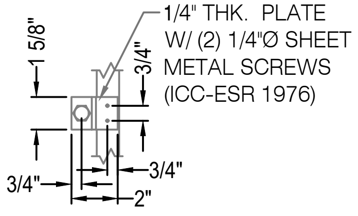


SECTION THRU CONDUIT TRAPEZE RACK

ALSO ACCEPTABLE FOR CABLE TRAY ON BOTH TIERS WITH OR WITHOUT CONDUIT



PLAN

# 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 2-WAY TRANSVERSE, RIGID BRACING

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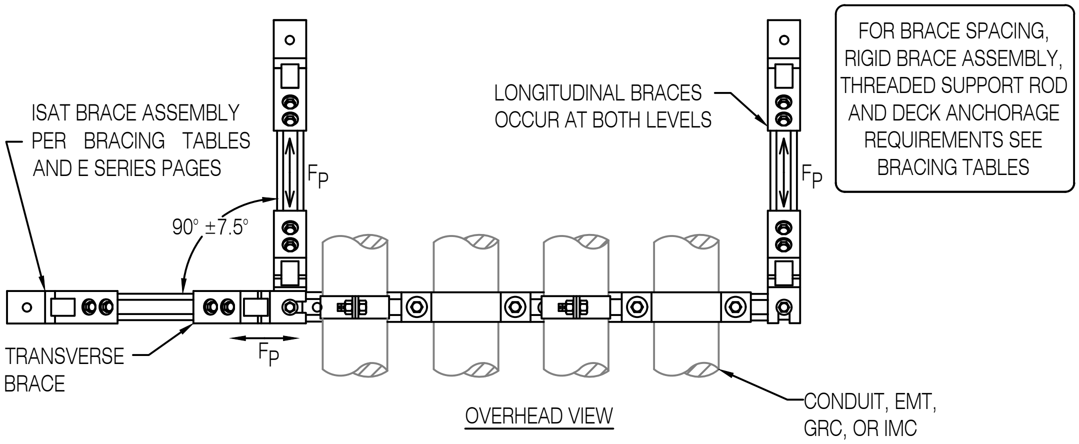

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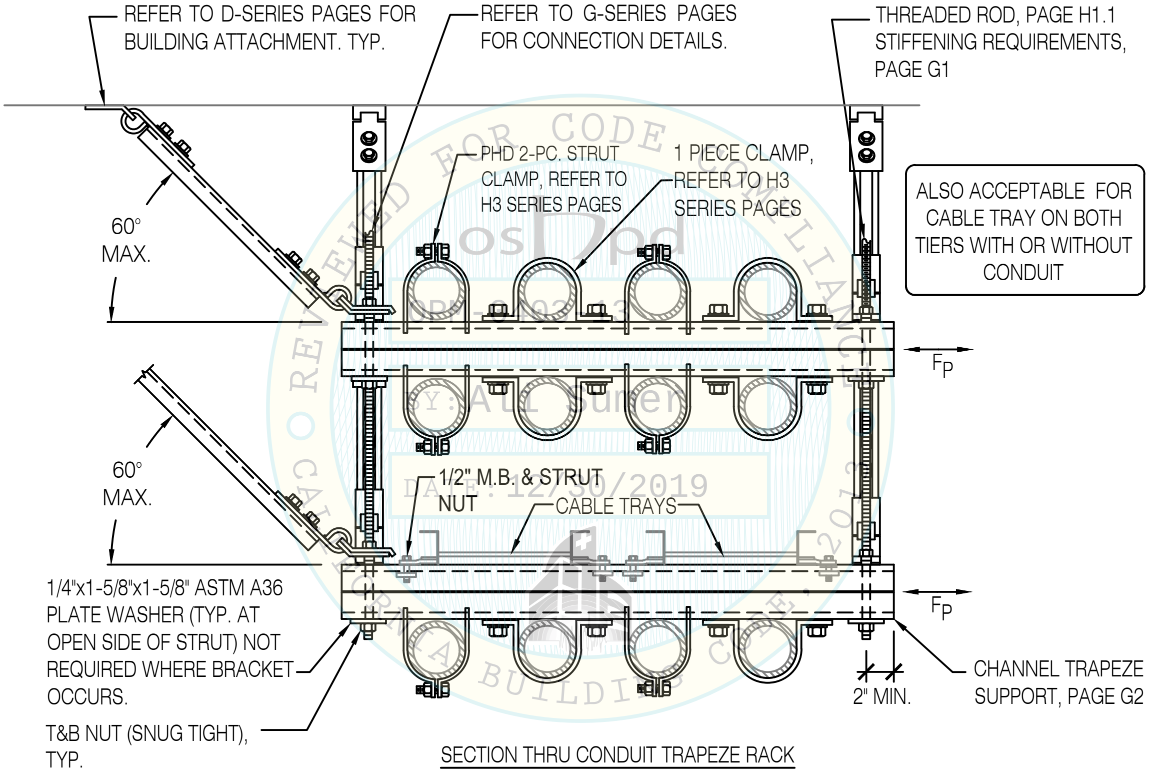
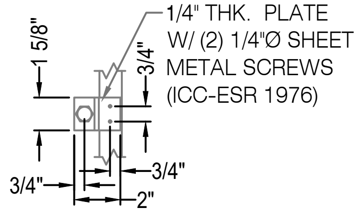


SECTION THRU CONDUIT TRAPEZE RACK



PLAN

# 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 3-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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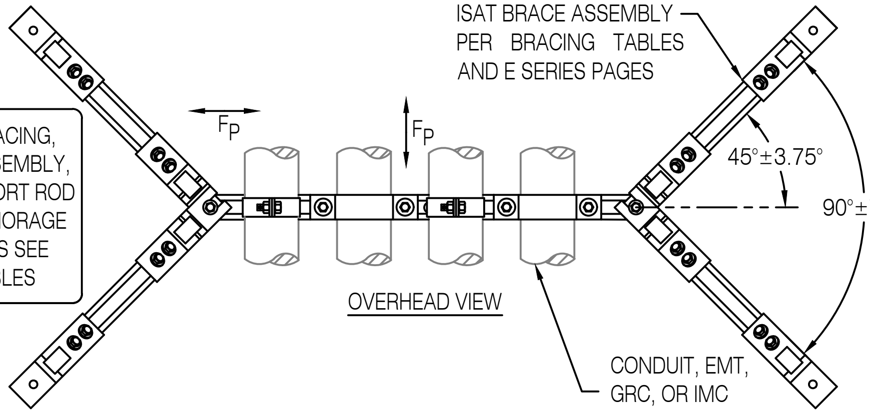
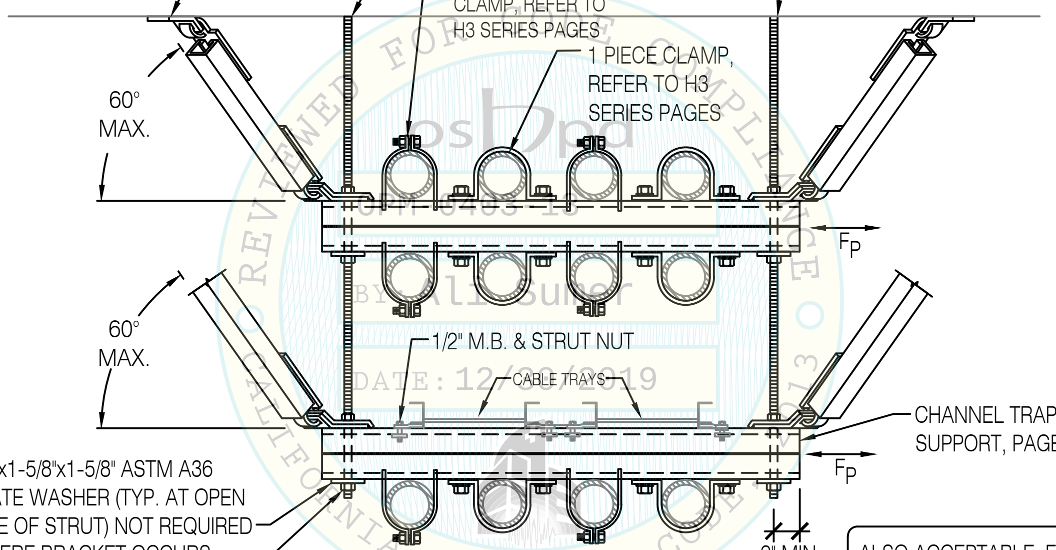


ISAT BRACE ASSEMBLY PER BRACING TABLES AND E SERIES PAGES

FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

CONDUIT, EMT, GRC, OR IMC

OVERHEAD VIEW



REFER TO D-SERIES PAGES FOR BUILDING ATTACHMENT. TYP.

REFER TO G-SERIES PAGES FOR CONNECTION DETAILS.

THREADED ROD, PAGE H1.1 STIFFENING REQUIREMENTS, PAGE G1

PHD 2-PC. STRUT CLAMP, REFER TO H3 SERIES PAGES

1 PIECE CLAMP, REFER TO H3 SERIES PAGES

1/2" M.B. & STRUT NUT

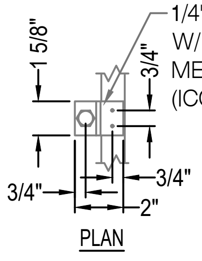
CHANNEL TRAPEZE SUPPORT, PAGE G2

1/4"x1-5/8"x1-5/8" ASTM A36 PLATE WASHER (TYP. AT OPEN SIDE OF STRUT) NOT REQUIRED WHERE BRACKET OCCURS.

T&B NUT (SNUG TIGHT), TYP.

ALSO ACCEPTABLE FOR CABLE TRAY ON BOTH TIERS WITH OR WITHOUT CONDUIT

SECTION THRU CONDUIT TRAPEZE RACK



1/4" THK. PLATE W/ (2) 1/4"Ø SHEET METAL SCREWS (ICC-ESR 1976)

PLAN

# 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 4-WAY SPLAYED, RIGID BRACING

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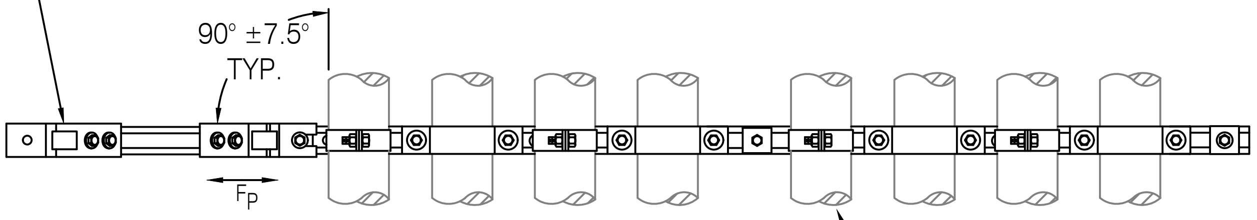

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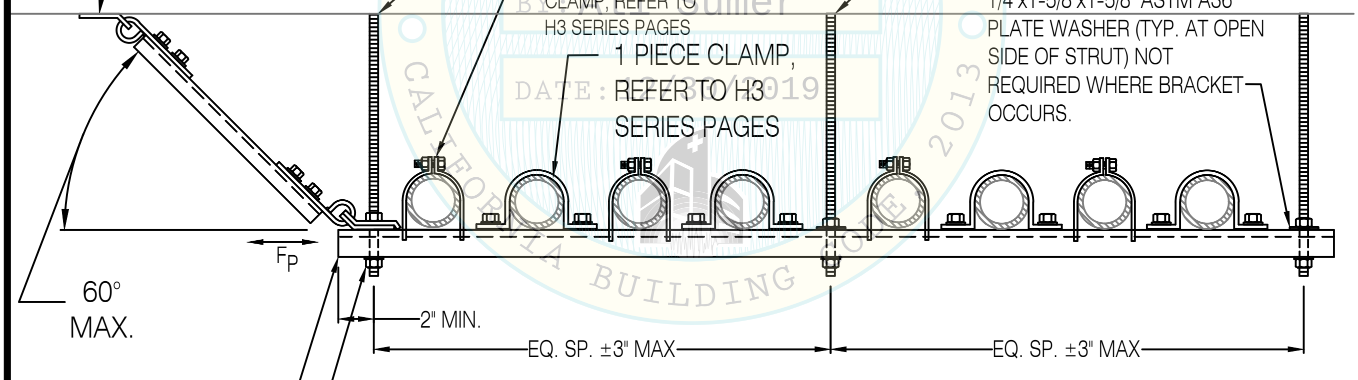

SECTION THRU CONDUIT TRAPEZE RACK

# 3-ROD CONDUIT TRAPEZE RACK
# 1-WAY TRANSVERSE, RIGID BRACING

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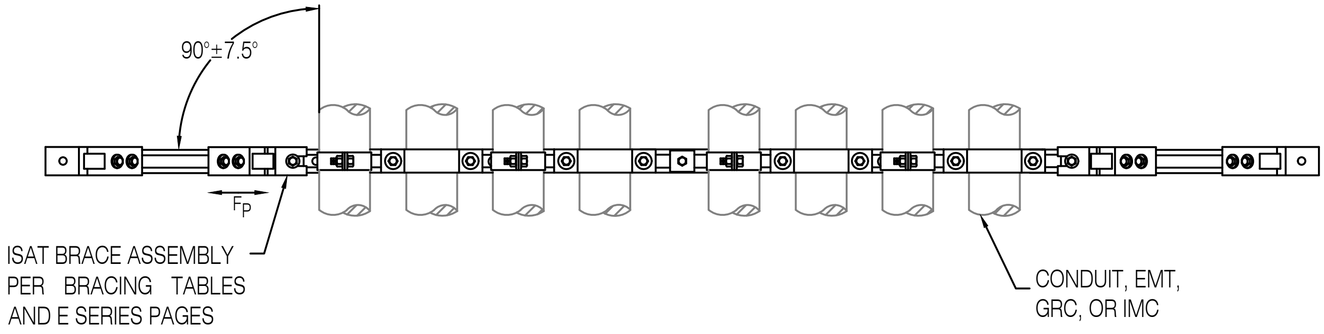

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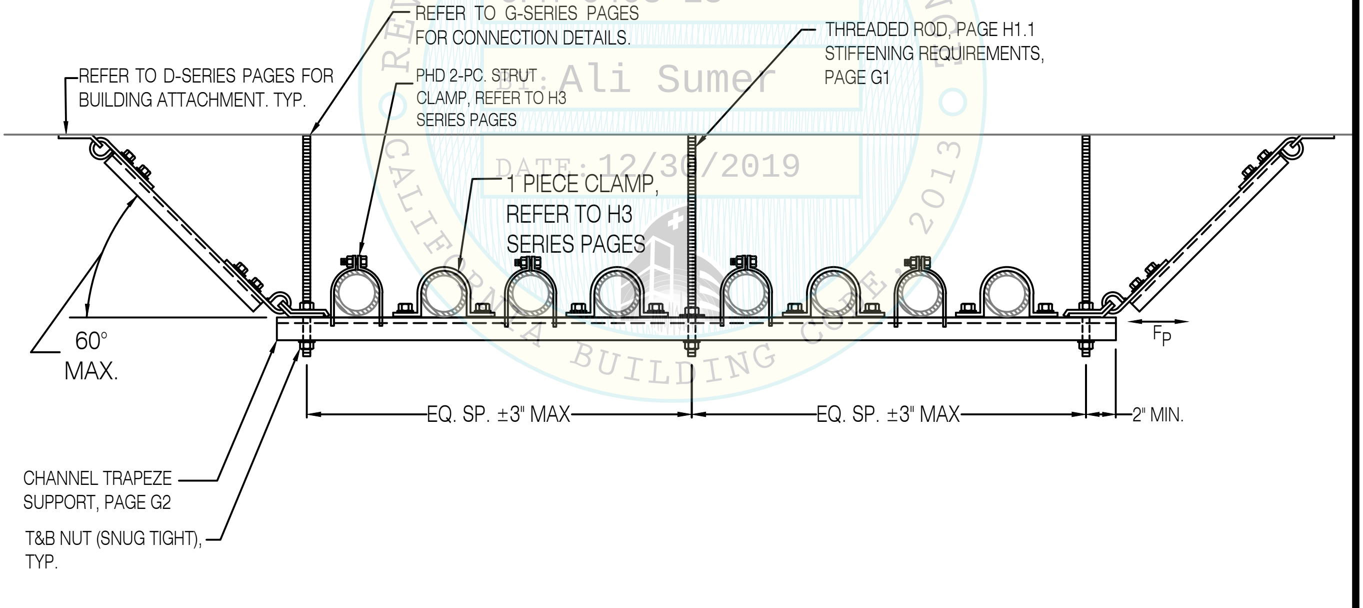

SECTION THRU CONDUIT TRAPEZE RACK

# 3-ROD CONDUIT TRAPEZE RACK
# 2-WAY TRANSVERSE, RIGID BRACING

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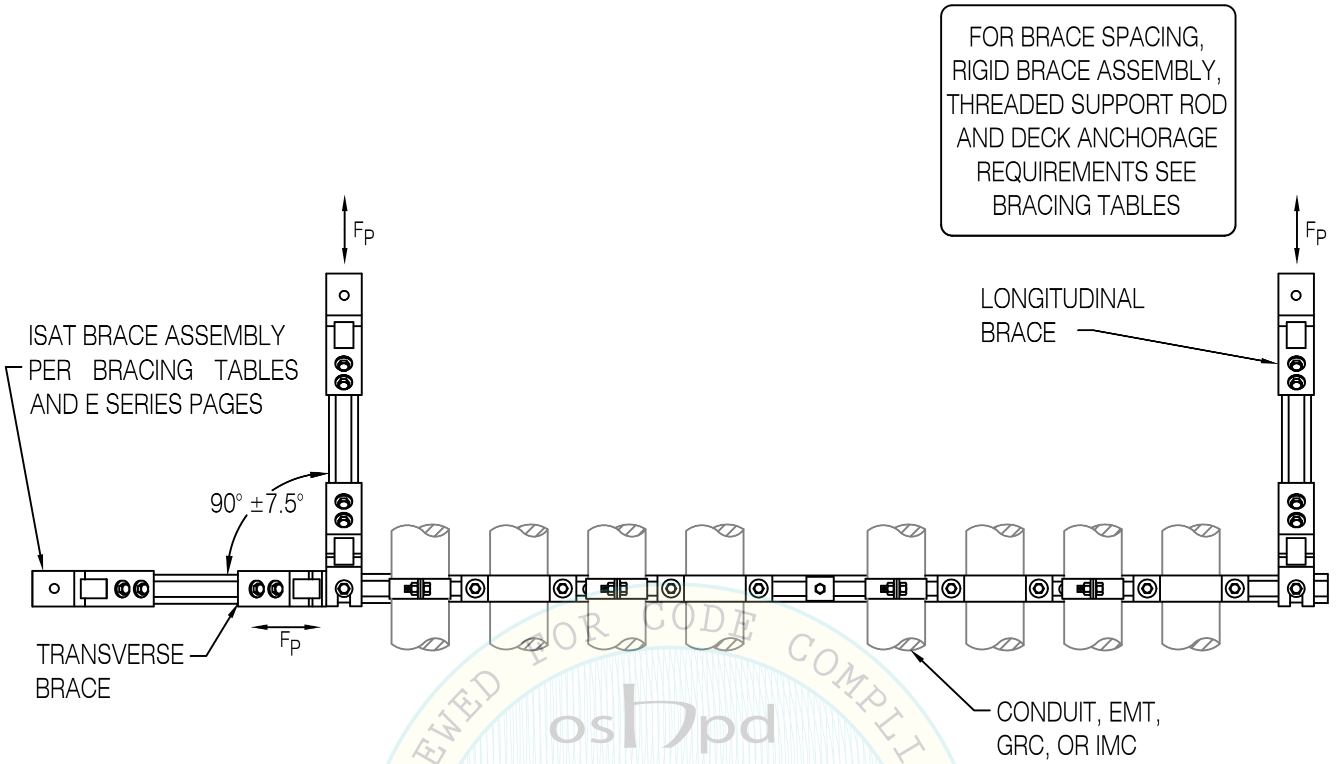

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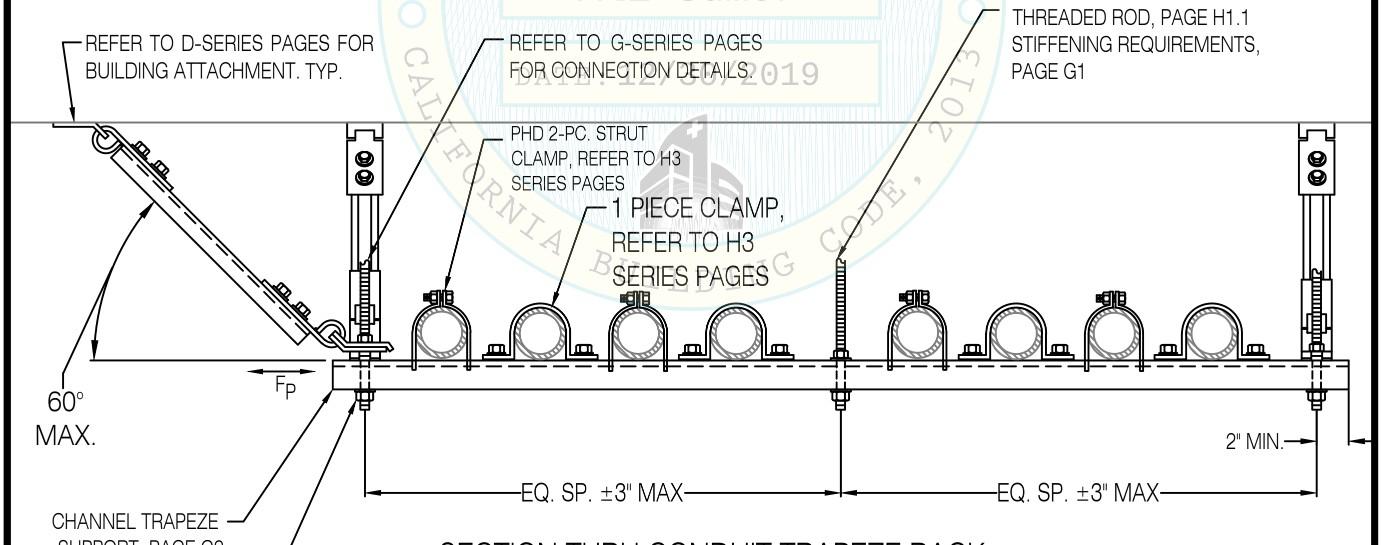

SECTION THRU CONDUIT TRAPEZE RACK

# 3-ROD CONDUIT TRAPEZE RACK
# 3-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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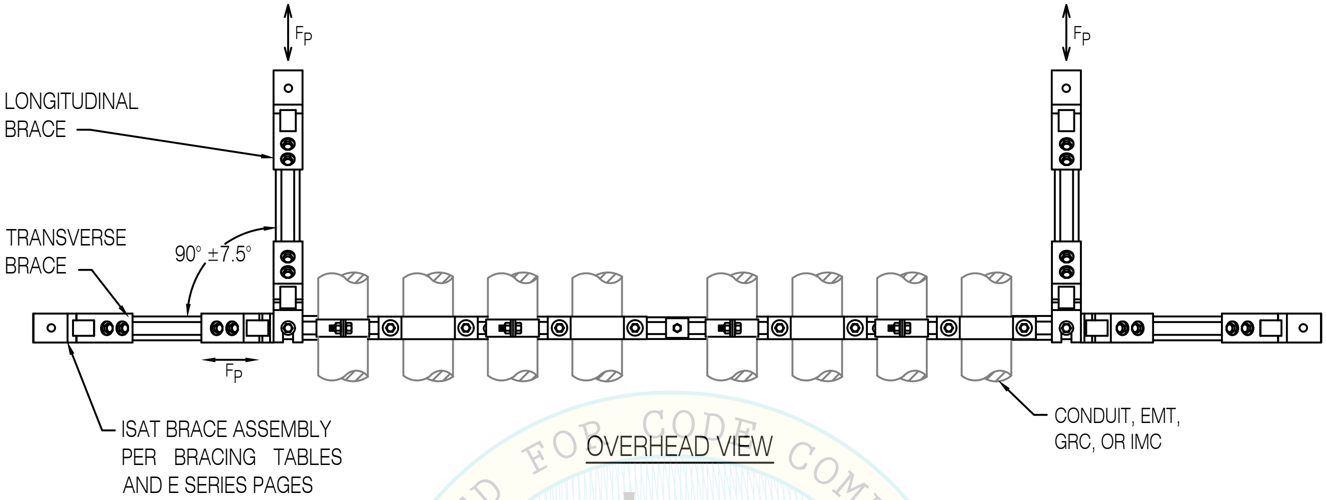

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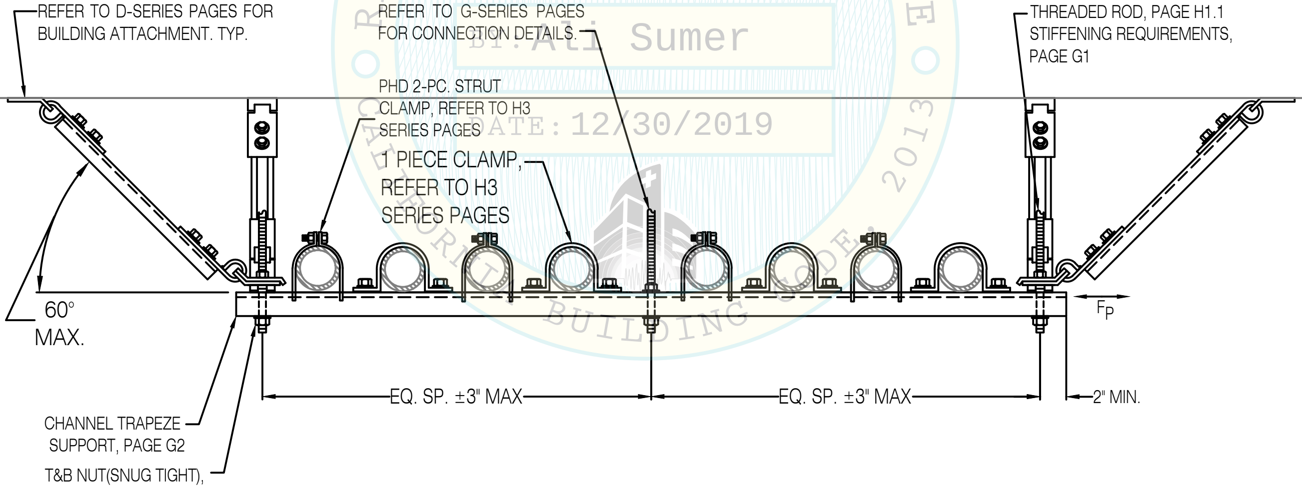

SECTION THRU CONDUIT TRAPEZE RACK

# 3-ROD CONDUIT TRAPEZE RACK
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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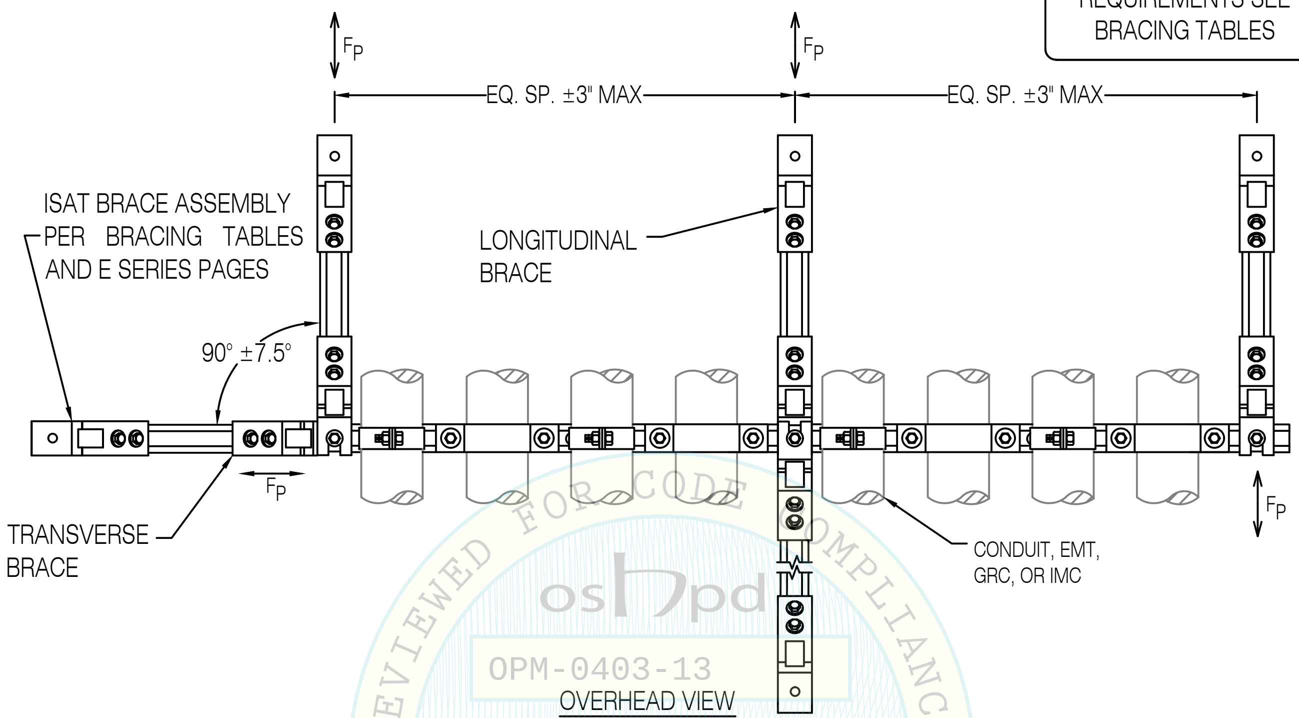
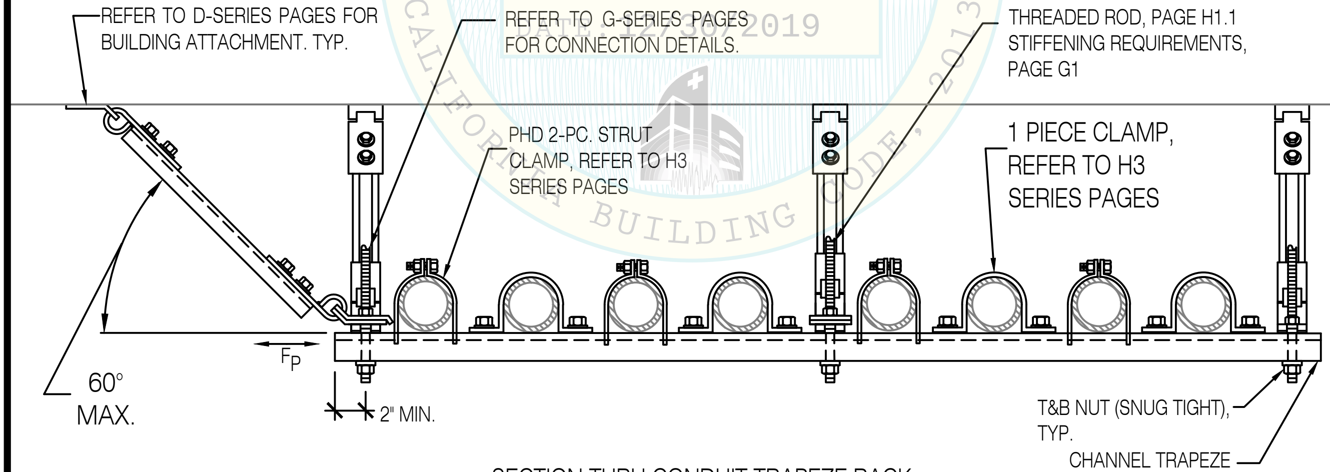


OVERHEAD VIEW



SECTION THRU CONDUIT TRAPEZE RACK

# 3-ROD CONDUIT TRAPEZE RACK
# 5-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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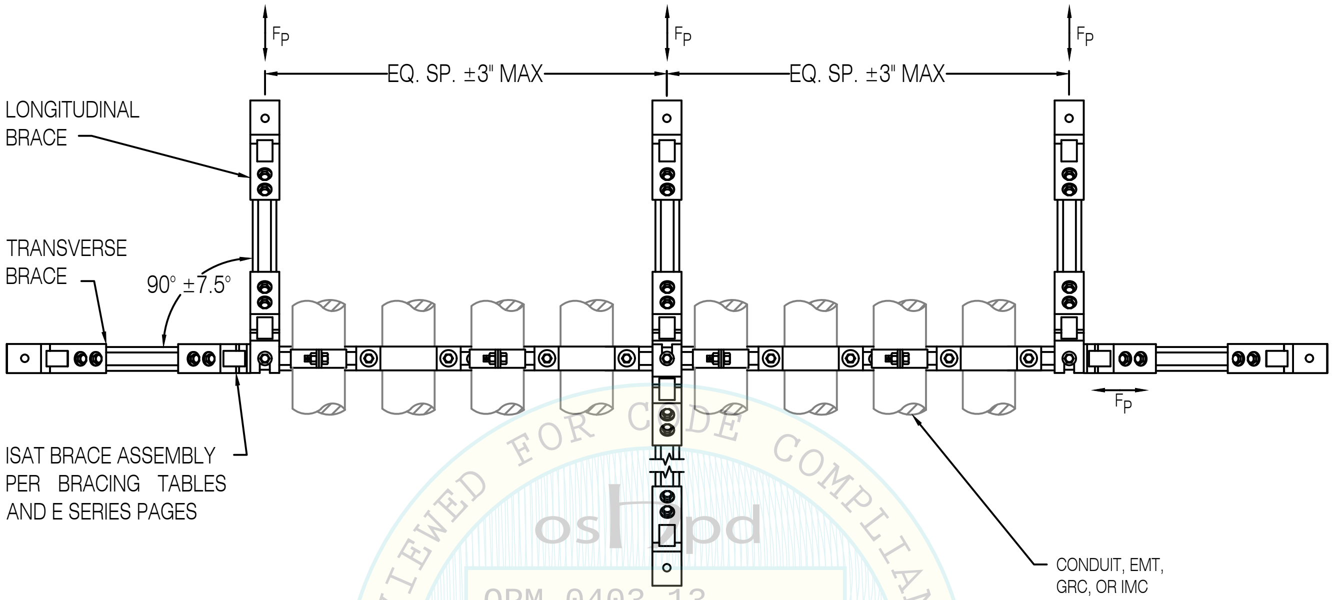
FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



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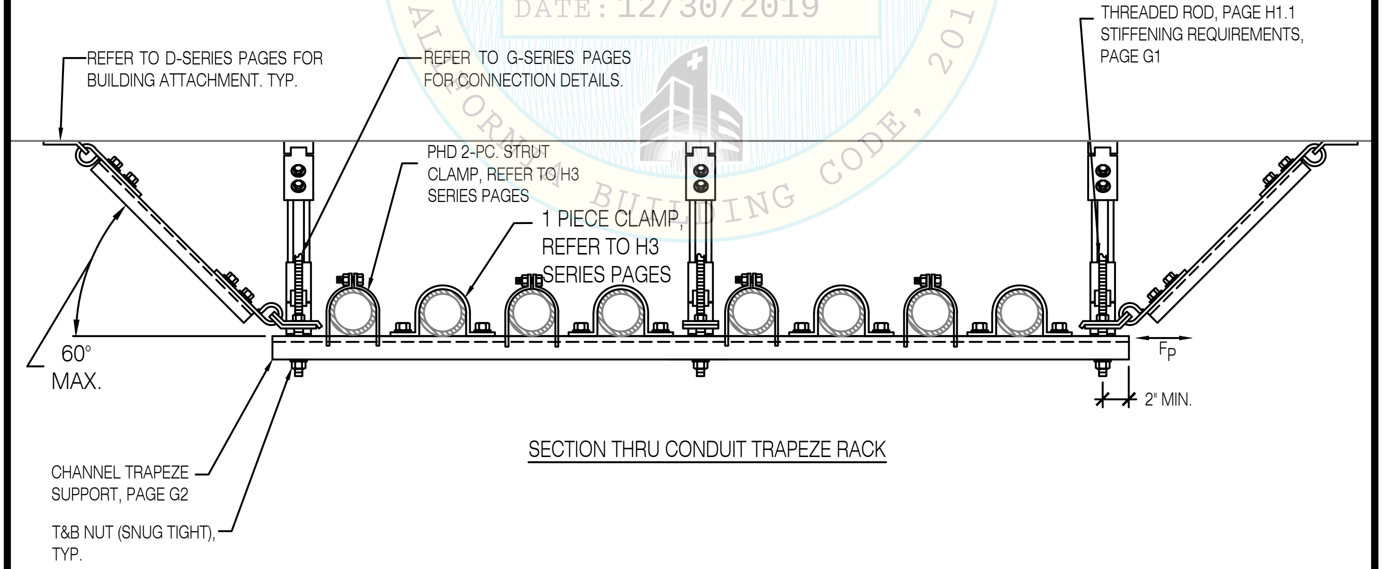

SECTION THRU CONDUIT TRAPEZE RACK

# 3-ROD CONDUIT TRAPEZE RACK
# 6-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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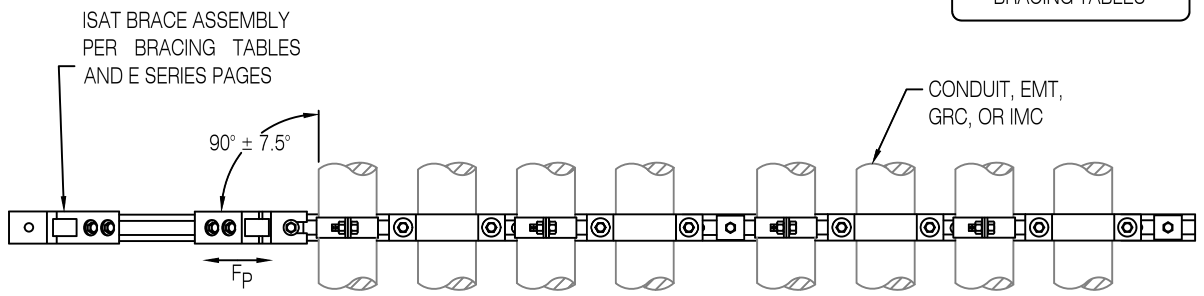
ALSO ACCEPTABLE FOR CABLE TRAY ON BOTH TIERS WITH OR WITHOUT CONDUIT

FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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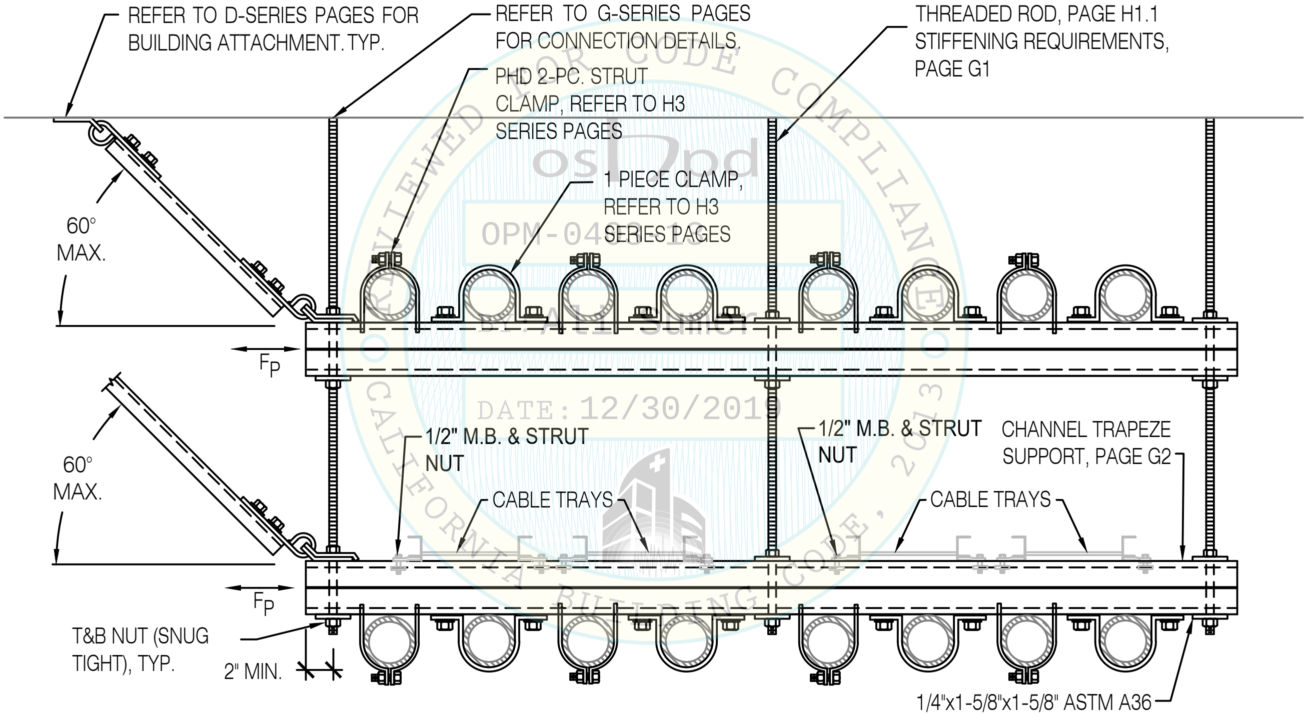
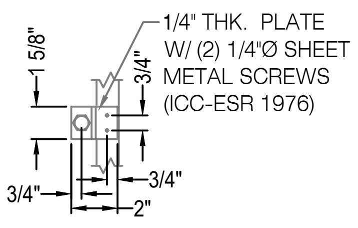


SECTION THRU CONDUIT TRAPEZE RACK



PLAN

# 3-ROD, 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 1-WAY TRANSVERSE, RIGID BRACING

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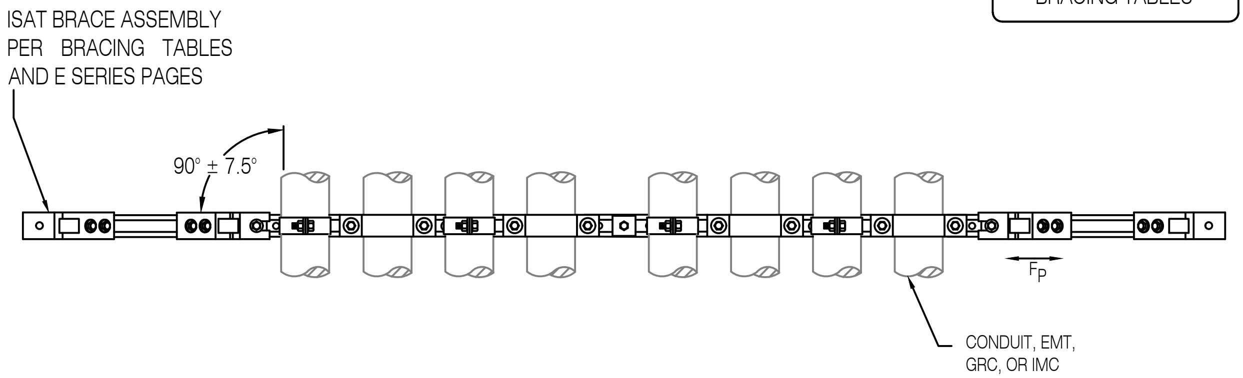
ALSO ACCEPTABLE FOR
CABLE TRAY ON BOTH
TIERS WITH OR WITHOUT
CONDUIT

FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



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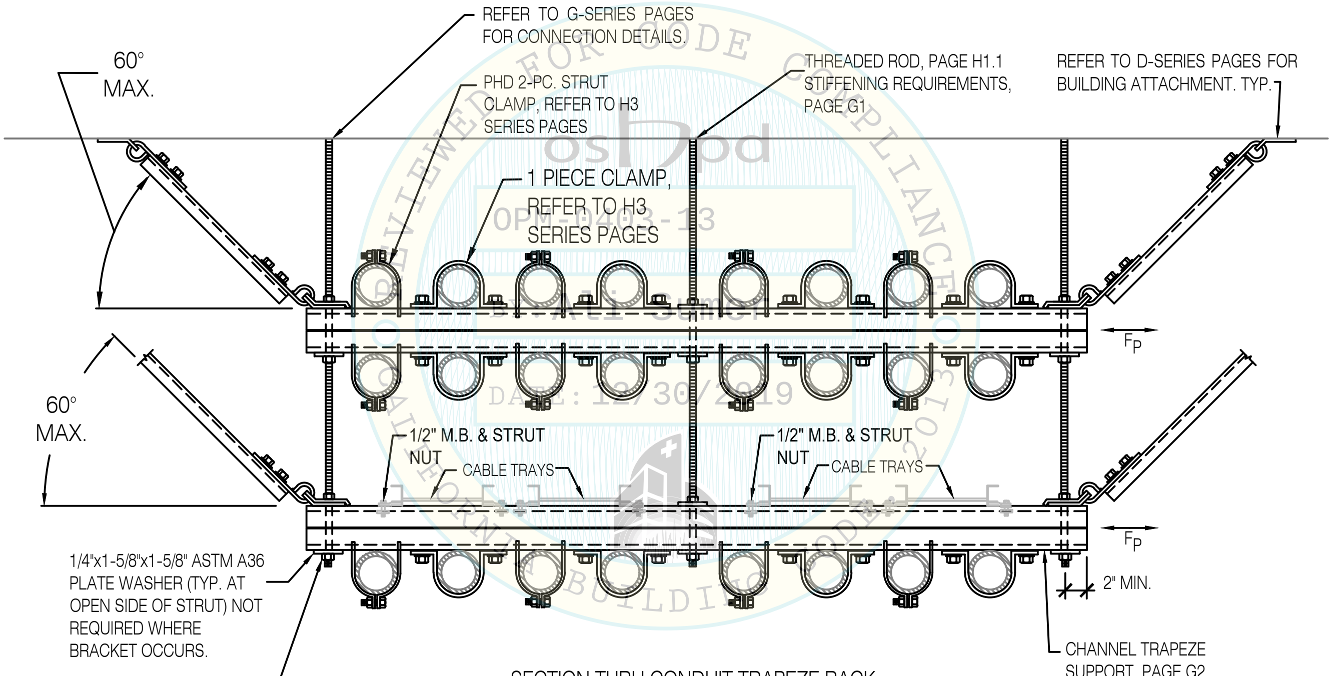
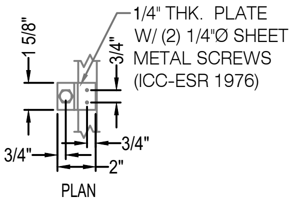


SECTION THRU CONDUIT TRAPEZE RACK



PLAN

# 3-ROD, 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 2-WAY TRANSVERSE, RIGID BRACING

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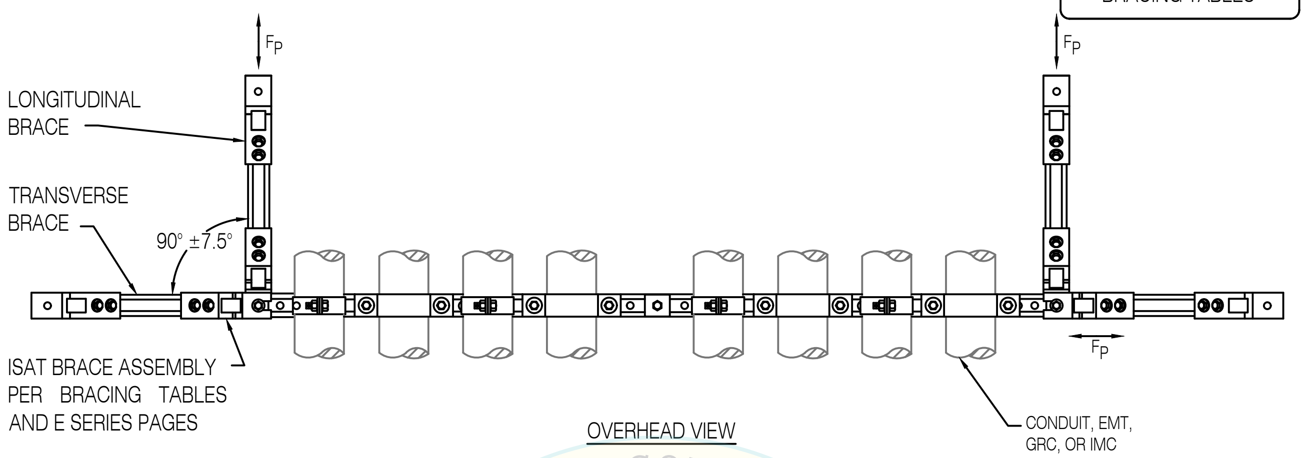

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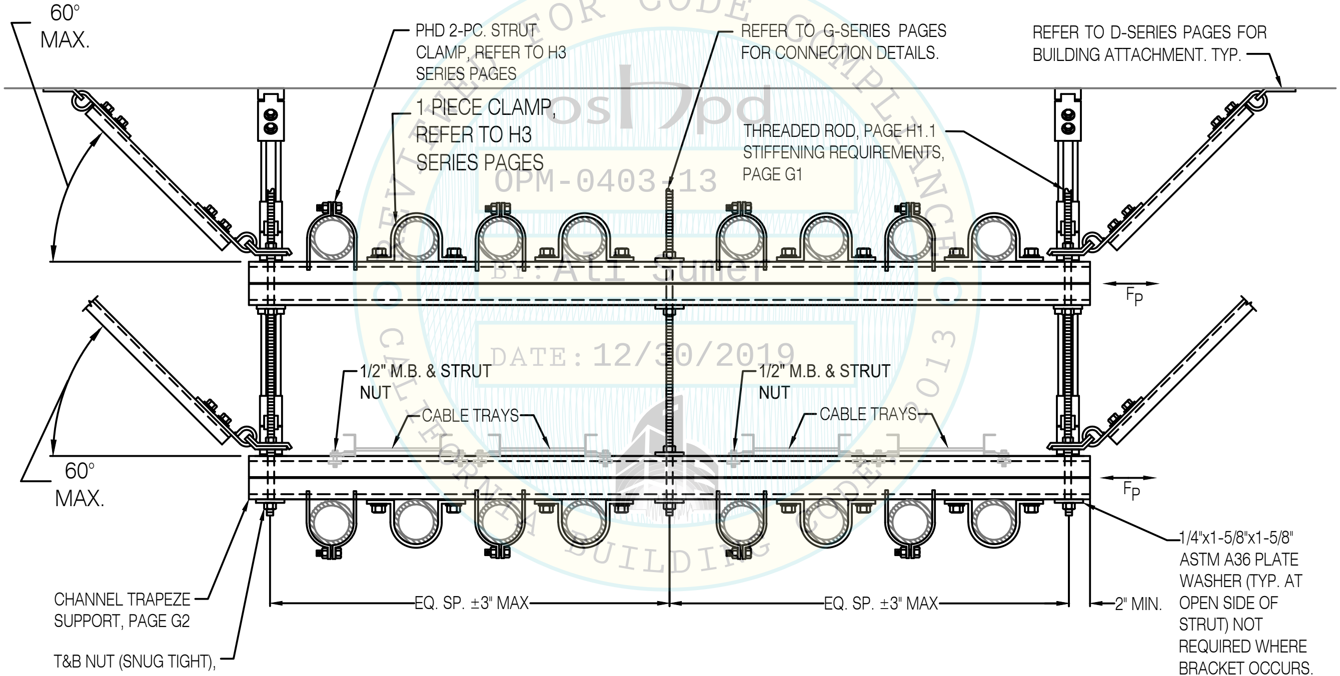
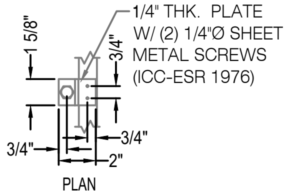


SECTION THRU CONDUIT TRAPEZE RACK



PLAN

# 3-ROD, 2-TIERED CONDUIT TRAPEZE RACK
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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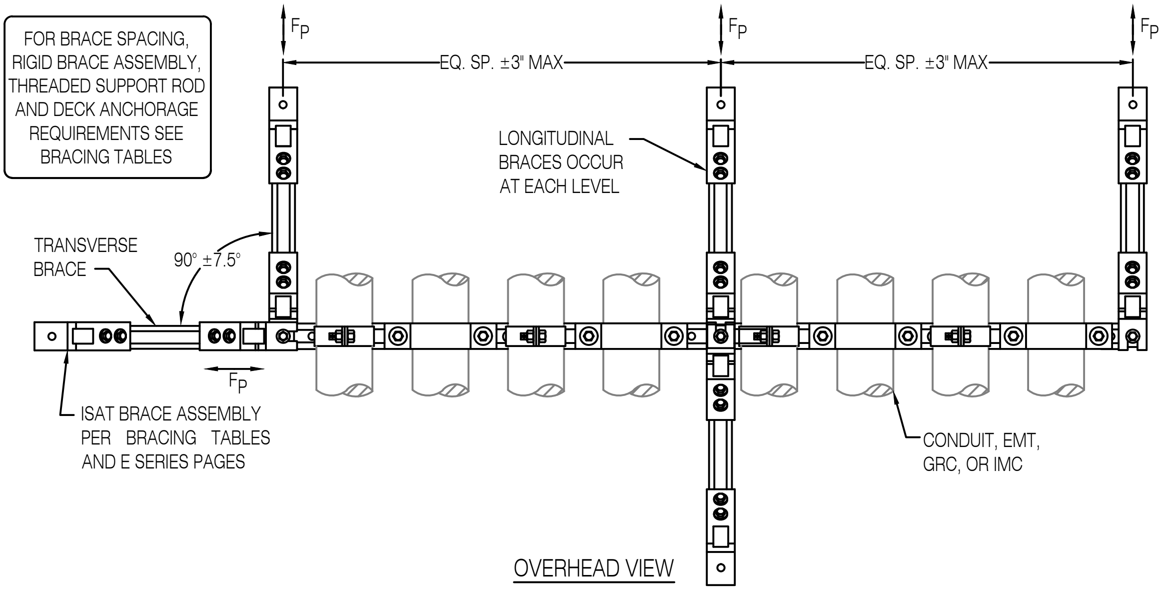

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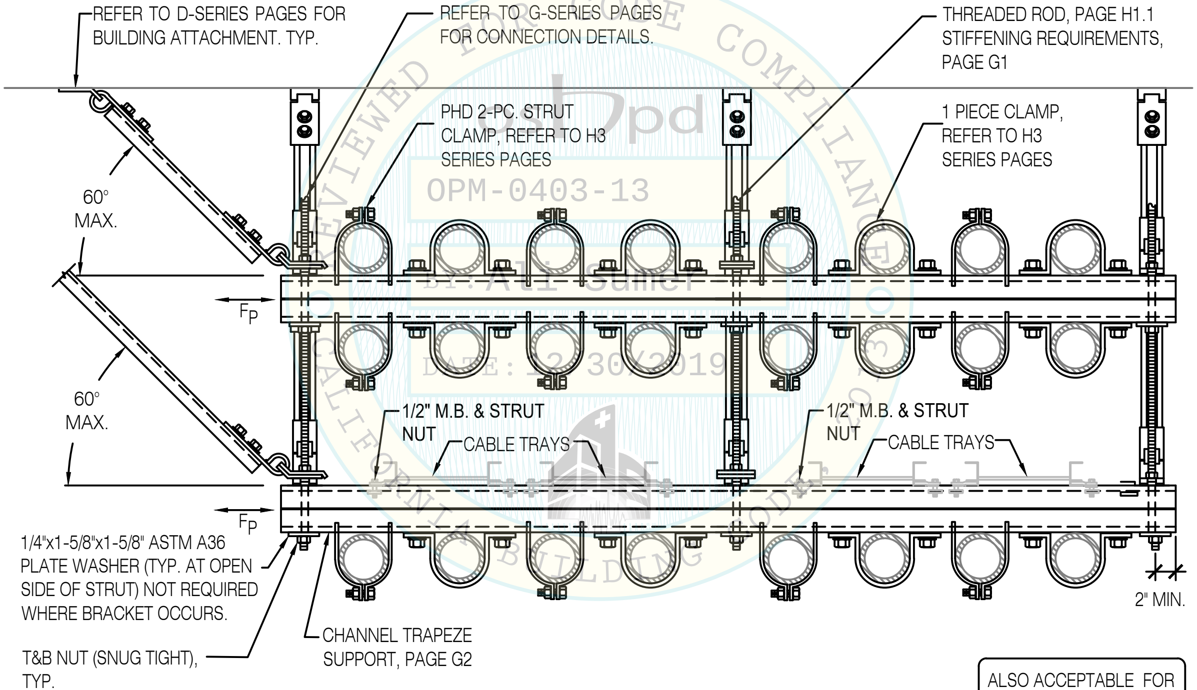
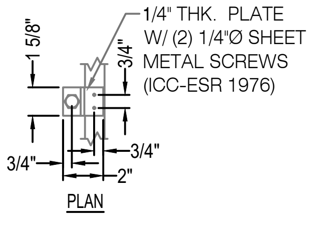


SECTION THRU CONDUIT TRAPEZE RACK

ALSO ACCEPTABLE FOR CABLE TRAY ON BOTH TIERS WITH OR WITHOUT CONDUIT



PLAN

# 3-ROD, 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 5-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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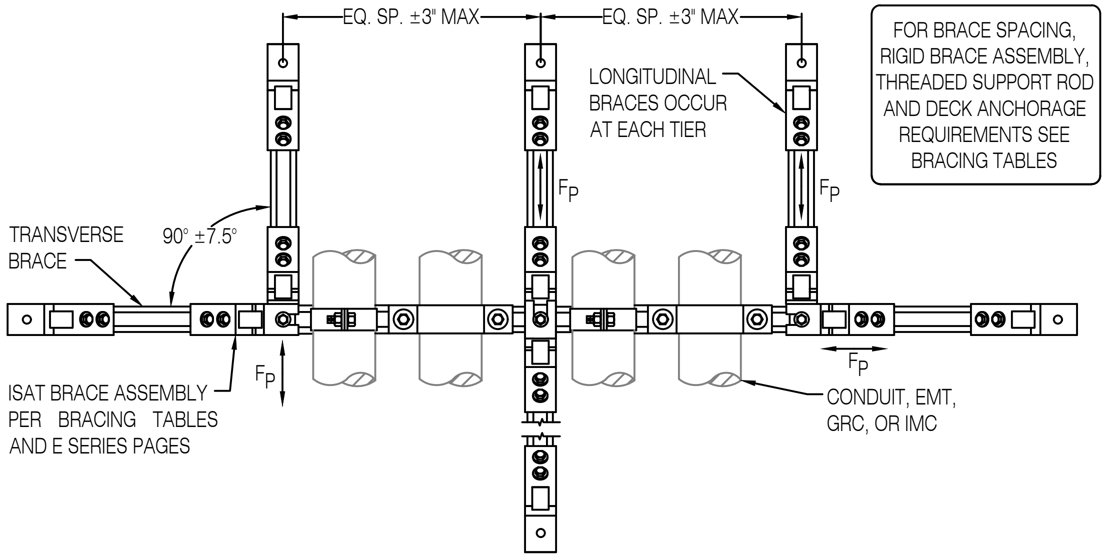
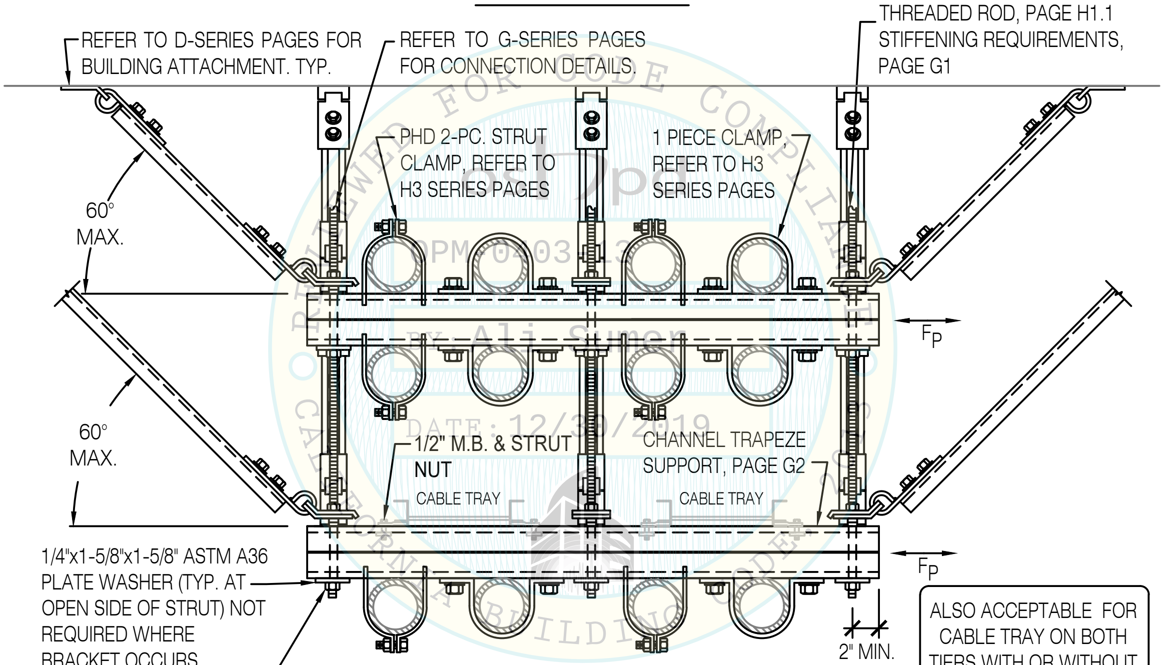


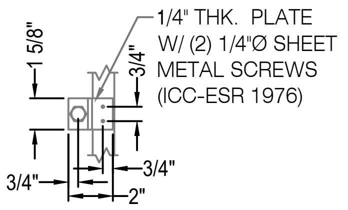
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

OVERHEAD VIEW



ALSO ACCEPTABLE FOR CABLE TRAY ON BOTH TIERS WITH OR WITHOUT CONDUIT

SECTION THRU CONDUIT TRAPEZE RACK



PLAN

# 3-ROD, 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 6-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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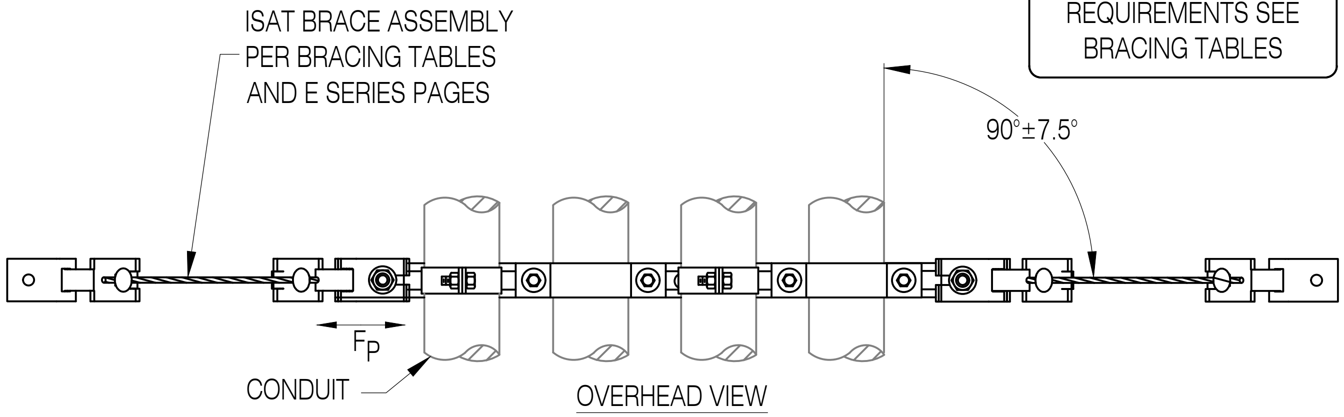
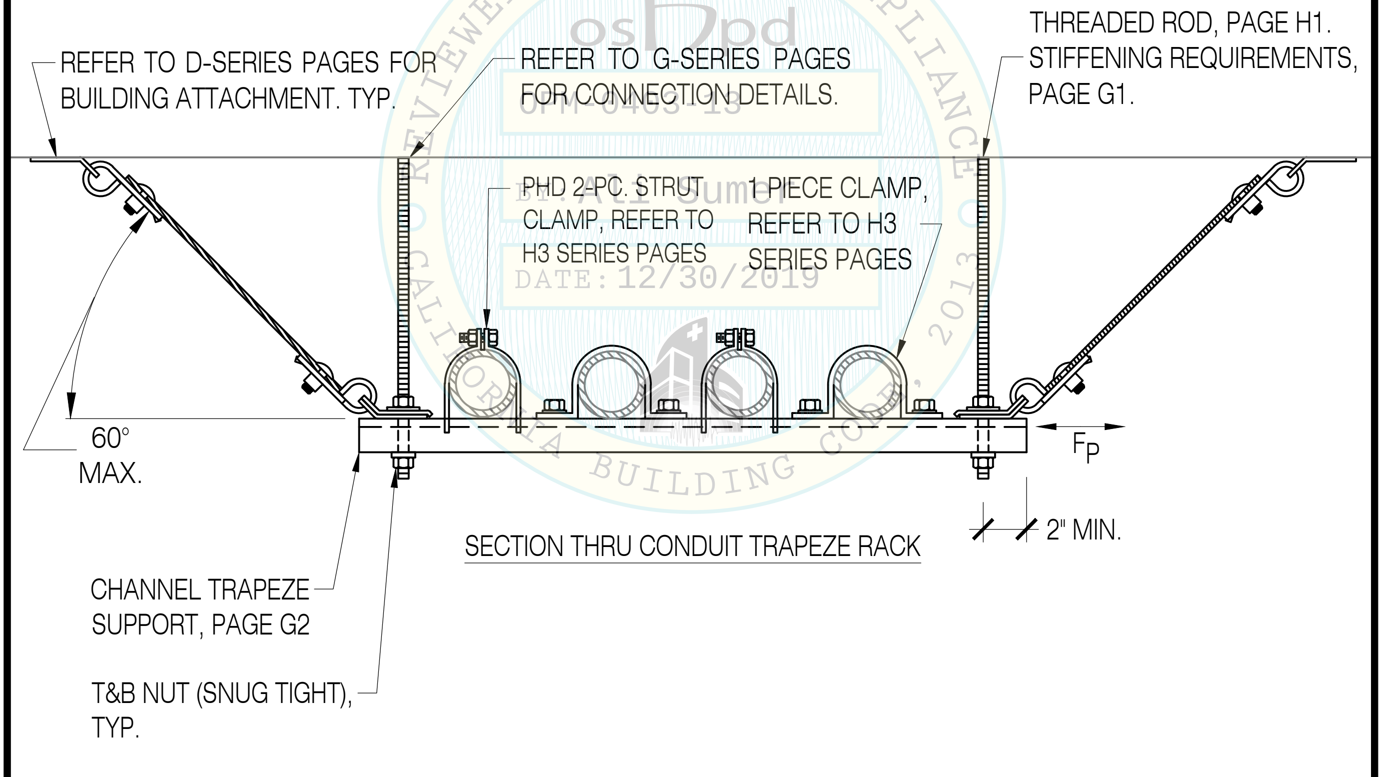


OVERHEAD VIEW



SECTION THRU CONDUIT TRAPEZE RACK

# CONDUIT TRAPEZE RACK 2-WAY TRANSVERSE, CABLE BRACING

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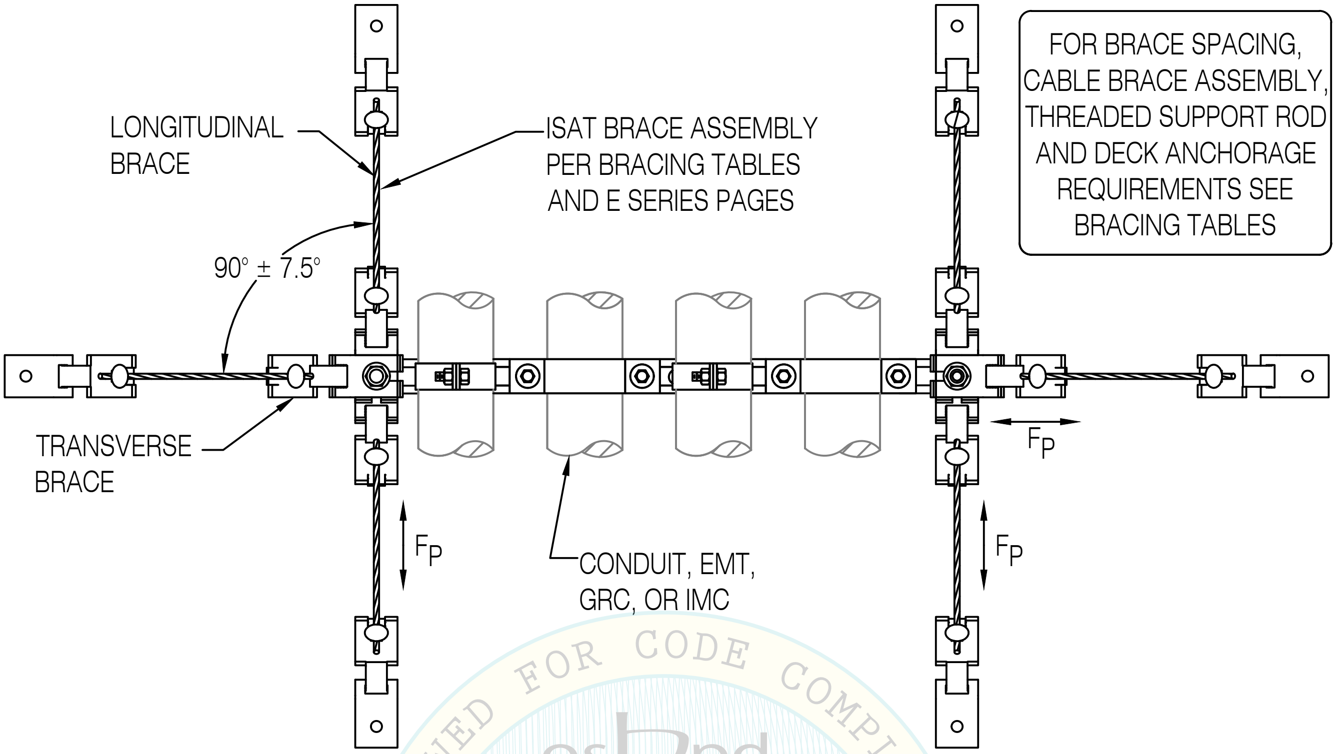
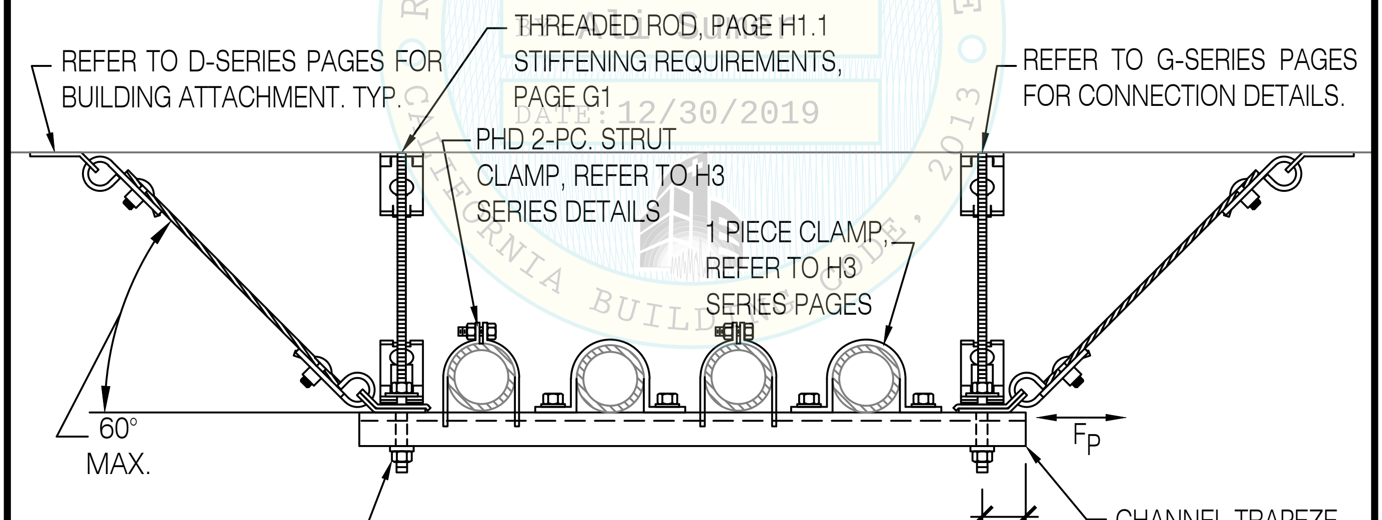


OVERHEAD VIEW



SECTION THRU CONDUIT TRAPEZE RACK

# CONDUIT TRAPEZE RACK
# 6-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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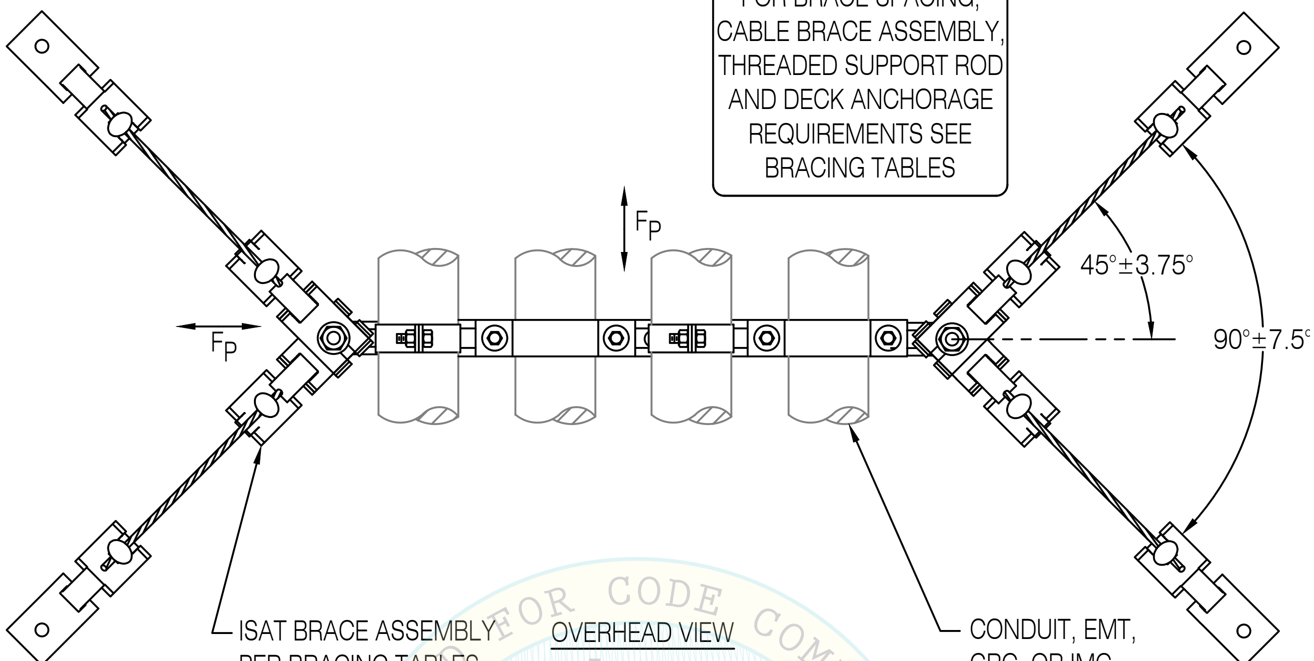
CABLE BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



ISAT BRACE ASSEMBLY
PER BRACING TABLES
AND E SERIES PAGES

OVERHEAD VIEW

CONDUIT, EMT,
GRC, OR IMC

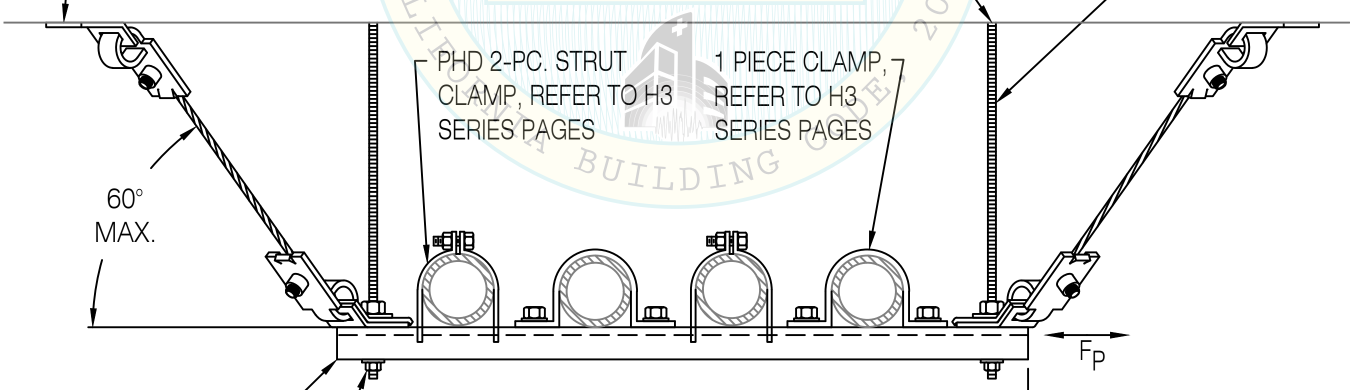
REFER TO D-SERIES PAGES FOR
BUILDING ATTACHMENT. TYP.

REFER TO G-SERIES PAGES
FOR CONNECTION DETAILS.

THREADED ROD, PAGE H1.1
STIFFENING REQUIREMENTS,
PAGE G1

PHD 2-PC. STRUT
CLAMP, REFER TO H3
SERIES PAGES

1 PIECE CLAMP,
REFER TO H3
SERIES PAGES



CHANNEL TRAPEZE
SUPPORT, PAGE G2

T&B NUT (SNUG TIGHT),
TYP.

SECTION THRU CONDUIT TRAPEZE RACK

# CONDUIT TRAPEZE RACK
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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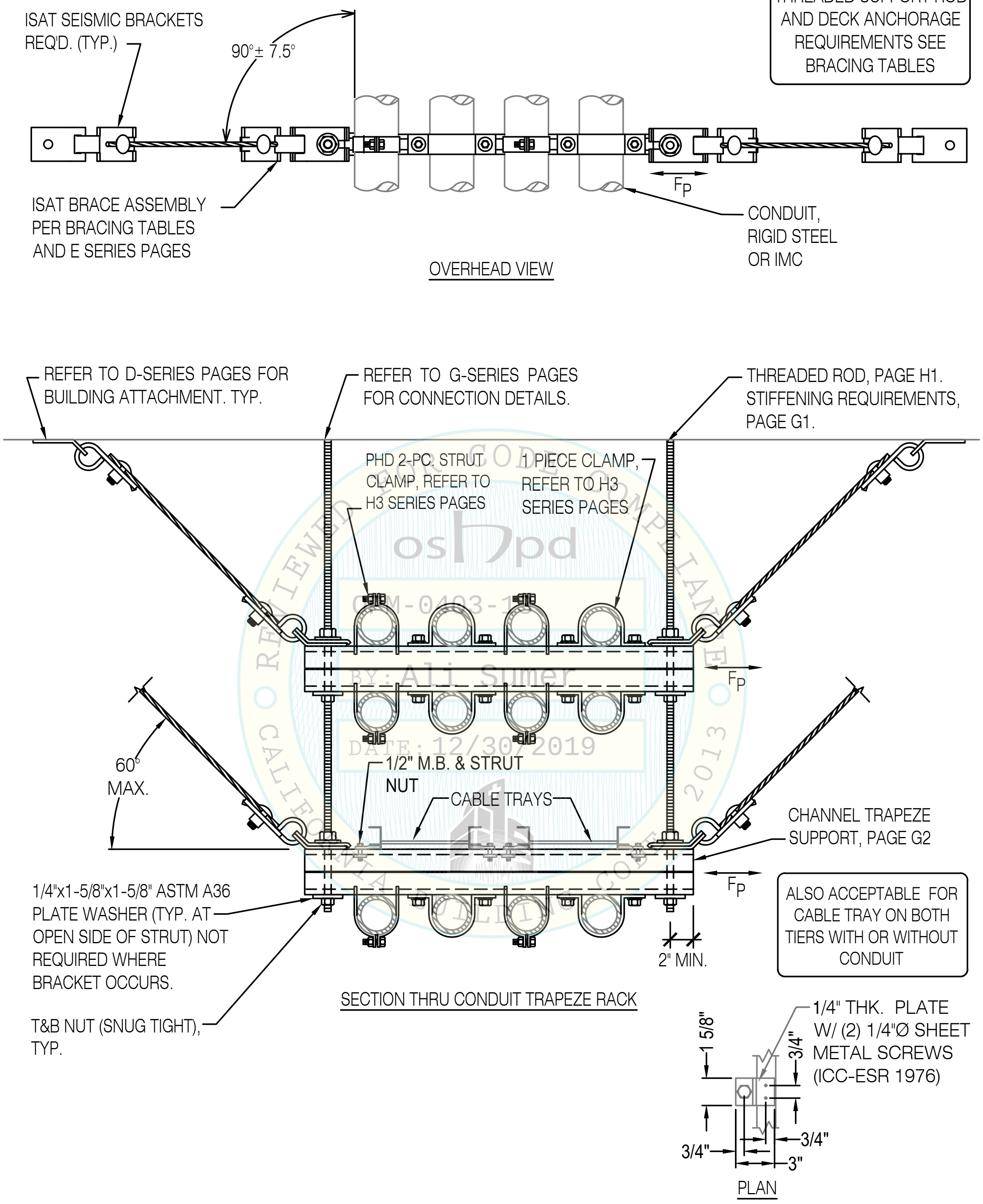

ALSO ACCEPTABLE FOR CABLE TRAY ON BOTH TIERS WITH OR WITHOUT CONDUIT

# 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 2-WAY TRANSVERSE, CABLE BRACING

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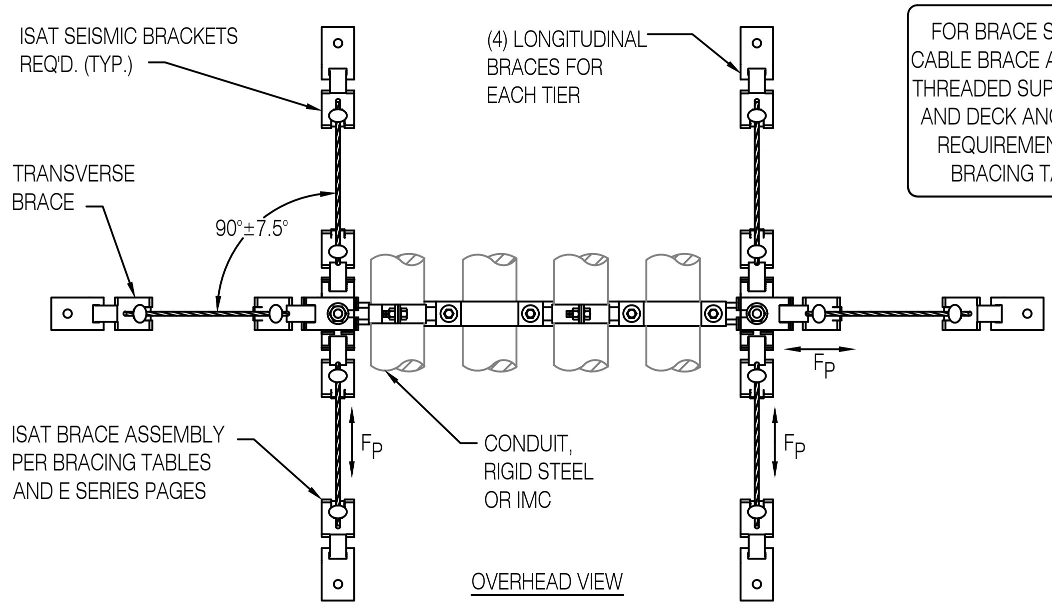
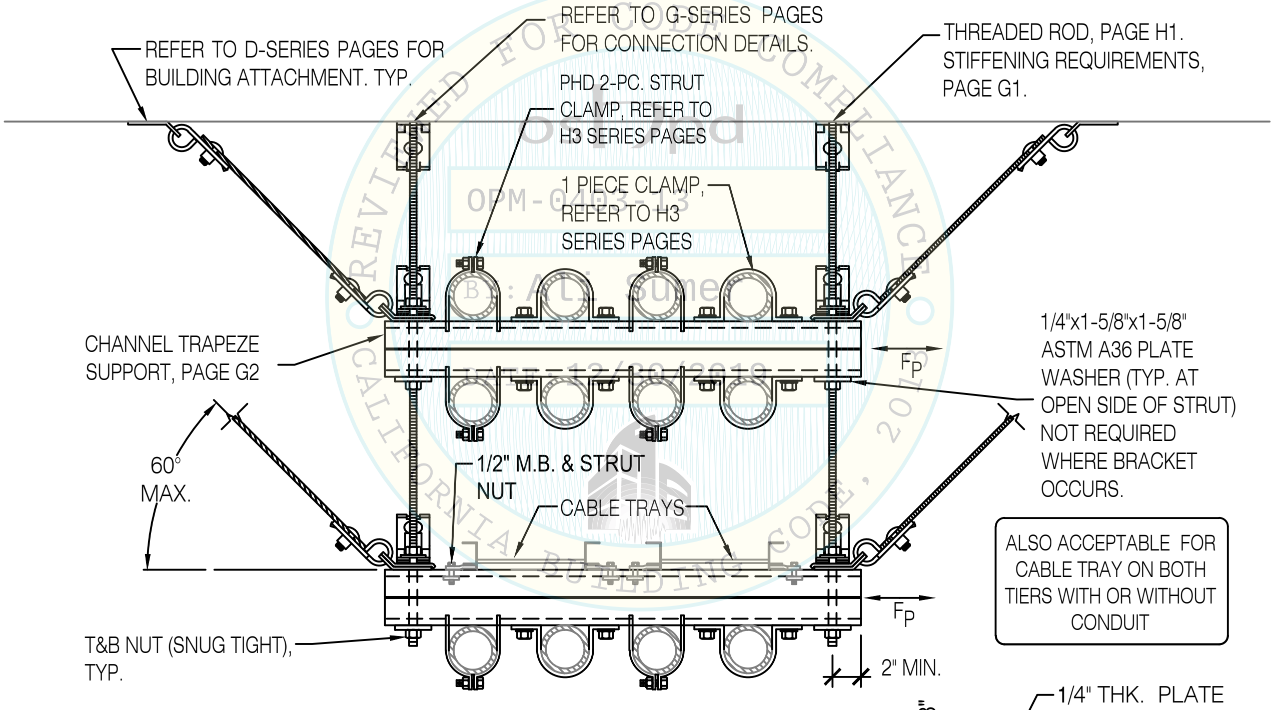


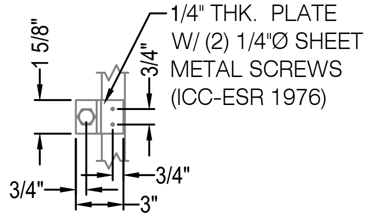
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

OVERHEAD VIEW



ALSO ACCEPTABLE FOR CABLE TRAY ON BOTH TIERS WITH OR WITHOUT CONDUIT

SECTION THRU CONDUIT TRAPEZE RACK



PLAN

# 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 6-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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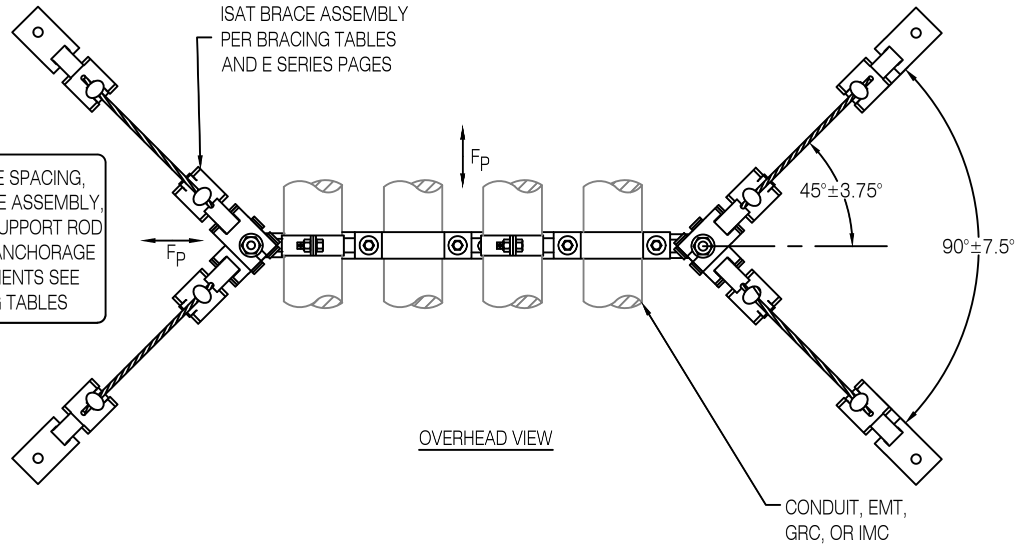

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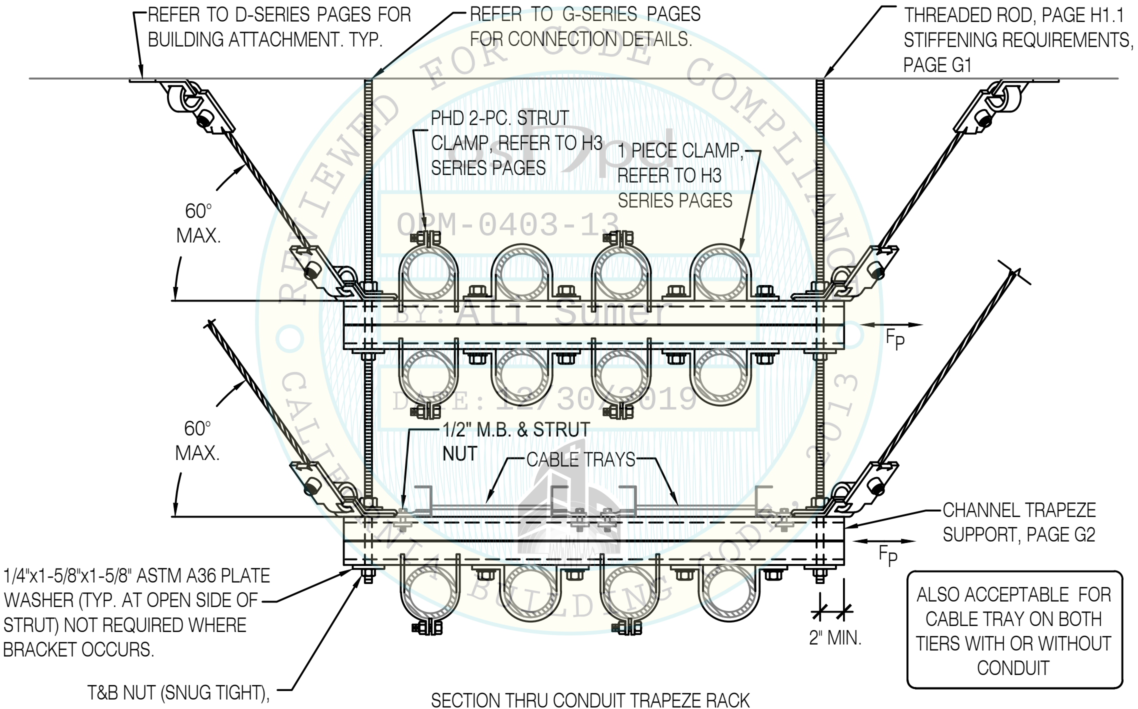
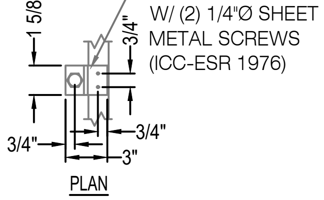


SECTION THRU CONDUIT TRAPEZE RACK



PLAN

# 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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CABLE BRACE ASSEMBLY,
THREADED SUPPORT ROD
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REQUIREMENTS SEE
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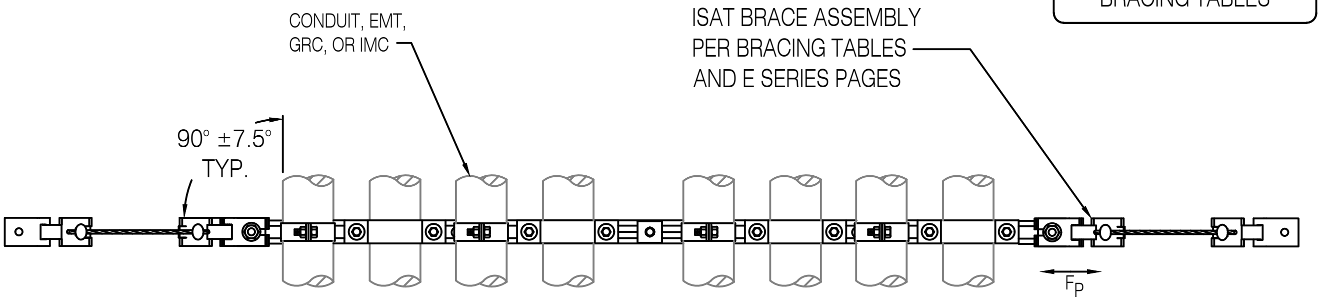

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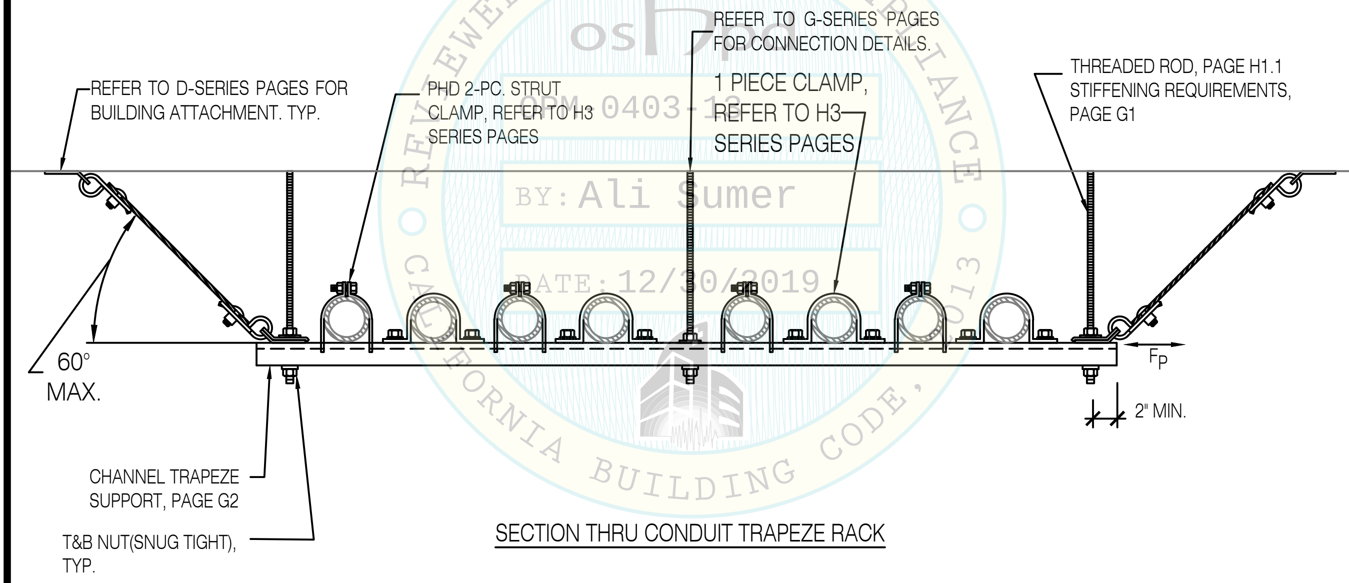

SECTION THRU CONDUIT TRAPEZE RACK

# 3-ROD, CONDUIT TRAPEZE RACK
# 2-WAY TRANSVERSE, CABLE BRACING

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THREADED SUPPORT ROD
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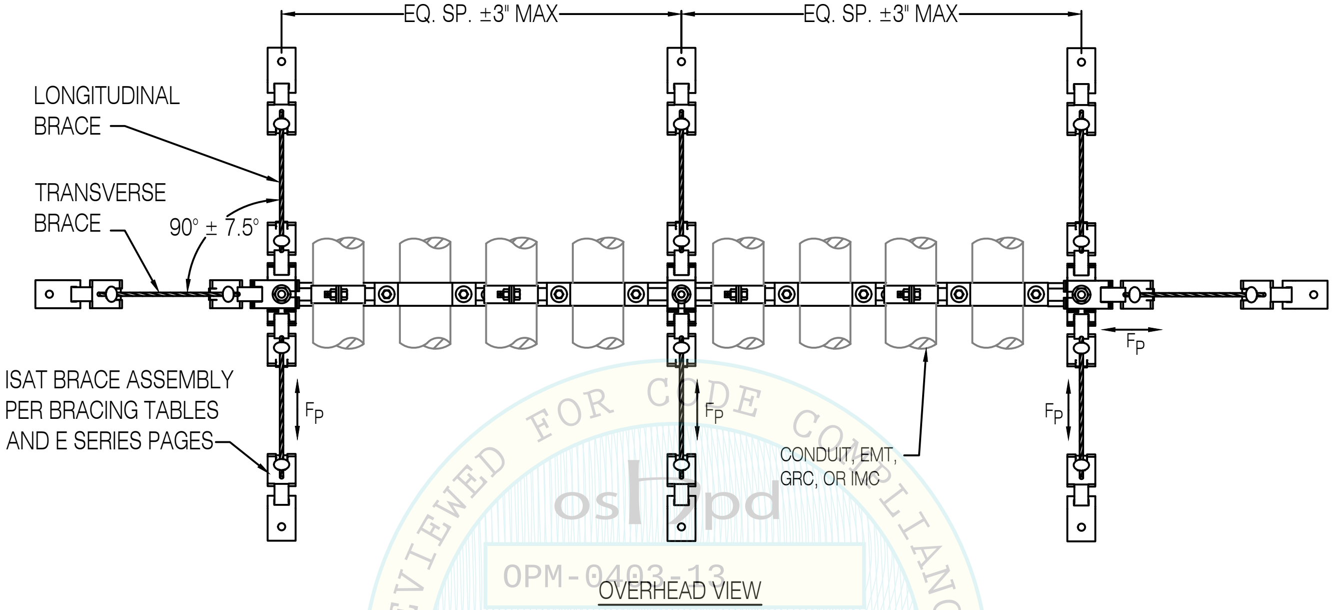

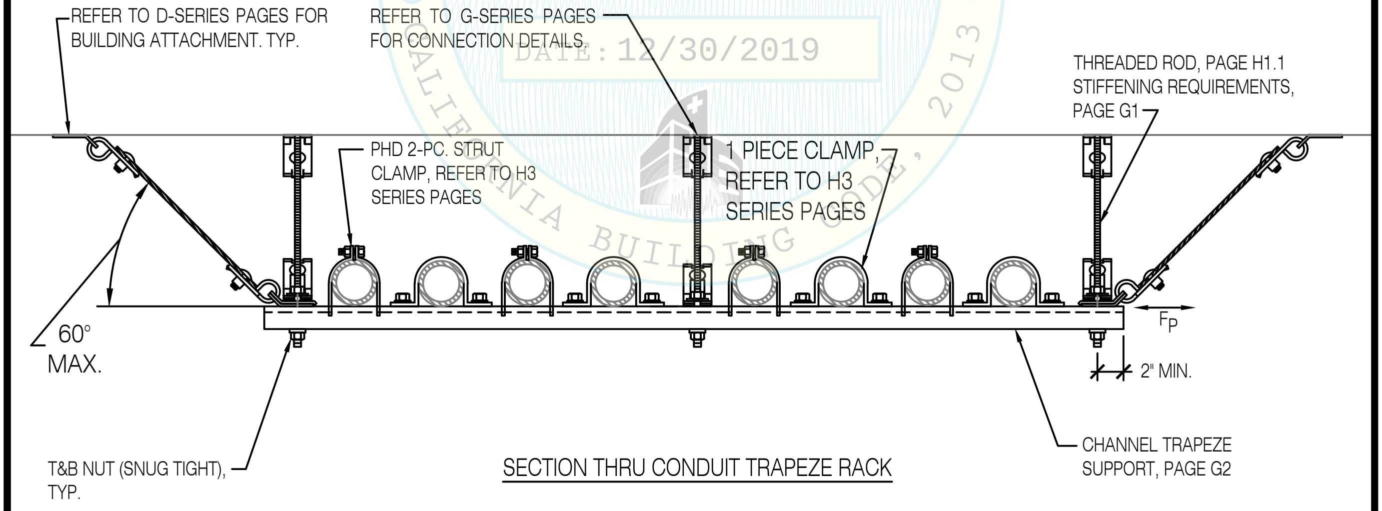

# 3-ROD CONDUIT TRAPEZE RACK
# 8-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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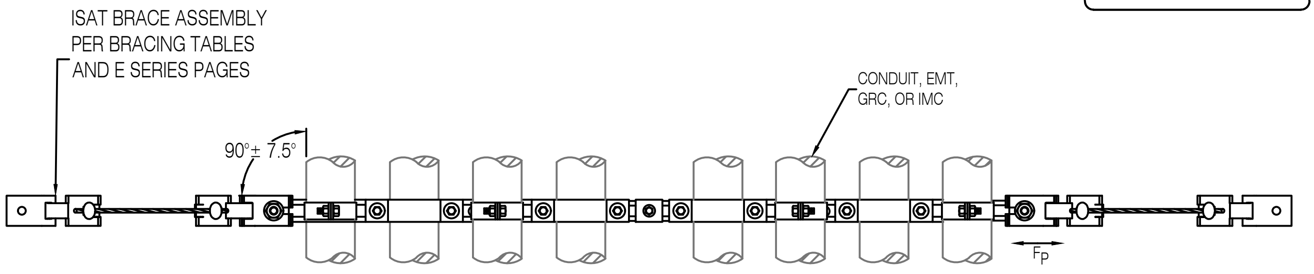

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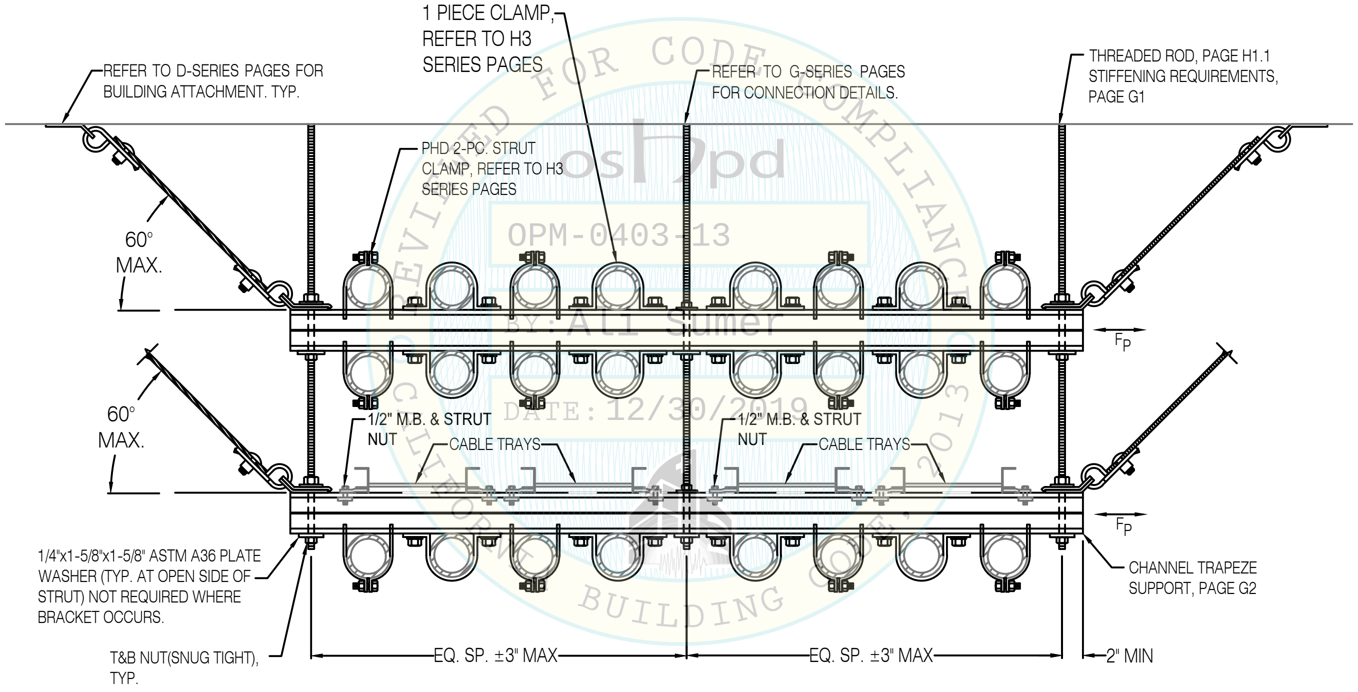
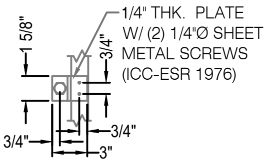


SECTION THRU CONDUIT TRAPEZE RACK



PLAN

ALSO ACCEPTABLE FOR
CABLE TRAY ON BOTH
TIERS WITH OR WITHOUT
CONDUIT

# 3-ROD, 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 2-WAY TRANSVERSE, CABLE BRACING

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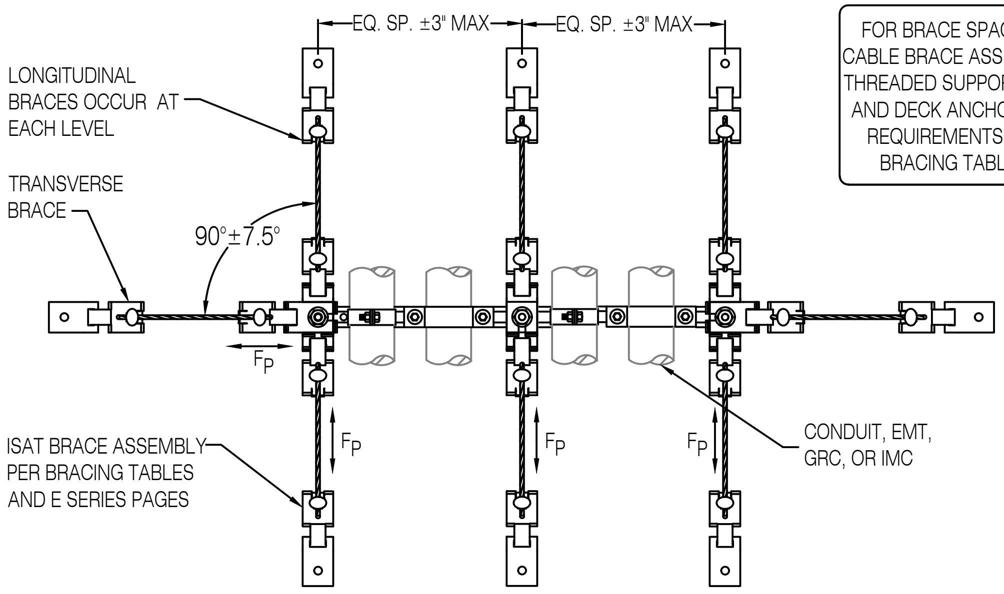
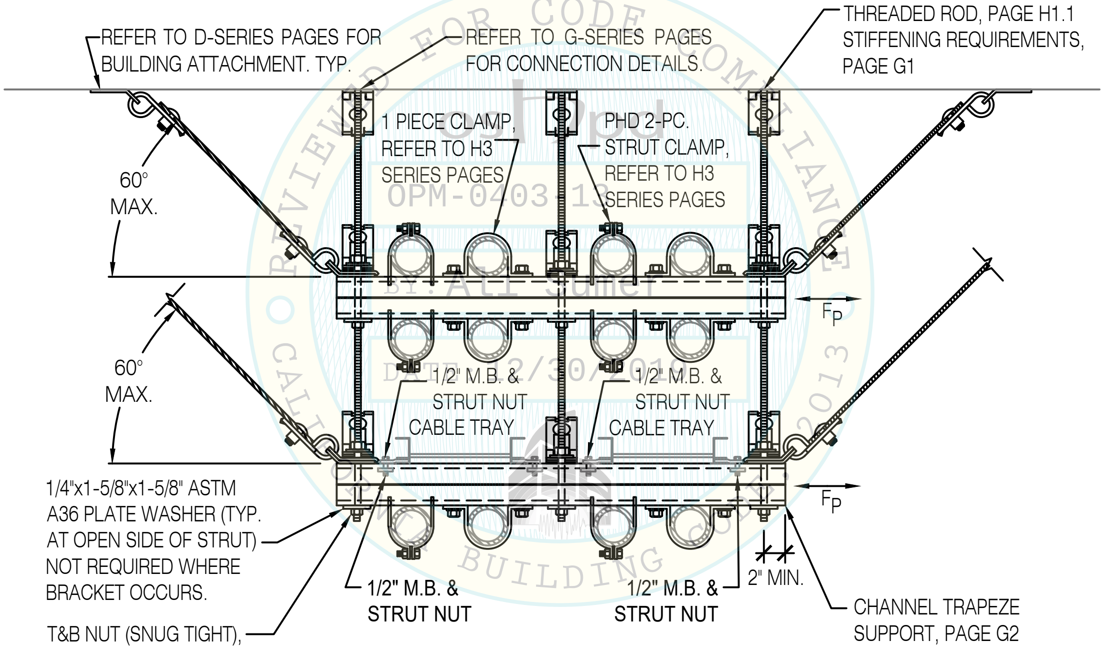
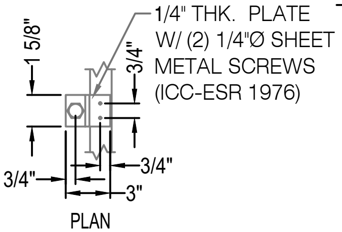


OVERHEAD VIEW



SECTION THRU CONDUIT TRAPEZE RACK

ALSO ACCEPTABLE FOR CABLE TRAY ON BOTH TIERS WITH OR WITHOUT CONDUIT



PLAN

# 3-ROD, 2-TIERED CONDUIT/CABLE TRAY TRAPEZE RACK
# 8-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

ANTHONY A. RUBALCAVA
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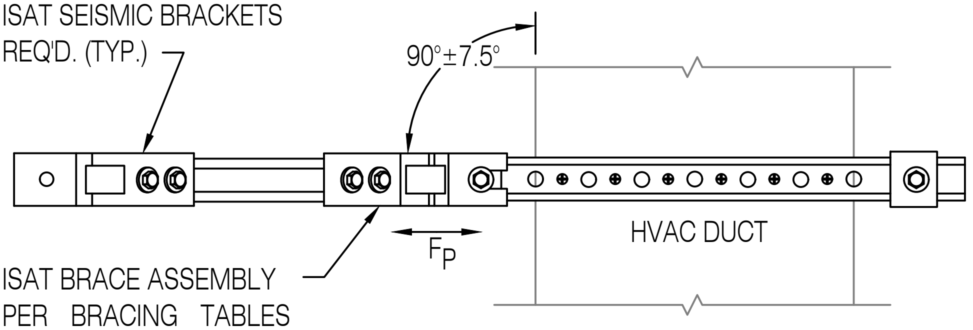
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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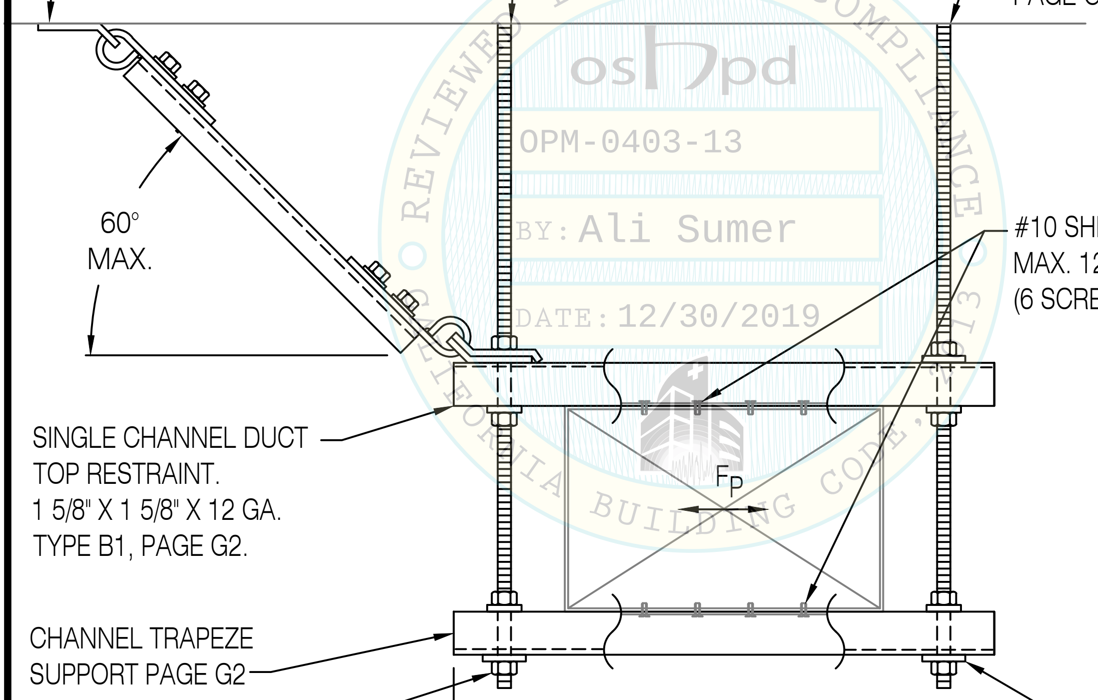

SECTION THRU HVAC DUCT

# HVAC DUCT TRAPEZE SUPPORTED 1-WAY TRANSVERSE, RIGID BRACING

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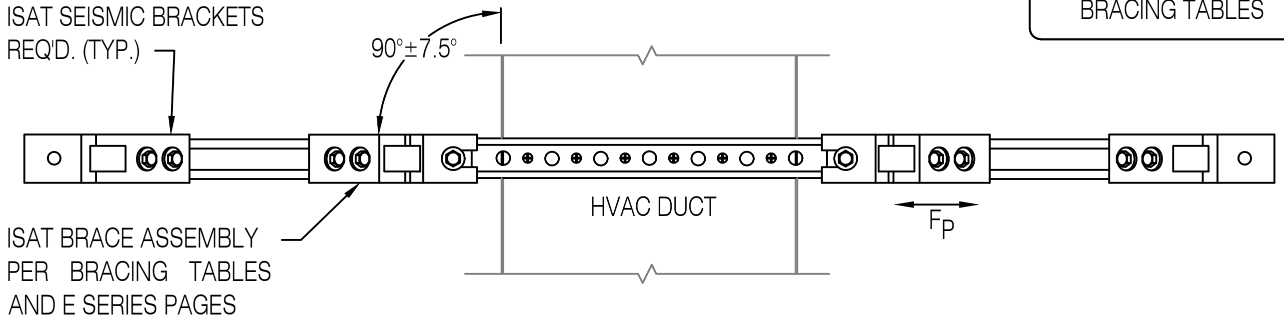

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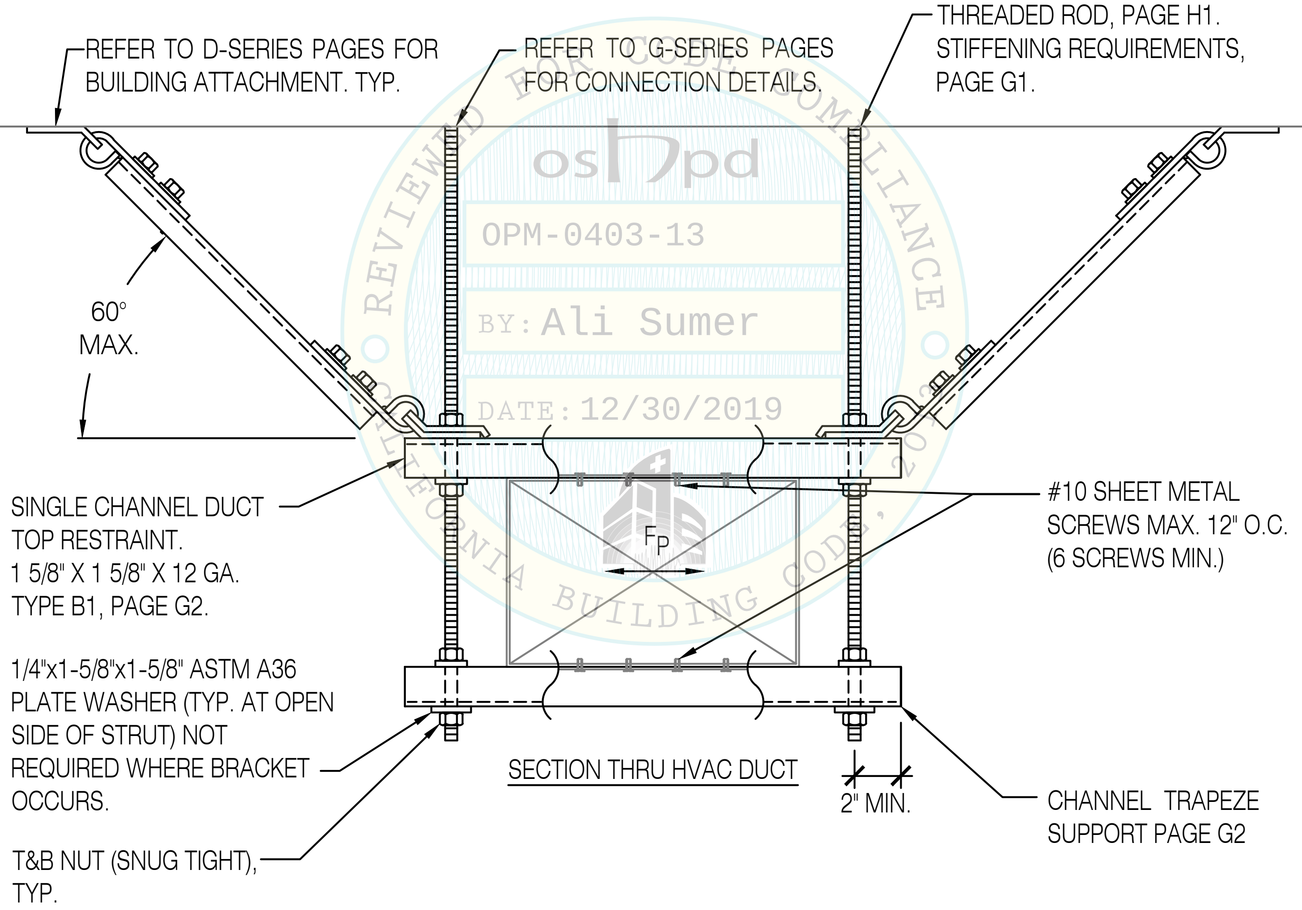

SECTION THRU HVAC DUCT

# HVAC DUCT TRAPEZE SUPOPRTED
# 2-WAY TRANSVERSE, RIGID BRACING

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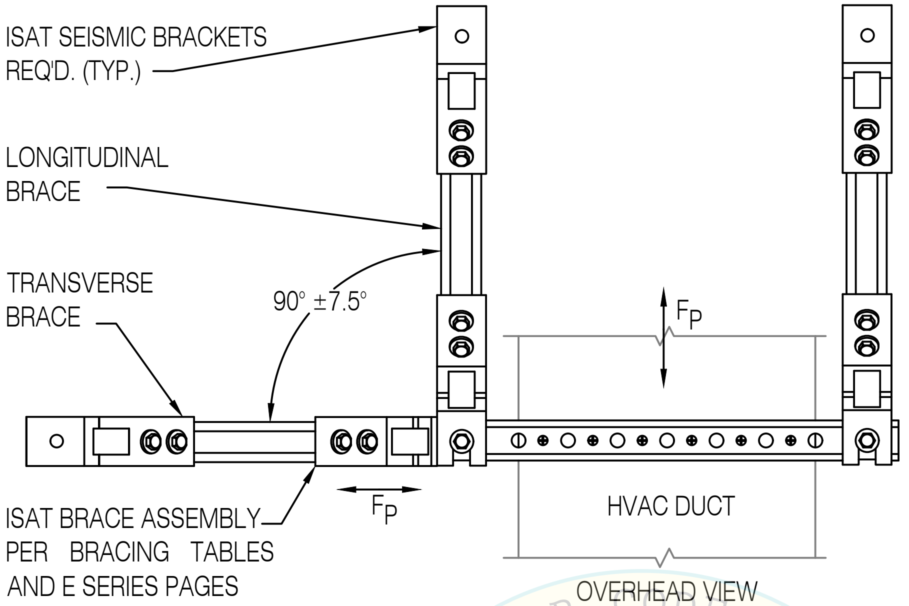
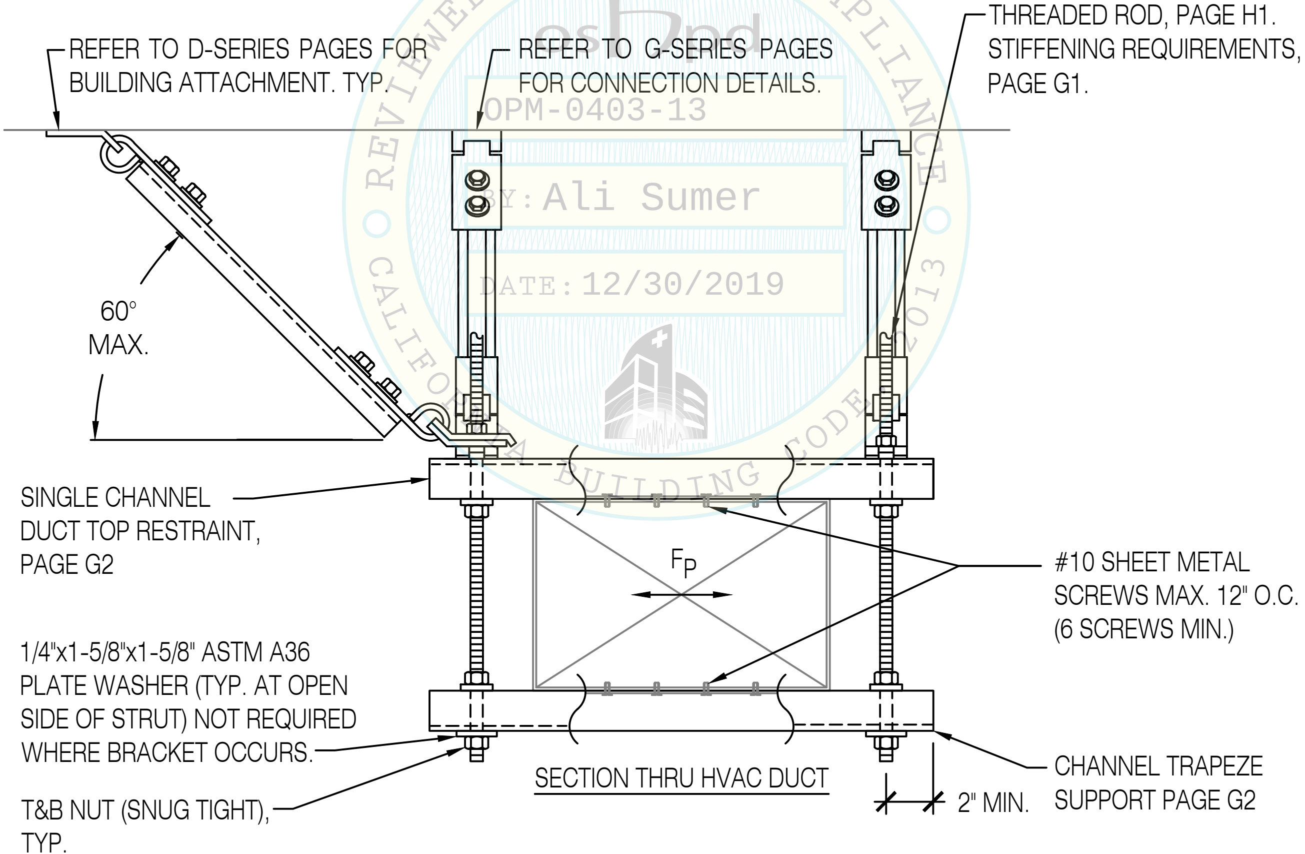


OVERHEAD VIEW



SECTION THRU HVAC DUCT

REVIEWED FOR CODE COMPLIANCE
OPM-0403-13
BY: Ali Sumer
DATE: 12/30/2019
CALIFORNIA BUILDING CODE 2013

# HVAC DUCT TRAPEZE SUPPORTED 3-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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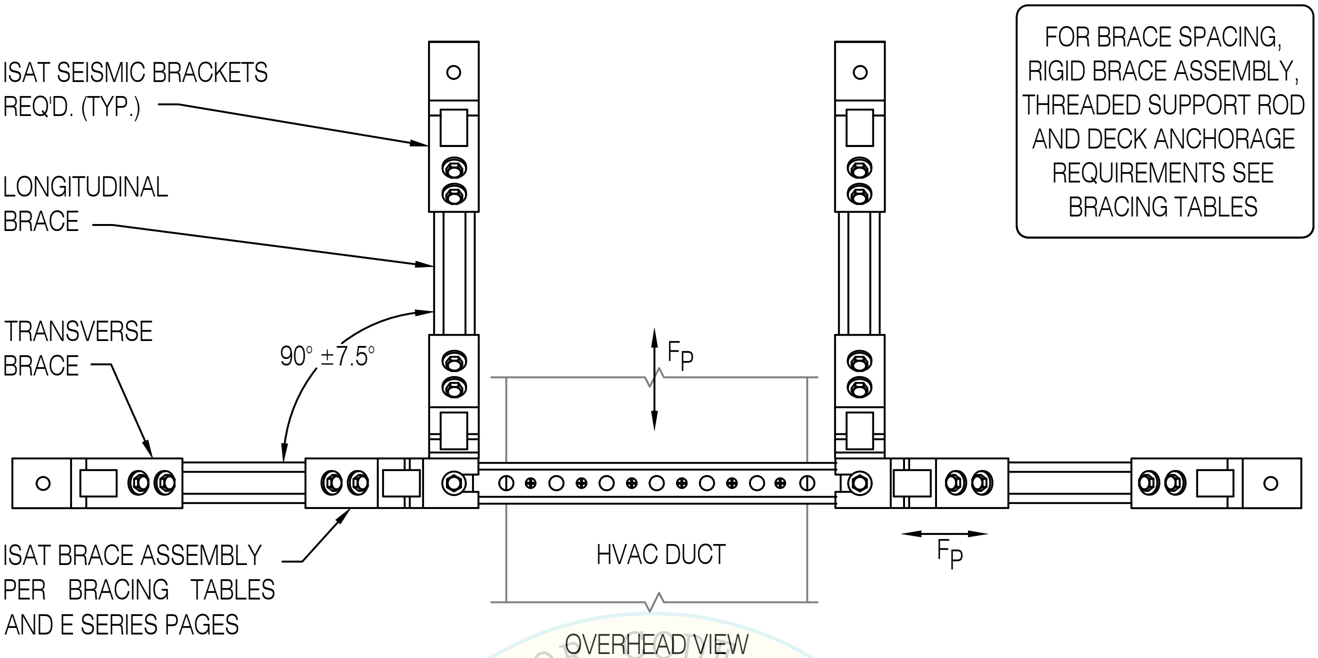
FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



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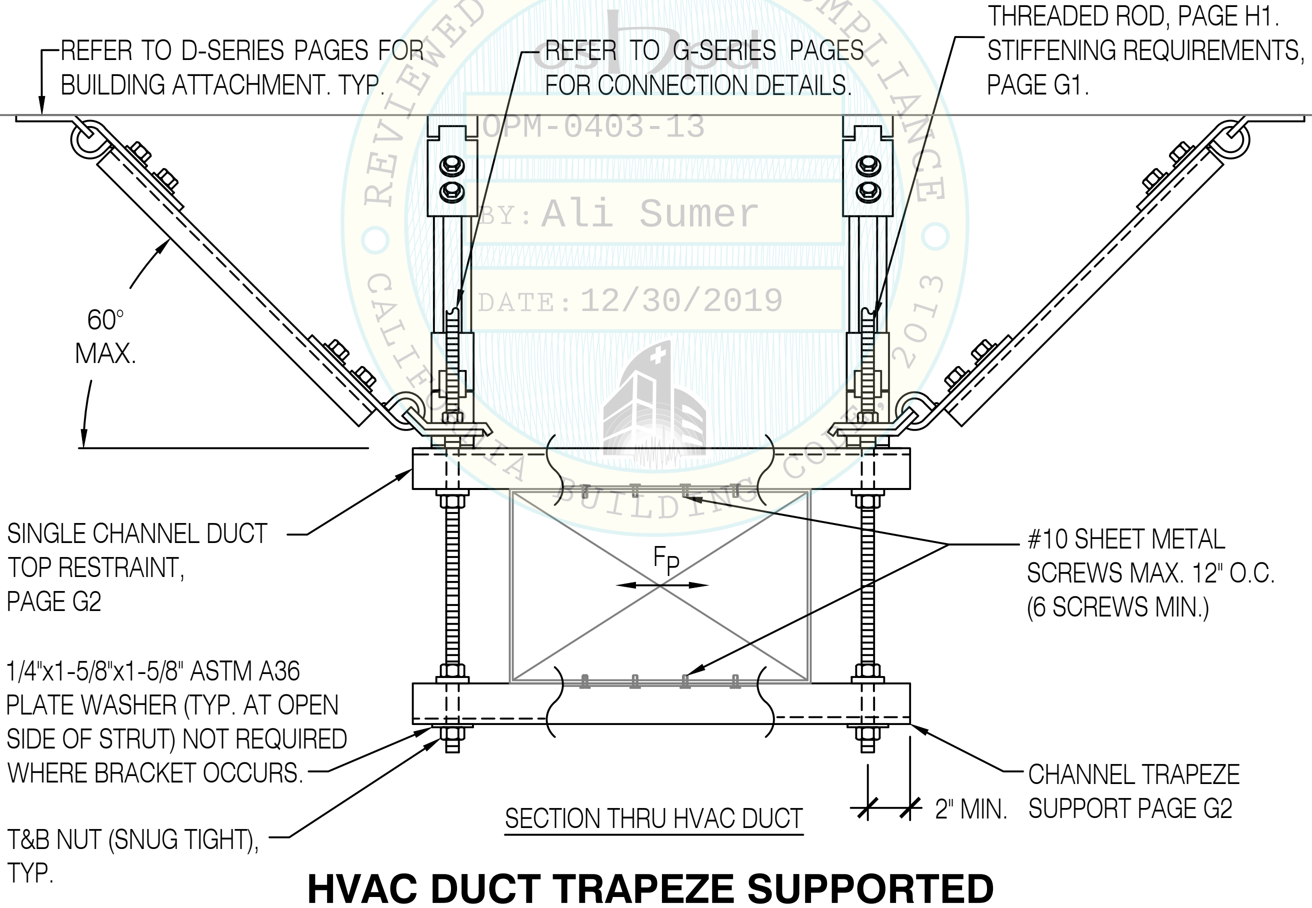

SECTION THRU HVAC DUCT

# HVAC DUCT TRAPEZE SUPPORTED
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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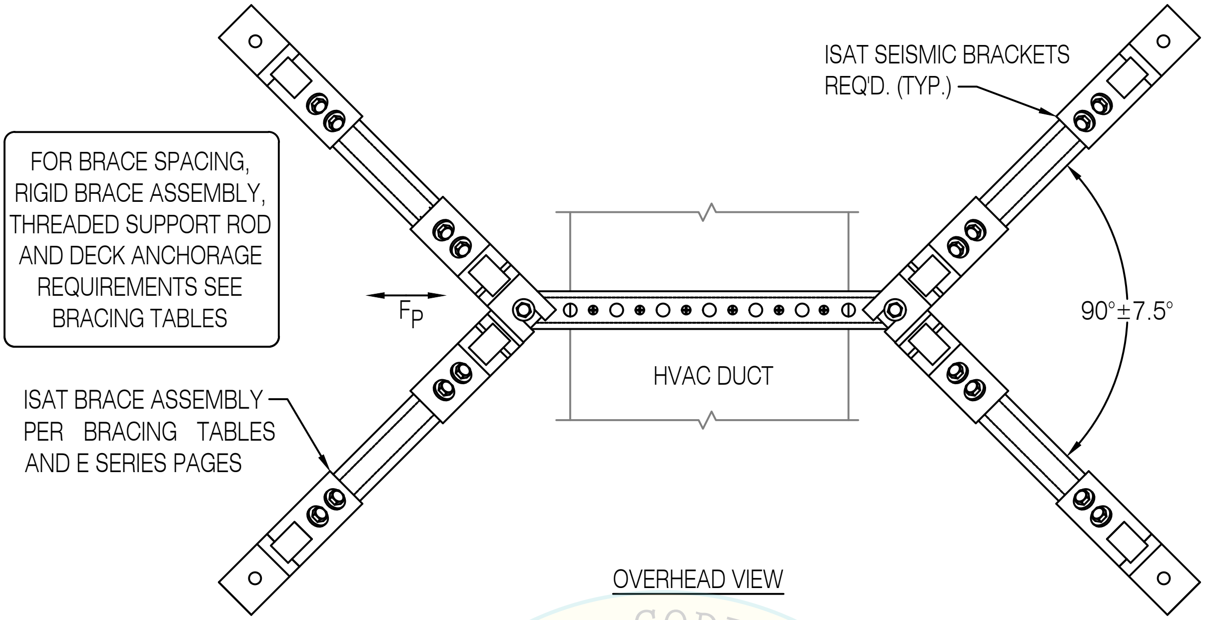
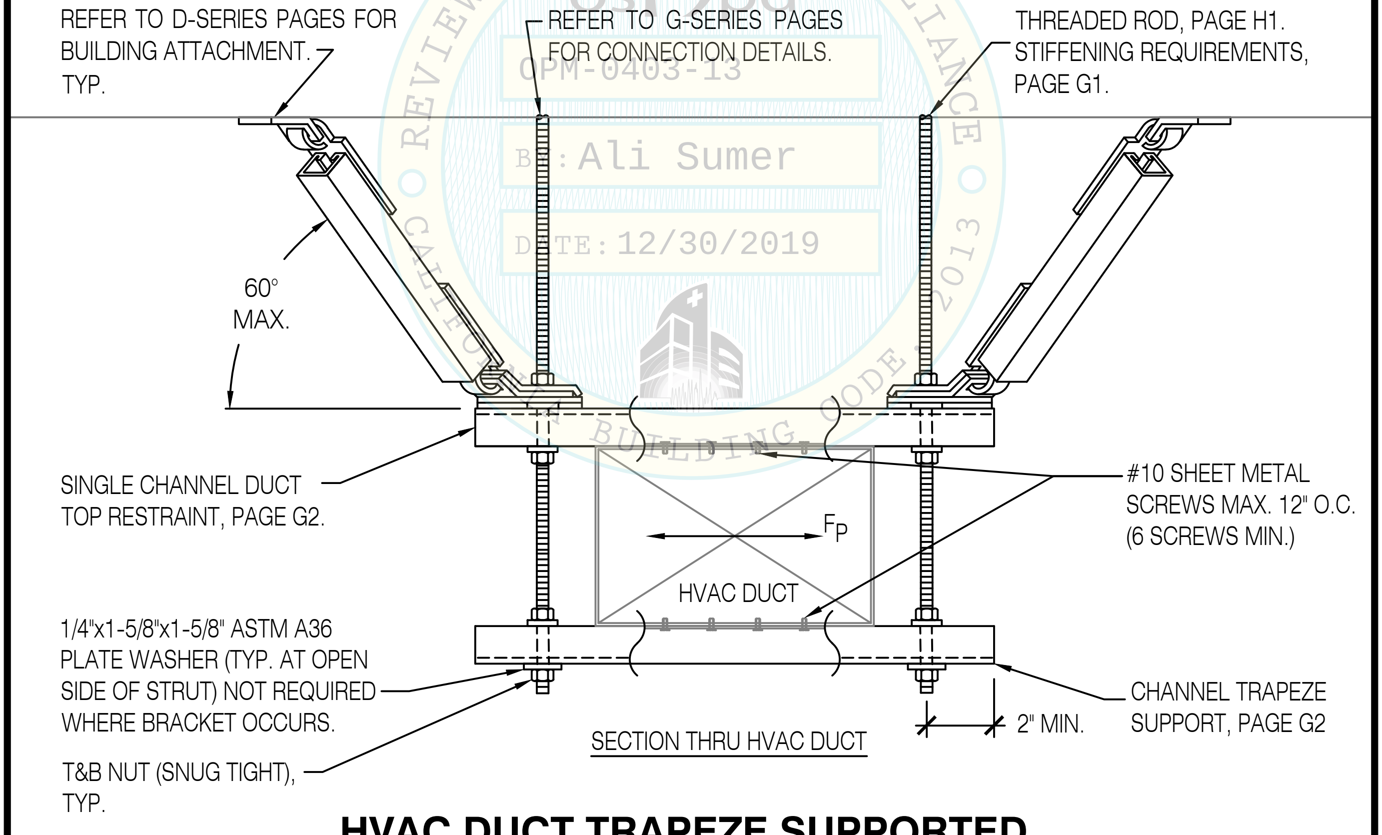


OVERHEAD VIEW



SECTION THRU HVAC DUCT

# HVAC DUCT TRAPEZE SUPPORTED
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, RIGID BRACING

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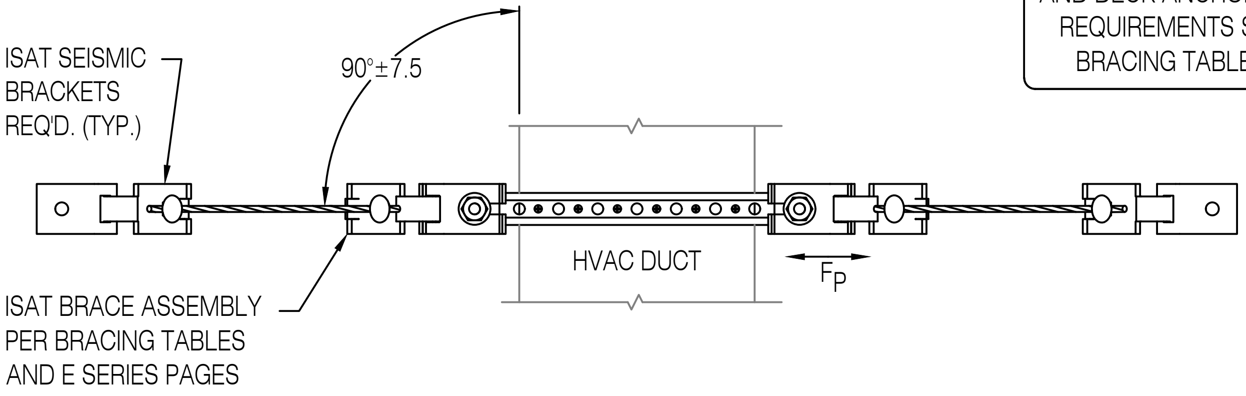
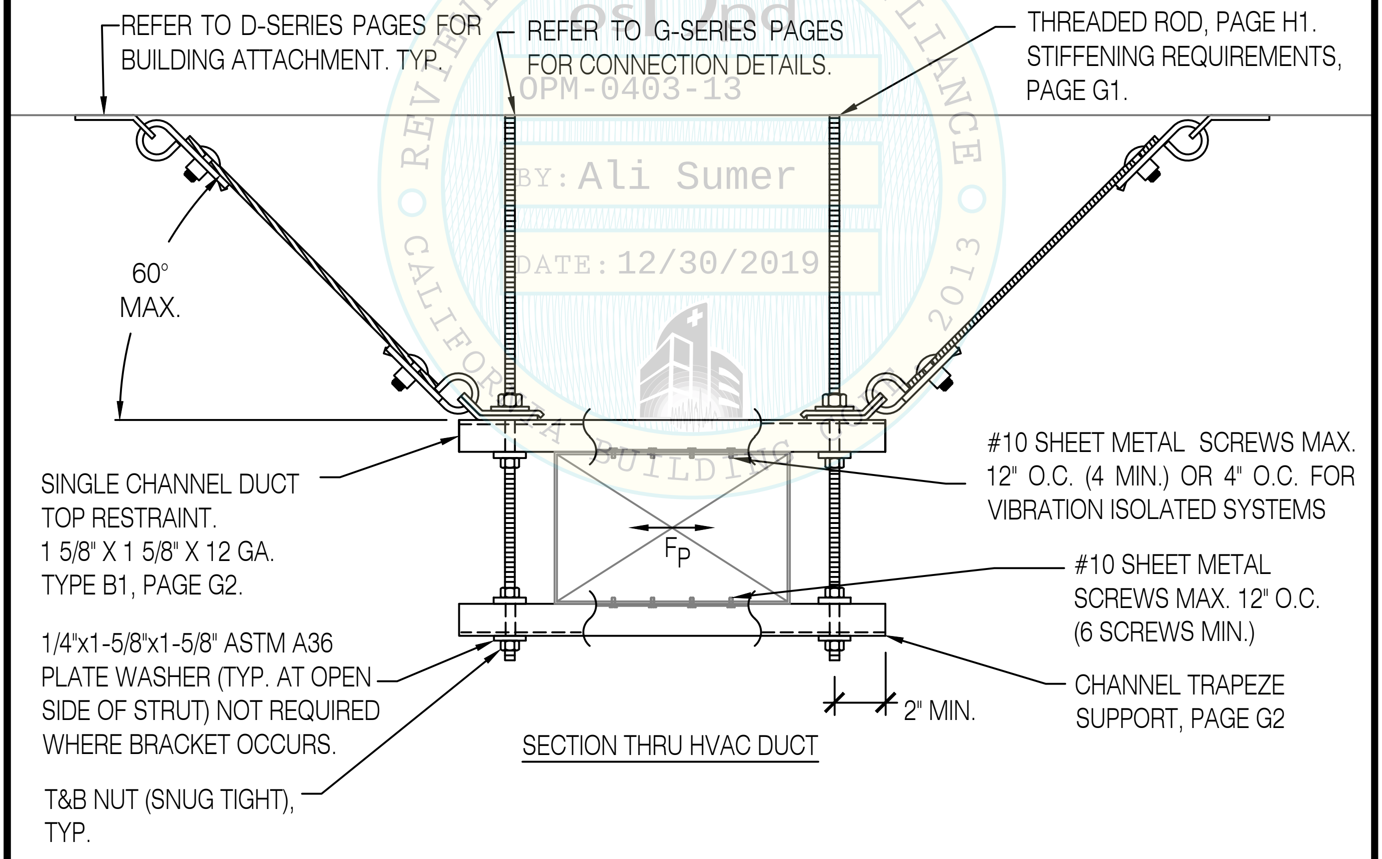


OVERHEAD VIEW



SECTION THRU HVAC DUCT

# HVAC DUCT 2-WAY TRANSVERSE, CABLE BRACING

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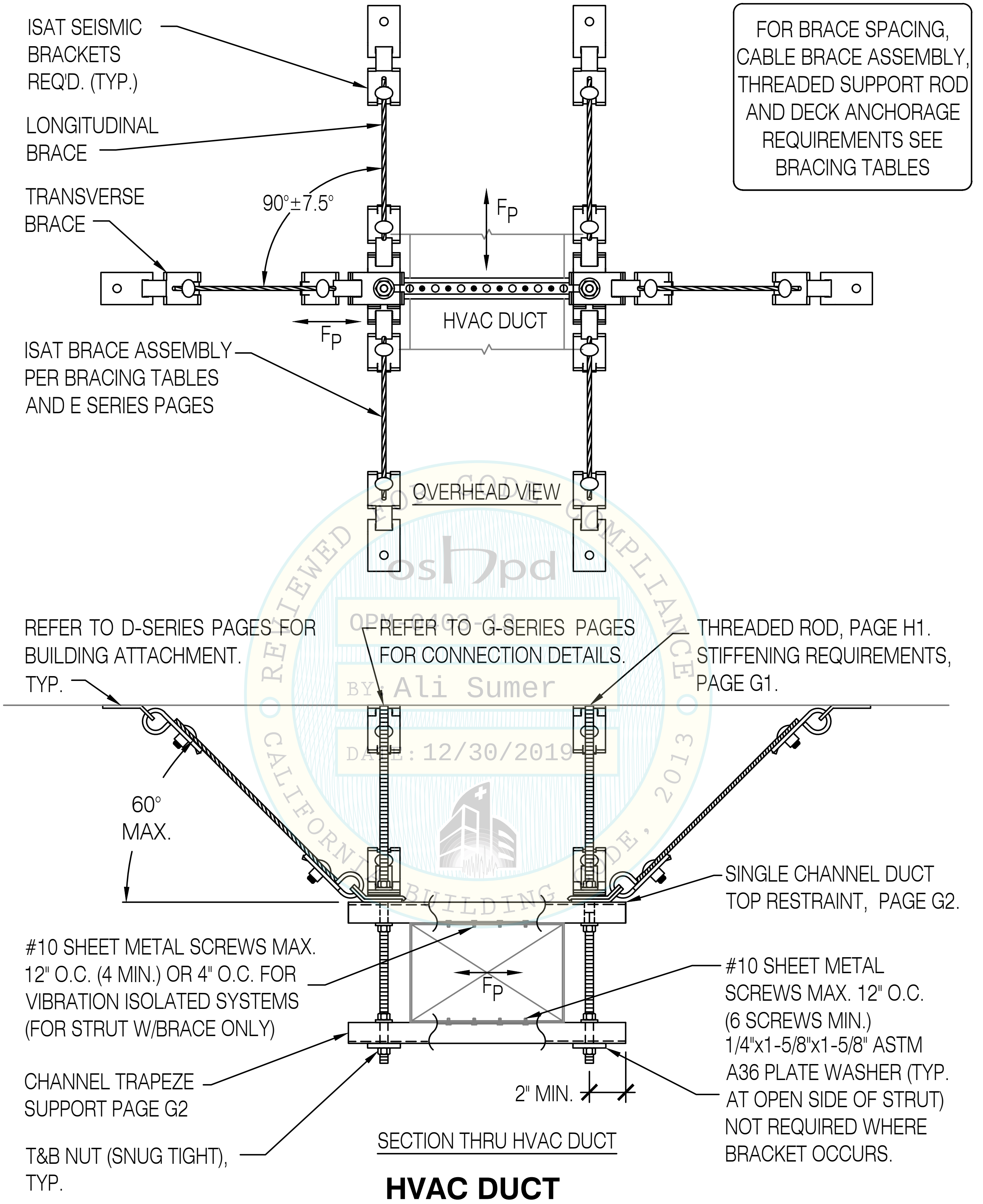

ISAT SEISMIC BRACKETS REQ'D. (TYP.)

LONGITUDINAL BRACE

TRANSVERSE BRACE

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ISAT BRACE ASSEMBLY PER BRACING TABLES AND E SERIES PAGES

OVERHEAD VIEW

REFER TO D-SERIES PAGES FOR BUILDING ATTACHMENT. TYP.

REFER TO G-SERIES PAGES FOR CONNECTION DETAILS.

THREADED ROD, PAGE H1. STIFFENING REQUIREMENTS, PAGE G1.

SINGLE CHANNEL DUCT TOP RESTRAINT, PAGE G2.

#10 SHEET METAL SCREWS MAX. 12" O.C. (4 MIN.) OR 4" O.C. FOR VIBRATION ISOLATED SYSTEMS (FOR STRUT W/BRACE ONLY)

#10 SHEET METAL SCREWS MAX. 12" O.C. (6 SCREWS MIN.)

1/4"x1-5/8"x1-5/8" ASTM A36 PLATE WASHER (TYP. AT OPEN SIDE OF STRUT) NOT REQUIRED WHERE BRACKET OCCURS.

CHANNEL TRAPEZE SUPPORT PAGE G2

T&B NUT (SNUG TIGHT), TYP.

SECTION THRU HVAC DUCT

## HVAC DUCT
## 6-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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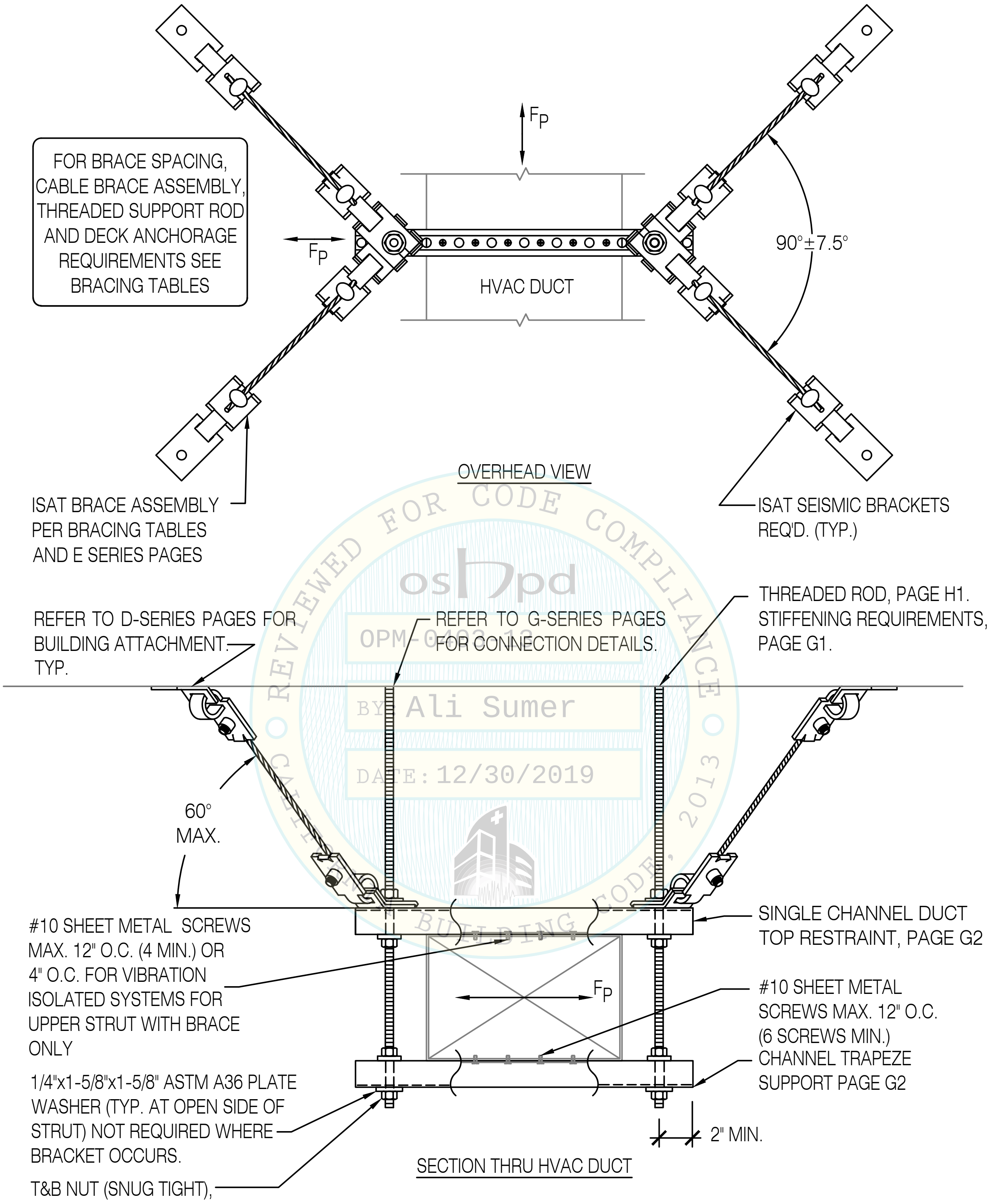

# HVAC DUCT

# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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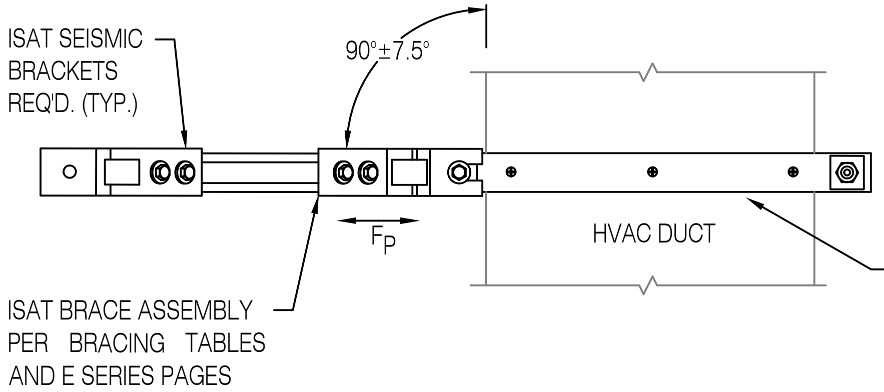

| DUCT DIA. | STRAP SIZES |
|---|---|
| >33" | 12 GA X 2 1/2" |
| 24" TO 33" | 14 GA X 2 1/2" |
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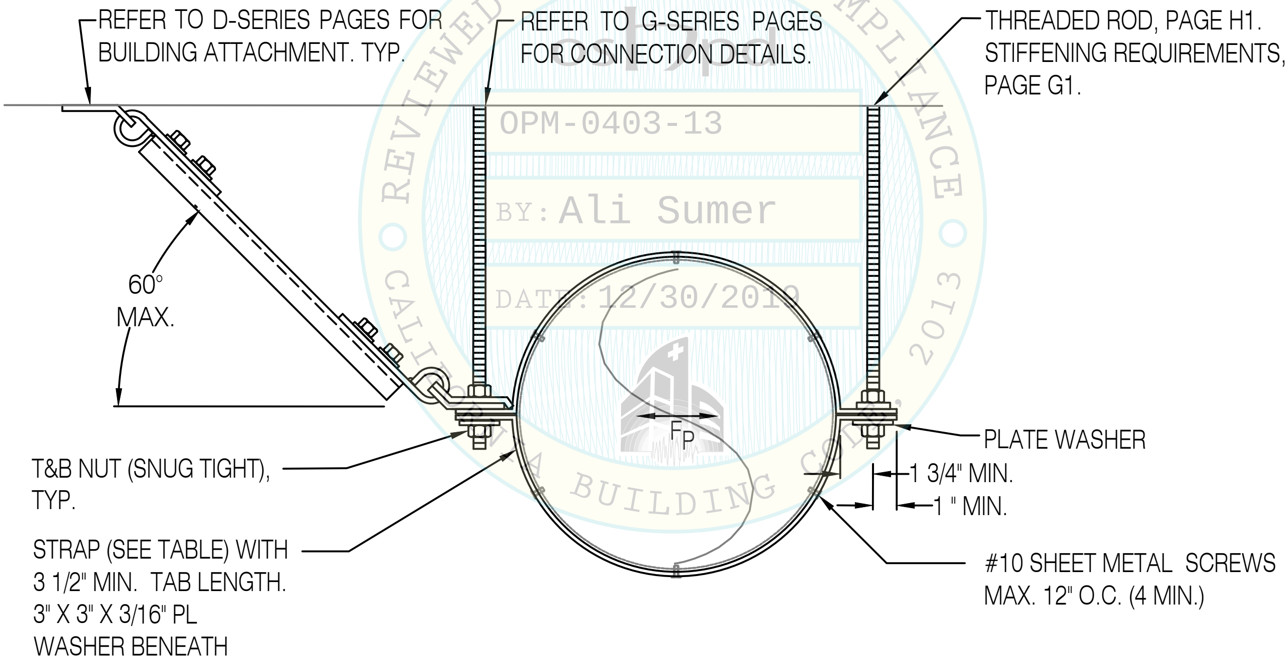
OVERHEAD VIEW



SECTION THRU ROUND HVAC DUCT

# ROUND HVAC DUCT
# 1-WAY TRANSVERSE, RIGID BRACING

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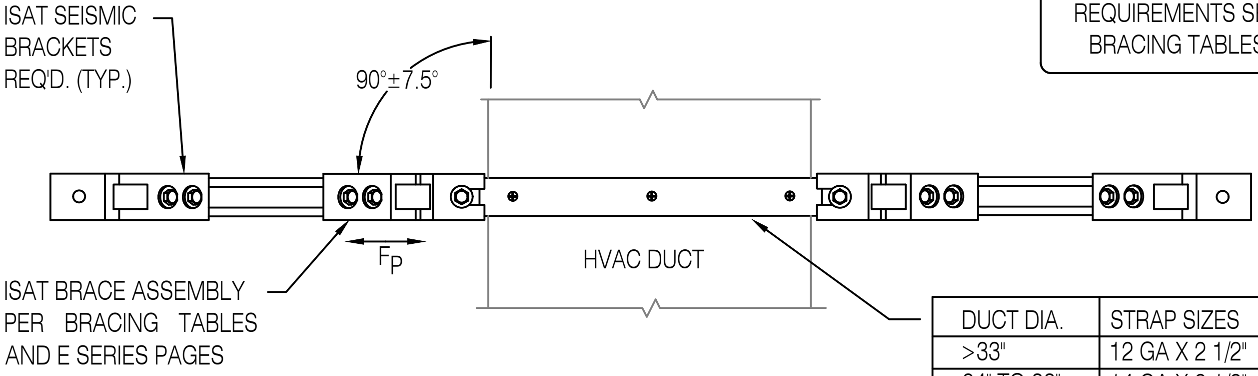

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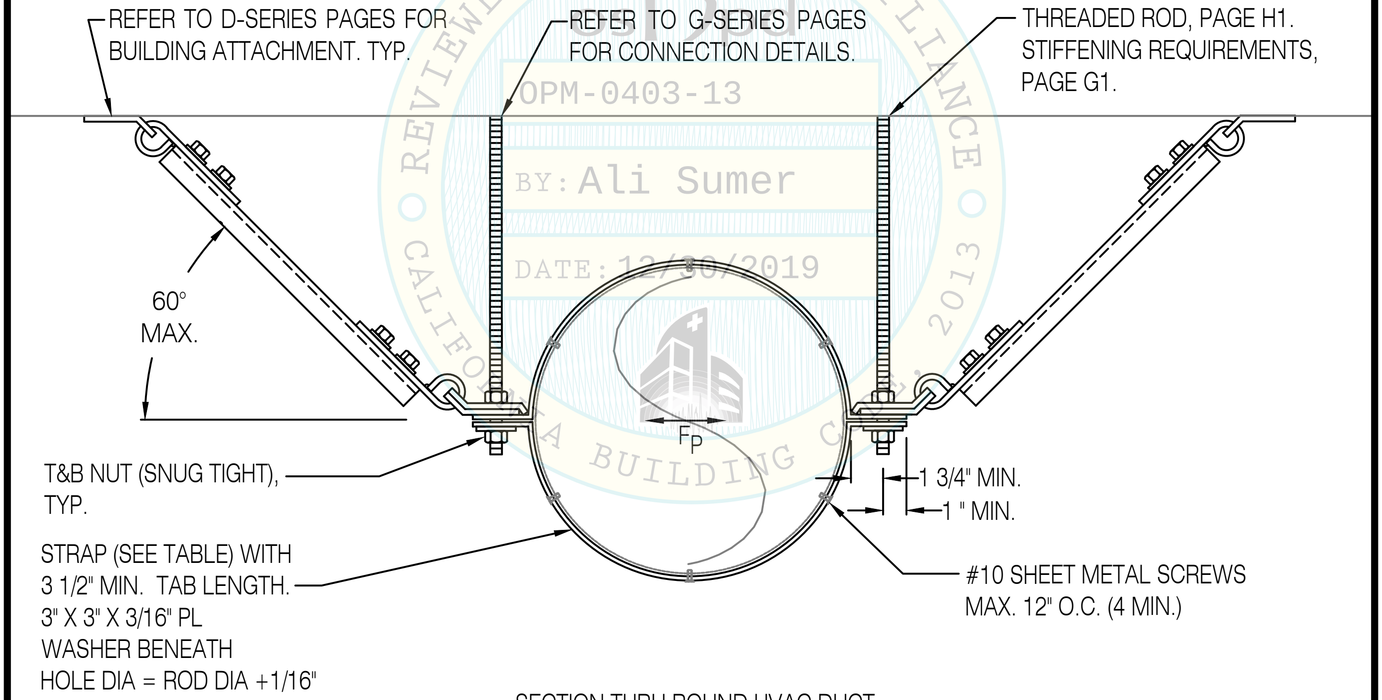

SECTION THRU ROUND HVAC DUCT

# ROUND HVAC DUCT
# 2-WAY TRANSVERSE, RIGID BRACING

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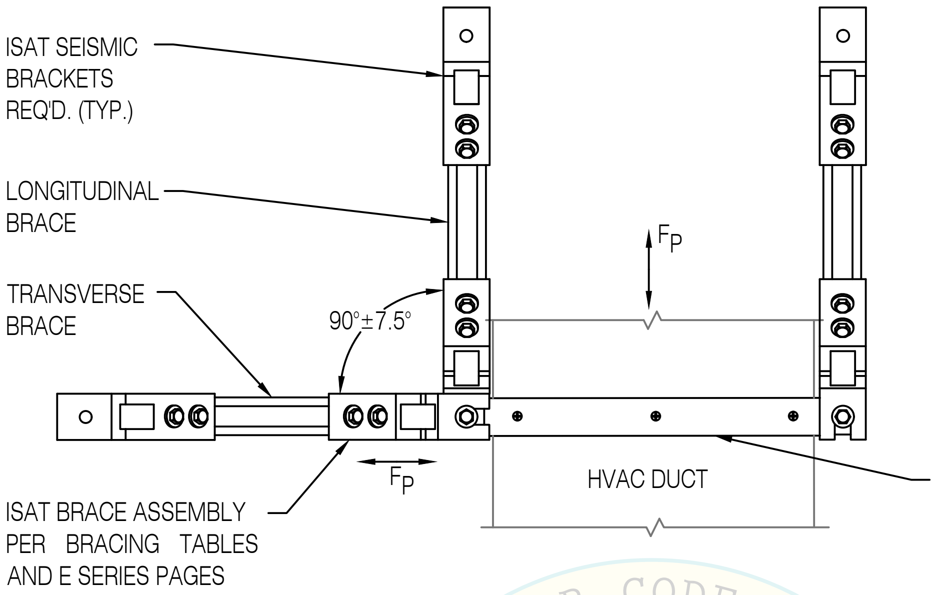

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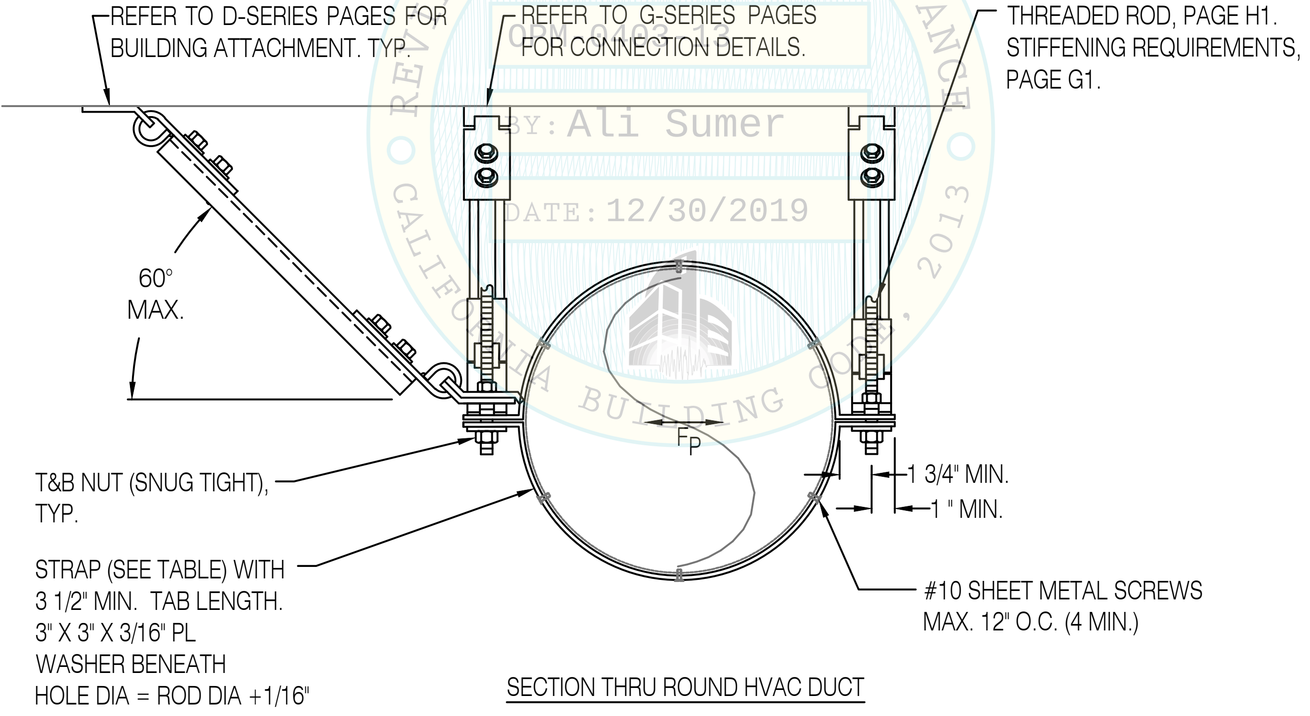

SECTION THRU ROUND HVAC DUCT

# ROUND HVAC DUCT
# 3-WAY TRANSVERSE-LONGITUDINAL RIGID BRACING

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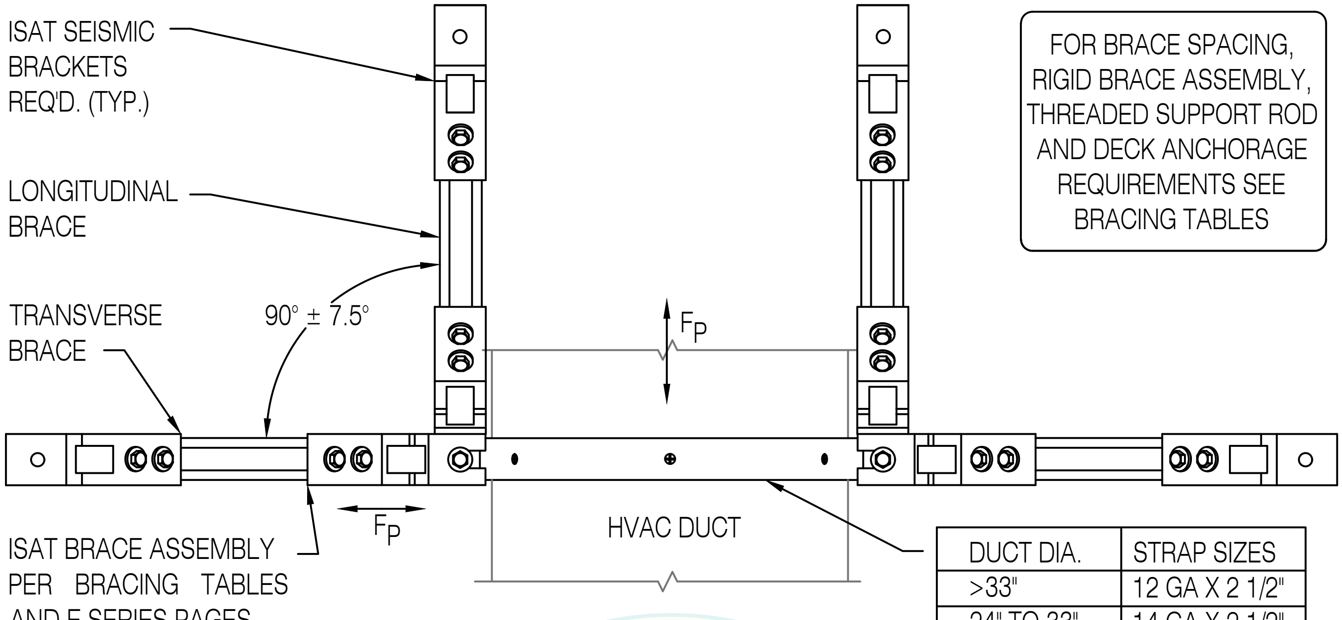

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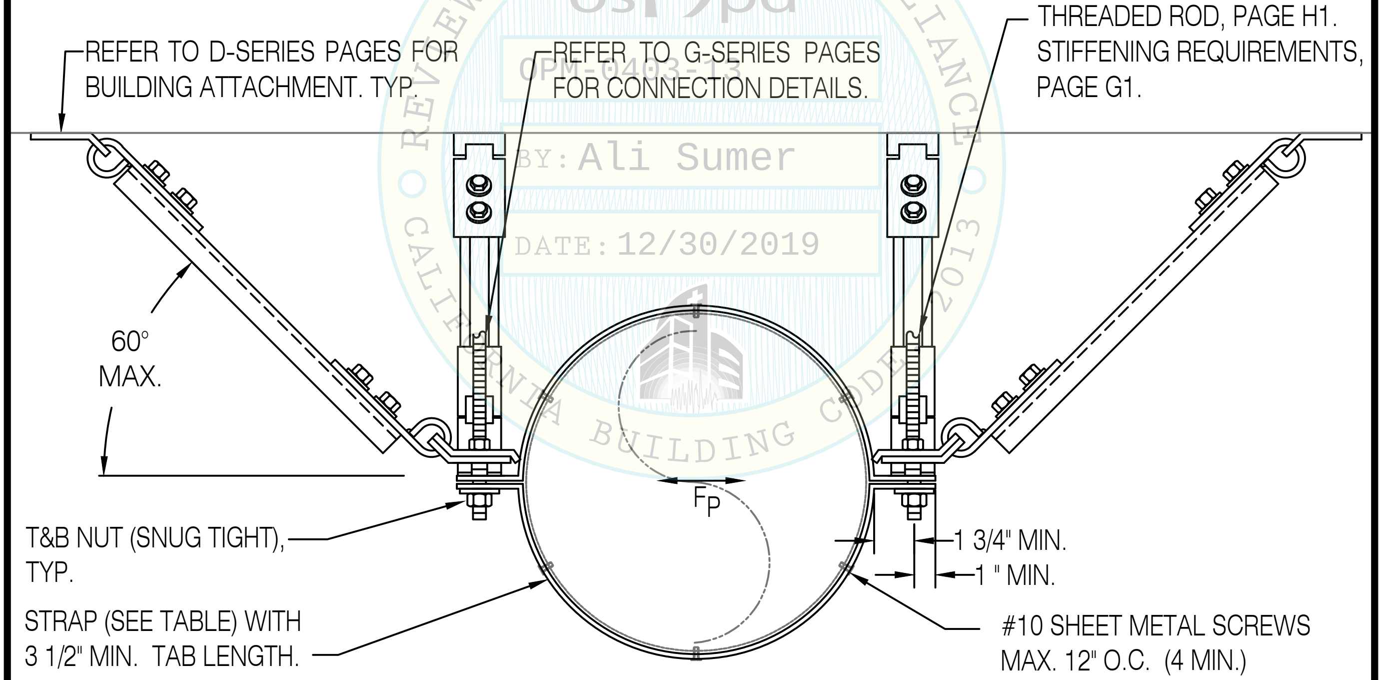

STRAP (SEE TABLE) WITH 3 1/2" MIN. TAB LENGTH.
3" X 3" X 3/16" PL WASHER BENEATH
HOLE DIA = ROD DIA +1/16"

SECTION THRU ROUND HVAC DUCT

# ROUND HVAC DUCT
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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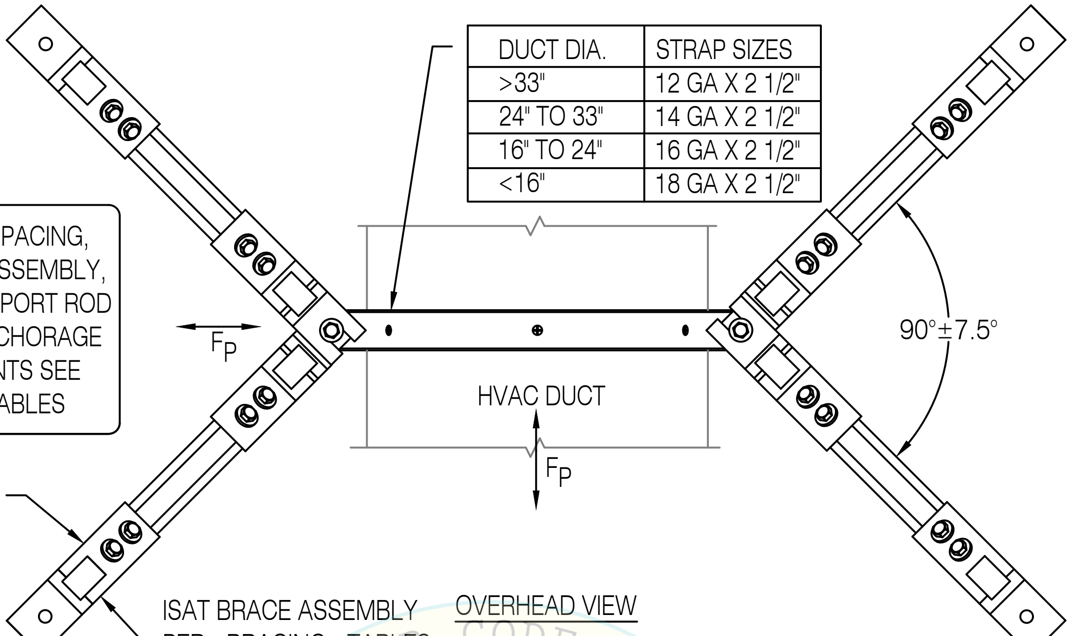

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FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

ISAT SEISMIC BRACKETS REQ'D. (TYP.)

ISAT BRACE ASSEMBLY PER BRACING TABLES AND E SERIES PAGES

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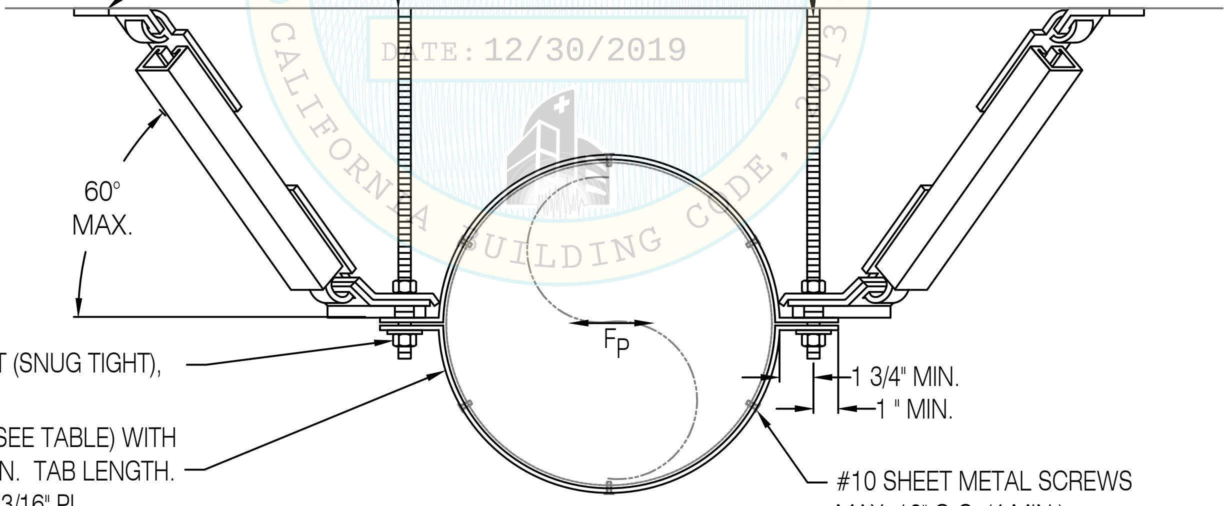

T&B NUT (SNUG TIGHT), TYP.

STRAP (SEE TABLE) WITH 3 1/2" MIN. TAB LENGTH. 3" X 3" X 3/16" PL WASHER BENEATH HOLE DIA = ROD DIA +1/16"

1 3/4" MIN.

1 " MIN.

#10 SHEET METAL SCREWS MAX. 12" O.C. (4 MIN.)

SECTION THRU ROUND HVAC DUCT

# ROUND HVAC DUCT
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, RIGID BRACING

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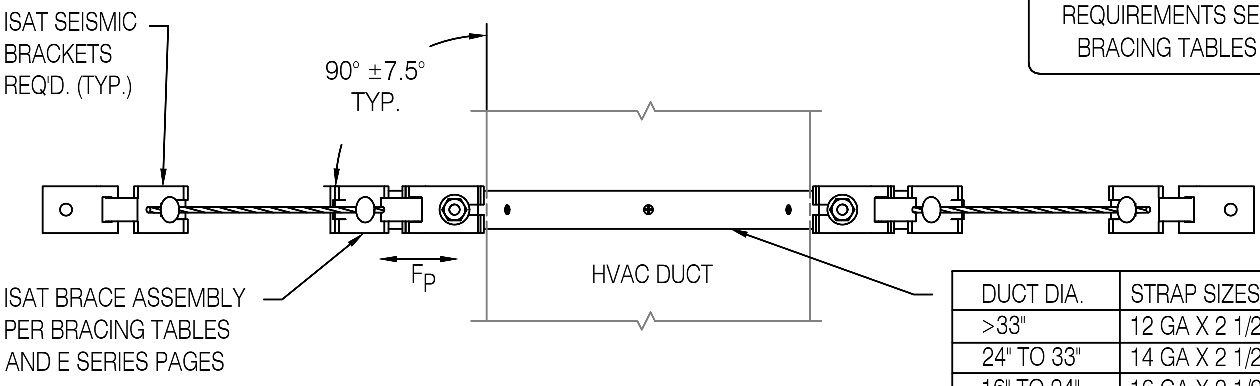

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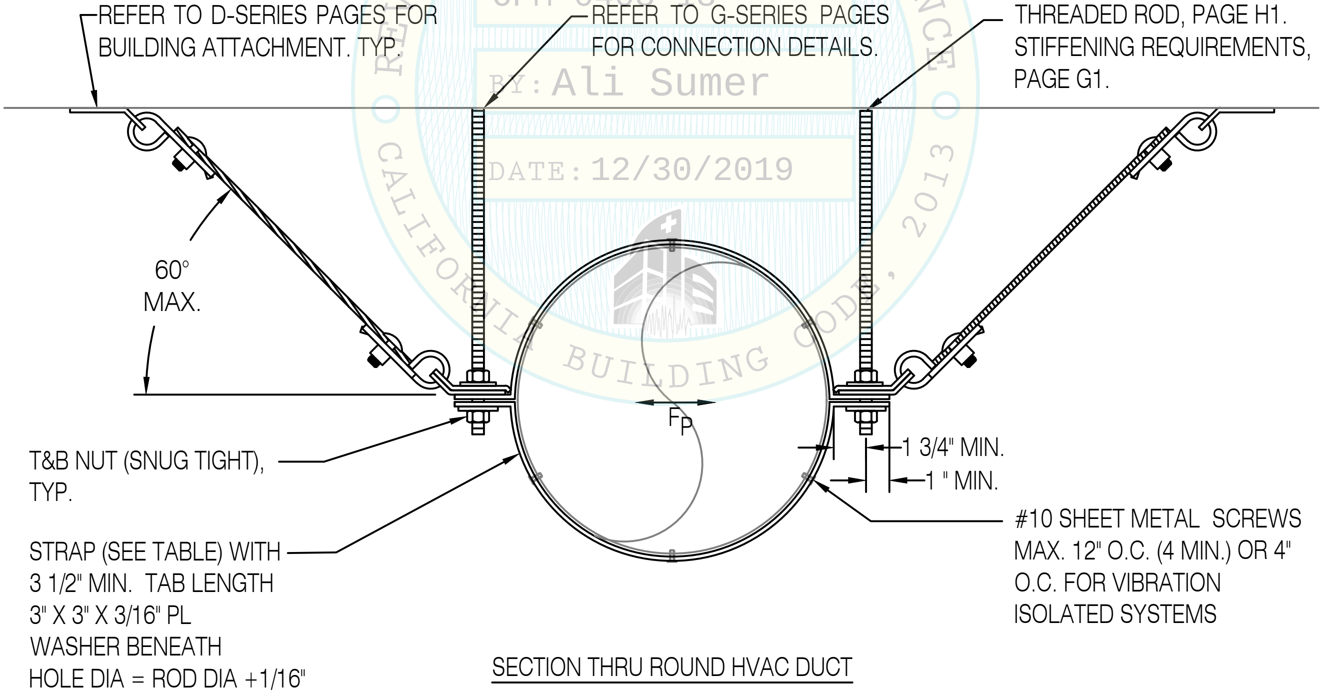

SECTION THRU ROUND HVAC DUCT

# ROUND HVAC DUCT 2-WAY TRANSVERSE, CABLE BRACING

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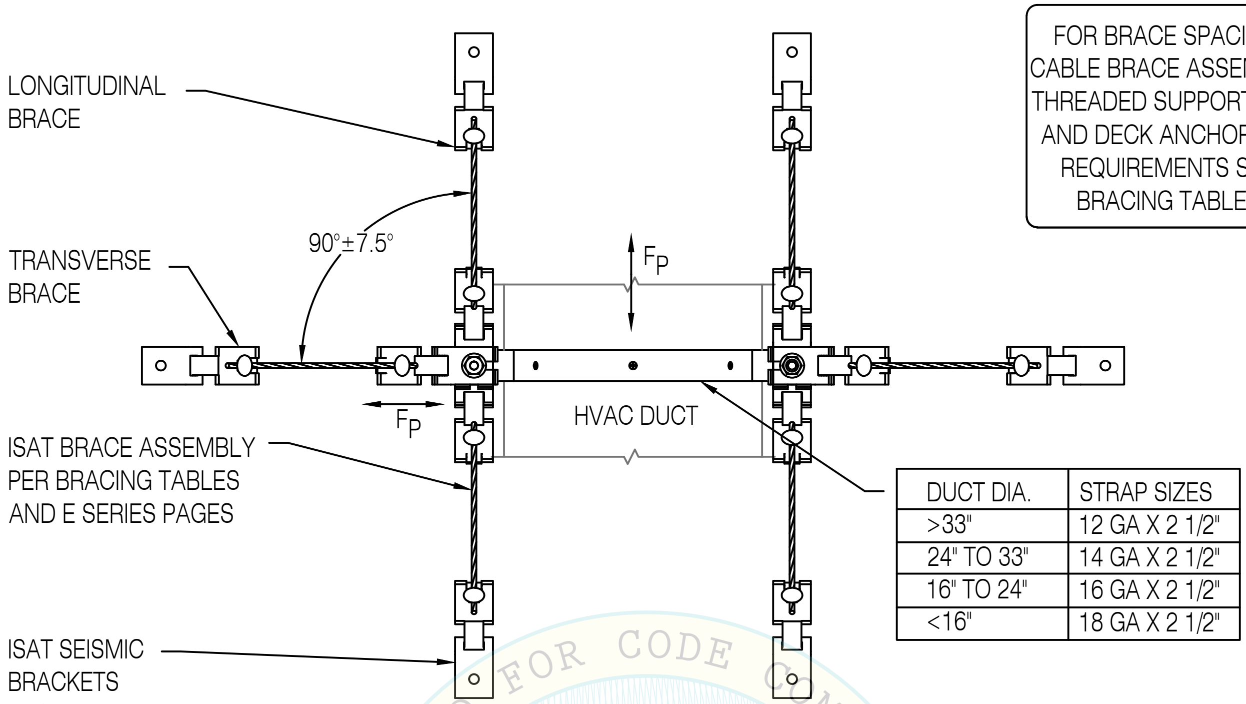
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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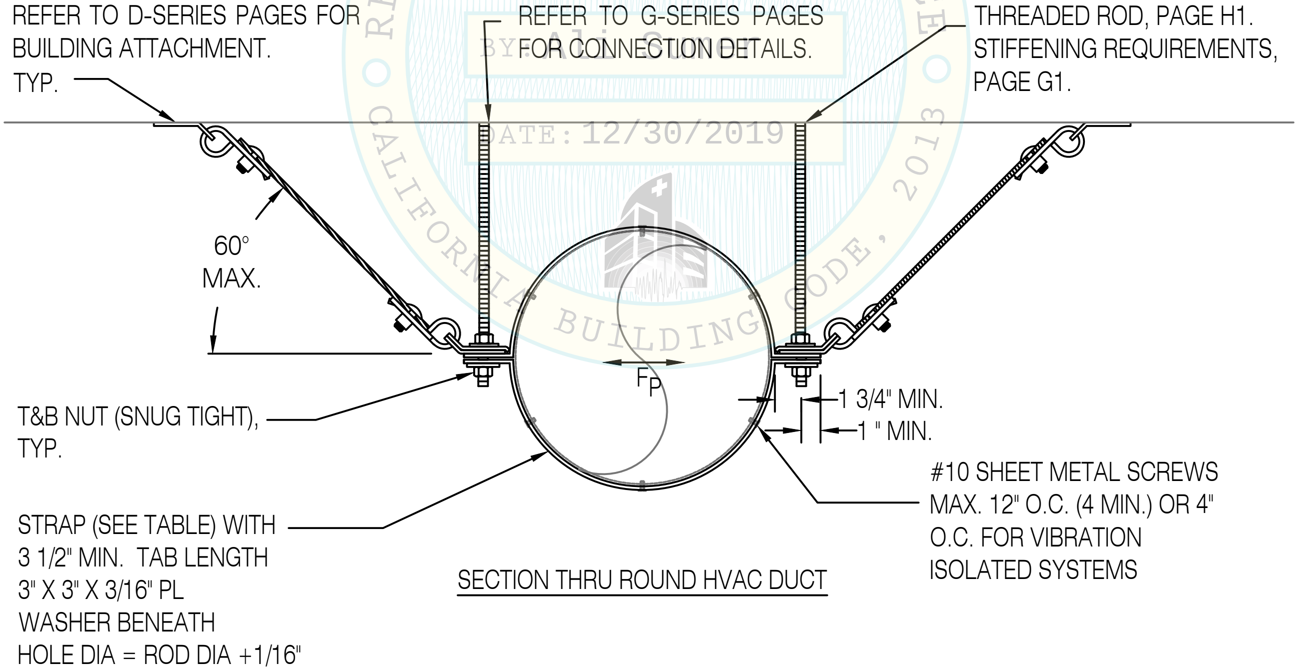

SECTION THRU ROUND HVAC DUCT

# ROUND HVAC DUCT
# 6-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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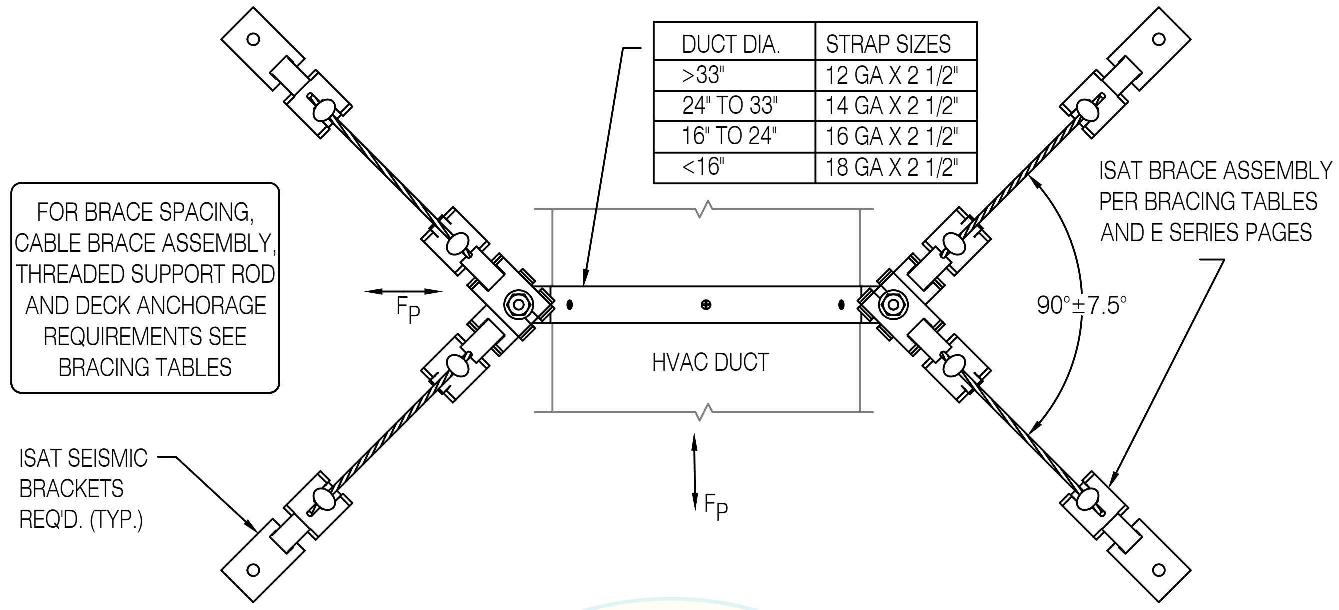

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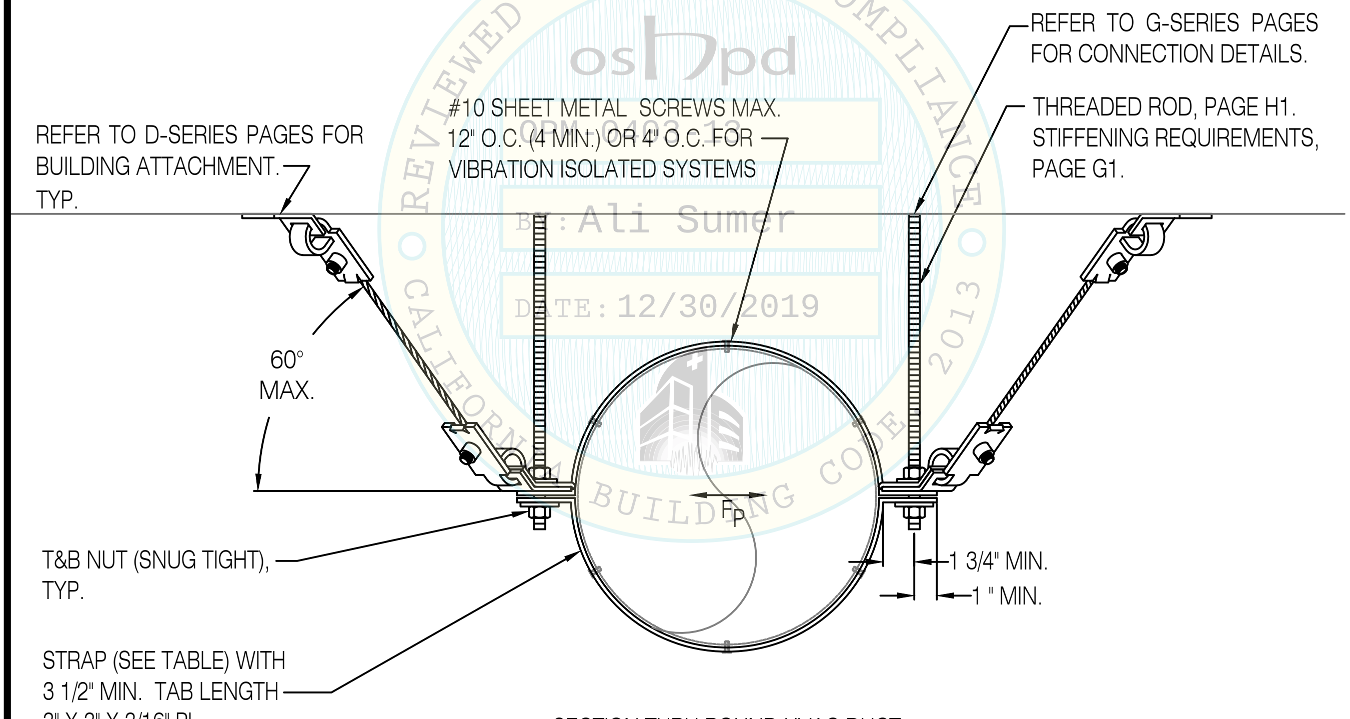

SECTION THRU ROUND HVAC DUCT

# ROUND HVAC DUCT
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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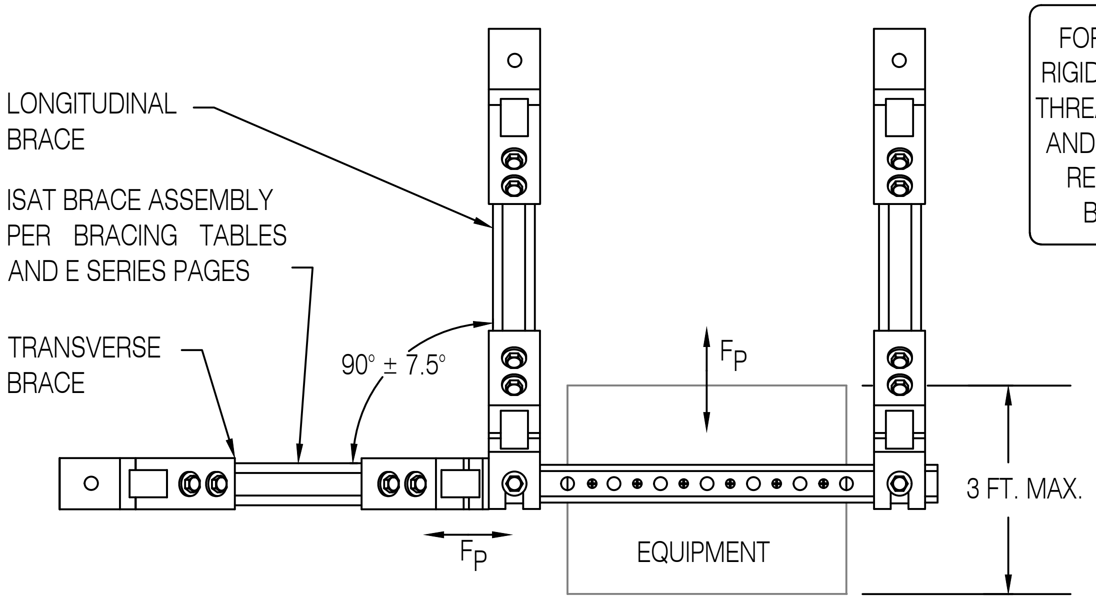
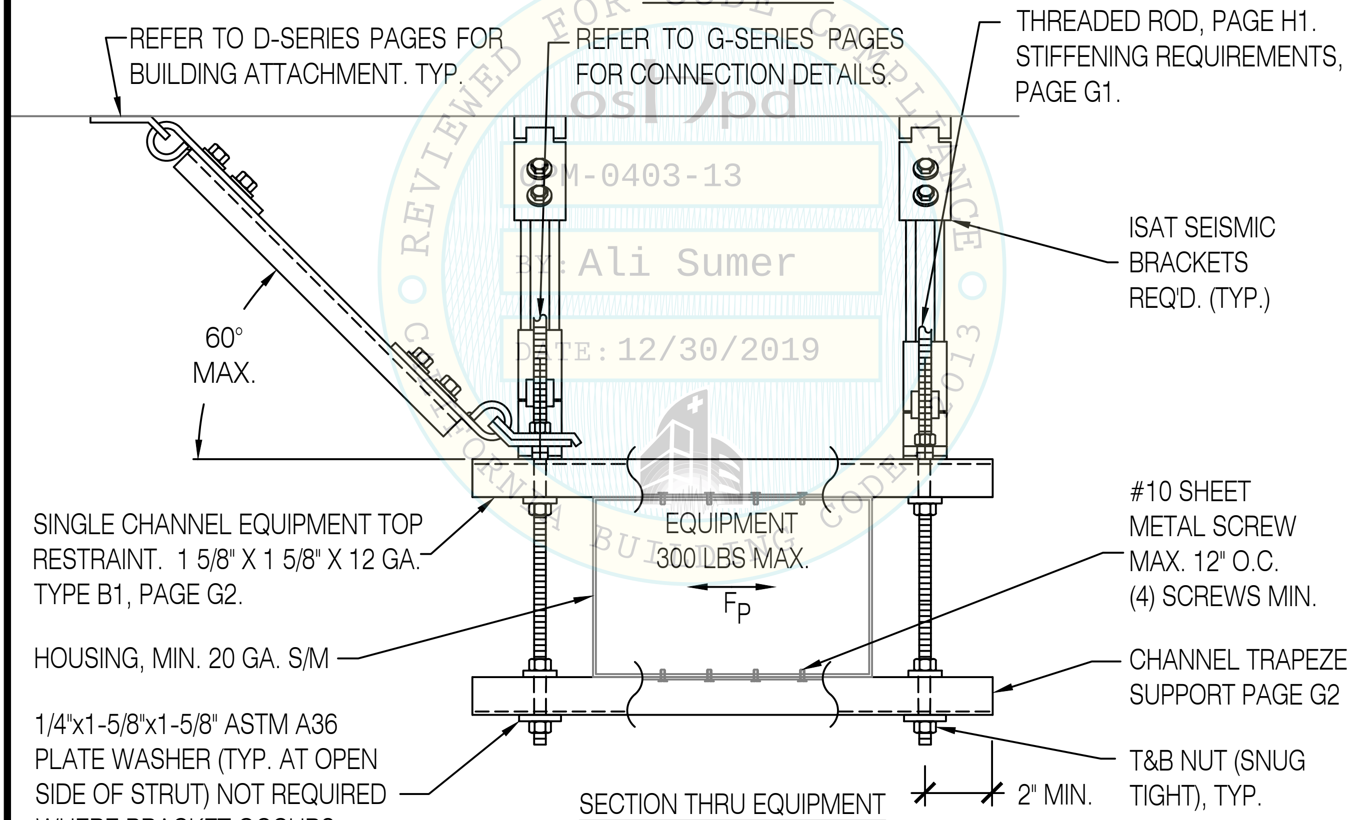
FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



OVERHEAD VIEW



SECTION THRU EQUIPMENT

MAXIMUM UNIT LENGTH 3 FEET. FOR UNITS EXCEEDING 3 FEET SEE PAGES B38.1 & B38.2

# IN-LINE EQUIPMENT
# 3-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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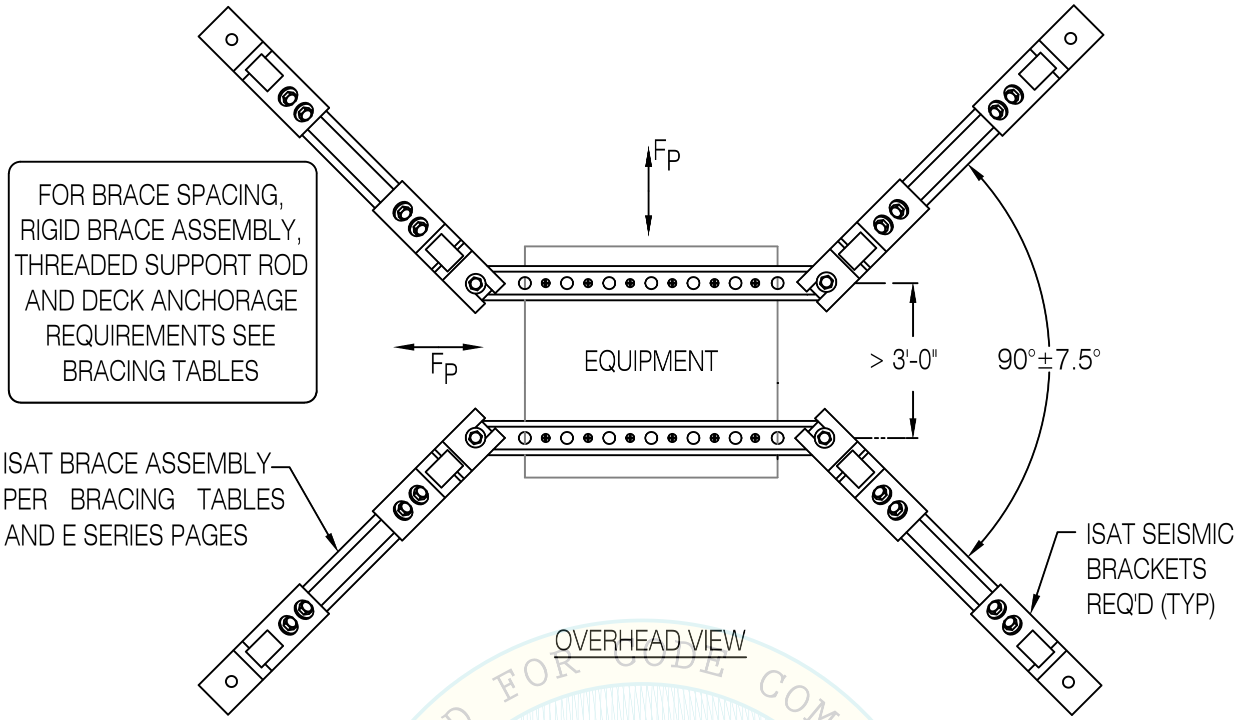
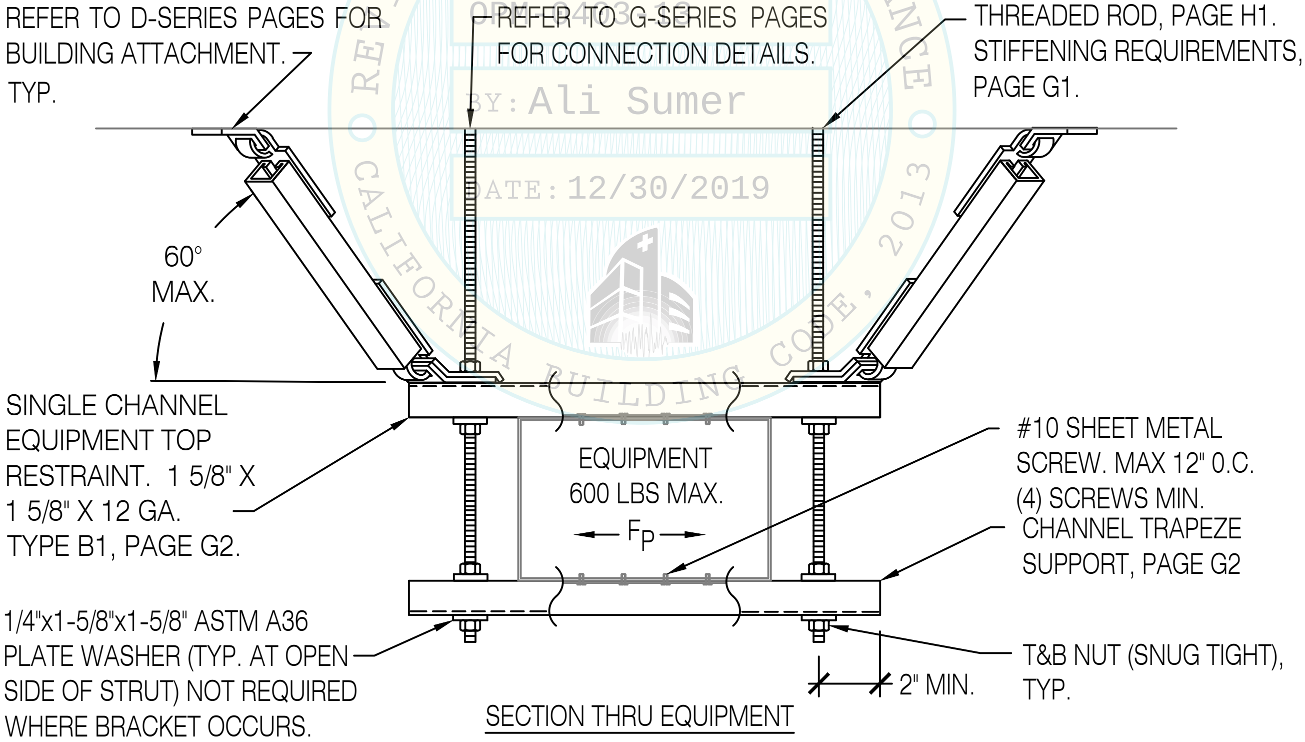


FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

ISAT BRACE ASSEMBLY PER BRACING TABLES AND E SERIES PAGES

ISAT SEISMIC BRACKETS REQ'D (TYP)

OVERHEAD VIEW



REFER TO D-SERIES PAGES FOR BUILDING ATTACHMENT. TYP.

REFER TO G-SERIES PAGES FOR CONNECTION DETAILS.

THREADED ROD, PAGE H1. STIFFENING REQUIREMENTS, PAGE G1.

SINGLE CHANNEL EQUIPMENT TOP RESTRAINT. 1 5/8" X 1 5/8" X 12 GA. TYPE B1, PAGE G2.

#10 SHEET METAL SCREW. MAX 12" 0.C. (4) SCREWS MIN.

CHANNEL TRAPEZE SUPPORT, PAGE G2

1/4"x1-5/8"x1-5/8" ASTM A36 PLATE WASHER (TYP. AT OPEN SIDE OF STRUT) NOT REQUIRED WHERE BRACKET OCCURS.

T&B NUT (SNUG TIGHT), TYP.

SECTION THRU EQUIPMENT

# 4-ROD SUSPENDED EQUIPMENT
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, RIGID BRACING

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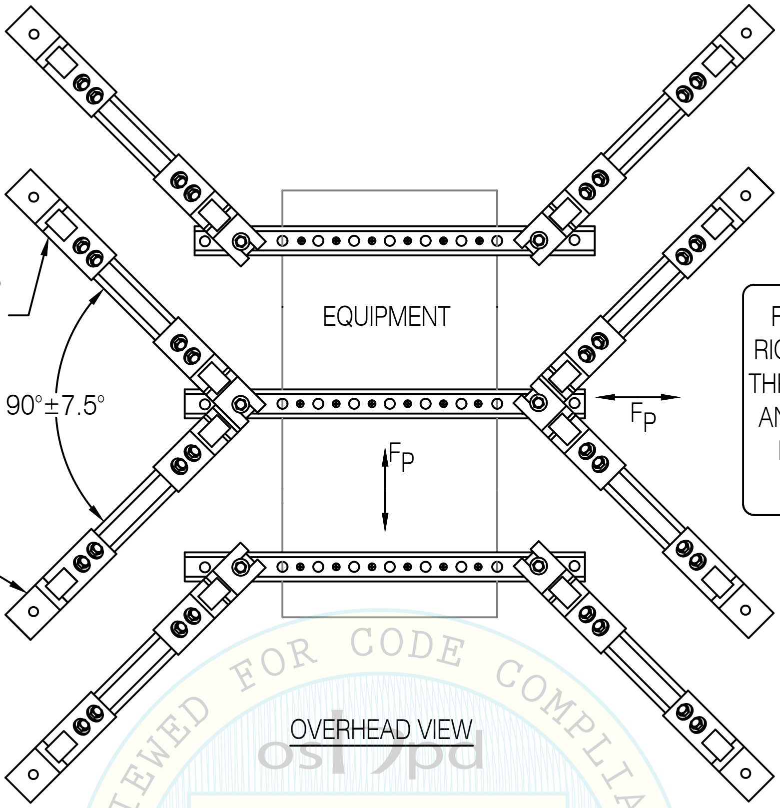
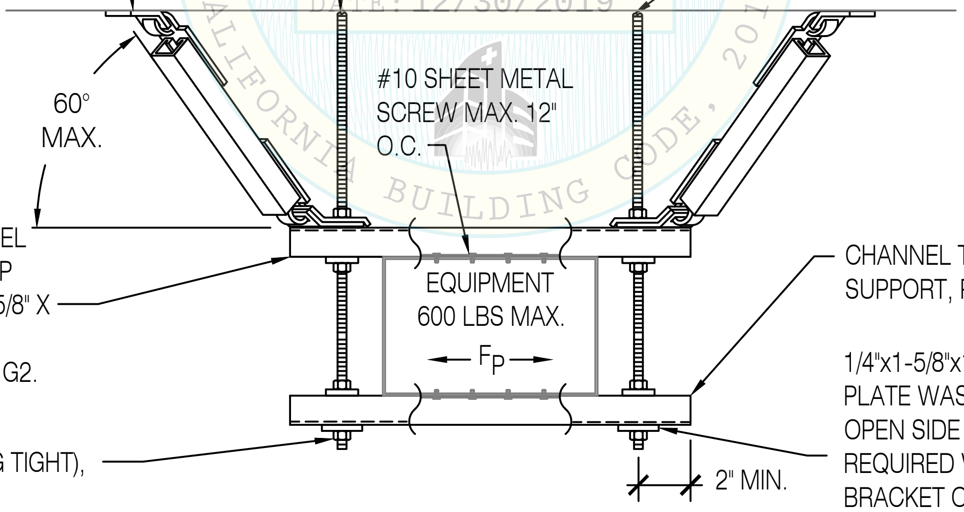


FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

OVERHEAD VIEW



SECTION THRU MECHANICAL EQUIPMENT

# 6-ROD SUSPENDED EQUIPMENT
# 8-WAY SPLAYED TRANSVERSE-LONGITUDINAL, RIGID BRACING

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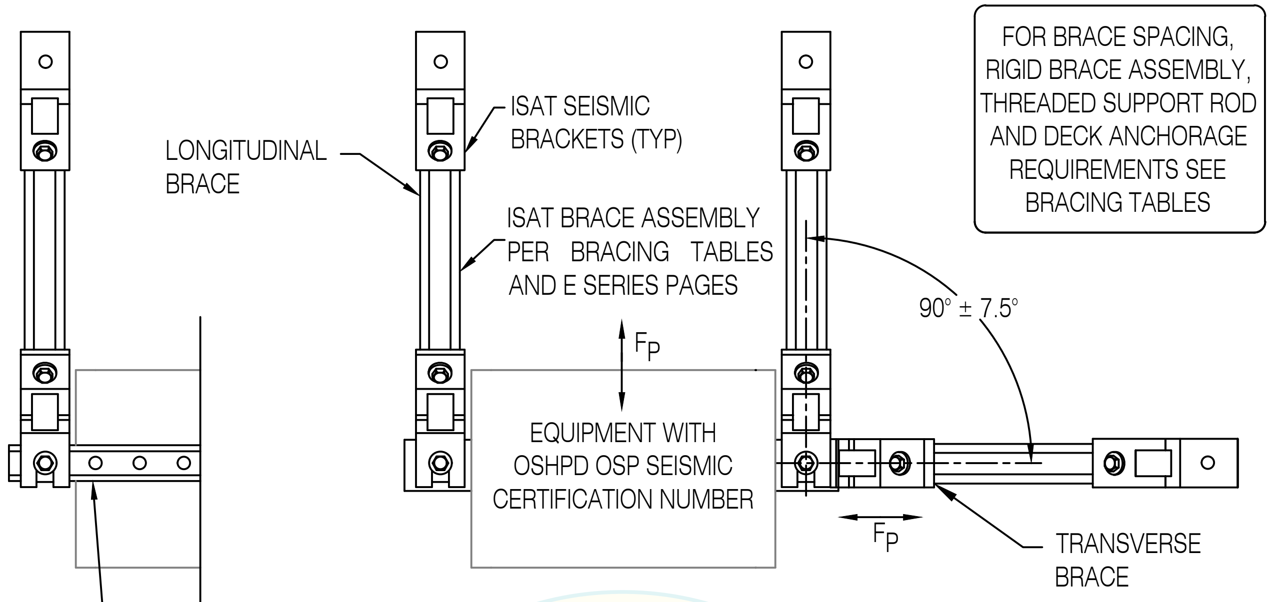
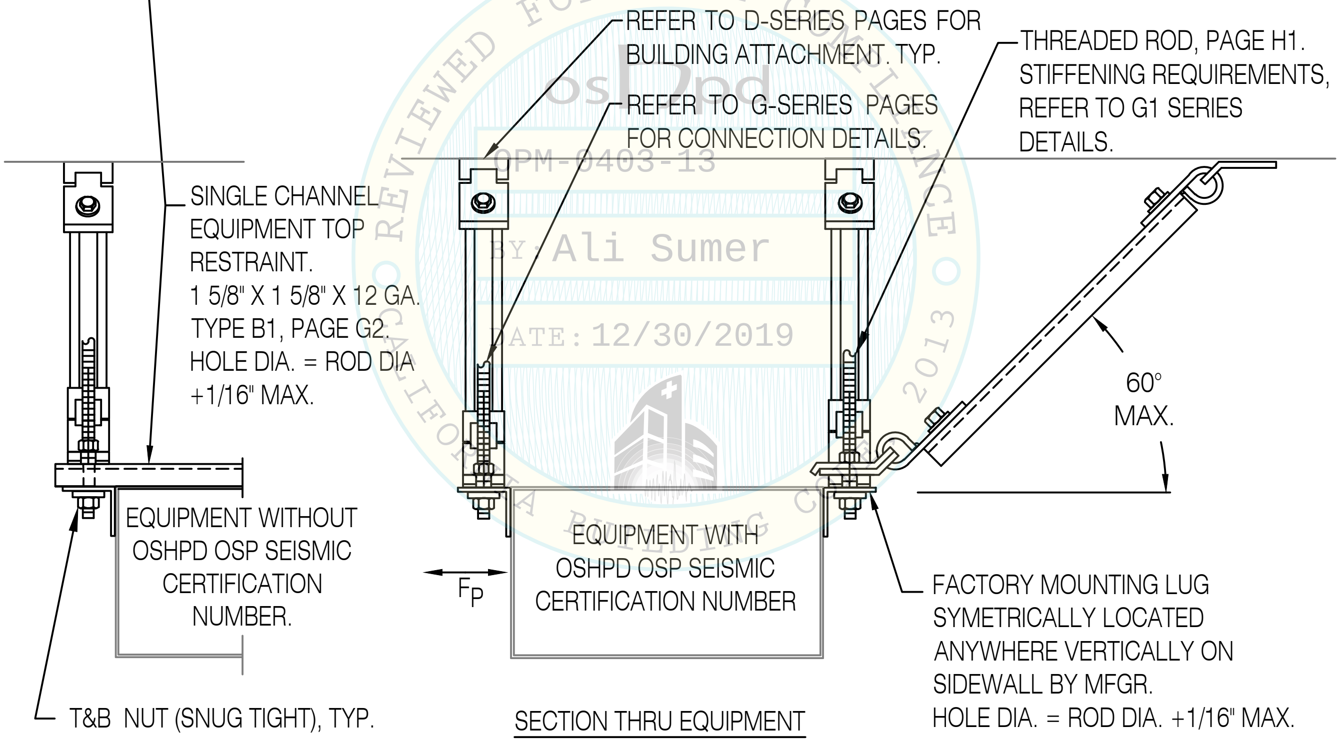


OVERHEAD VIEW



SECTION THRU EQUIPMENT

MAXIMUM UNIT WEIGHT, 300 LBS.

MAXIMUM UNIT LENGTH 3 FEET. FOR UNITS EXCEEDING 3 FEET SEE PAGES B38.5 & B38.6

# IN-LINE EQUIPMENT WITH FACTORY MOUNTING LUGS
# 3-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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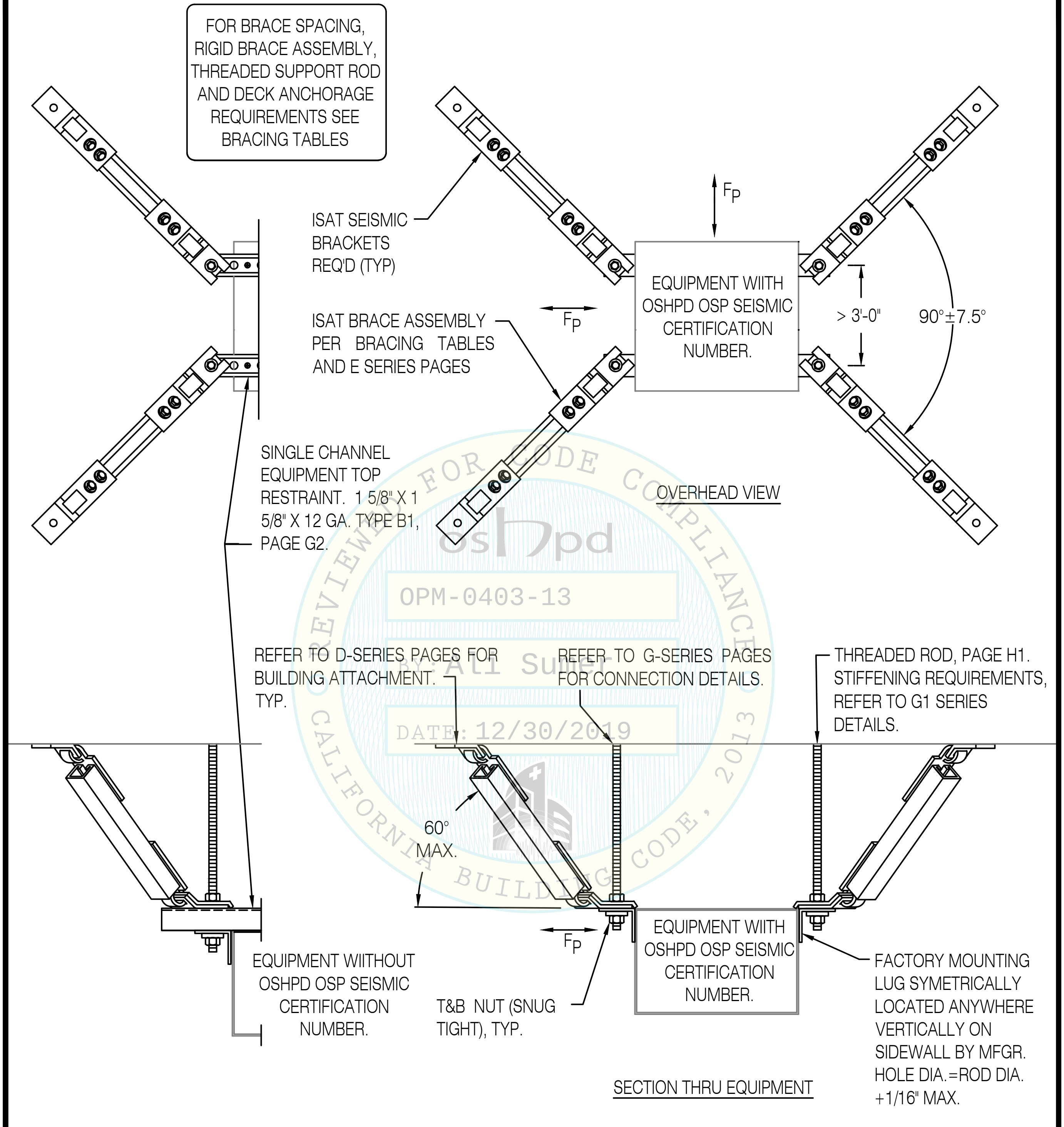

FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

ISAT SEISMIC BRACKETS REQ'D (TYP)

ISAT BRACE ASSEMBLY PER BRACING TABLES AND E SERIES PAGES

EQUIPMENT WIITH OSHPD OSP SEISMIC CERTIFICATION NUMBER.

SINGLE CHANNEL EQUIPMENT TOP RESTRAINT. 1 5/8" X 1 5/8" X 12 GA. TYPE B1, PAGE G2.

OVERHEAD VIEW

REFER TO D-SERIES PAGES FOR BUILDING ATTACHMENT. TYP.

REFER TO G-SERIES PAGES FOR CONNECTION DETAILS.

THREADED ROD, PAGE H1. STIFFENING REQUIREMENTS, REFER TO G1 SERIES DETAILS.

EQUIPMENT WIITHOUT OSHPD OSP SEISMIC CERTIFICATION NUMBER.

T&B NUT (SNUG TIGHT), TYP.

EQUIPMENT WIITH OSHPD OSP SEISMIC CERTIFICATION NUMBER.

FACTORY MOUNTING LUG SYMETRICALLY LOCATED ANYWHERE VERTICALLY ON SIDEWALL BY MFGR. HOLE DIA.=ROD DIA. +1/16" MAX.

SECTION THRU EQUIPMENT

# 4-ROD SUSPENDED EQUIPMENT WITH FACTORY MOUNTING LUGS
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, RIGID BRACING

ANTHONY A. RUBALCAVA
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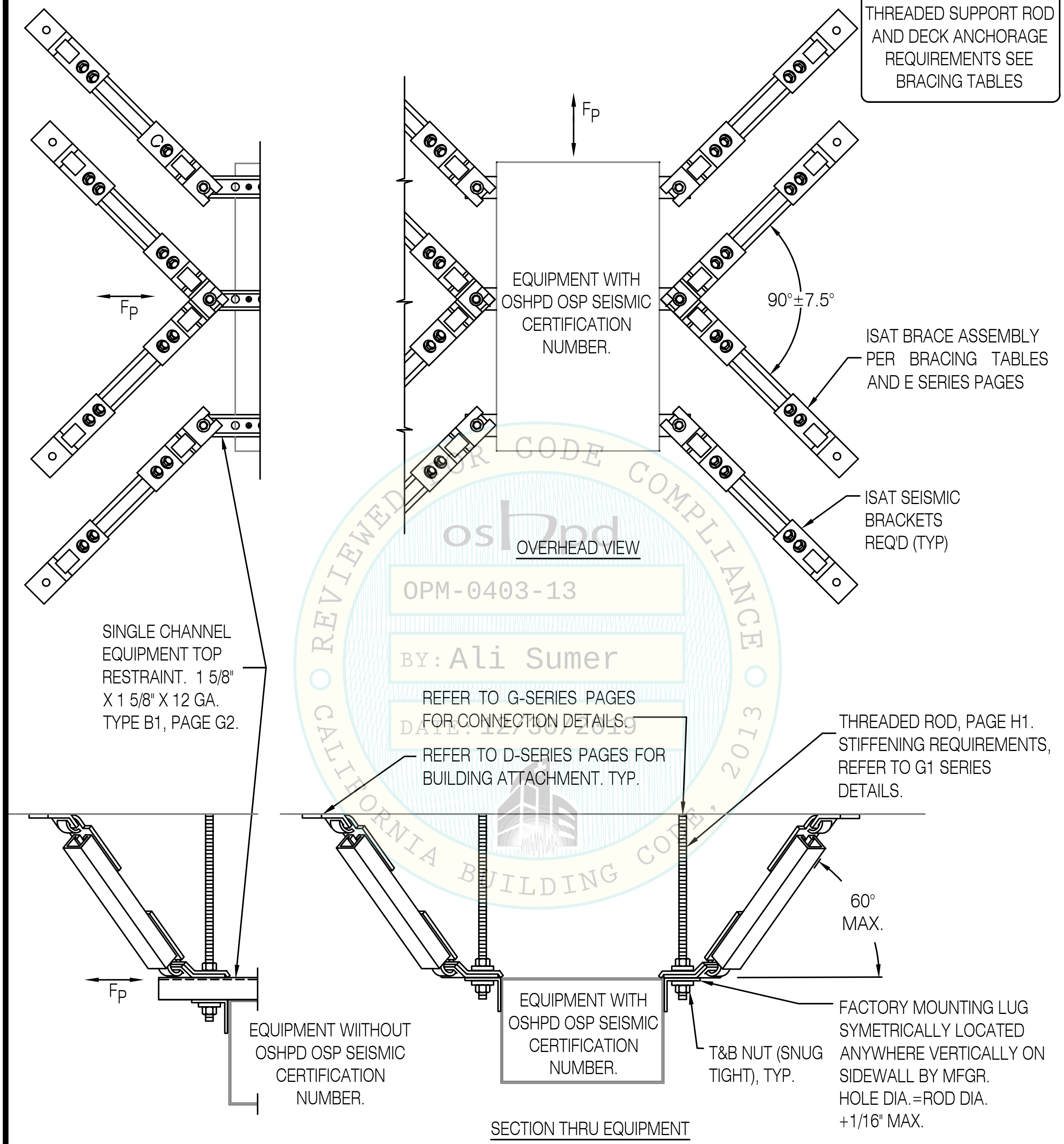

FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

EQUIPMENT WITH OSHPD OSP SEISMIC CERTIFICATION NUMBER.

ISAT BRACE ASSEMBLY PER BRACING TABLES AND E SERIES PAGES

ISAT SEISMIC BRACKETS REQ'D (TYP)

OVERHEAD VIEW

SINGLE CHANNEL EQUIPMENT TOP RESTRAINT. 1 5/8" X 1 5/8" X 12 GA. TYPE B1, PAGE G2.

REFER TO G-SERIES PAGES FOR CONNECTION DETAILS.

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EQUIPMENT WIITHOUT OSHPD OSP SEISMIC CERTIFICATION NUMBER.

EQUIPMENT WITH OSHPD OSP SEISMIC CERTIFICATION NUMBER.

T&B NUT (SNUG TIGHT), TYP.

FACTORY MOUNTING LUG SYMETRICALLY LOCATED ANYWHERE VERTICALLY ON SIDEWALL BY MFGR. HOLE DIA.=ROD DIA. +1/16" MAX.

SECTION THRU EQUIPMENT

# 6-ROD SUSPENDED EQUIPMENT
# 8-WAY SPLAYED TRANSVERSE-LONGITUDINAL, RIGID BRACING

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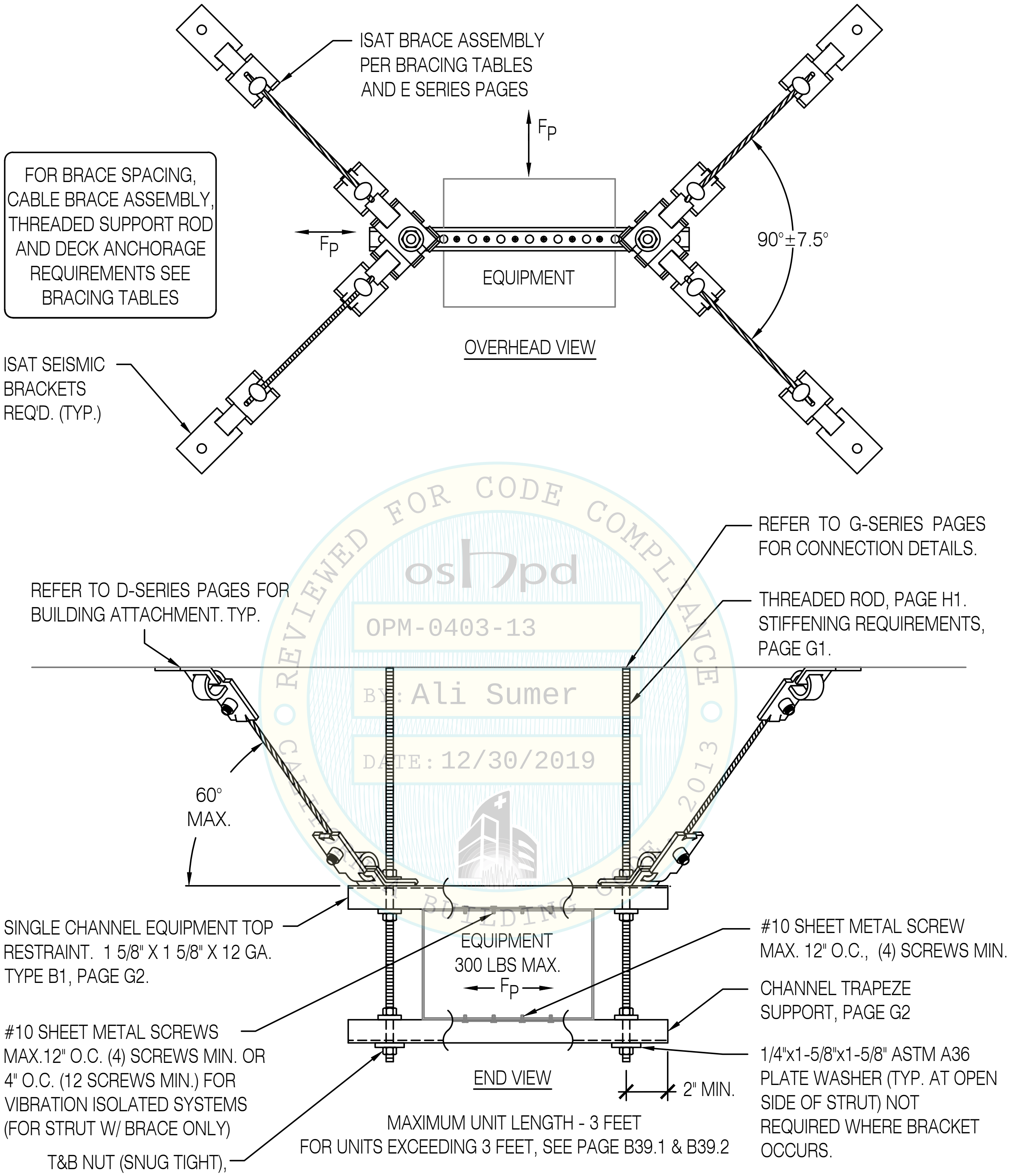

MAXIMUM UNIT LENGTH - 3 FEET
FOR UNITS EXCEEDING 3 FEET, SEE PAGE B39.1 & B39.2

# 2-ROD SUSPENDED EQUIPMENT
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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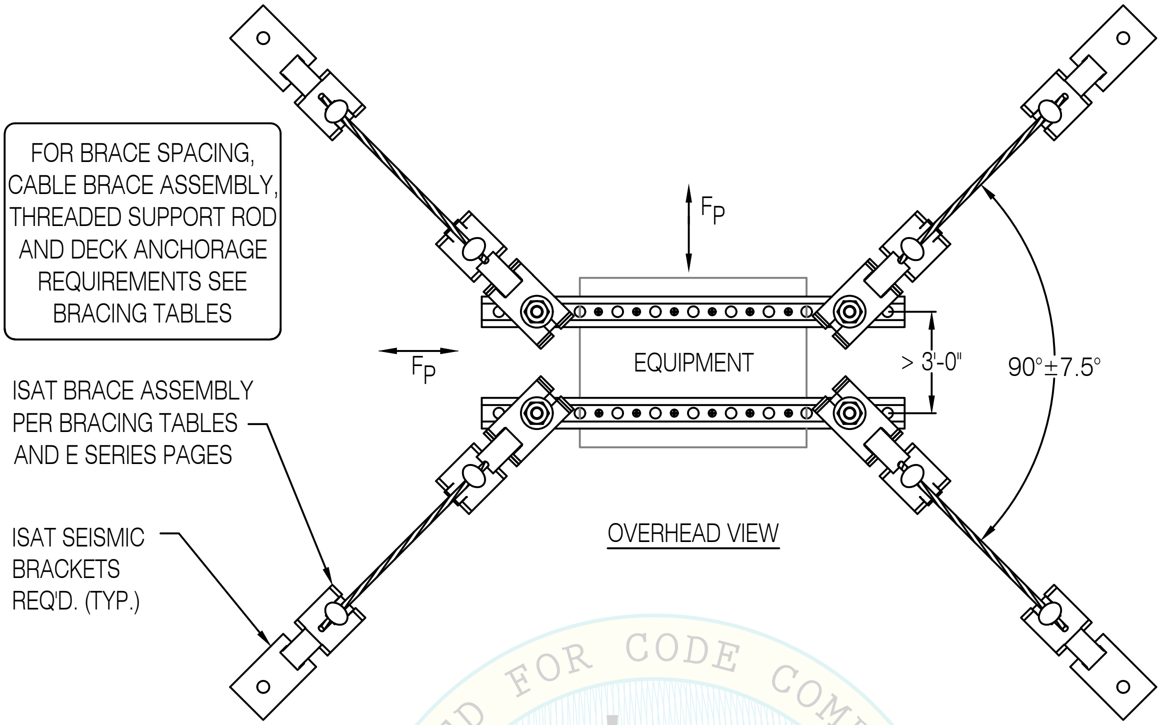

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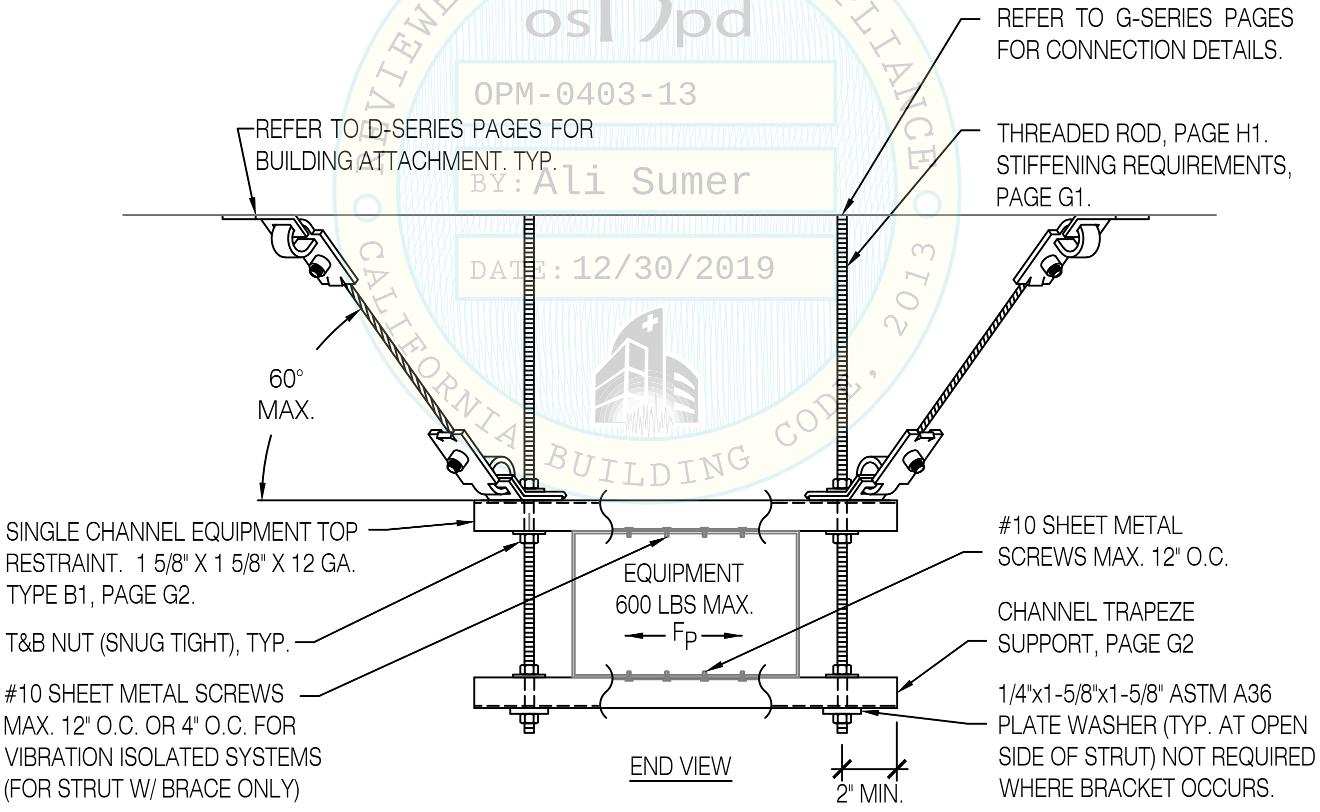

END VIEW

# 4-ROD SUSPENDED EQUIPMENT
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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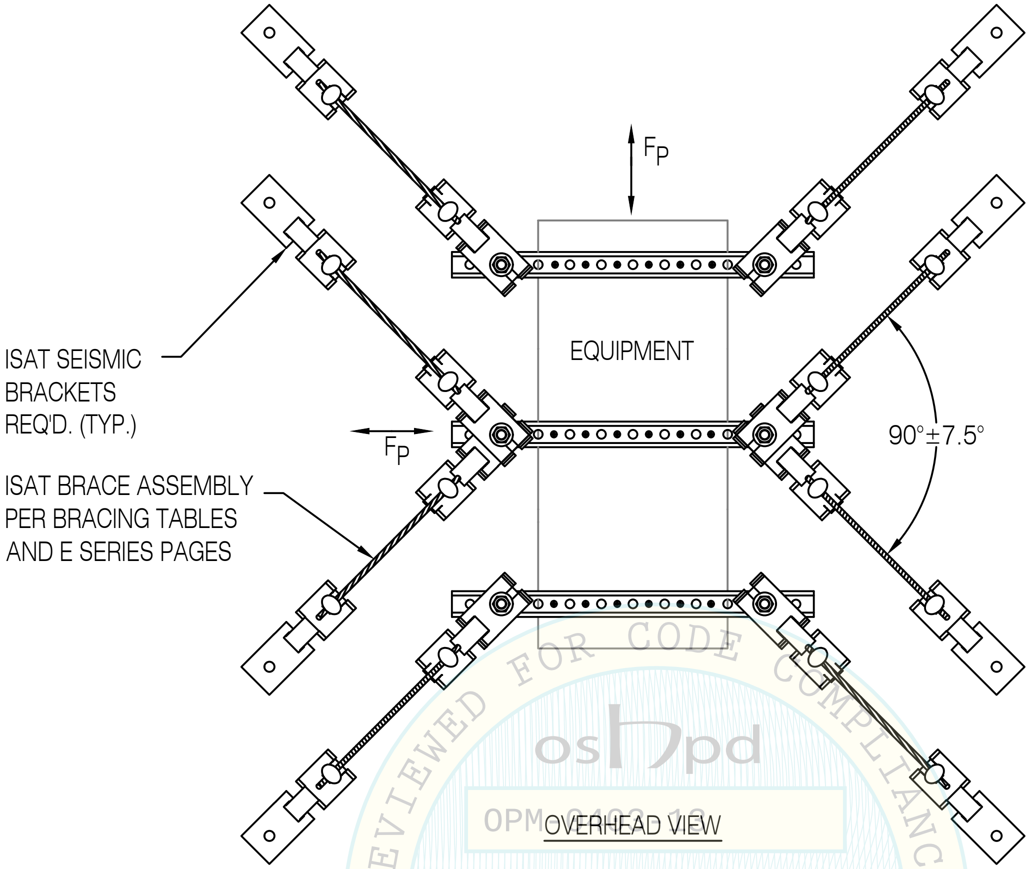
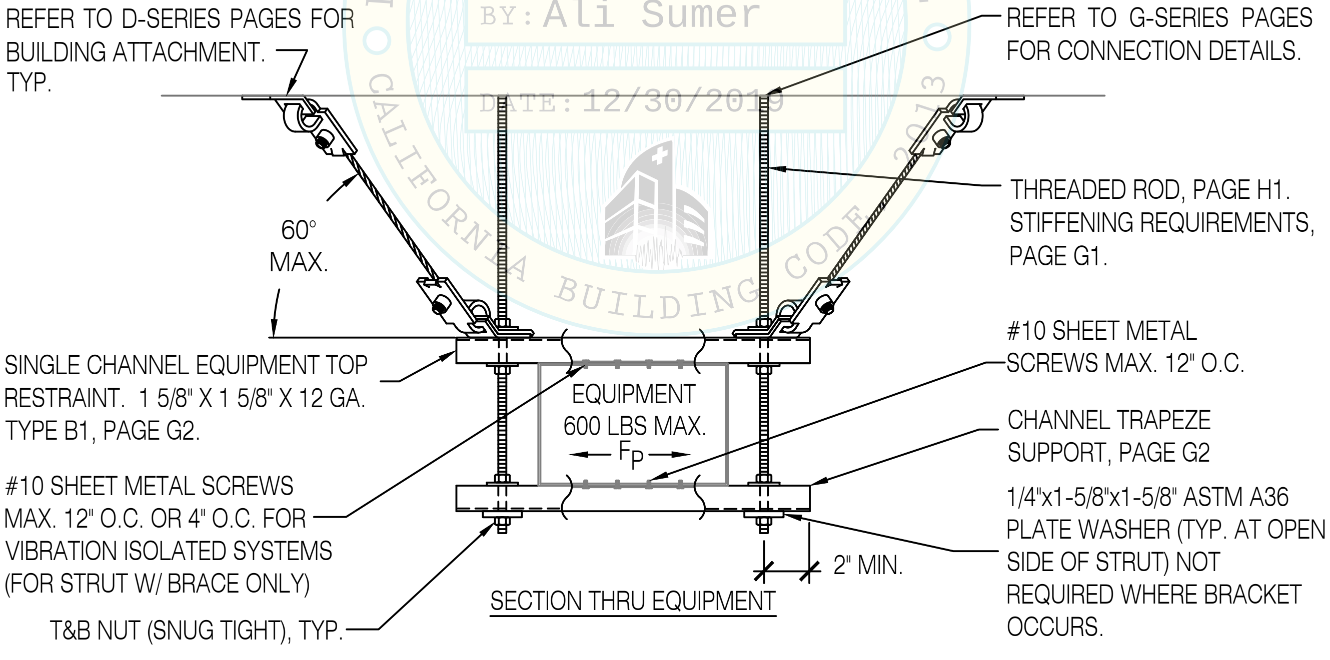
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES





# 6-ROD SUSPENDED EQUIPMENT
# 8-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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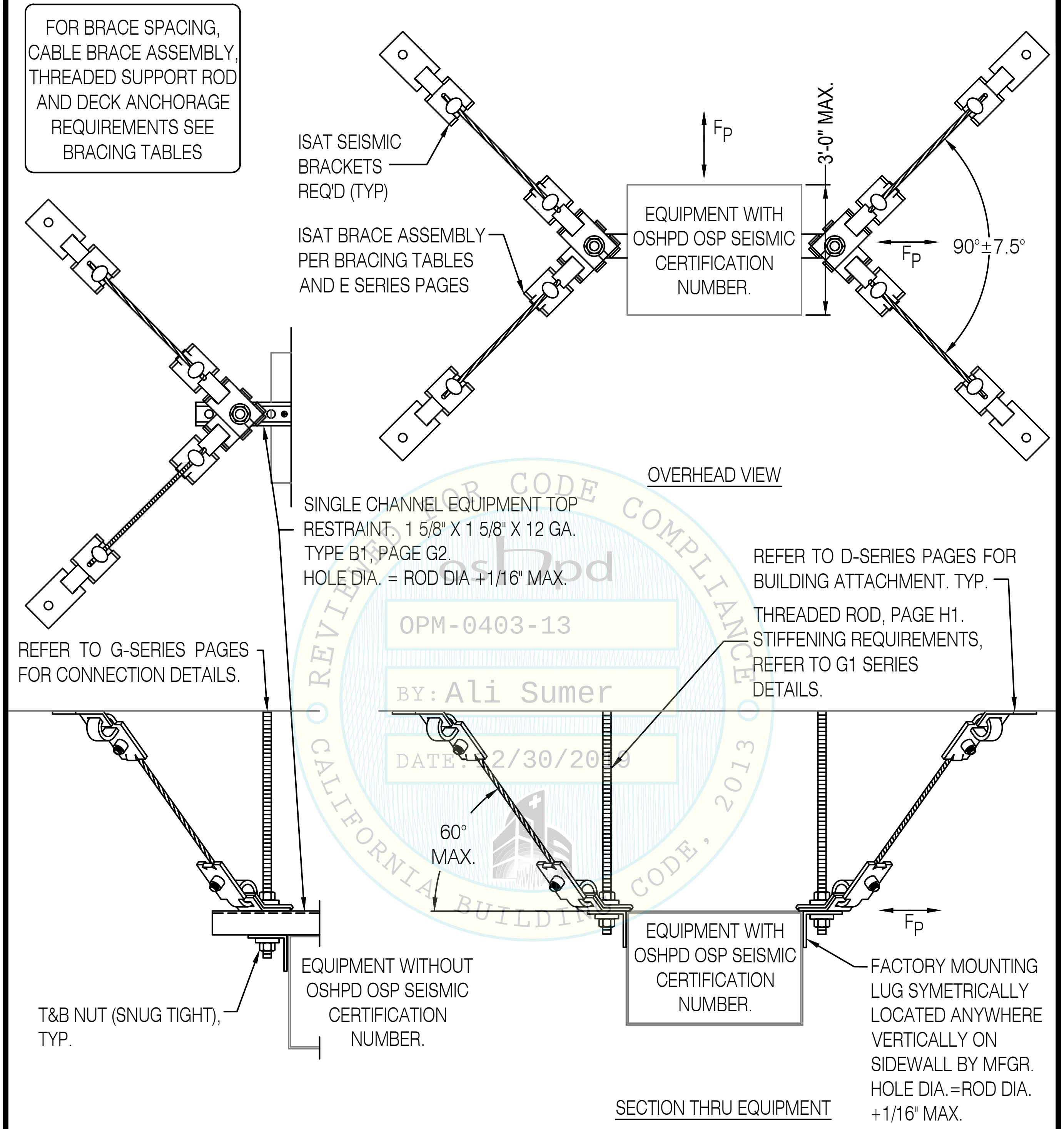
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



MAXIMUM WEIGHT = 300 LBS

# 2-ROD SUSPENDED EQUIPMENT
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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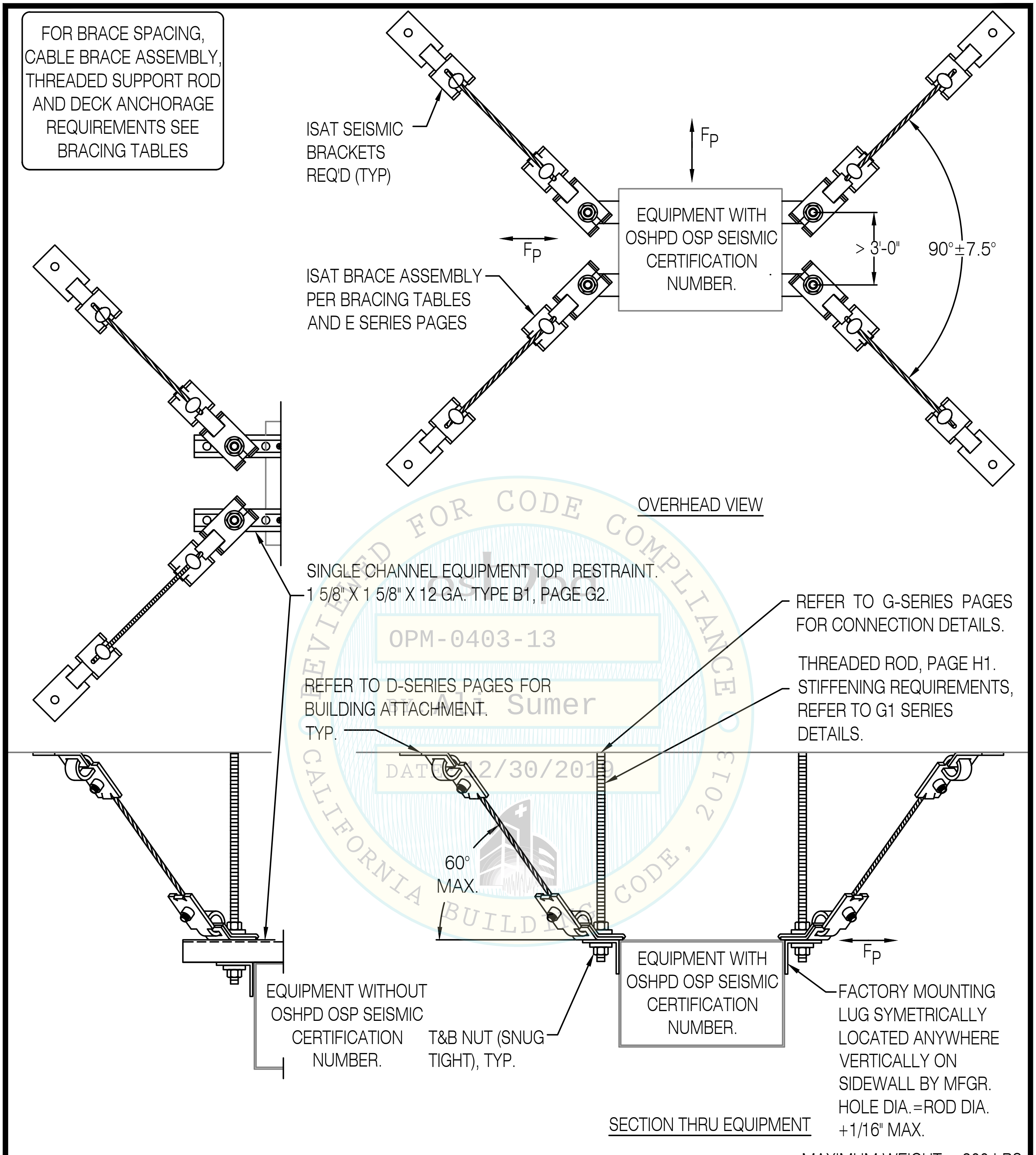

MAXIMUM WEIGHT = 300 LBS

# 4-ROD SUSPENDED EQUIPMENT
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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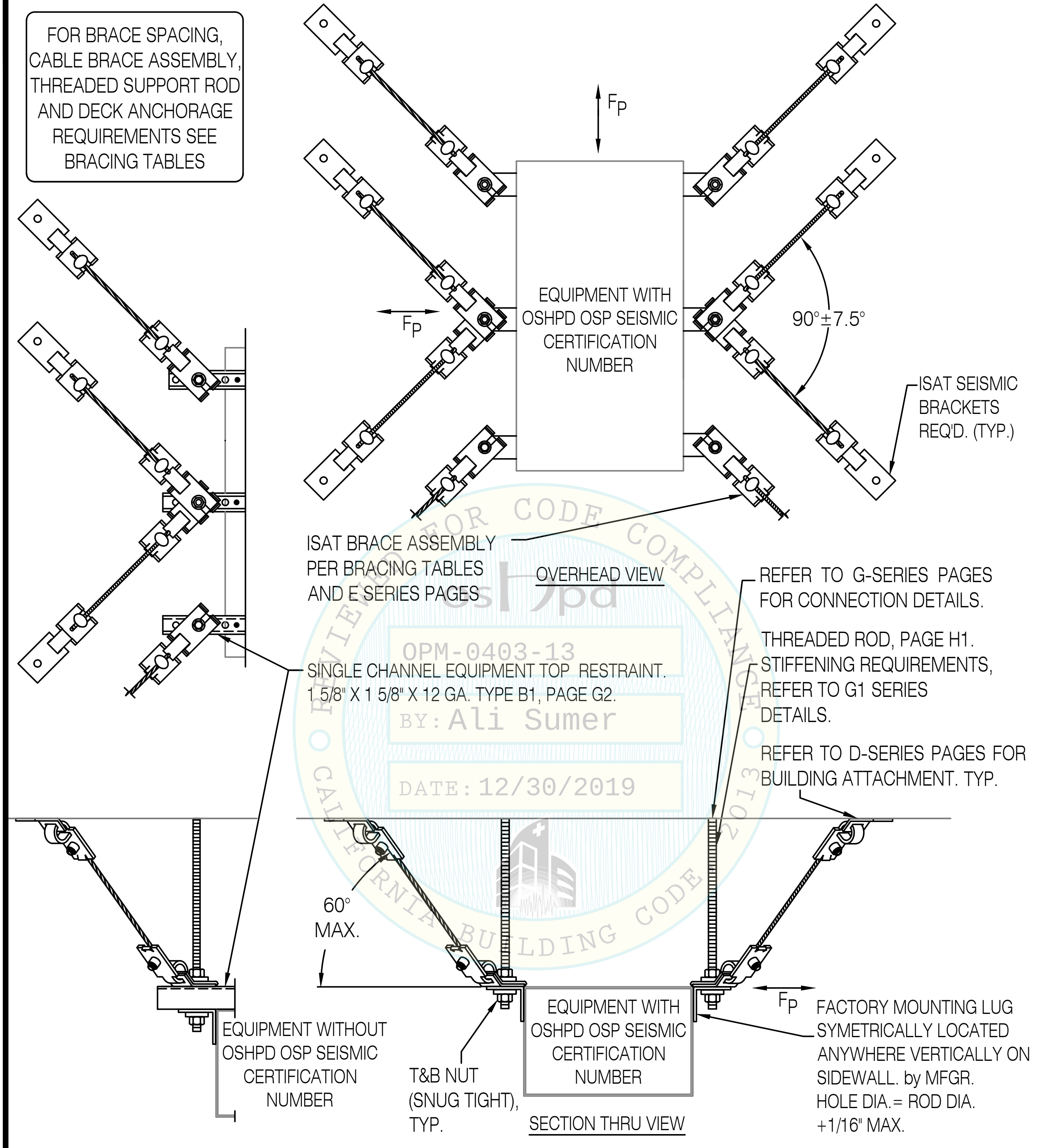
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



MAXIMUM WEIGHT = 300 LBS

# 6-ROD SUSPENDED EQUIPMENT
# 8-WAY SPLAYED TRANSVERSE-LONGITUDINAL, CABLE BRACING

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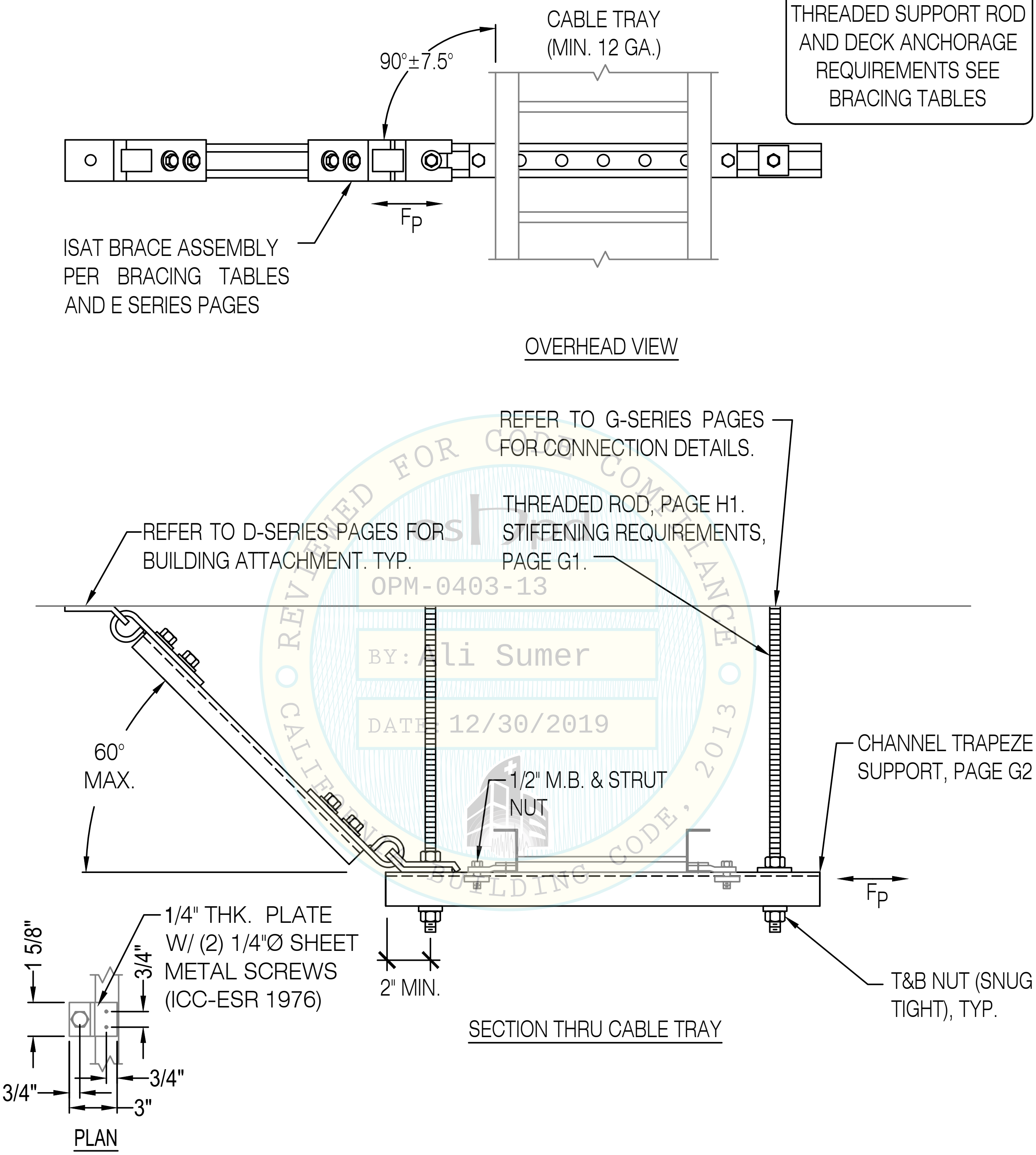
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



# CABLE TRAY
# 1-WAY TRANSVERSE, RIGID BRACING

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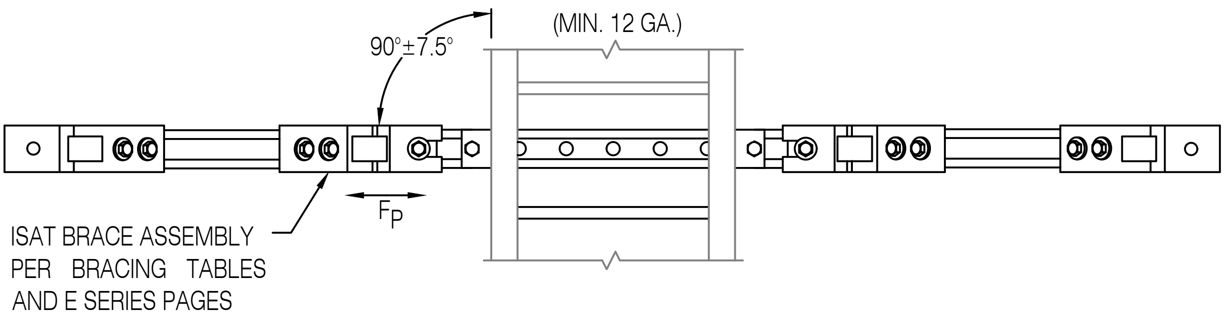
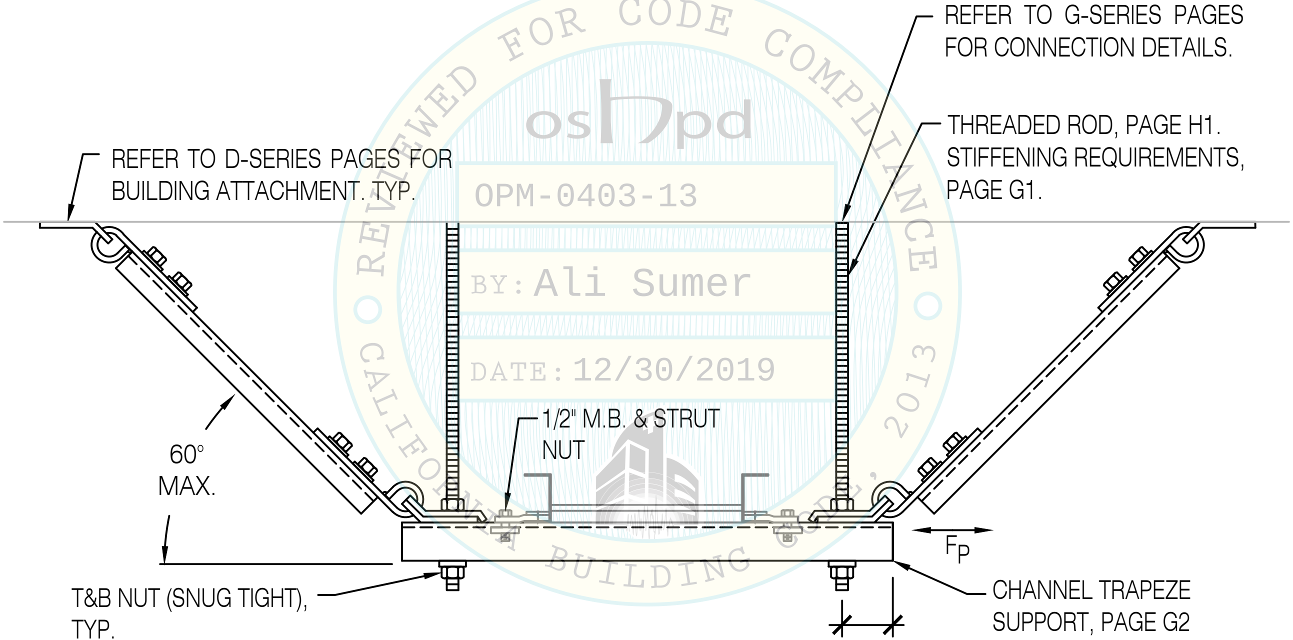
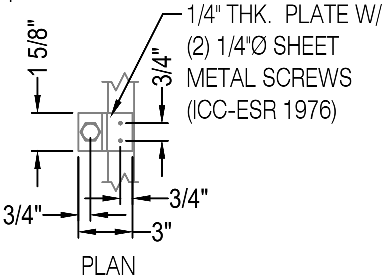
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



OVERHEAD VIEW



SECTION THRU CABLE TRAY



PLAN

# CABLE TRAY
# 2-WAY TRANSVERSE, RIGID BRACING

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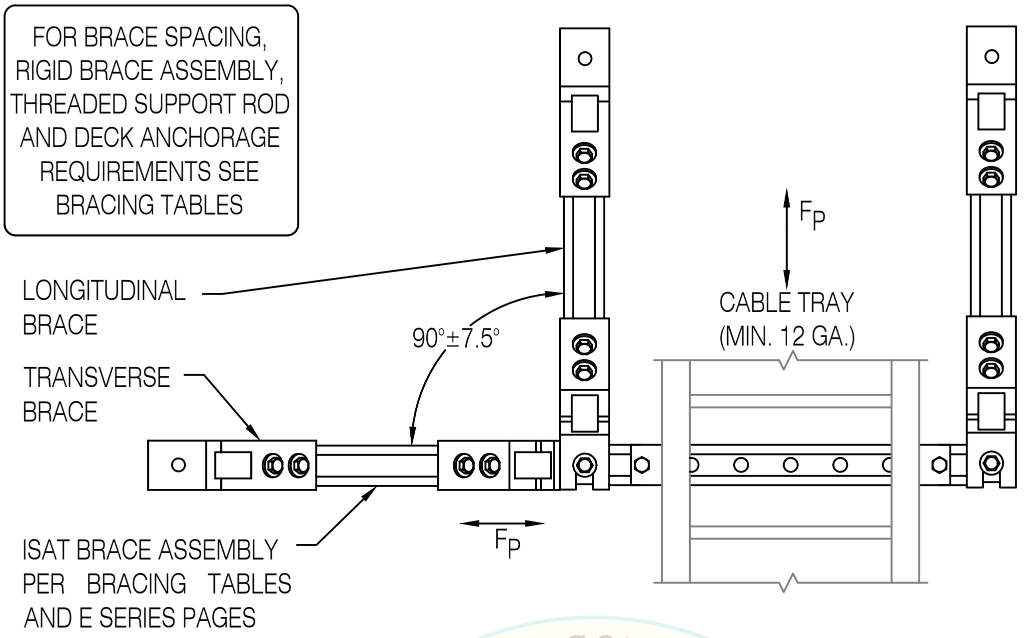

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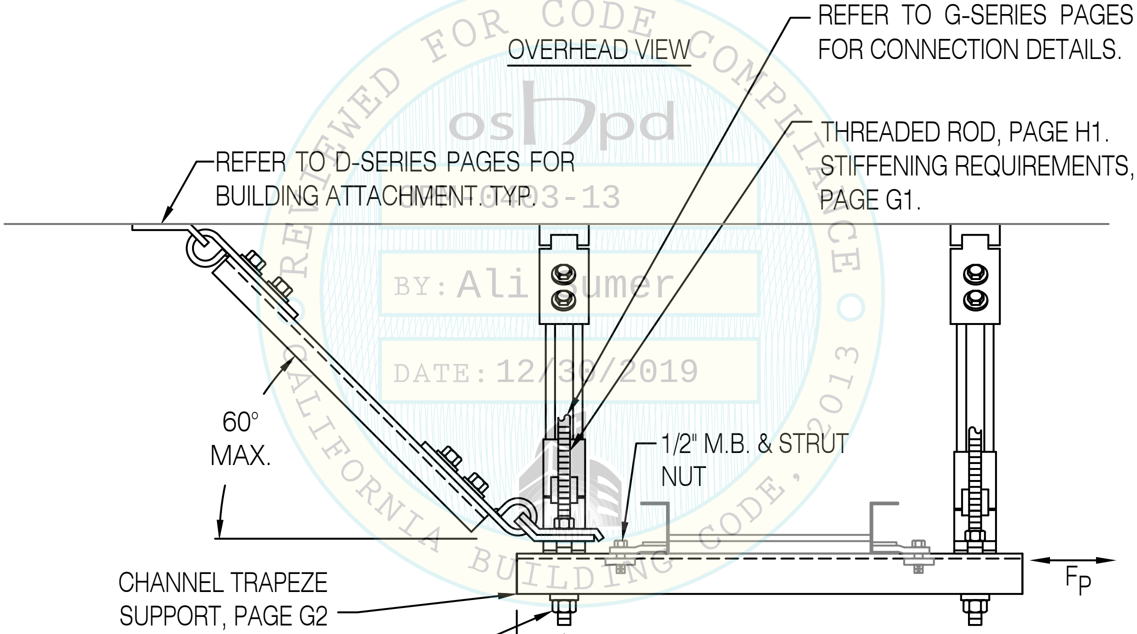
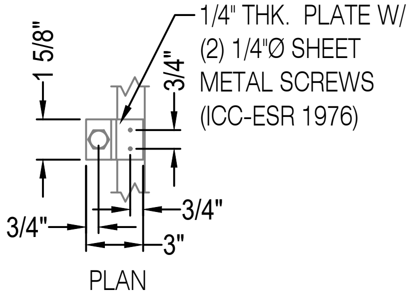


SECTION THRU CABLE TRAY



PLAN

## CABLE TRAY
## 3-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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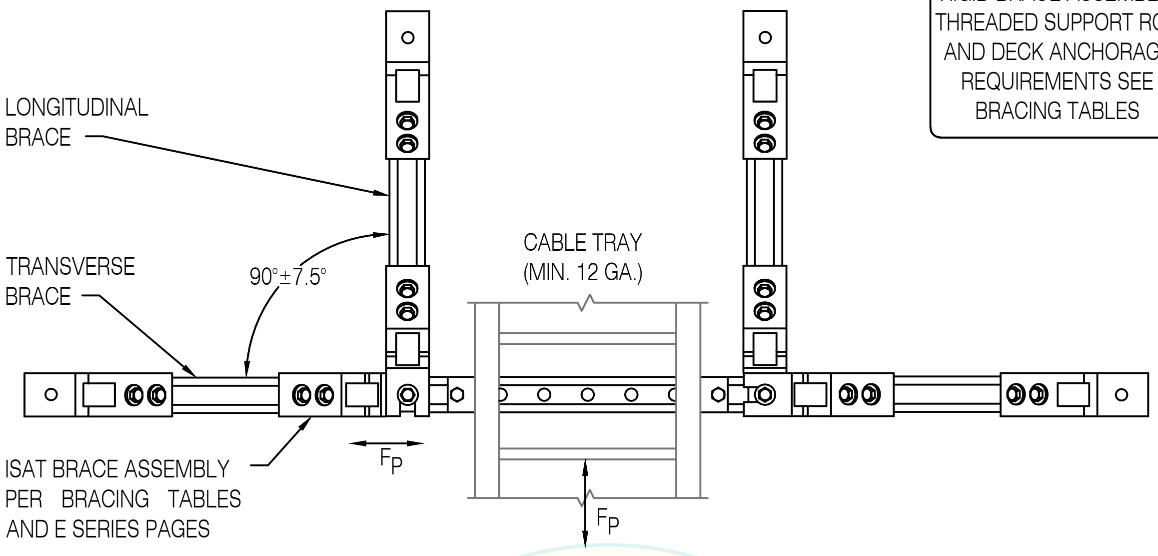
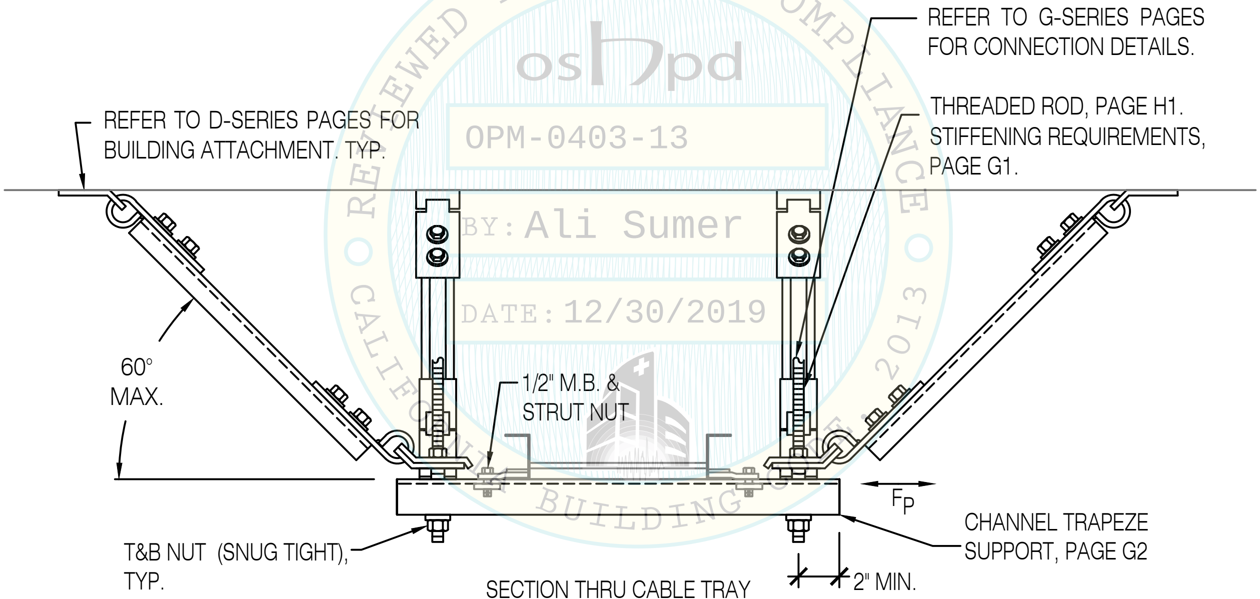
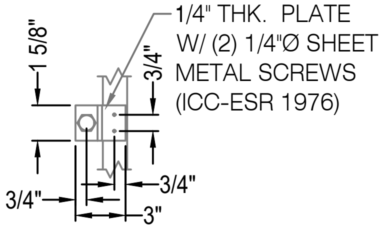


OVERHEAD VIEW



SECTION THRU CABLE TRAY



PLAN

# CABLE TRAY
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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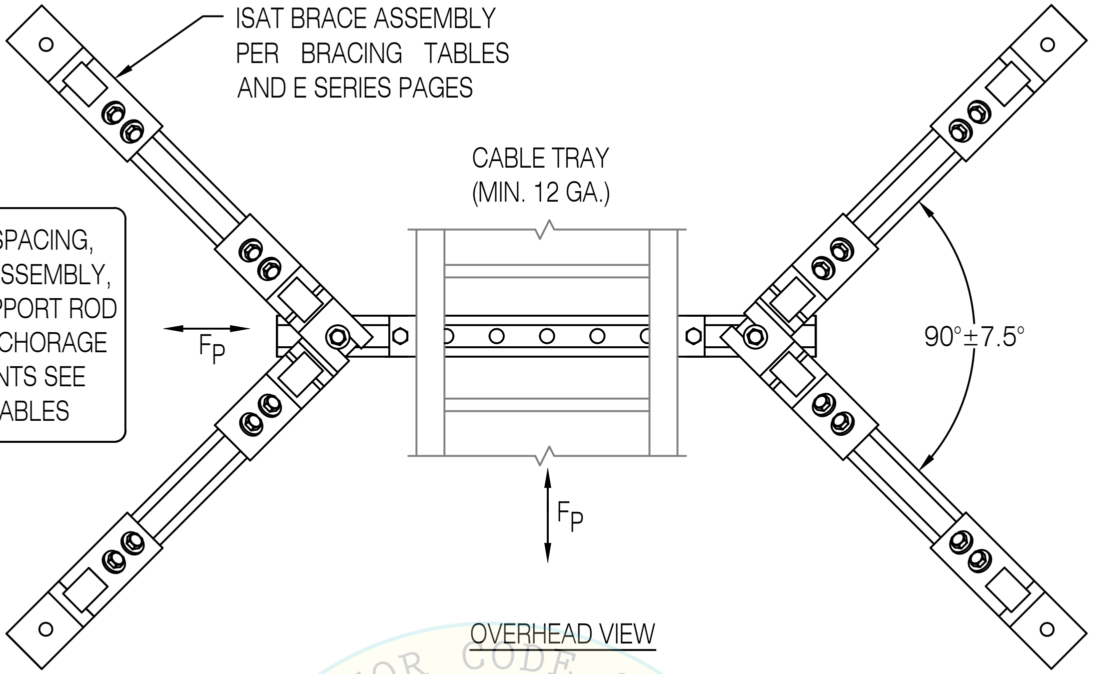
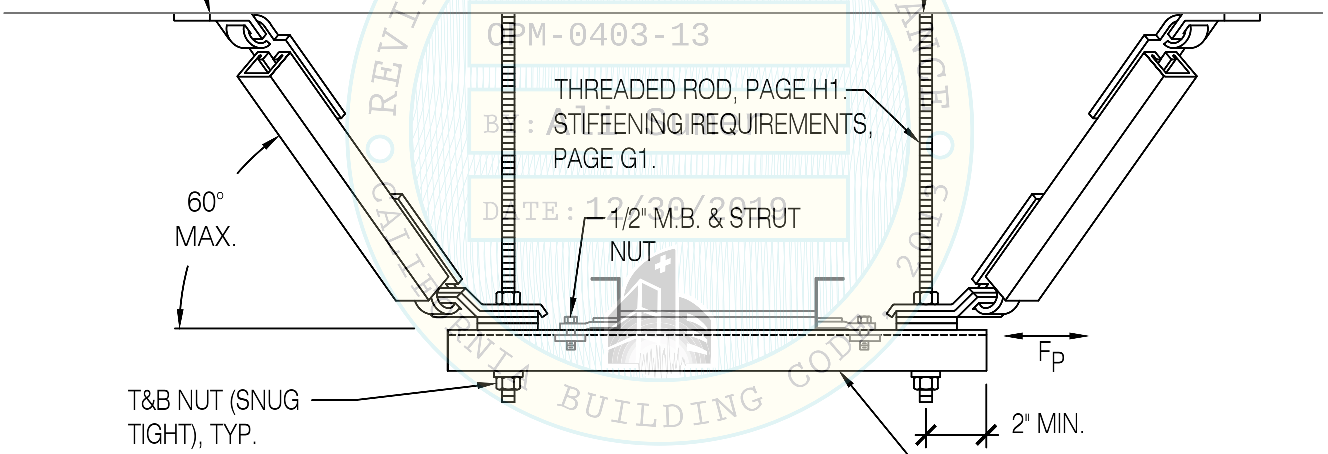


FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

OVERHEAD VIEW

REFER TO D-SERIES PAGES FOR BUILDING ATTACHMENT. TYP.

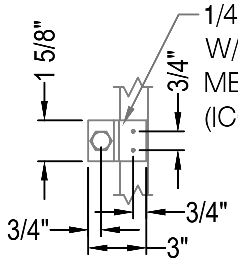
REFER TO G-SERIES PAGES FOR CONNECTION DETAILS.



CHANNEL TRAPEZE SUPPORT, PAGE G2

SECTION THRU CABLE TRAY

1/4" THK. PLATE W/ (2) 1/4"Ø SHEET METAL SCREWS (ICC-ESR 1976)



PLAN

## CABLE TRAY
## 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, RIGID BRACING

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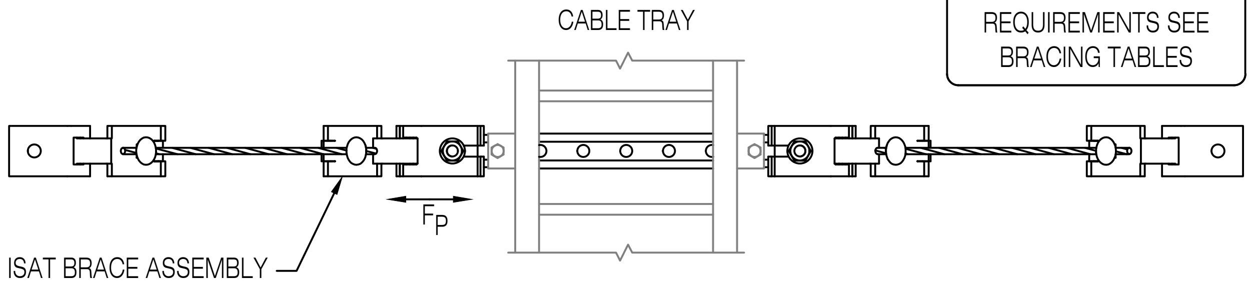
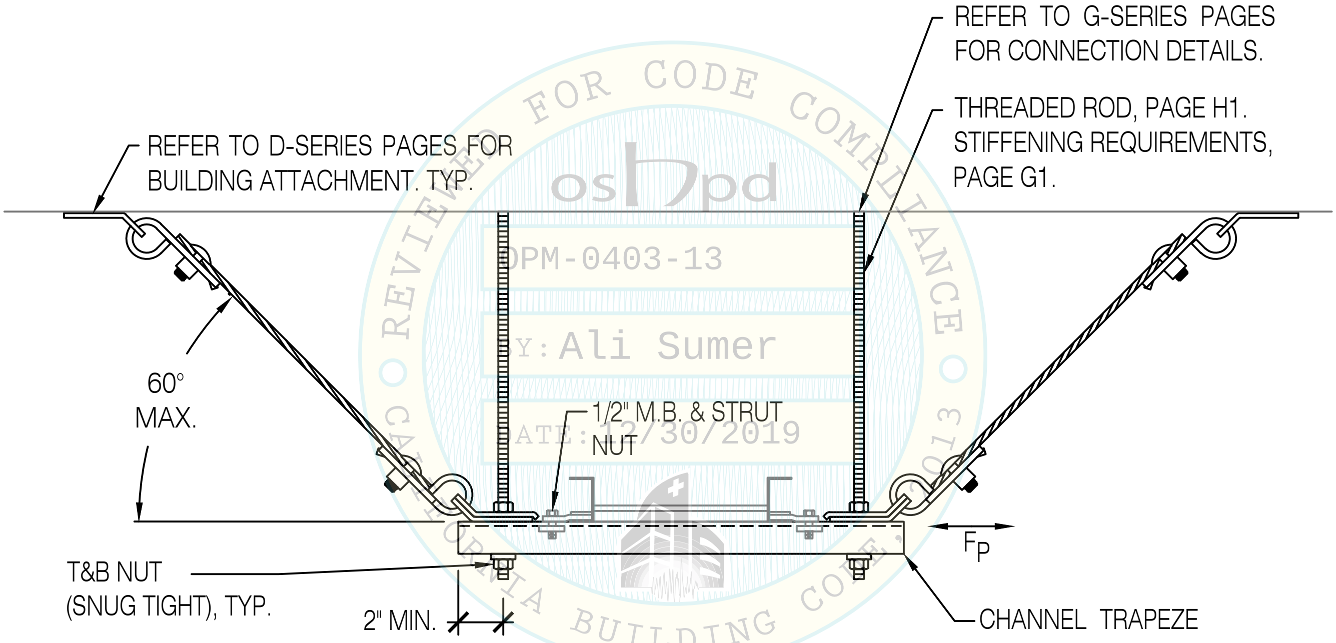
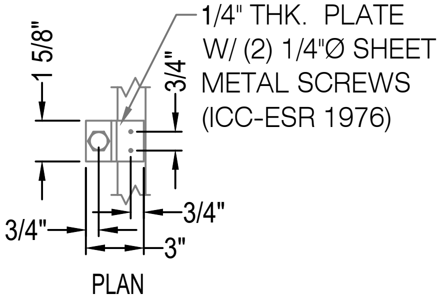
FOR BRACE SPACING,
CABLE BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



OVERHEAD VIEW



SECTION THRU CABLE TRAY



PLAN

# CABLE TRAY
# 2-WAY TRANSVERSE, CABLE BRACING

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S 4710

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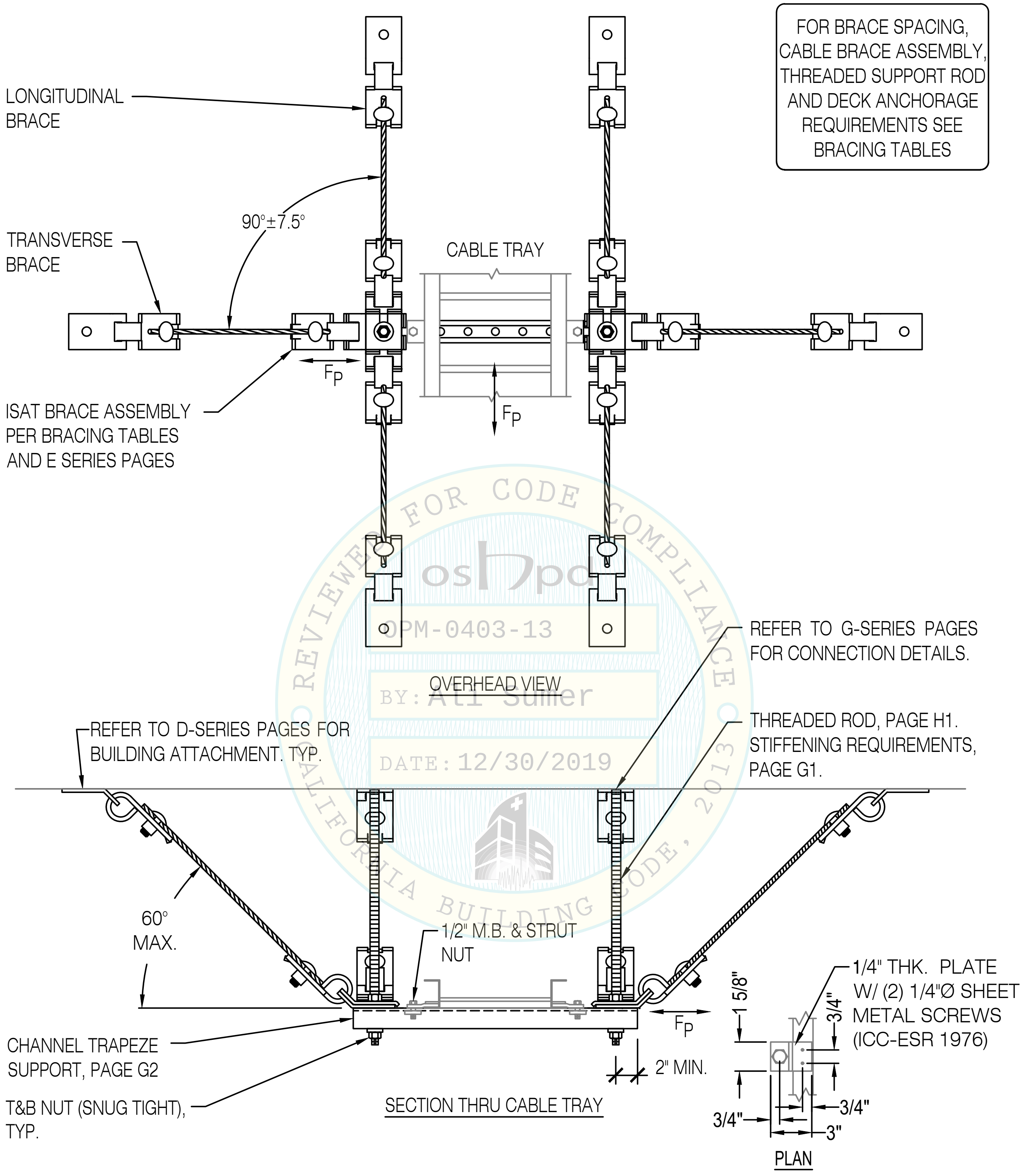
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



# CABLE TRAY
# 6-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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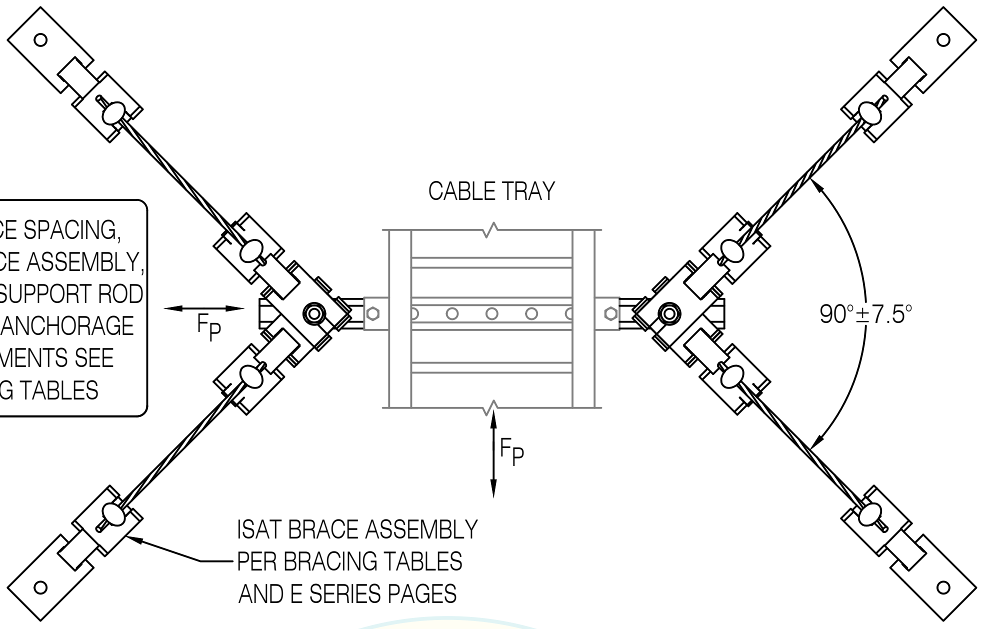
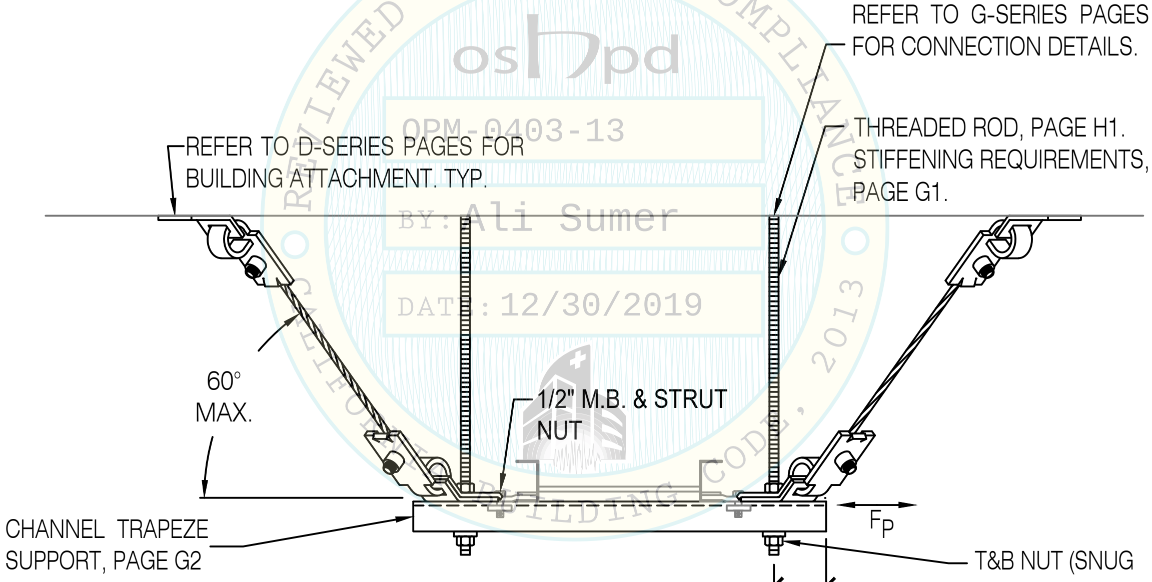
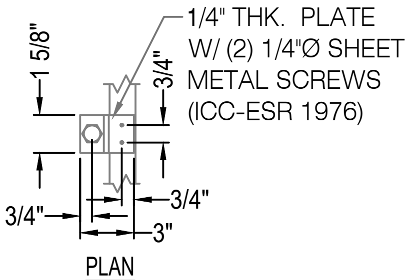


OVERHEAD VIEW



SECTION THRU CABLE TRAY



PLAN

# CABLE TRAY
# 4-WAY SPLAYED, CABLE BRACING

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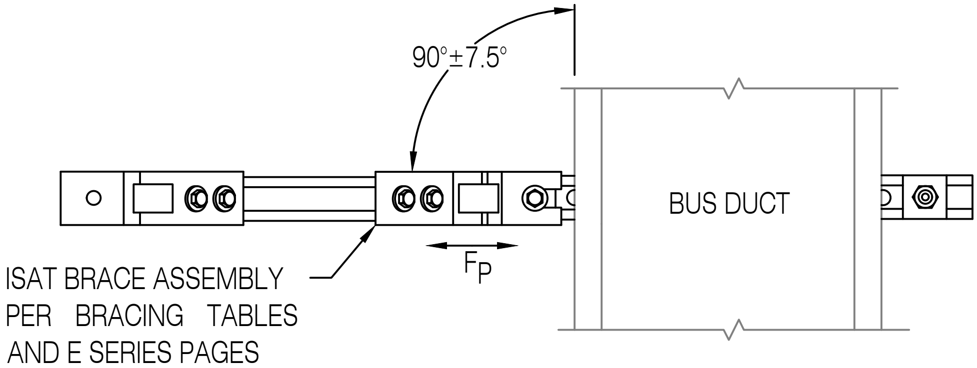
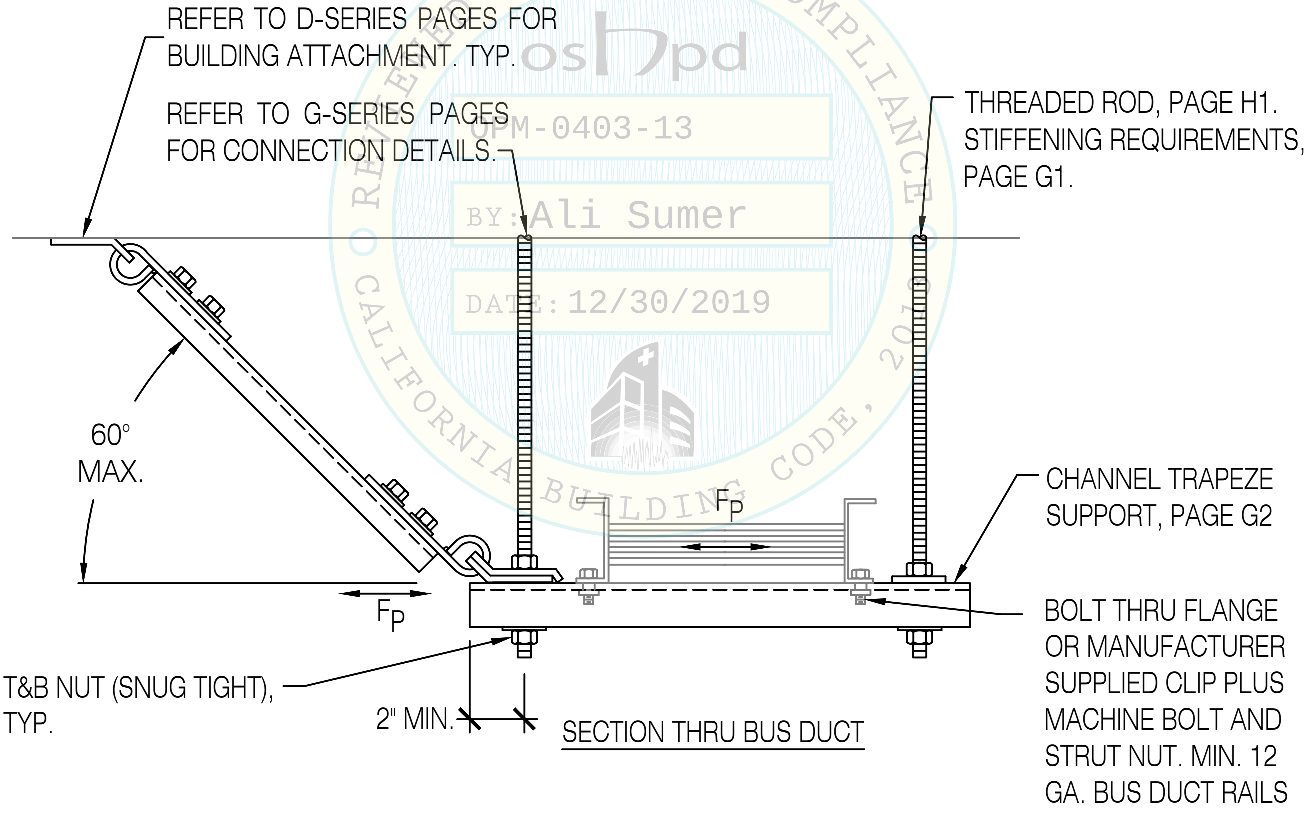


OVERHEAD VIEW



SECTION THRU BUS DUCT

# BUS DUCT TRAPEZE
# 1-WAY TRANSVERSE, RIGID BRACING

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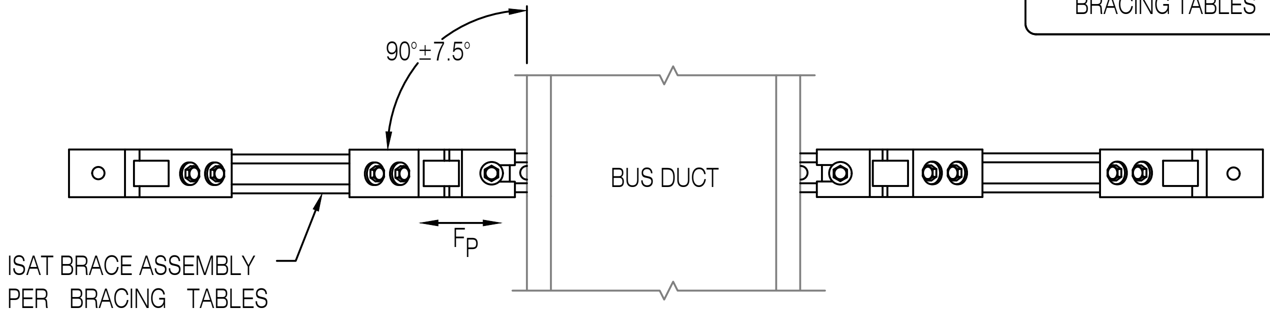
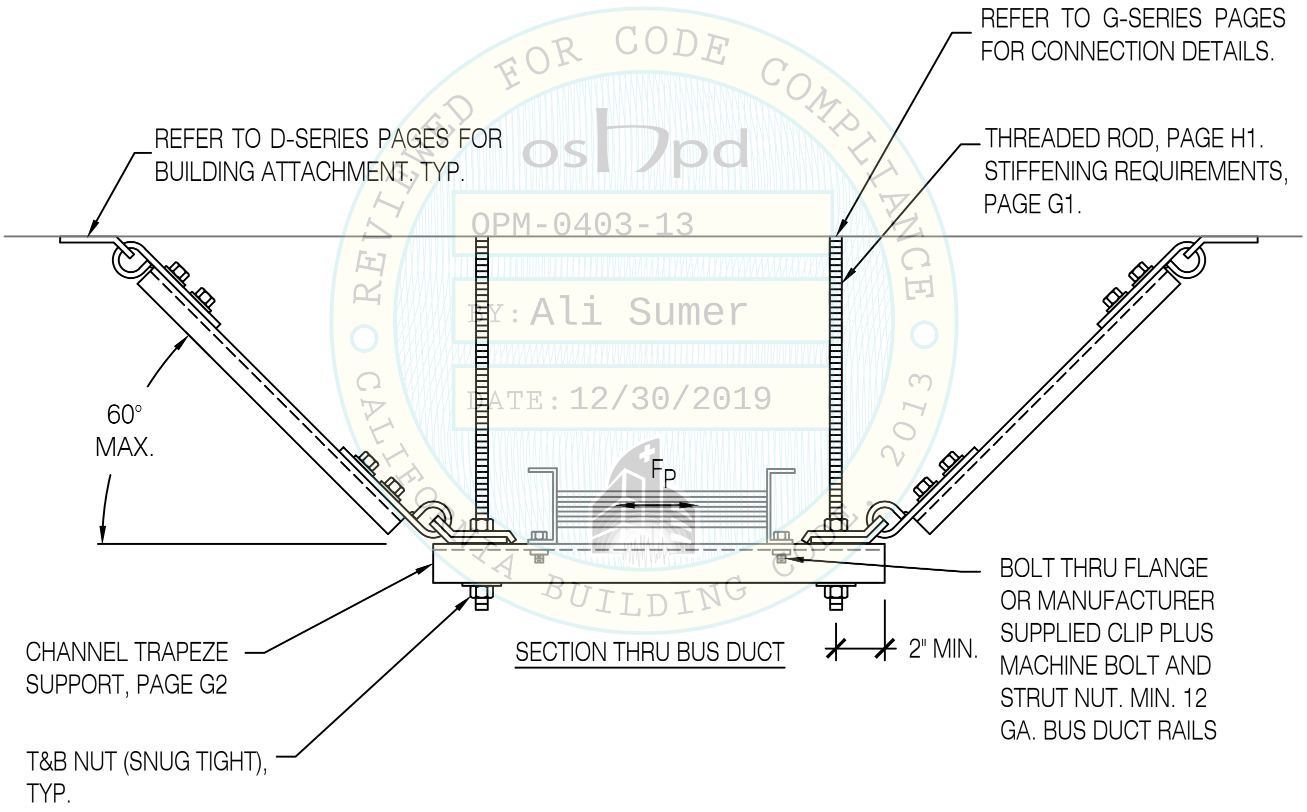
FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



OVERHEAD VIEW



SECTION THRU BUS DUCT

# BUS DUCT TRAPEZE
# 2-WAY TRANSVERSE, RIGID BRACING

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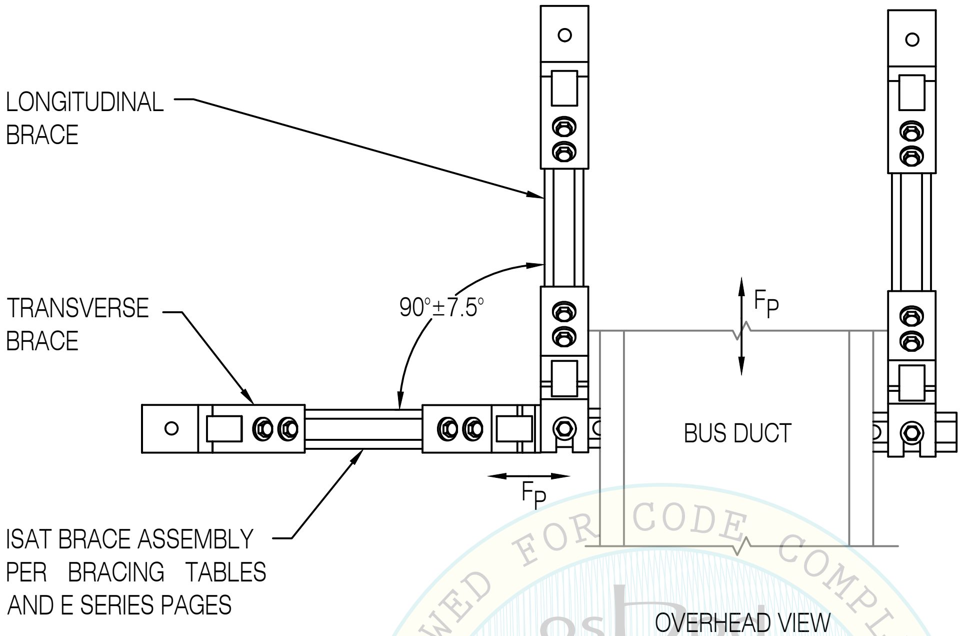
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



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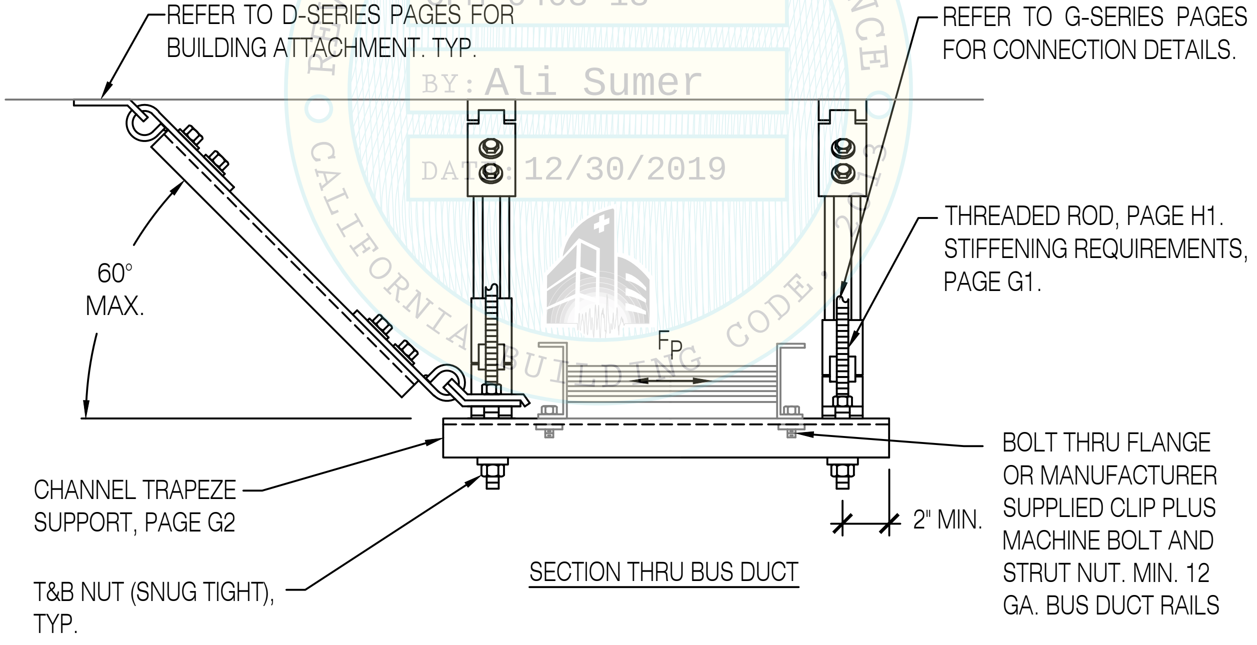

SECTION THRU BUS DUCT

# BUS DUCT TRAPEZE
# 3-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

REGISTERED PROFESSIONAL ENGINEER
ANTHONY A. RUBALCAVA
S 4710
STRUCTURAL
STATE OF CALIFORNIA

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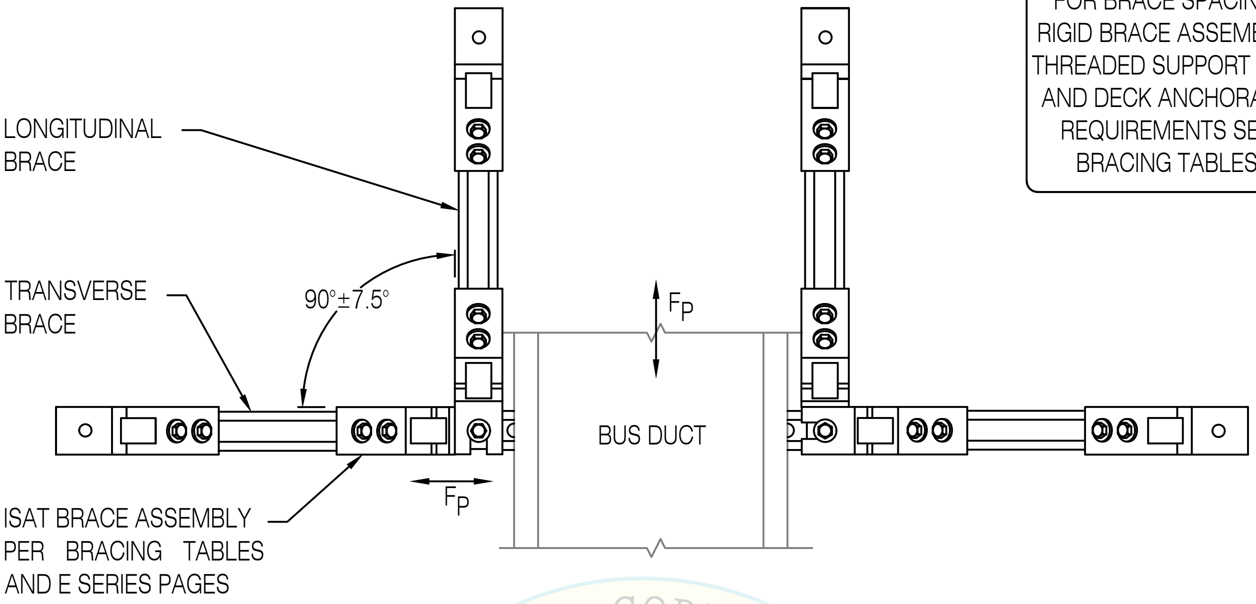
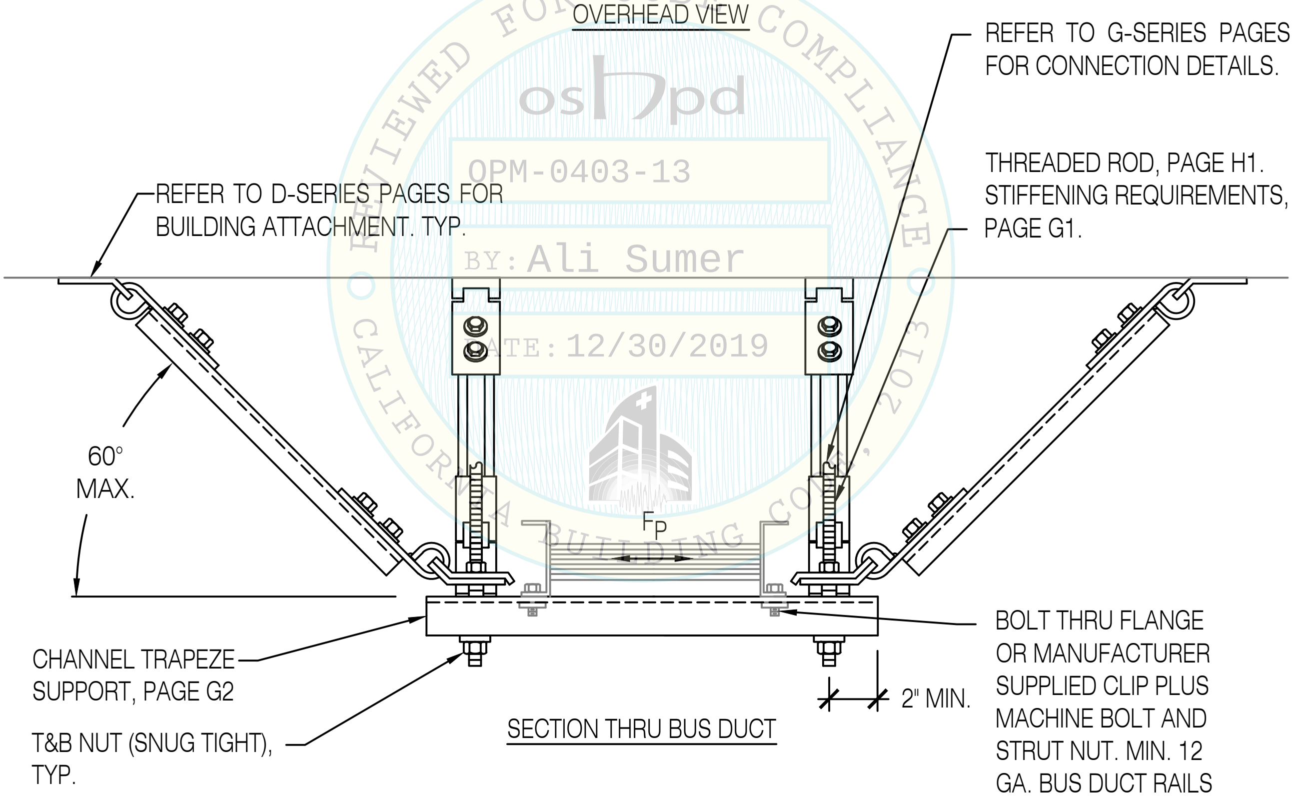


OVERHEAD VIEW



SECTION THRU BUS DUCT

# BUS DUCT TRAPEZE
# 4-WAY TRANSVERSE-LONGITUDINAL, RIGID BRACING

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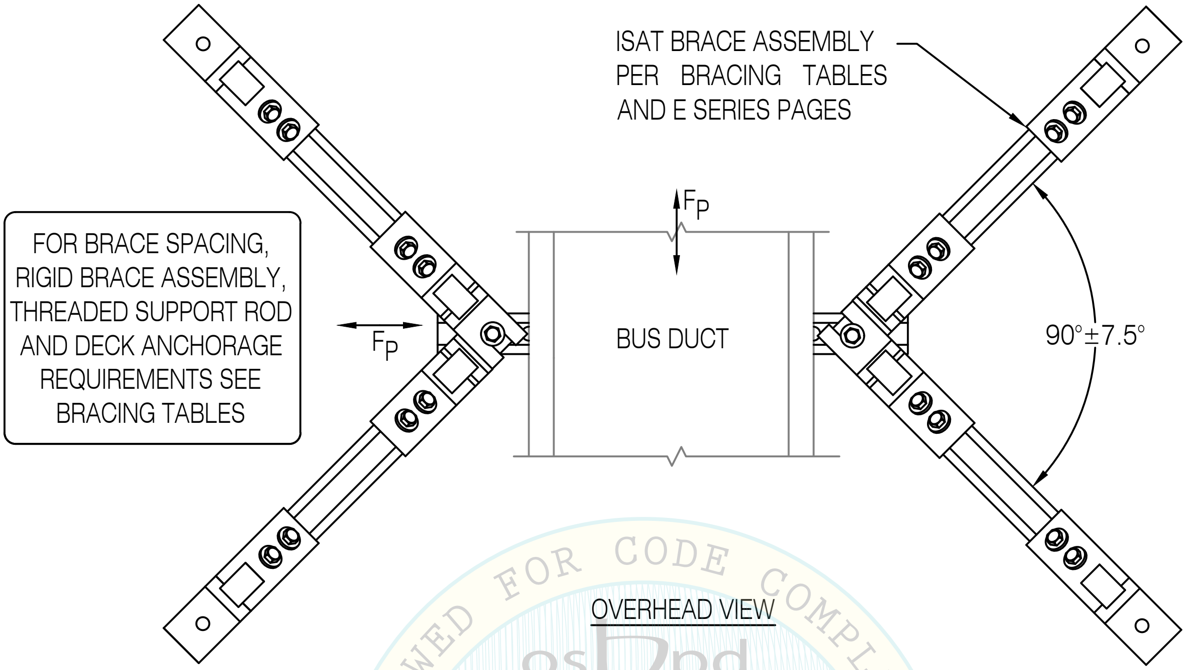
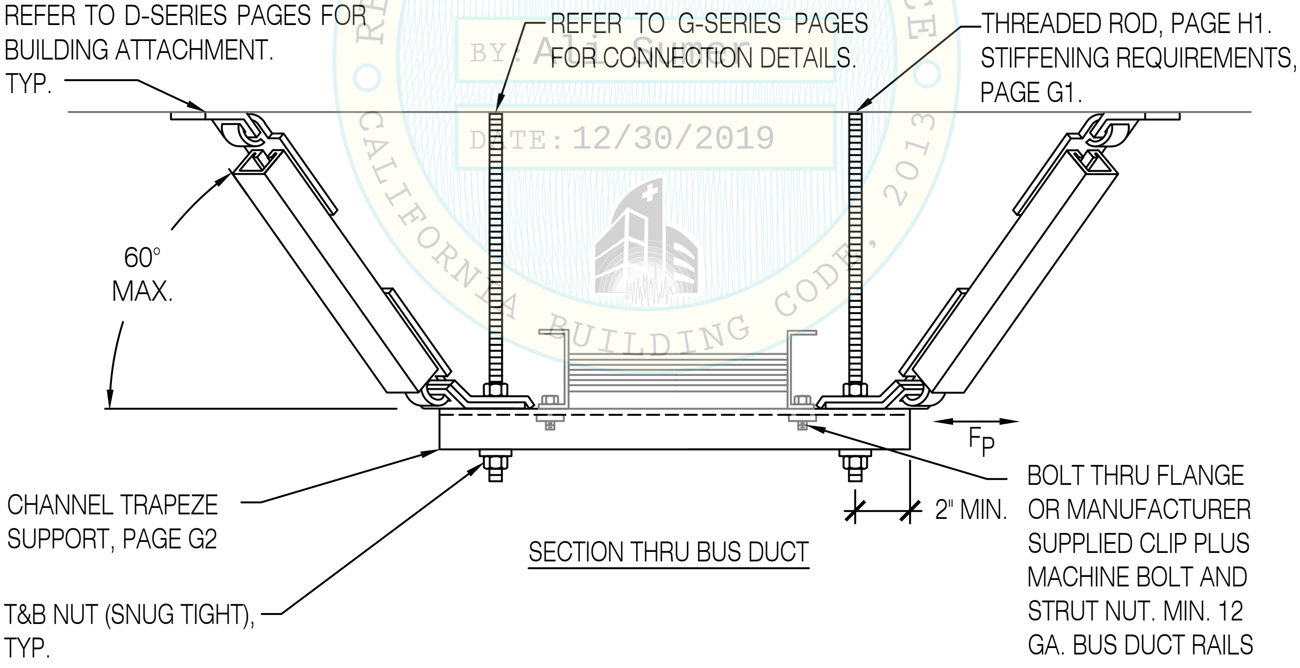


OVERHEAD VIEW



SECTION THRU BUS DUCT

# BUS DUCT TRAPEZE
# 4-WAY SPLAYED TRANSVERSE-LONGITUDINAL, RIGID BRACING

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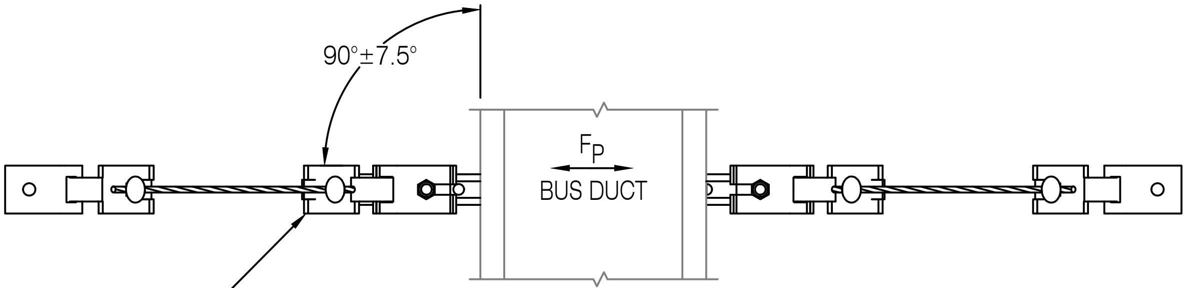
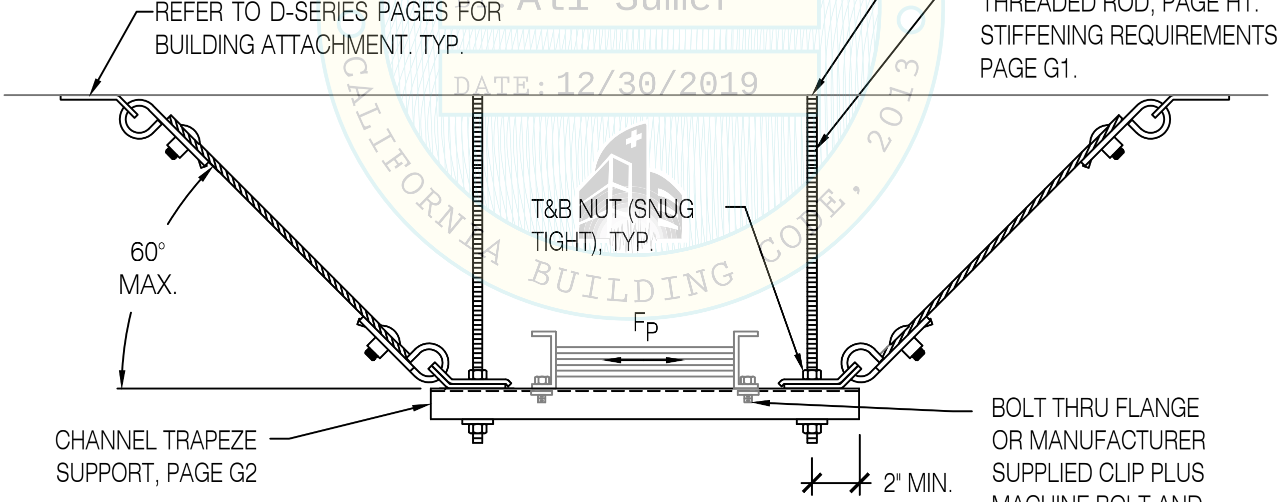
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



OVERHEAD VIEW



SECTION THRU BUS DUCT

# BUS DUCT TRAPEZE
# 2-WAY TRANSVERSE, CABLE BRACING

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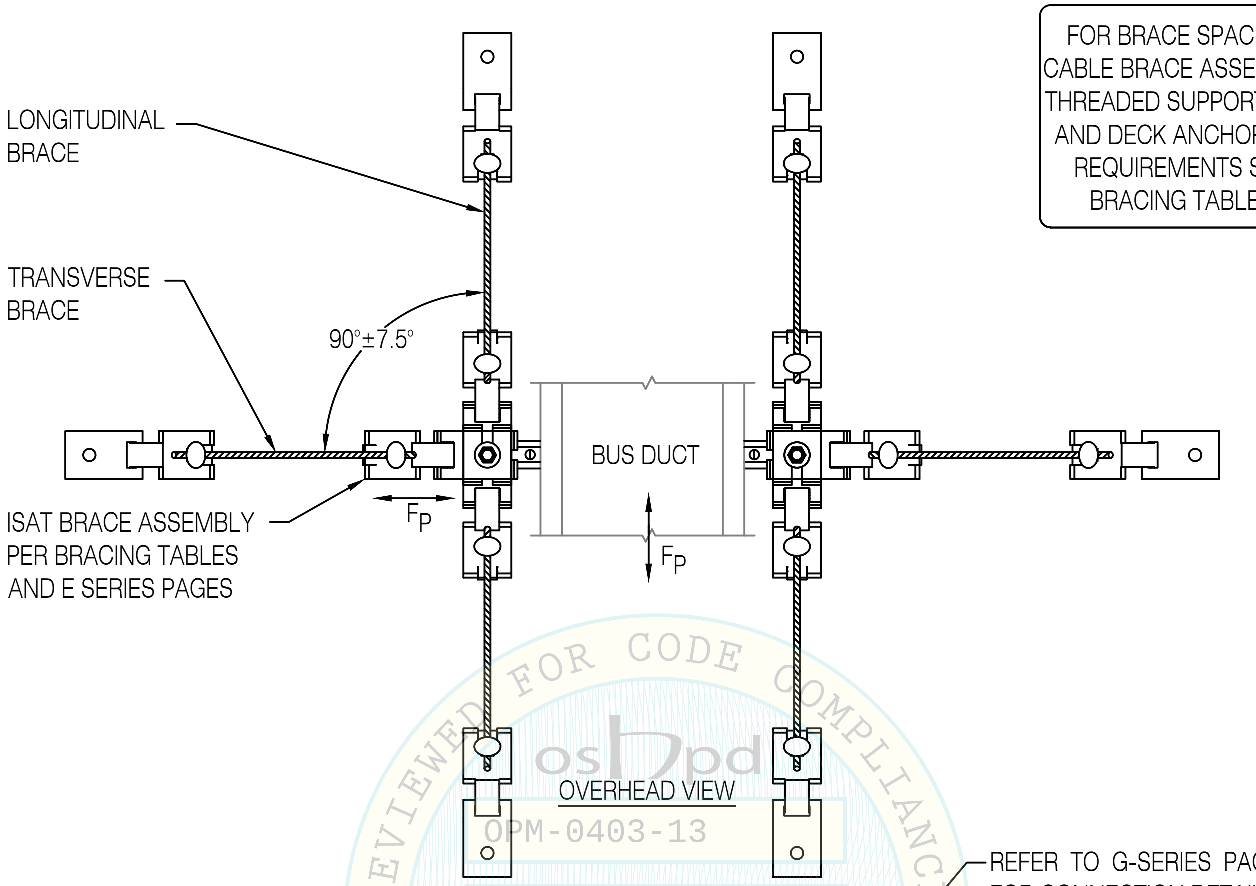
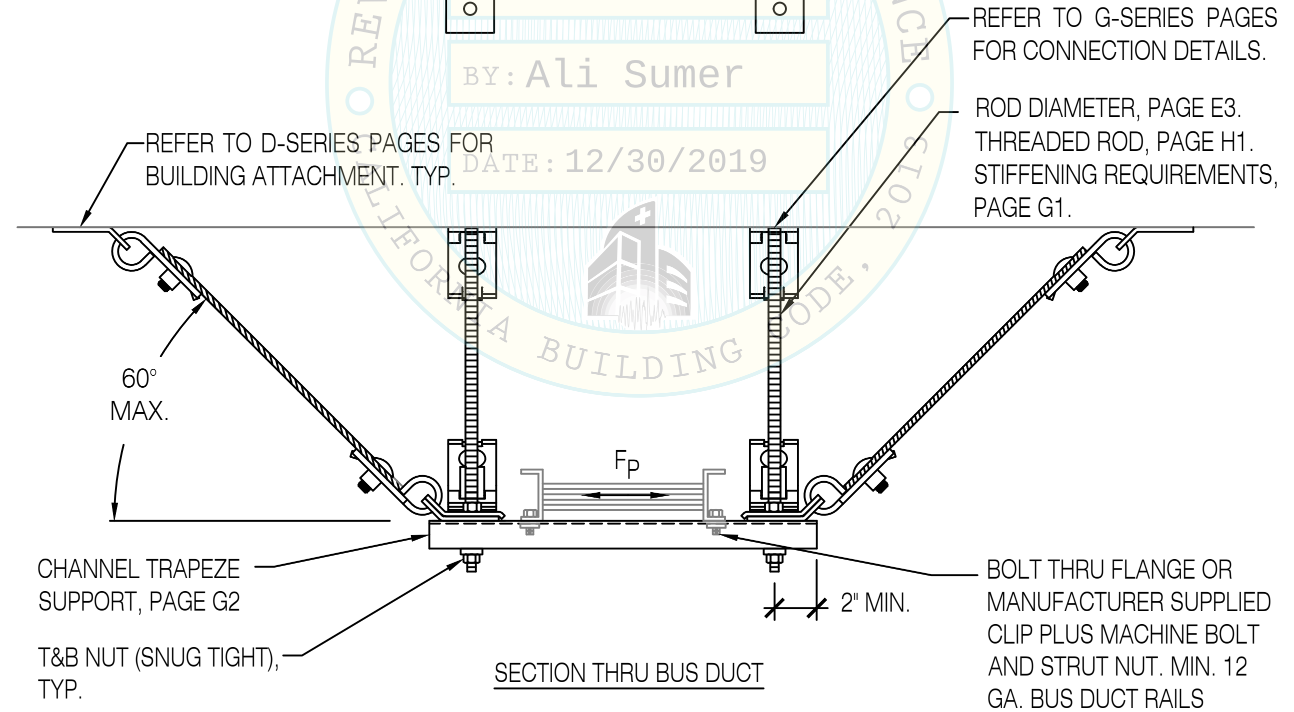
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



OVERHEAD VIEW



SECTION THRU BUS DUCT

# BUS DUCT TRAPEZE
# 6-WAY TRANSVERSE-LONGITUDINAL, CABLE BRACING

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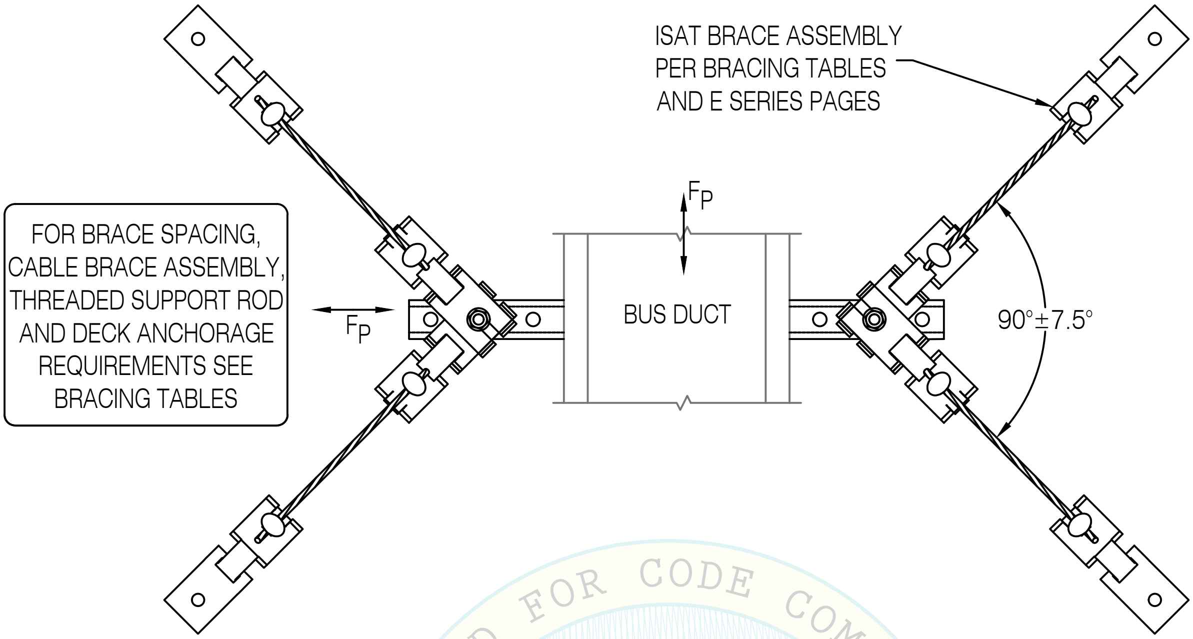
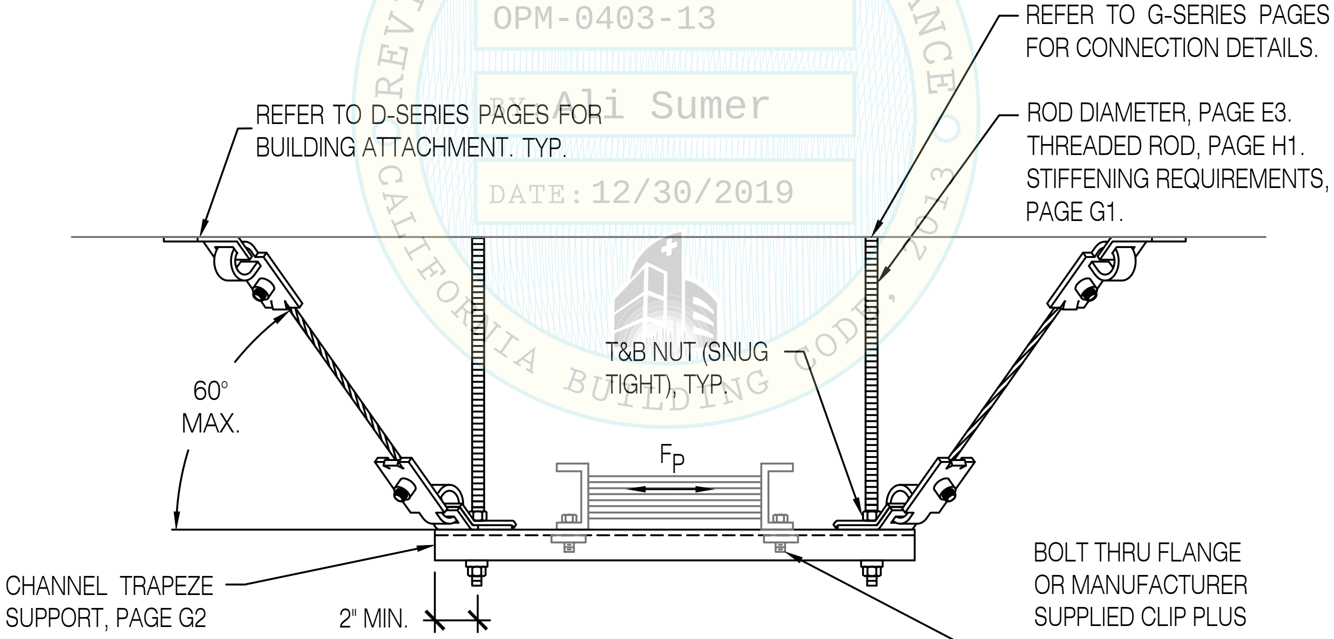


OVERHEAD VIEW



SECTION THRU BUS DUCT

# BUS DUCT TRAPEZE
# 4-WAY SPLAYED, CABLE BRACING

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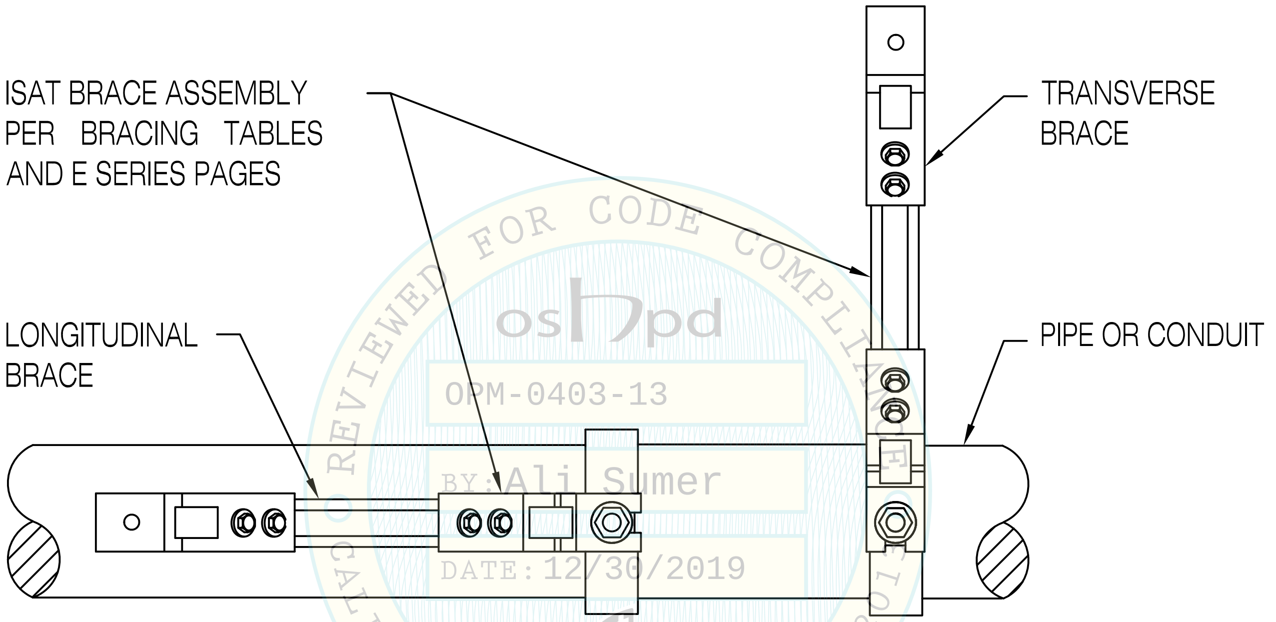
FOR BRACE SPACING,
RIGID BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



MAY BE LOCATED AT DIFFERENT VERTICAL SUPPORTS.
LOCATION AT THE SAME VERTICAL SUPPORT ROD IS NOT REQUIRED.

## NON-CONCURRENT BRACING CONFIGURATION TRANSVERSE-LONGITUDINAL, RIGID OR CABLE BRACING

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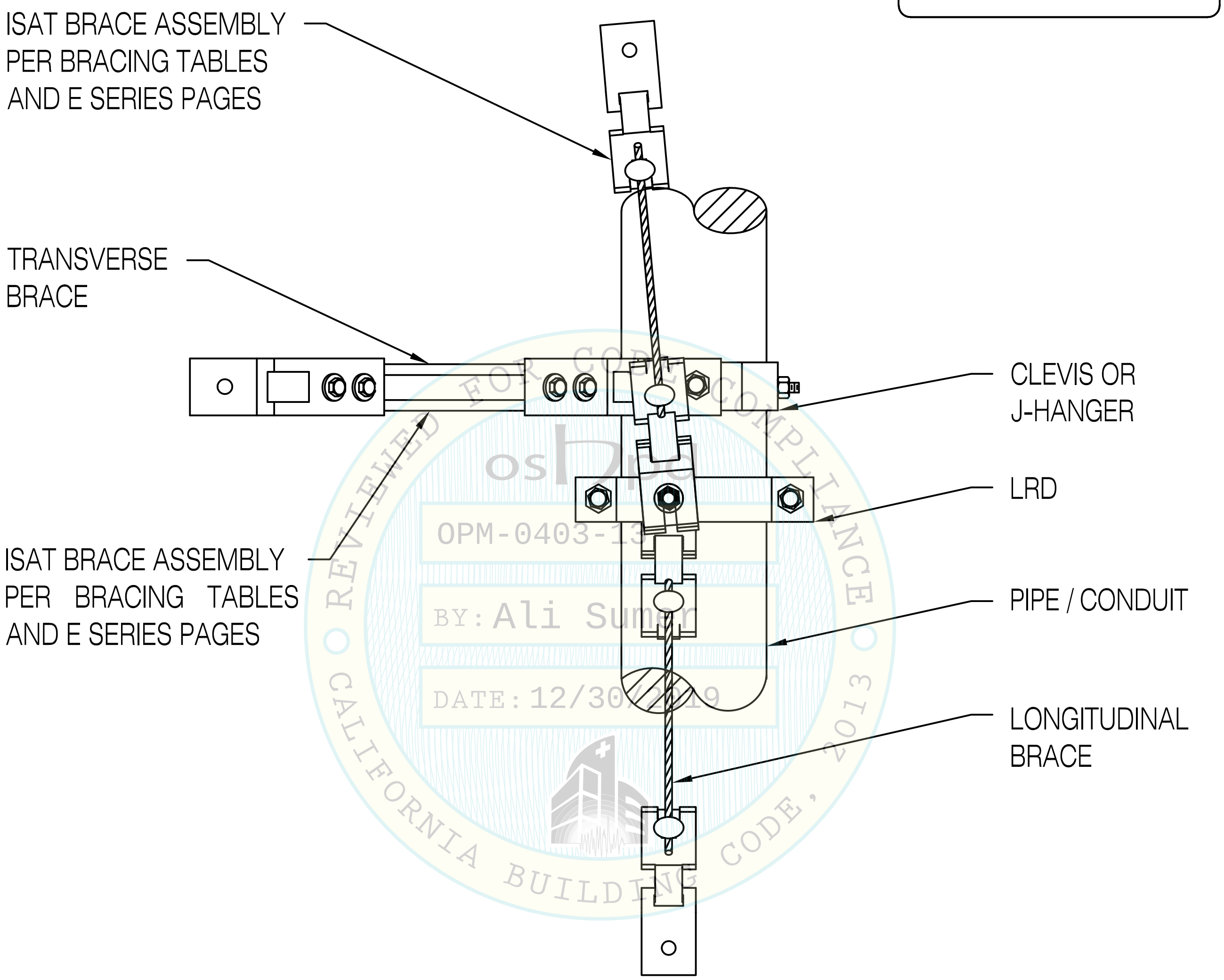
REFER TO B-SERIES
INSTALLATION DETAILS
FOR INFORMATION
NOT SHOWN

FOR BRACE SPACING,
CABLE BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES



ISAT CABLE AND RIGID BRACING ASSEMBLIES MAY BE USED
ON THE SAME RUN WHEN THE BRACING TYPES ARE
PERPENDICULAR TO EACH OTHER

# MIXED BRACING TYPES FOR SINGLE HUNG UTILITY

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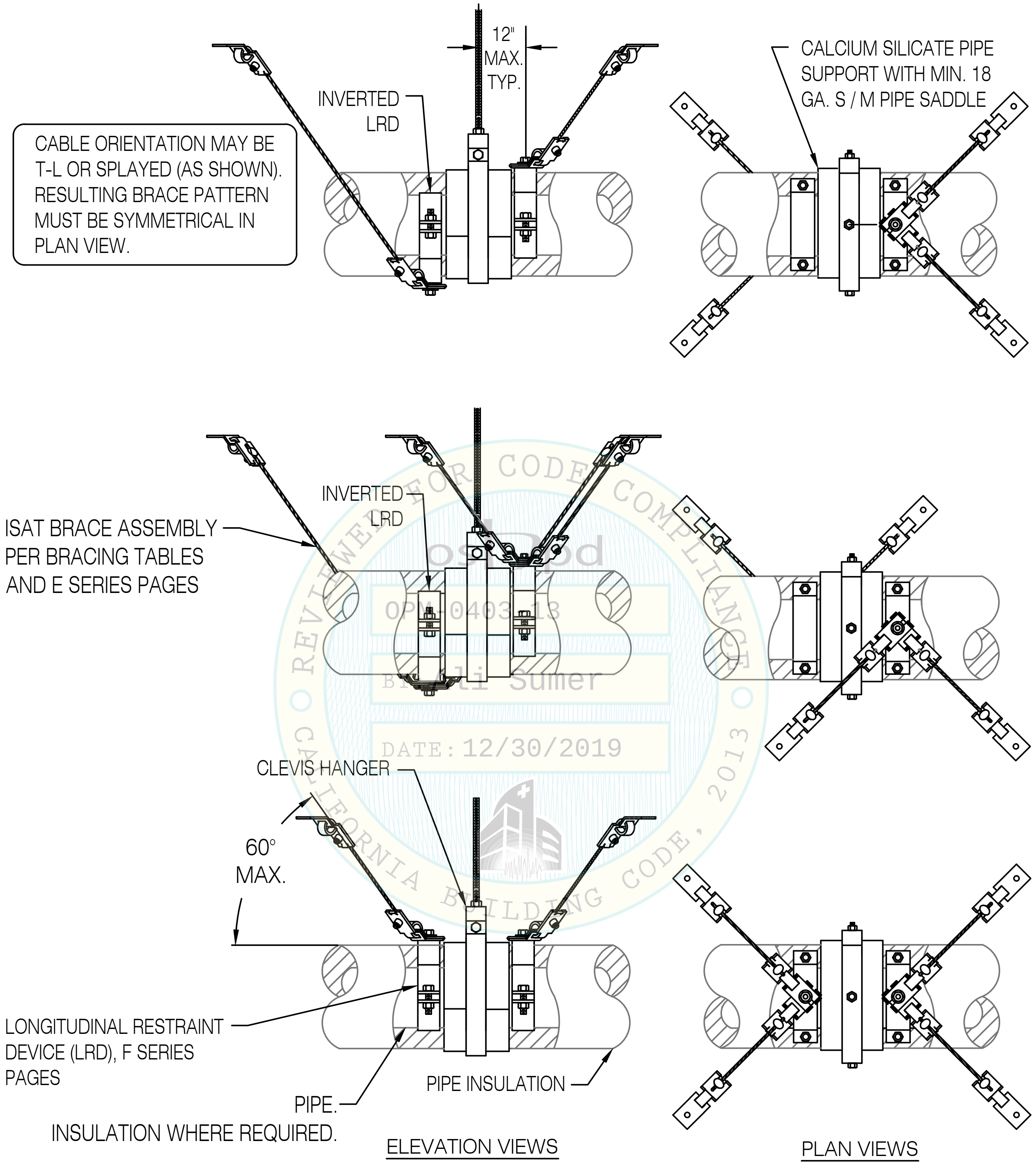

CABLE ORIENTATION MAY BE T-L OR SPLAYED (AS SHOWN). RESULTING BRACE PATTERN MUST BE SYMMETRICAL IN PLAN VIEW.

ELEVATION VIEWS

PLAN VIEWS

REVIEWED FOR CODE COMPLIANCE
OPM-0403-13
BY: Ali Sumer
DATE: 12/30/2019
CALIFORNIA BUILDING CODE, 2013

# ALTERNATE CABLE BRACE ATTACHMENTS, DUAL LRD'S
# TRANSVERSE / LONGITUDINAL BRACE LOCATIONS

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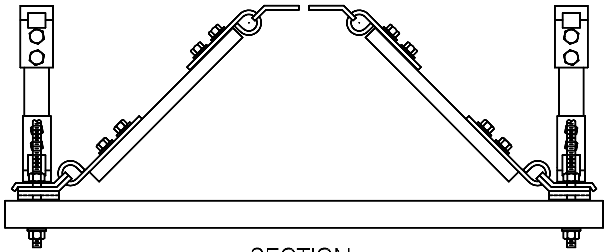
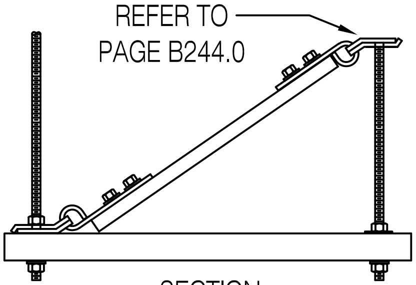
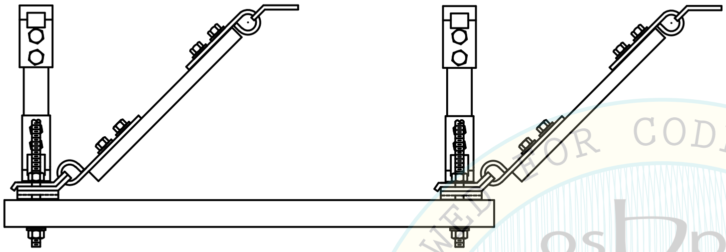


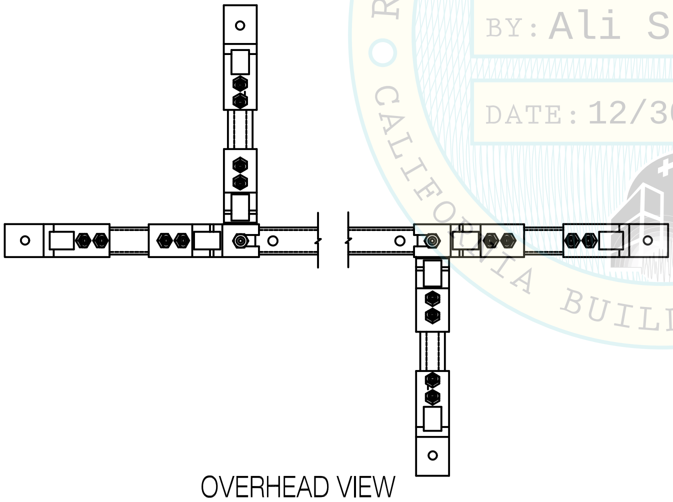
SECTION
ALTERNATE TRANSVERSE BRACE PATTERN



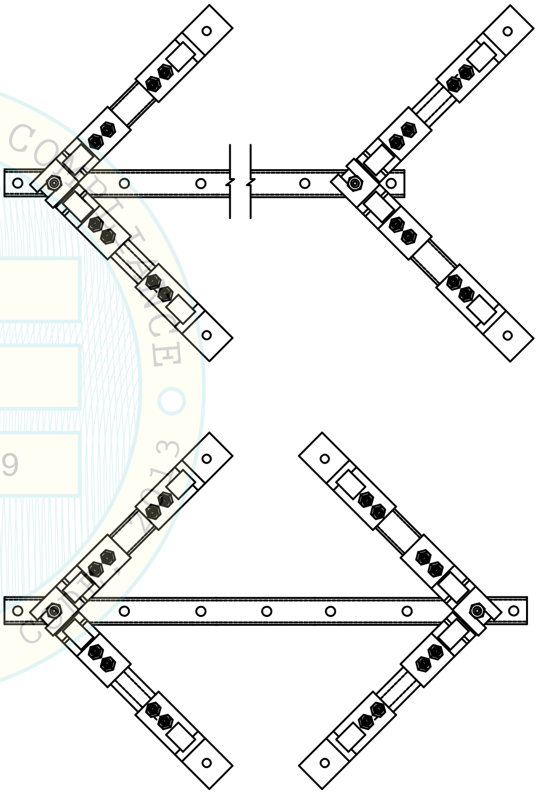
SECTION
ALTERNATE TRANSVERSE BRACE PATTERN



SECTION
ALTERNATE TRANSVERSE BRACE PATTERN



OVERHEAD VIEW
ALTERNATE LONGITUDINAL BRACE PATTERN



OVERHEAD VIEW
ALTERNATE SPLAYED BRACE PATTERNS

# ALTERNATE RIGID BRACE ARM PATTERNS
# TRAPEZE SUPPORTED SYSTEMS

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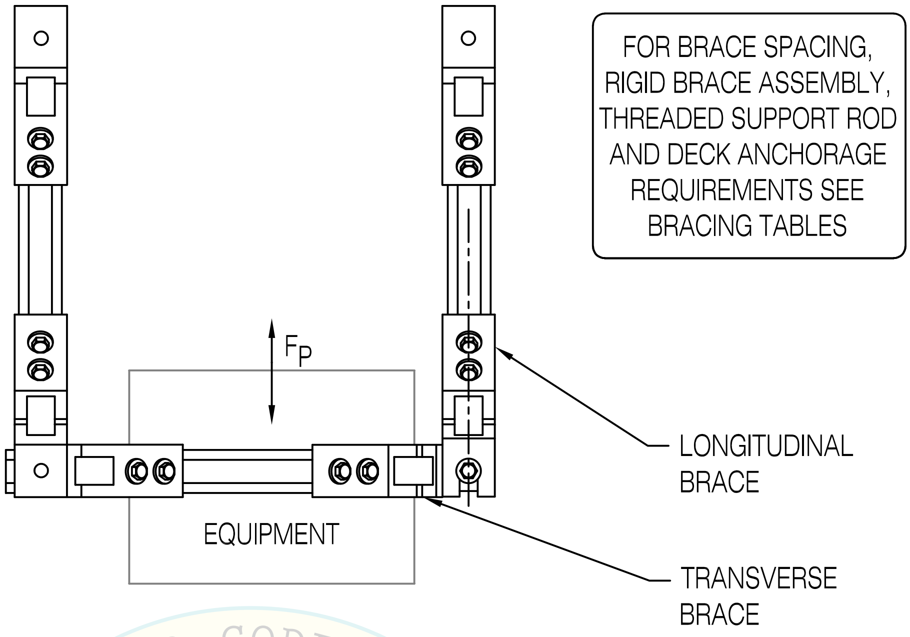
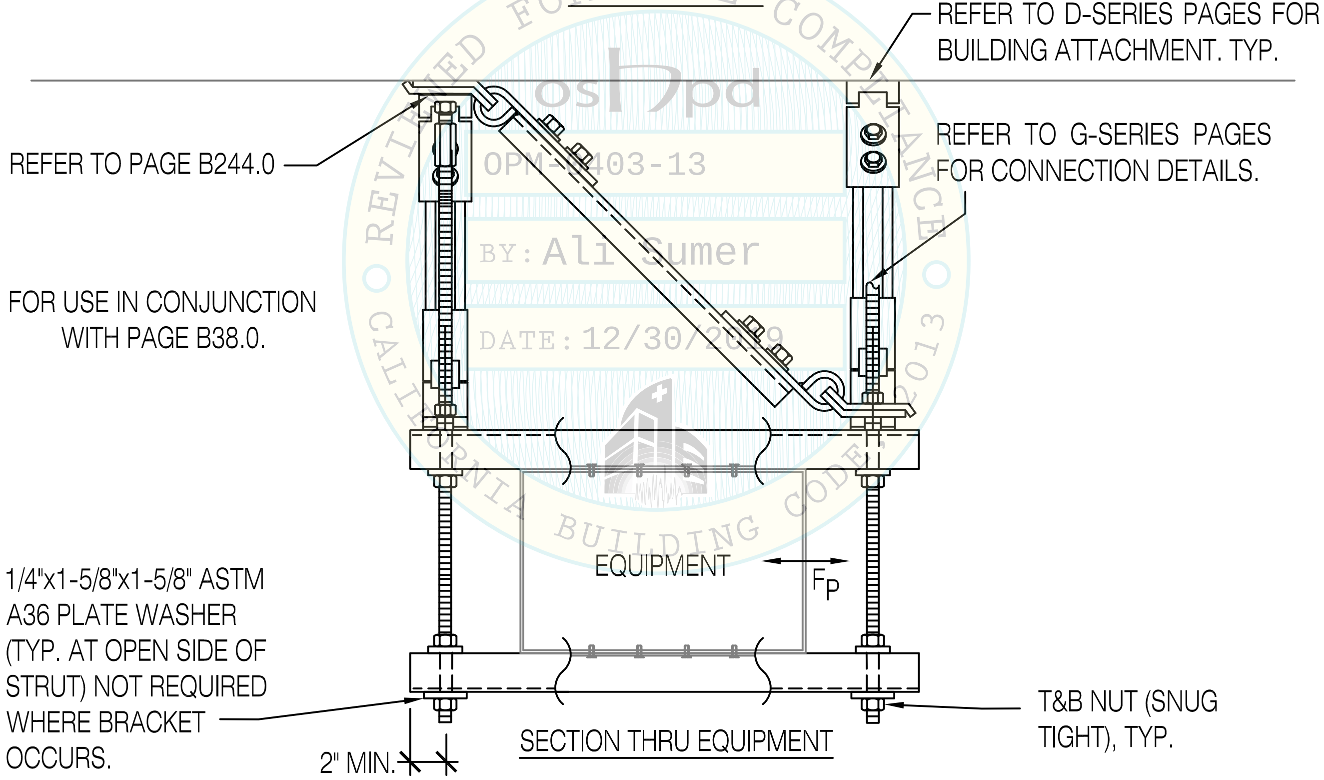


FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES

OVERHEAD VIEW



FOR USE IN CONJUNCTION WITH PAGE B38.0.

SECTION THRU EQUIPMENT

MAXIMUM UNIT LENGTH 3 FEET, FOR UNITS EXCEEEDING 3 FEET SEE PAGE B38.1 & B38.2

# IN-LINE EQUIPMENT: ALTERNATE CROSS TOP, 3-WAY TRANSVERSE-LONGITUDINAL RIGID BRACING

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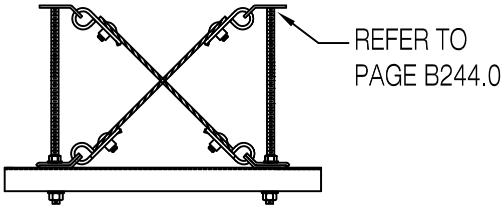
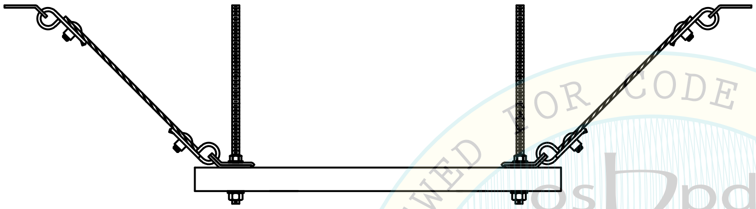
FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES, PG. E3.

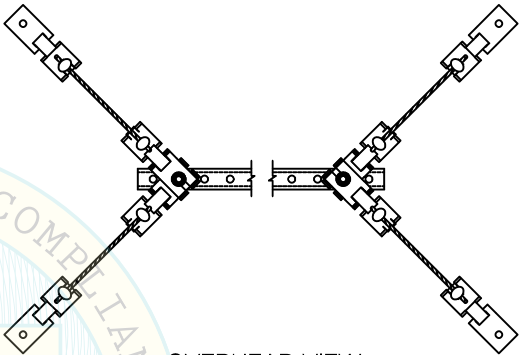


SECTION THRU TRAPEZE
ALTERNATE CABLE/WIRE TRANSVERSE BRACE PATTERN

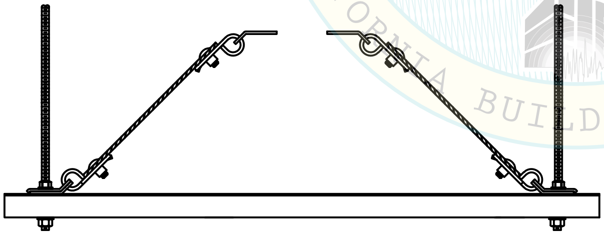
FOR USE WITH ANY "B" SERIES CABLE/WIRE BRACING DETAIL UTILIZING TRAPEZE SUPPORT.



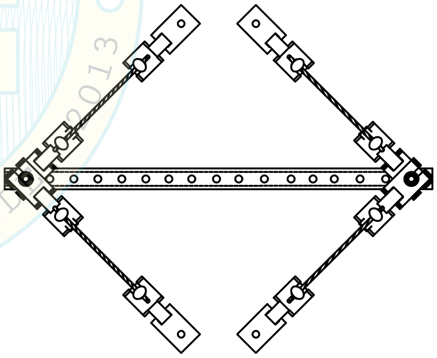
SECTION THRU TRAPEZE
STD. CABLE/WIRE TRANSVERSE BRACE PATTERN



OVERHEAD VIEW
STD. SPLAYED CABLE/WIRE BRACE PATTERN



SECTION THRU TRAPEZE
ALTERNATE CABLE/WIRE TRANSVERSE BRACE PATTERN



OVERHEAD VIEW
ALTERNATE SPLAYED CABLE/WIRE BRACE PATTERN

# ALTERNATE CABLE OR WIRE BRACE ARM PATTERNS TRAPEZE SUPPORTED SYSTEMS

ANTHONY A. RUBALCAVA
S 4710

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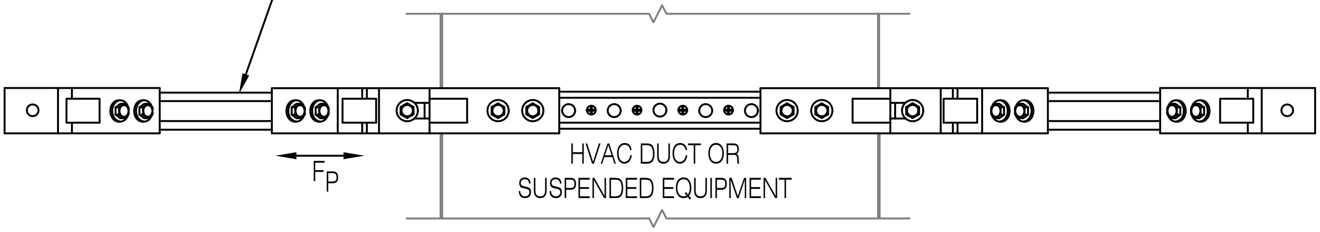
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES

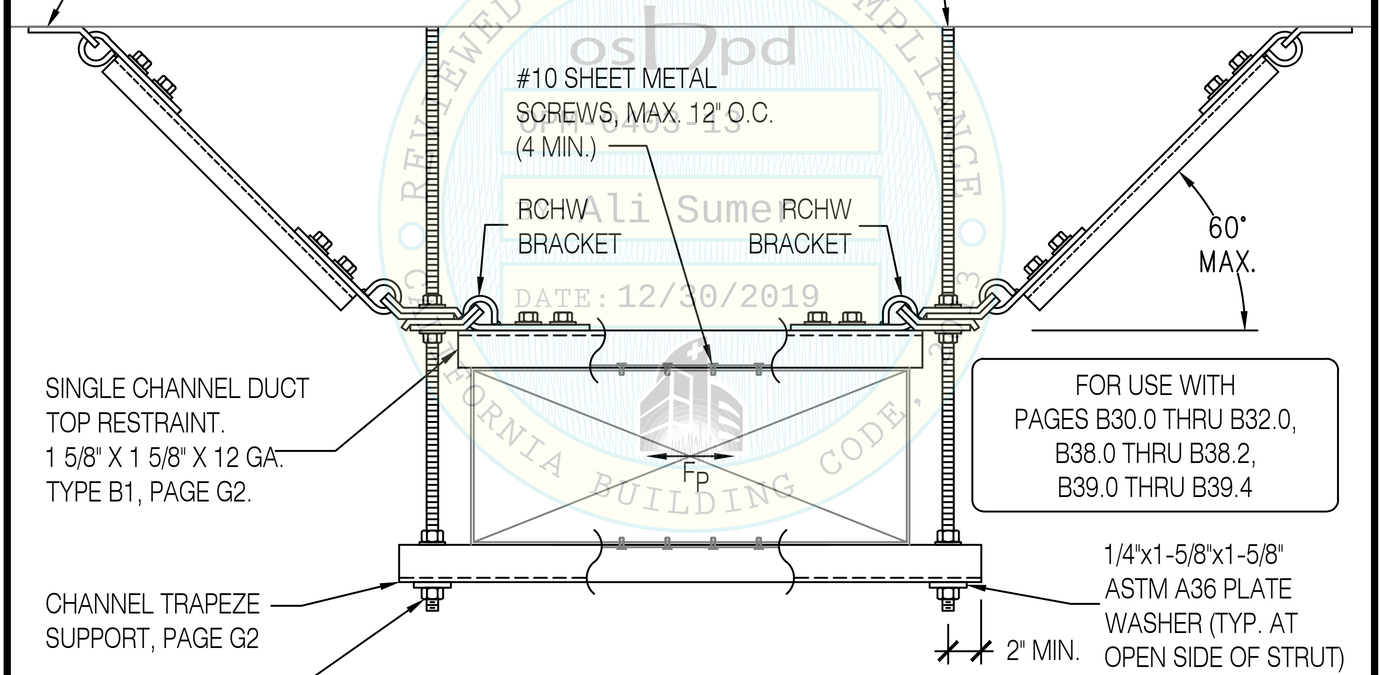
ANY PATTERN RIGID,
CABLE OR WIRE
ISAT BRACE ASSEMBLY
PER BRACING TABLES



OVERHEAD VIEW

REFER TO D-SERIES PAGES FOR
BUILDING ATTACHMENT. TYP.

REFER TO G-SERIES PAGES
FOR CONNECTION DETAILS.



#10 SHEET METAL
SCREWS, MAX. 12" O.C.
(4 MIN.)

RCHW
BRACKET

RCHW
BRACKET

SINGLE CHANNEL DUCT
TOP RESTRAINT.
1 5/8" X 1 5/8" X 12 GA.
TYPE B1, PAGE G2.

FOR USE WITH
PAGES B30.0 THRU B32.0,
B38.0 THRU B38.2,
B39.0 THRU B39.4

CHANNEL TRAPEZE
SUPPORT, PAGE G2

T&B NUT (SNUG
TIGHT), TYP.

1/4"x1-5/8"x1-5/8"
ASTM A36 PLATE
WASHER (TYP. AT
OPEN SIDE OF STRUT)
NOT REQUIRED
WHERE BRACKET
OCCURS.

SECTION THRU HVAC DUCT OR SUSPENDED EQUIPMENT

# HVAC DUCT OR SUSPENDED EQUIPMENT ALTERNATE DETAIL OPTIONAL RETRO FIT CROSS-TOP BOX-IN (TOP CAP)

ANTHONY A. RUBALCAVA
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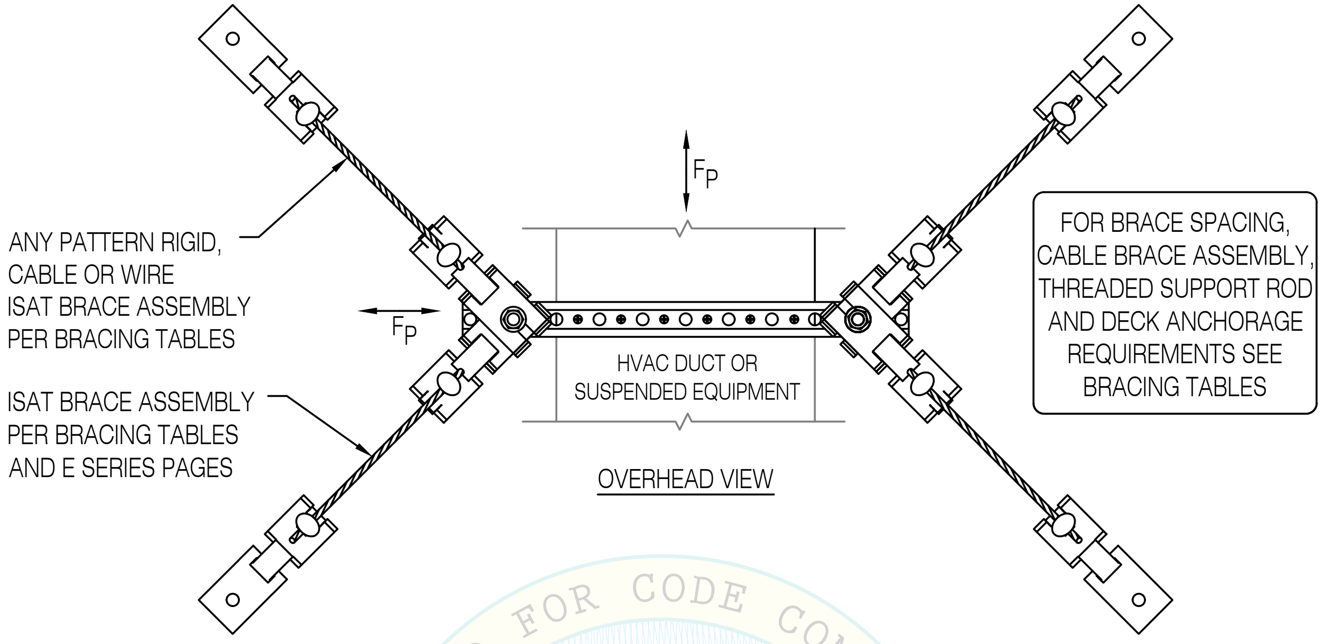
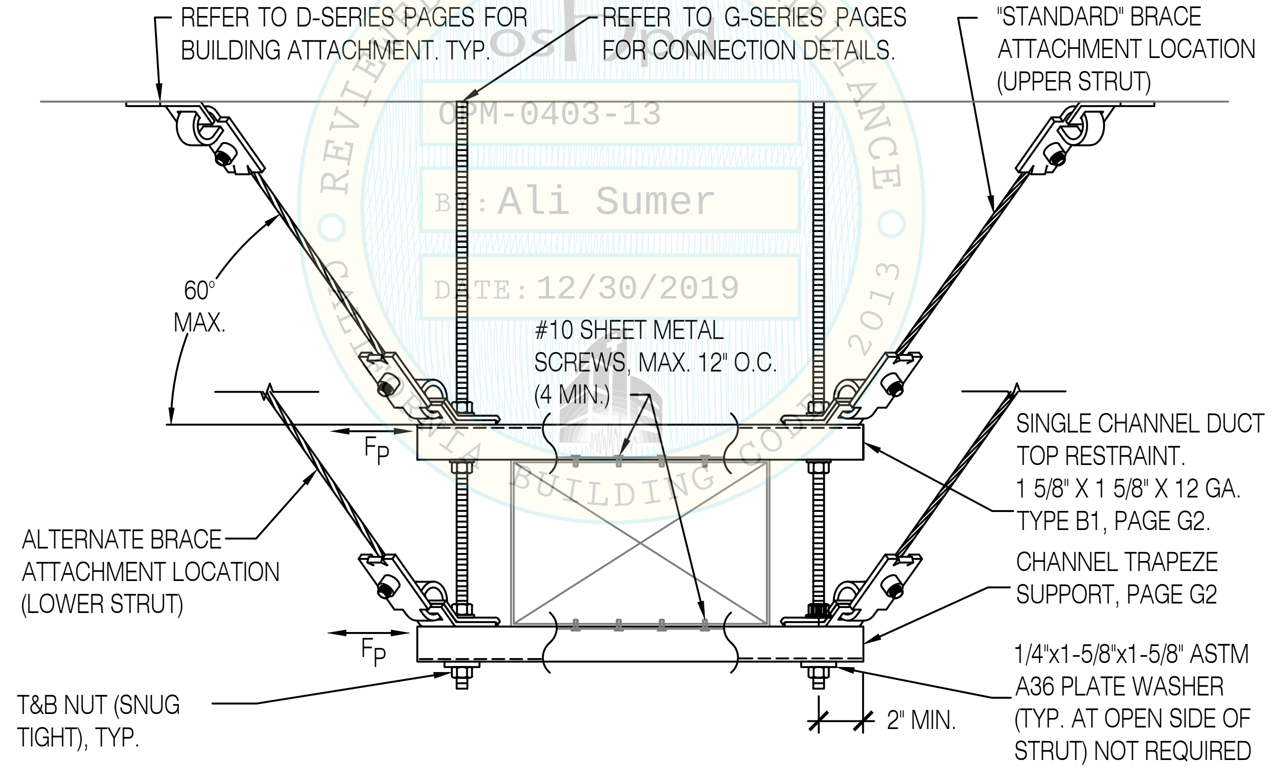


OVERHEAD VIEW



SECTION THRU HVAC DUCT OR SUSPENDED EQUIPMENT

# HVAC DUCT OR SUSPENDED EQUIPMENT ALTERNATE DETAIL OPTIONAL BRACE ARM CONNECTION TO LOWER TRAPEZE STRUT

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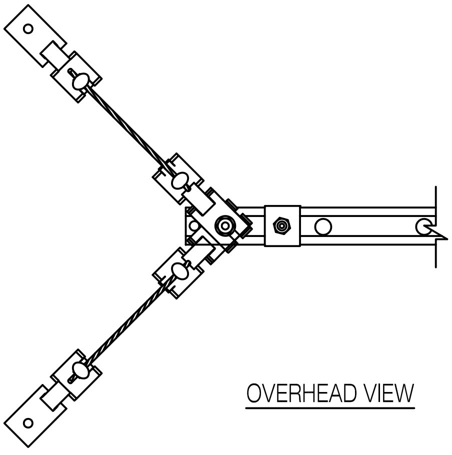

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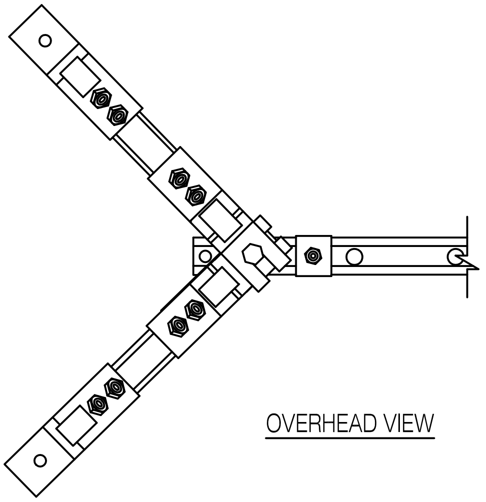
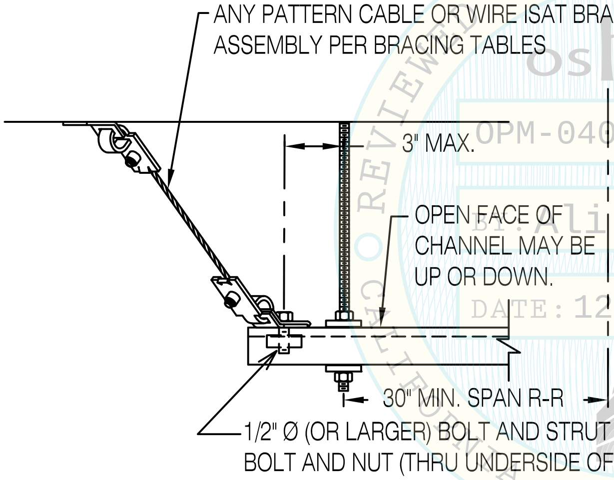
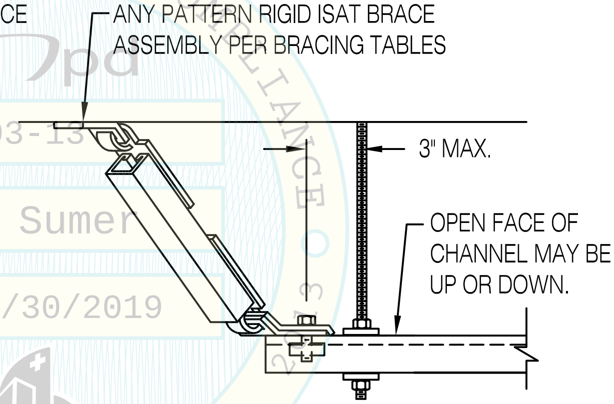


OVERHEAD VIEW



SECTION



SECTION

MAX ALLOWED BRACE FORCE (P):
B1 SINGLE STRUT (PUNCHED) TRAPEZE ELEMENT = 1,565 LBS.
B2 B-B STRUT (PUNCHED) TRAPEZE ELEMENT = 2,100 LBS
OR PER C-SERIES BRACING TABLES, WHICHEVER IS LOWER.

NOTE: OFFSET INTRODUCES AN INCREASE IN ROD TOTAL VERTICAL LOAD OF 10%

OUTBOARD OF SUPPORT ROD FOR USE WITH CHANNEL TRAPEZE SUPPORT

# ALTERNATE BRACE CONNECTION TO TRAPEZE

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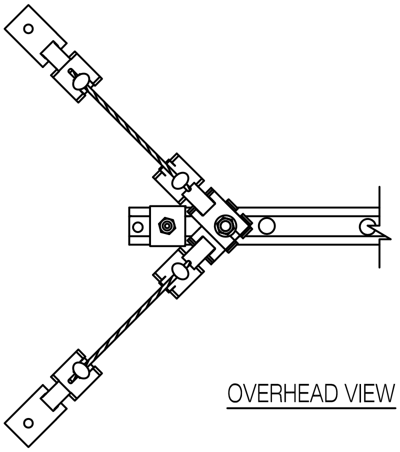

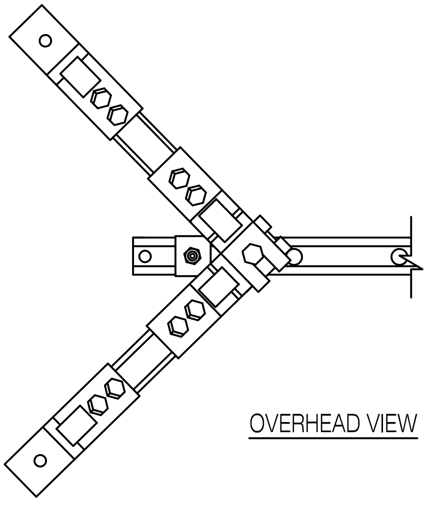

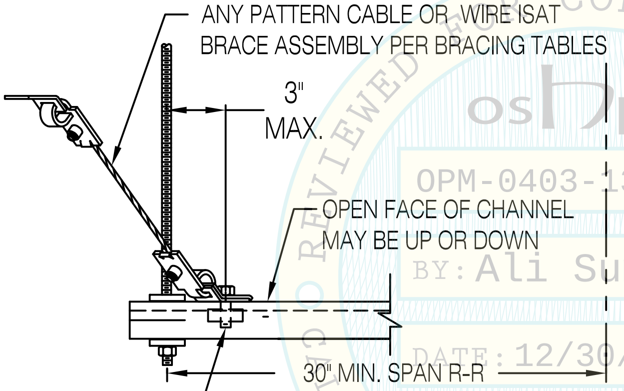

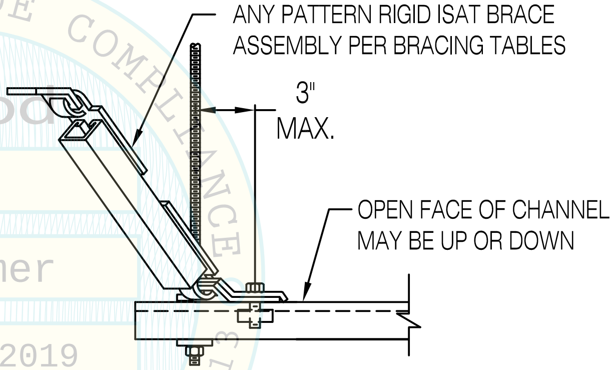

MAX ALLOWED BRACE FORCE (P):
B1 SINGLE STRUT (PUNCHED) TRAPEZE ELEMENT = 1,565 LBS.
B2 B-B STRUT (PUNCHED) TRAPEZE ELEMENT = 2,100 LBS
OR PER C-SERIES BRACING TABLES, WHICHEVER IS LOWER.

NOTE: OFFSET INTRODUCES AN INCREASE IN ROD TOTAL VERTICAL LOAD OF 10%

INBOARD OF SUPPORT ROD FOR USE WITH CHANNEL TRAPEZE SUPPORT

# ALTERNATE BRACE CONNECTION TO TRAPEZE

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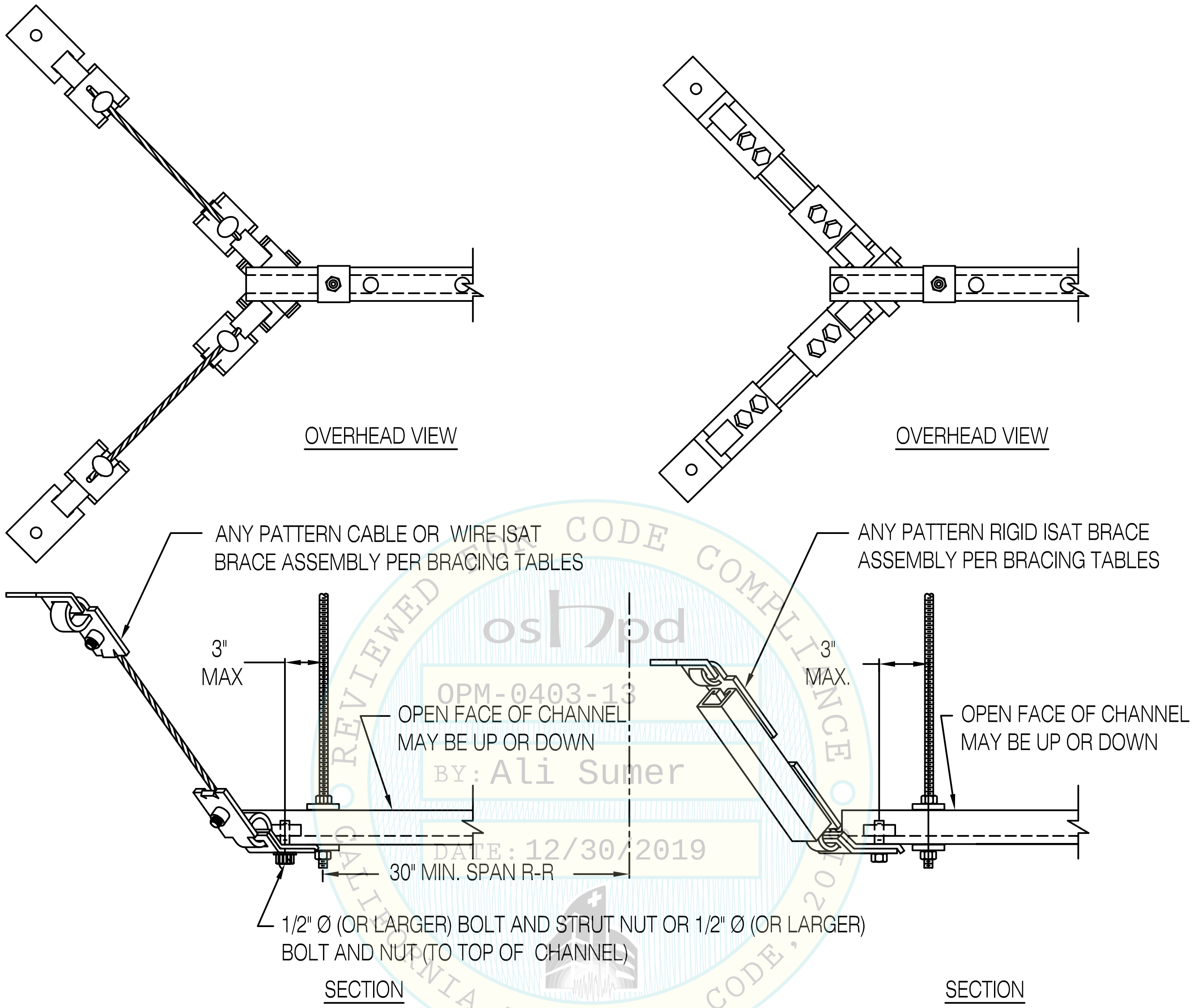

MAX ALLOWED BRACE FORCE (P):
B1 SINGLE STRUT (PUNCHED) TRAPEZE ELEMENT = 1,565 LBS.
B2 B-B STRUT (PUNCHED) TRAPEZE ELEMENT = 2,100 LBS
OR PER C-SERIES BRACING TABLES, WHICHEVER IS LOWER.

NOTE: OFFSET INTRODUCES AN INCREASE IN ROD TOTAL VERTICAL LOAD OF 10%

UNDERSIDE CONNECTION OUTBOARD OF SUPPORT ROD FOR USE WITH CHANNEL TRAPEZE SUPPORT

# UNDERSIDE ALTERNATE BRACE CONNECTION TO TRAPEZE

REGISTERED PROFESSIONAL ENGINEER
ANTHONY A. RUBALCAVA
S 4710
STRUCTURAL
STATE OF CALIFORNIA

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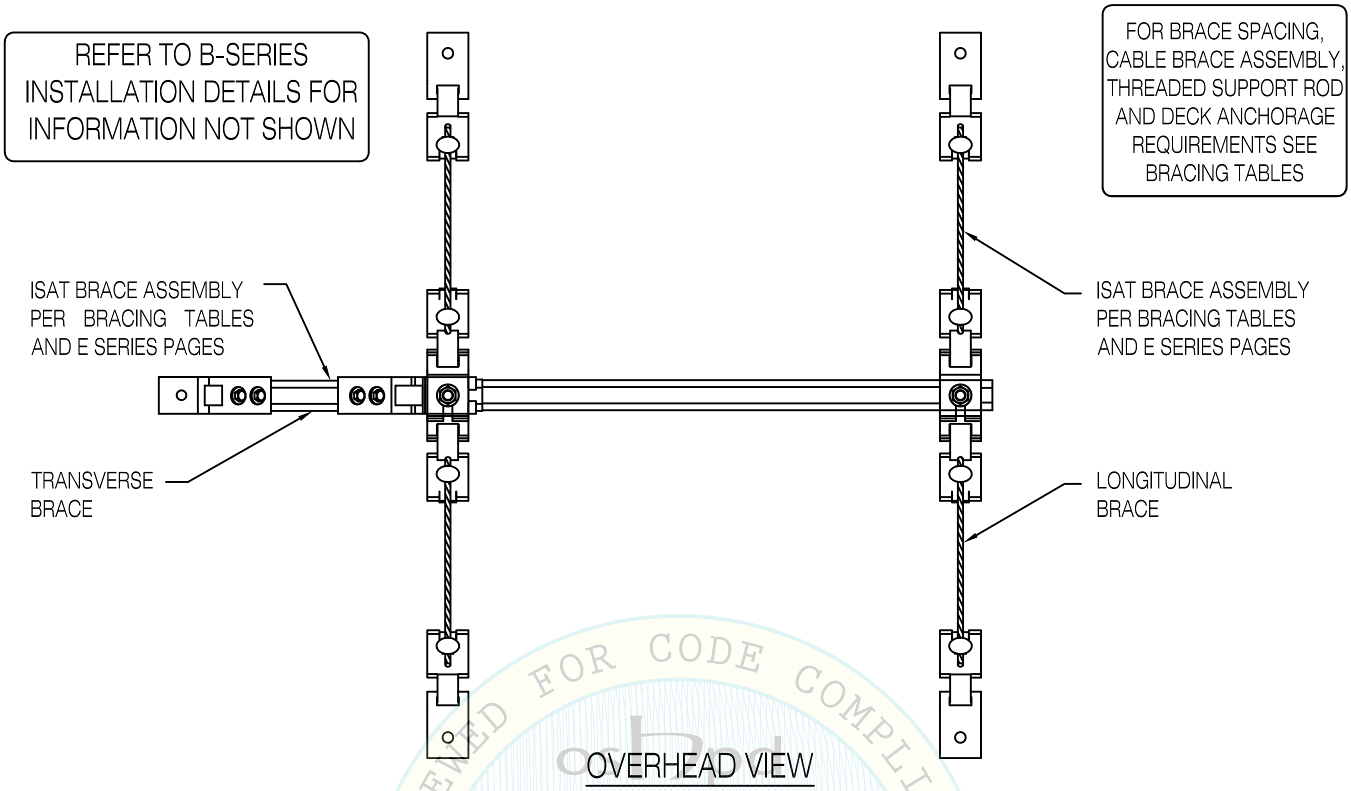
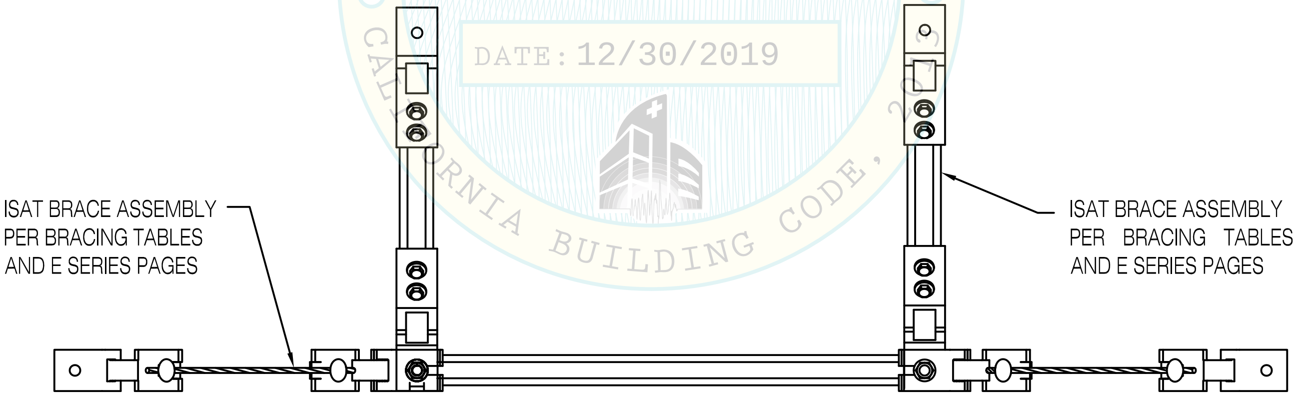
REFER TO B-SERIES INSTALLATION DETAILS FOR INFORMATION NOT SHOWN

FOR BRACE SPACING, CABLE BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



OVERHEAD VIEW



ISAT CABLE AND RIGID BRACING ASSEMBLIES MAY BE USED ON THE SAME RUN WHEN THE BRACING TYPES ARE PERPENDICULAR TO EACH OTHER

OVERHEAD VIEW

# MIXED BRACING TYPES FOR TRAPEZE UTILITY

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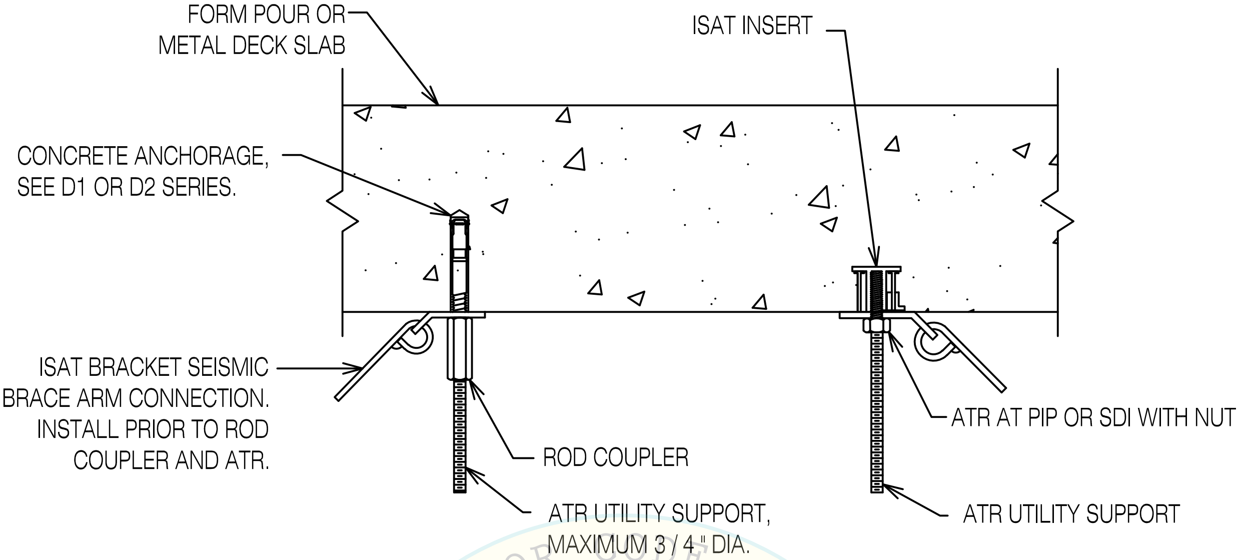


NOTE:
BRACE ARM CONNECTIONS CAN BE MADE TO GRAVITY LOAD SUPPORT ROD CONNECTIONS WHEN ENGINEERED FOR THE SPECIFIC CONDITION BY ISAT AND APPROVED BY THE ENGINEER OF RECORD.

## ISAT INSERTS

ONLY SUITABLE WITH LARGEST ROD DIAMETER FOR THE INSERT SIZE.

FOR FORM POUR:
PUSH ROD PRPIP3812, PAGE F10.0
BBH PIP143812, PAGE F10.1
BBH PIP381258, PAGE F10.2
BBH PIP5834, PAGE F10.3

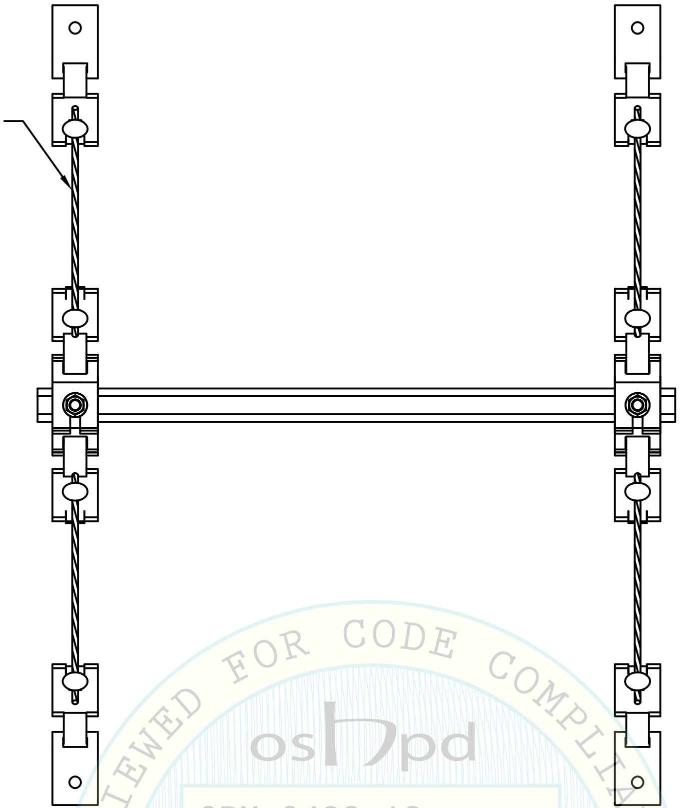
FOR METAL DECK:
PUSH ROD PRSDI3812, PAGE F11.0
BBH SDI143812, PAGE F11.1
BBH SDI381258, PAGE F11.2
BBH SDI381258-SQX, PAGE F11.2.1
BBH SDI5834, PAGE 11.3

# ALTERNATE BRACE CONNECTION TO VERTICAL SUPPORT ROD ANCHORAGE

ANTHONY A. RUBALCAVA
S 4710

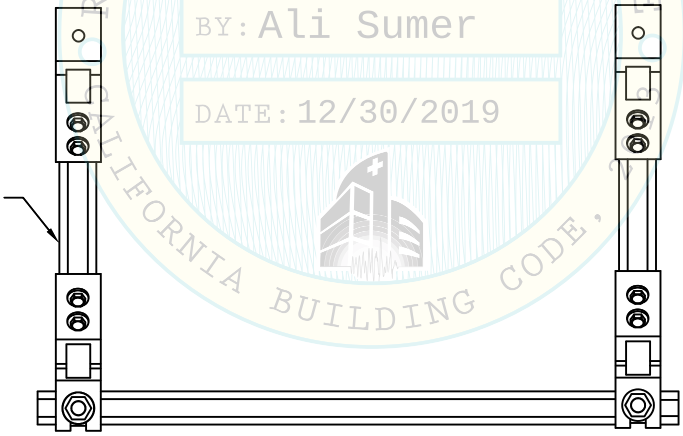
FOR BRACE SPACING,
CABLE BRACE ASSEMBLY,
THREADED SUPPORT ROD
AND DECK ANCHORAGE
REQUIREMENTS SEE
BRACING TABLES

ISAT BRACE ASSEMBLY
PER BRACING TABLES
AND E SERIES PAGES



OVERHEAD VIEW

ISAT BRACE ASSEMBLY
PER BRACING TABLES
AND E SERIES PAGES



OVERHEAD VIEW

MAY BE LOCATED AT DIFFERENT VERTICAL SUPPORTS.
LOCATION AT THE SAME VERTICAL SUPPORT ROD IS NOT REQUIRED.

# LONGITUDINAL RIGID AND CABLE BRACING FOR TRAPEZE UTILITY

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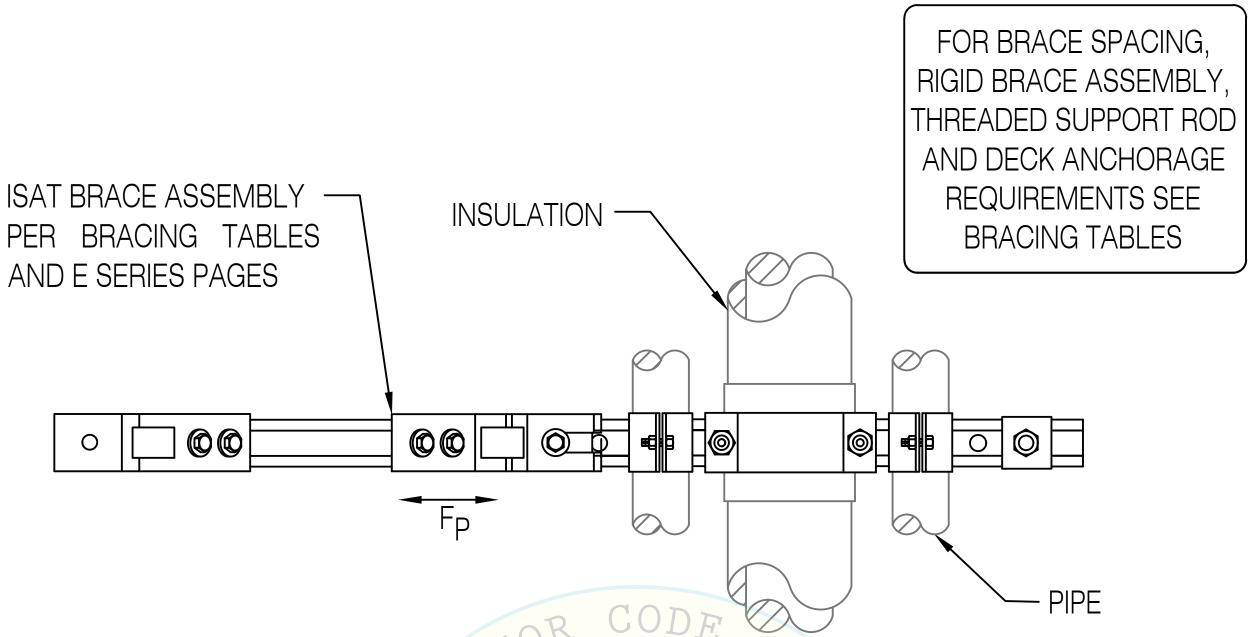
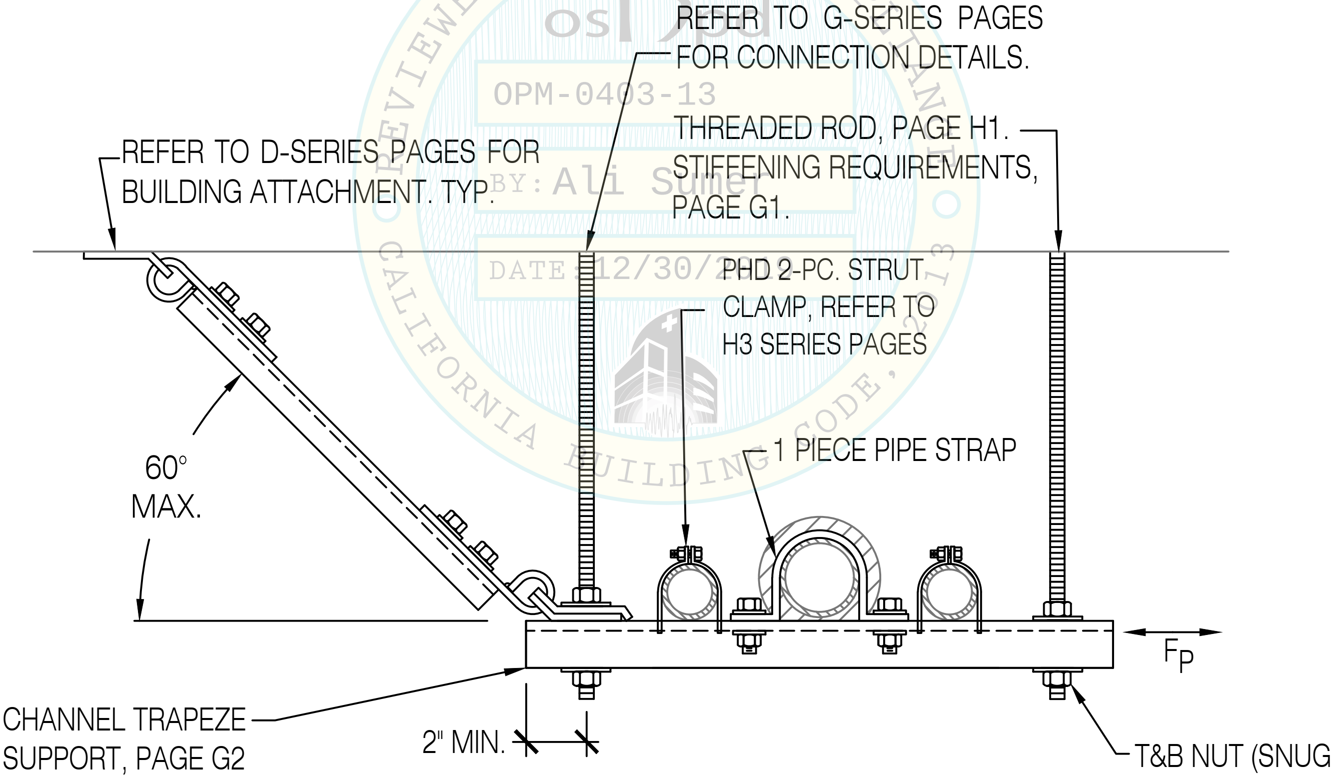


OVERHEAD VIEW



SECTION THRU PIPE TRAPEZE RACK

# ALTERNATE MOUNTING DETAIL FOR INSULATED PIPE

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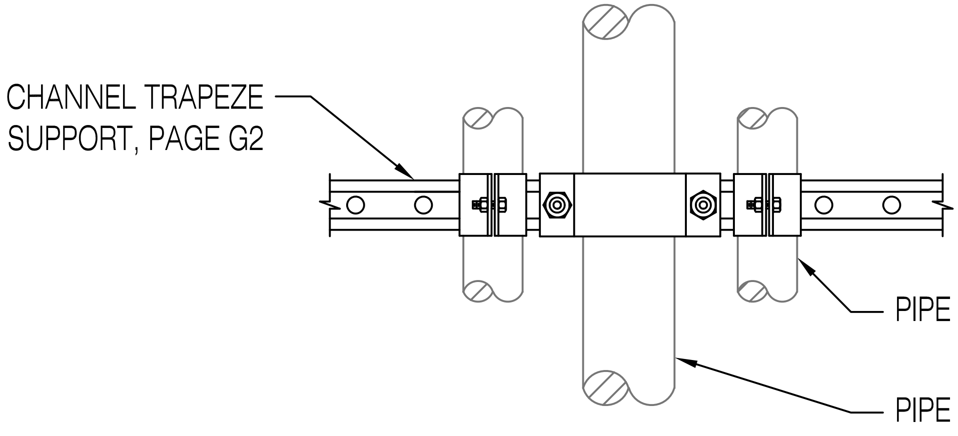
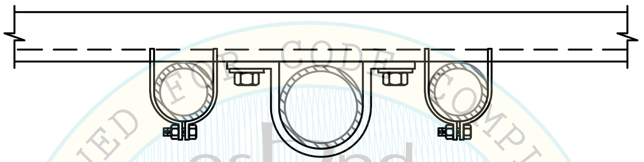
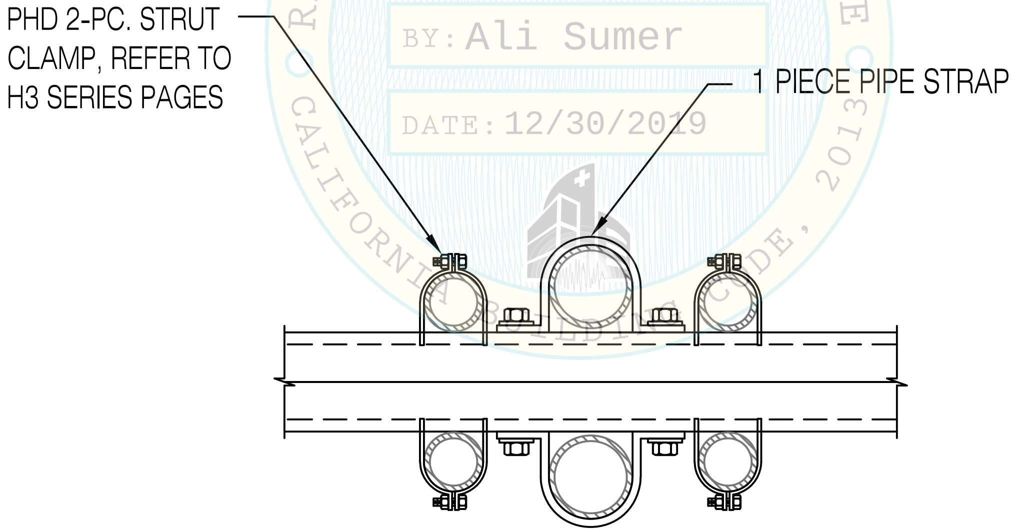


OVERHEAD VIEW
TOP OF STRUT



SECTION THRU PIPE OR CONDUIT TRAPEZE RACK
OPTION 1 - BOTTOM OF STRUT



SECTION THRU PIPE OR CONDUIT TRAPEZE RACK
OPTION 2 - BOTTOM AND TOP OF STRUT

# PIPE OR CONDUIT TRAPEZE RACK
# ALTERNATE SUPPORT CONFIGURATIONS AT SEISMIC LOCATIONS

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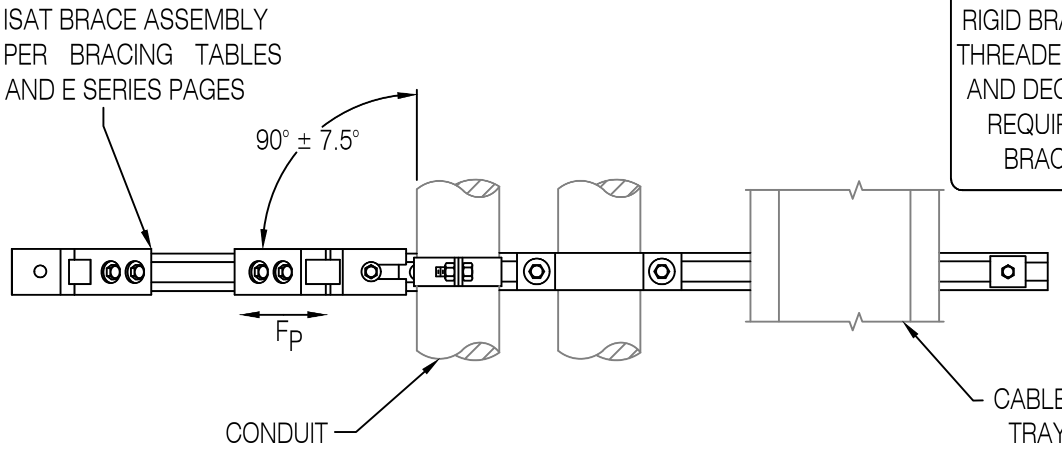
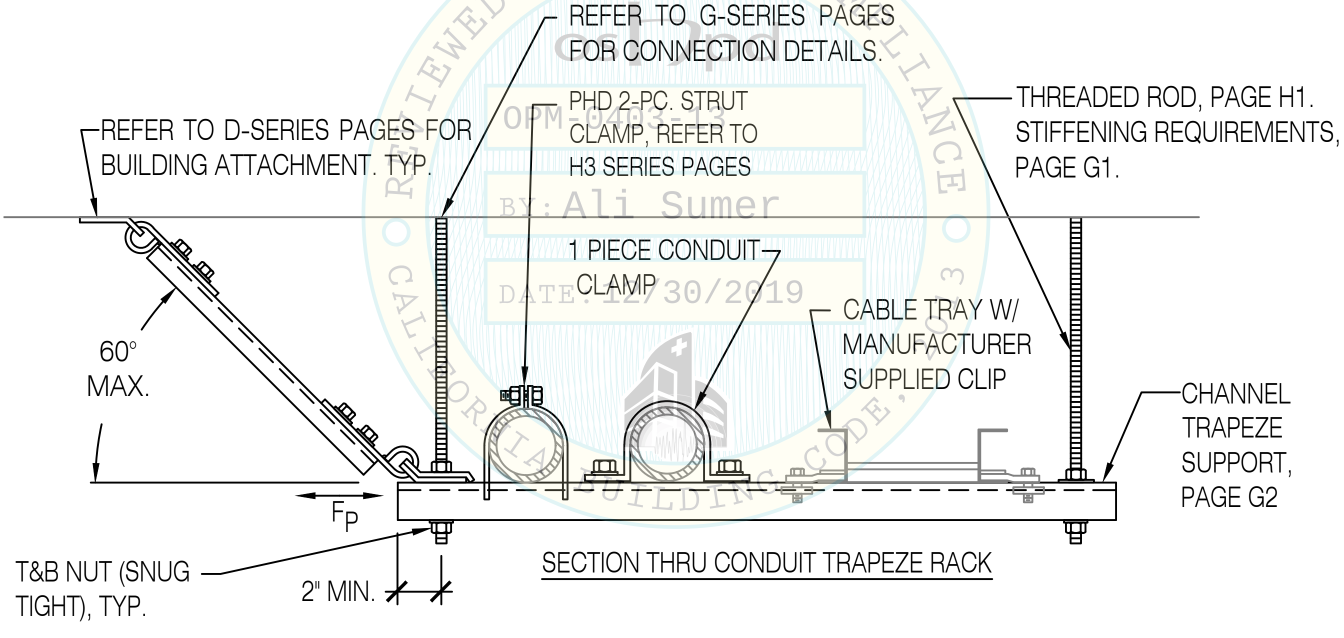
FOR BRACE SPACING, RIGID BRACE ASSEMBLY, THREADED SUPPORT ROD AND DECK ANCHORAGE REQUIREMENTS SEE BRACING TABLES



OVERHEAD VIEW



SECTION THRU CONDUIT TRAPEZE RACK

SINGLE RIGID TRANSVERSE BRACE (SHOWN). SUITABLE WHERE CABLE TRAY LOADING (LBS/LF) DOES NOT EXCEED 1.30 X AGGREGATE CONDUIT LOAD (LBS/LF). OTHERWISE INSTALL TRANSVERSE BRACING ON BOTH RODS.

# CONDUIT AND CABLE TRAY ON SAME TRAPEZE RACK
# TYPICAL FOR ALL BRACING TYPES AND CONFIGURATIONS

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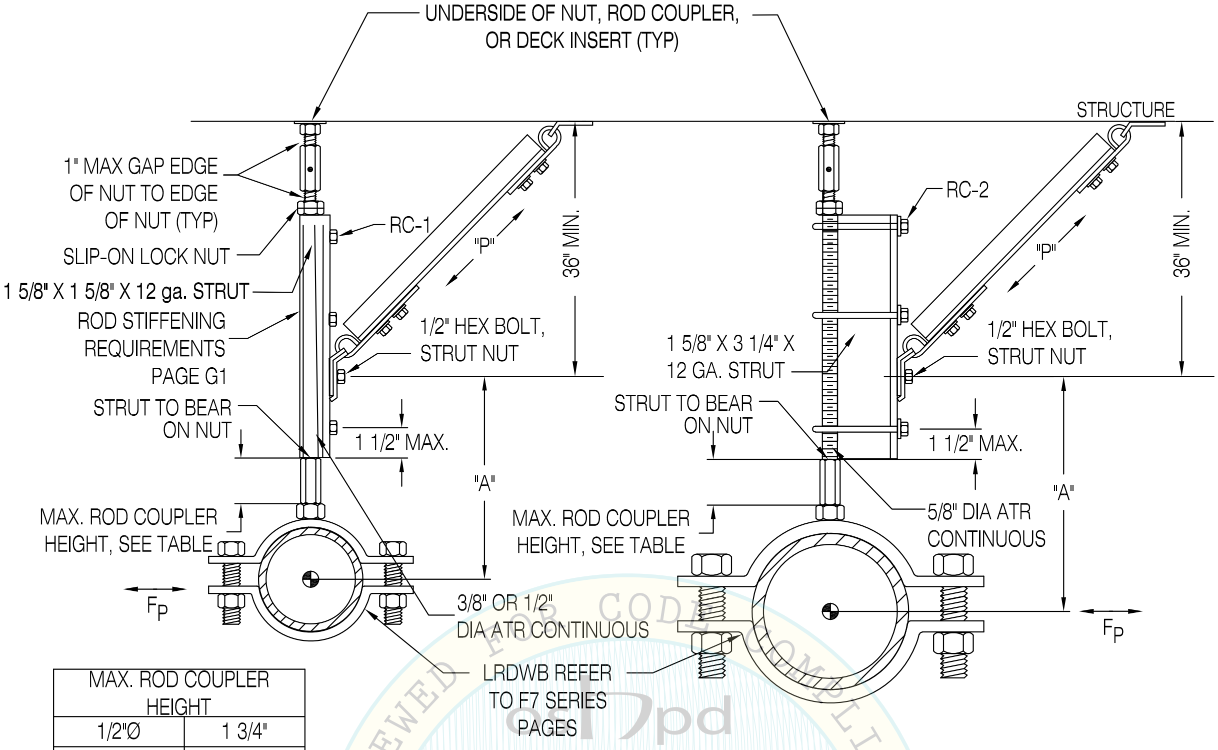

| MAX. ROD COUPLER HEIGHT | |
|---|---|
| 1/2"Ø | 1 3/4" |
| 5/8"Ø | 2 1/8" |

APPLICABLE FOR ANY SINGLE HUNG UTILITY SEE B-SERIES PAGES

| Max. Dim. | Maximum Brace Load "P" Per Rod Diameter (45° Max. Brace Angle From Horizontal) | | | |
|---|---|---|---|---|
| "A" | 1/2" | | 5/8" | |
| Inch | Max. Lateral Force at Utility ($F_p$) Lbs. | Maximum Brace Force (P) Lbs. | Max. Lateral Force at Utility Lbs. | Maximum Brace Force Lbs. |
| 4 | 850 | 1335 | 925 | 1454 |
| 5 | 680 | 1095 | 903 | 1454 |
| 6 | 566 | 934 | 881 | 1454 |
| 9 | 378 | 667 | 823 | 1454 |
| 12 | 283 | 534 | N/A | N/A |
| 15 | 227 | 454 | N/A | N/A |
| 18 | 189 | 400 | N/A | N/A |

1 WAY RIGID BRACE, TRANSVERSE OR LONGITUDINAL LOCATION

## SINGLE HUNG UTILITY ELEVATED BRACE ARM ATTACHMENT MINIMUM 36 INCHES BELOW DECK

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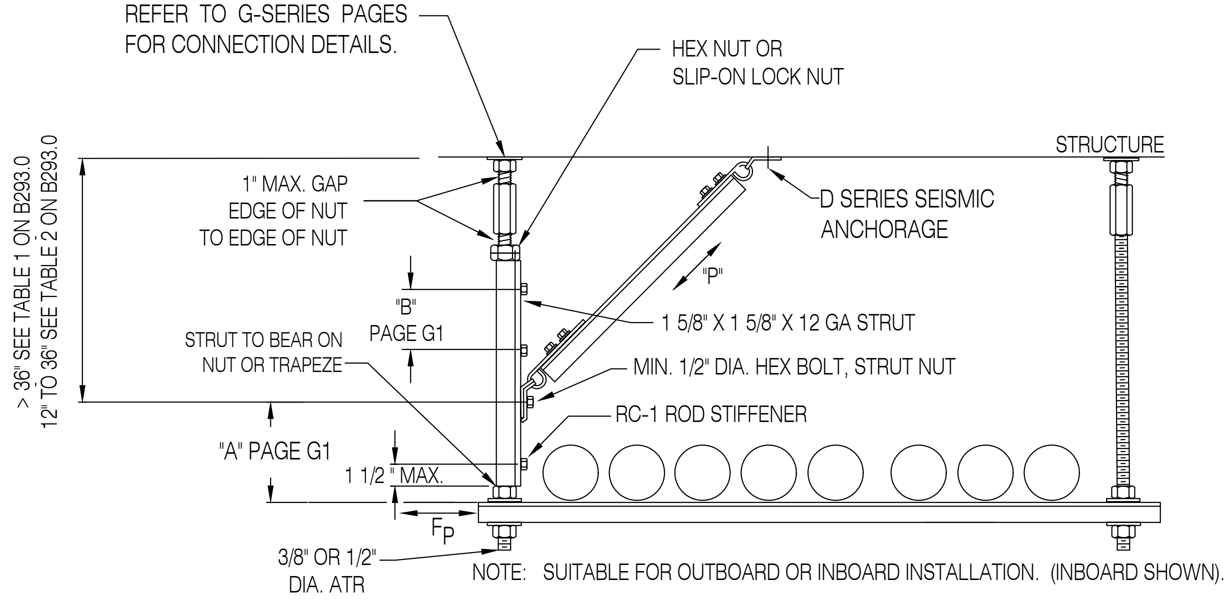

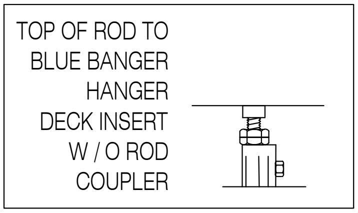

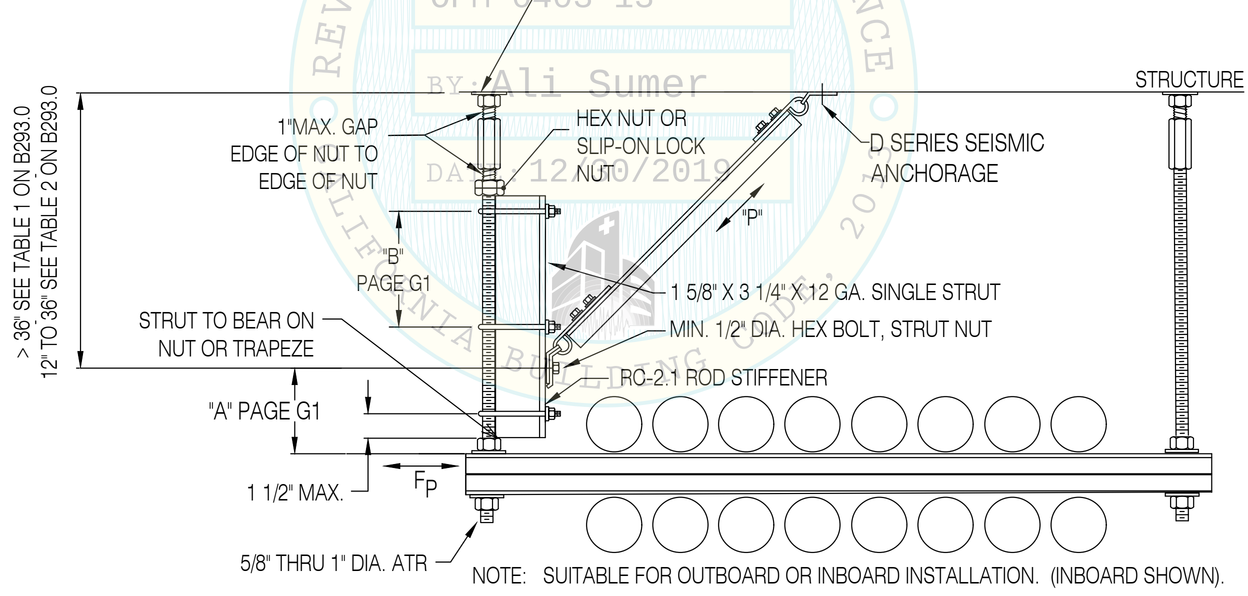

# ELEVATED BRACE ARM ATTACHMENT - TRAPEZE RACKS
# 1 - WAY RIGID TRANSVERSE

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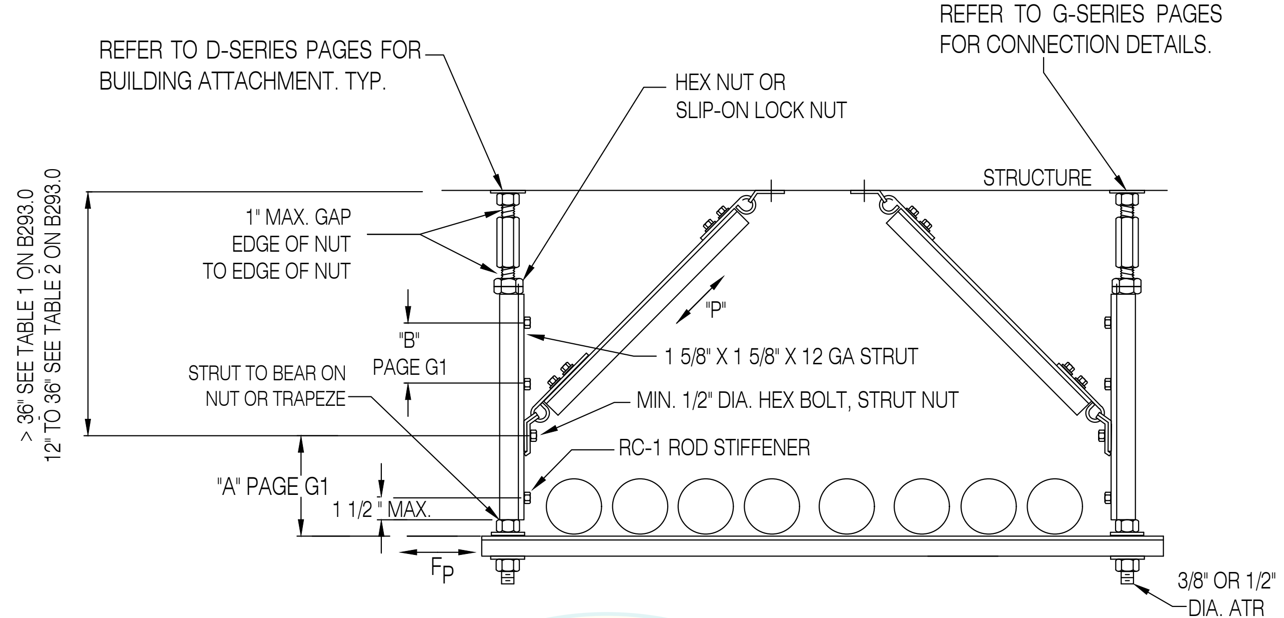
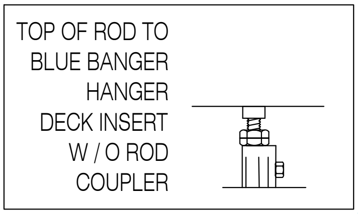
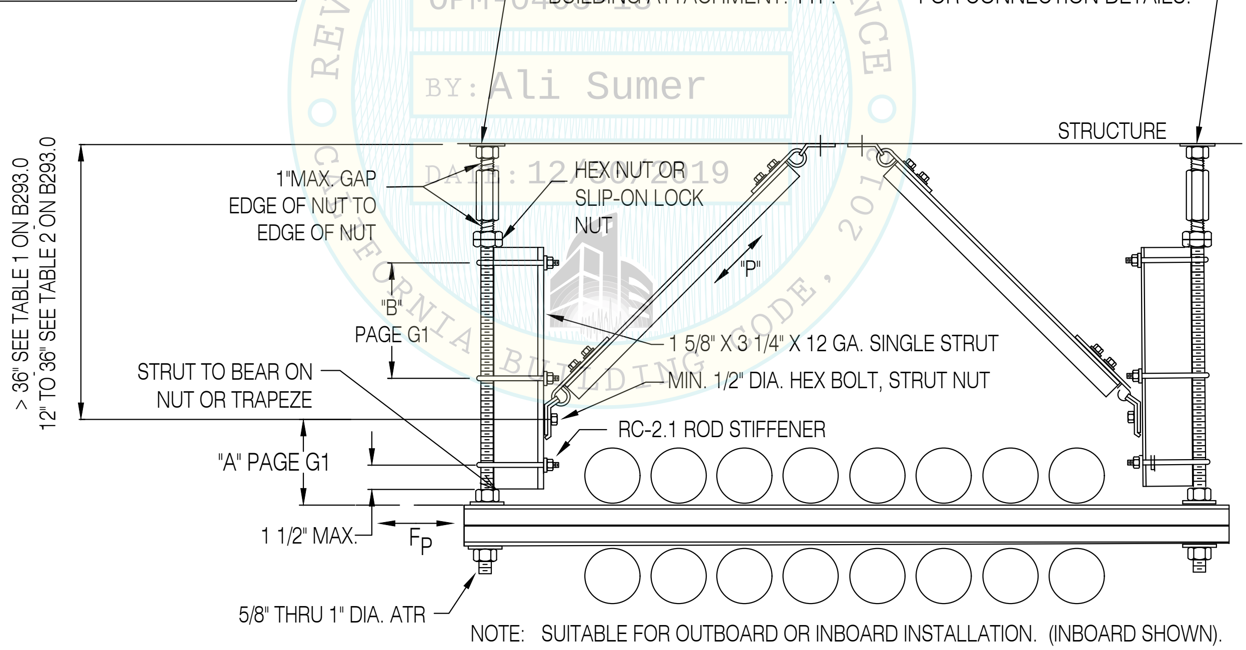


NOTE: SUITABLE FOR OUTBOARD OR INBOARD INSTALLATION. (INBOARD SHOWN).
ANY PATTERN (TRANSVERSE, LONGITUDINAL INSTALLATION)





NOTE: SUITABLE FOR OUTBOARD OR INBOARD INSTALLATION. (INBOARD SHOWN).
ANY PATTERN (TRANSVERSE, LONGITUDINAL INSTALLATION)

# ELEVATED BRACE ARM ATTACHMENT - TRAPEZE RACKS
# 2 - WAY RIGID TRANSVERSE OR LONGITUDINAL LOCATION

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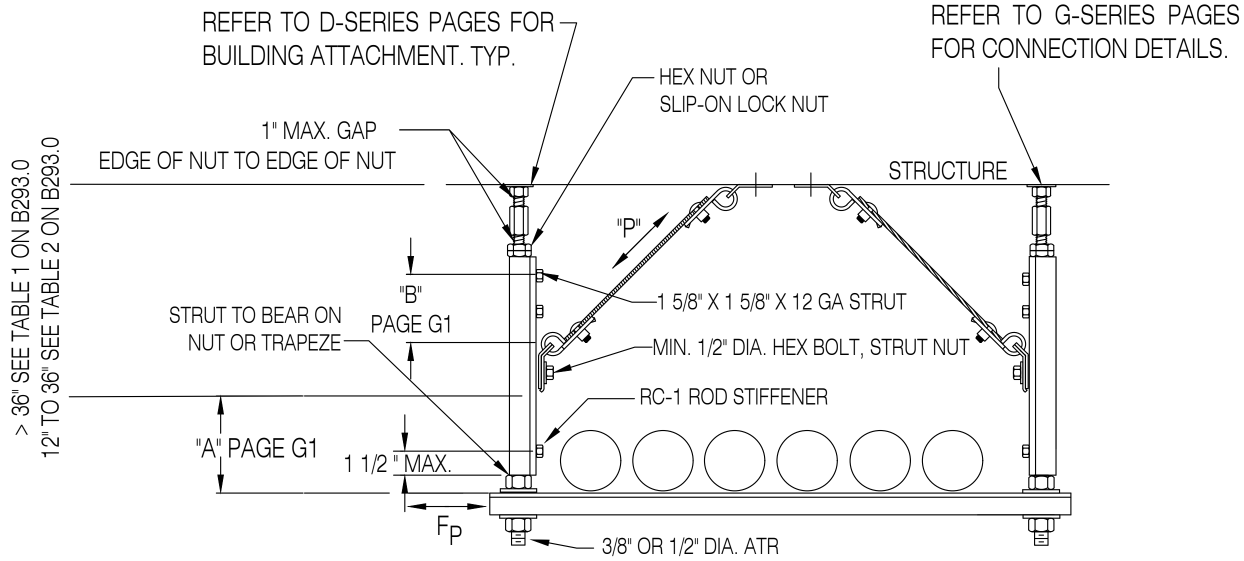

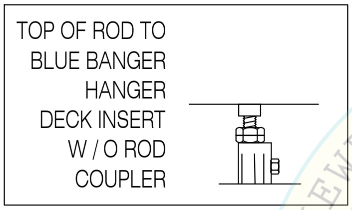

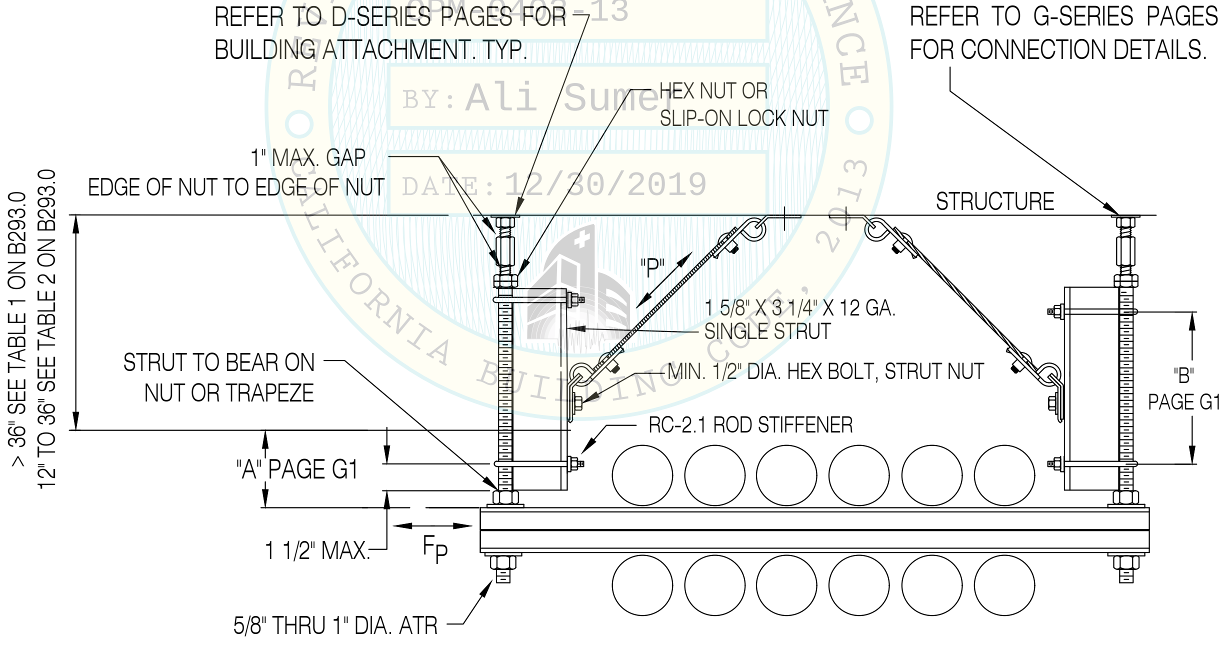

NOTE: SUITABLE FOR OUTBOARD OR INBOARD INSTALLATION. (INBOARD SHOWN).
ANY PATTERN (TRANSVERSE, LONGITUDINAL INSTALLATION)

# ELEVATED BRACE ARM ATTACHMENT - TRAPEZE RACKS

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## TABLE 1
## DESIGN VALUES FOR ELEVATED BRACE ARM ATTACHMENT MINIMUM 36 INCHES BELOW DECK

| MAXIMUM BRACE LOAD "P" PER ROD DIAMETER (45° MAX. BRACE ANGLE FROM HORIZONTAL) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3/8" | | | | 1/2" | | | | ≥ 5/8" | | | |
| Maximum Dim. "A" Inch | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.1 | Minimum Cable Brace Arm Assembly Pg. E3.1 | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.1 | Minimum Cable Brace Arm Assembly Pg. E3.1 | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.1 | Minimum Cable Brace Arm Assembly Pg. E3.1 |
| 4 | 850 | 1,335 | R12AAB2P12 | C12AA06WC | 850 | 1,335 | R12AAB2P12 | C12AA06WC | 925 | 1,454 | R12AAB2P12 | C12AA06WC |
| 5 | 680 | 1,095 | R12AAEM609 | C12AA06WC | 680 | 1,095 | R12AAEM609 | C12AA06WC | 903 | 1,454 | R12AAB2P12 | C12AA06WC |
| 6 | 566 | 934 | R12AAB1S09 | C12AA06WC | 566 | 934 | R12AAB1S09 | C12AA06WC | 881 | 1,454 | R12AAB2P12 | C12AA06WC |
| 9 | 378 | 667 | R12AAEM509 | C12AA06WC | 378 | 667 | R12AAEM509 | C12AA06WC | 823 | 1,454 | R12AAB2P12 | C12AA06WC |
| 12 | 283 | 534 | R12AAEM509 | C12AA06WC | 283 | 534 | R12AAEM509 | C12AA06WC | 747 | 1,409 | R12AAB2P12 | C12AA06WC |
| 15 | 227 | 454 | R12AAA1S07 | C12AA06WC | 227 | 454 | R12AAA1S07 | C12AA06WC | 598 | 1,198 | R12AAB2P12 | C12AA06WC |
| 18 | 189 | 400 | R12AAA1S07 | C12AA06WC | 189 | 400 | R12AAA1S07 | C12AA06WC | 498 | 1,057 | R12AAEM609 | C12AA06WC |

| MAXIMUM BRACE LOAD "P" PER ROD DIAMETER (45° MAX. BRACE ANGLE FROM HORIZONTAL) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3/8" | | | | 1/2" | | | | ≥ 5/8" | | | |
| Maximum Dim. "A" Inch | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.2 | Minimum Cable Brace Arm Assembly Pg. E3.1 | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.2 | Minimum Cable Brace Arm Assembly Pg. E3.1 | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.2 | Minimum Cable Brace Arm Assembly Pg. E3.1 |
| 4 | 850 | 1,335 | R12CFB1S06 | C12CF06WS | 850 | 1,335 | R12CFB1S06 | C12CF06WS | 925 | 1,454 | R12BEB2P12 | C12CF06WS |
| 5 | 680 | 1,095 | R12CFB1P06 | C12CF06WS | 680 | 1,095 | R12CFB1P06 | C12CF06WS | 903 | 1,454 | R12BEB2P12 | C12CF06WS |
| 6 | 566 | 934 | R12CFB1S09 | C12CF06WS | 566 | 934 | R12CFB1S09 | C12CF06WS | 881 | 1,454 | R12BEB2P12 | C12CF06WS |
| 9 | 378 | 667 | R12CFB1P09 | C12CF06WS | 378 | 667 | R12CFB1P09 | C12CF06WS | 823 | 1,454 | R12BEB2P12 | C12CF06WS |
| 12 | 283 | 534 | R12CFB1P09 | C12CF06WS | 283 | 534 | R12CFB1P09 | C12CF06WS | 747 | 1,409 | R12CFB1S06 | C12CF06WS |
| 15 | 227 | 454 | R12CFB1P09 | C12CF06WS | 227 | 454 | R12CFB1P09 | C12CF06WS | 598 | 1,198 | R12CFB1P06 | C12CF06WS |
| 18 | 189 | 400 | R12CFA1P07 | C12CF06WS | 189 | 400 | R12CFA1P07 | C12CF06WS | 498 | 1,057 | R12CFB1P06 | C12CF06WS |

## TABLE 2
## DESIGN VALUES FOR ELEVATED BRACE ARM ATTACHMENT MAXIMUM 36 INCHES TO MINIMUM 12 INCHES BELOW DECK

| MAXIMUM BRACE LOAD "P" PER ROD DIAMETER (45° MAX. BRACE ANGLE FROM HORIZONTAL) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3/8" | | | | 1/2" | | | | ≥ 5/8" | | | |
| Maximum Dim. "A" Inch | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.1 | Minimum Cable Brace Arm Assembly Pg. E3.1 | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.1 | Minimum Cable Brace Arm Assembly Pg. E3.1 | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.1 | Minimum Cable Brace Arm Assembly Pg. E3.1 |
| 4 | 462 | 726 | R12AAEM509 | C12AA06WC | 462 | 726 | R12AAEM509 | C12AA06WC | 771 | 1,454 | R12AAB2P12 | C12AA06WC |
| 5 | 382 | 615 | R12AAEM509 | C12AA06WC | 382 | 615 | R12AAEM509 | C12AA06WC | 726 | 1,454 | R12AAB2P12 | C12AA06WC |
| 6 | 328 | 541 | R12AAEM509 | C12AA06WC | 328 | 541 | R12AAEM509 | C12AA06WC | 685 | 1,454 | R12AAB2P12 | C12AA06WC |
| 9 | 229 | 405 | R12AAA1S07 | C12AA06WC | 229 | 405 | R12AAA1S07 | C12AA06WC | 588 | 1,454 | R12AAB2P12 | C12AA06WC |

| MAXIMUM BRACE LOAD "P" PER ROD DIAMETER (45° MAX. BRACE ANGLE FROM HORIZONTAL) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3/8" | | | | 1/2" | | | | ≥ 5/8" | | | |
| Maximum Dim. "A" Inch | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.2 | Minimum Cable Brace Arm Assembly Pg. E3.1 | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.2 | Minimum Cable Brace Arm Assembly Pg. E3.1 | Maximum Lateral Force at Utility Lbs. | Max. Brace Force Lbs. | Minimum Rigid Brace Arm Assembly Pg. E1.2 | Minimum Cable Brace Arm Assembly Pg. E3.1 |
| 4 | 462 | 726 | R12CFB1P09 | C12CF06WS | 462 | 726 | R12CFB1P09 | C12CF06WS | 771 | 1,454 | R12BEB2P12 | C12CF06WS |
| 5 | 382 | 615 | R12CFB1P09 | C12CF06WS | 382 | 615 | R12CFB1P09 | C12CF06WS | 726 | 1,454 | R12BEB2P12 | C12CF06WS |
| 6 | 328 | 541 | R12CFB1P09 | C12CF06WS | 328 | 541 | R12CFB1P09 | C12CF06WS | 685 | 1,454 | R12BEB2P12 | C12CF06WS |
| 9 | 229 | 405 | R12CFA1P07 | C12CF06WS | 229 | 405 | R12CFA1P07 | C12CF06WS | 588 | 1,454 | R12BEB2P12 | C12CF06WS |

| | |
|---|---|
| PAGE B290.0 | 1 - WAY RIGID BRACE, TRANSVERSE OR LONGITUDINAL INSTALLATION |
| PAGE B291.0 | 2 - WAY RIGID BRACE, TRANSVERSE OR LONGITUDINAL INSTALLATION |
| PAGE B292.0 | 2 - CABLE BRACE, TRANSVERSE OR LONGITUDINAL INSTALLATION |

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## *INDEX - SEISMIC BRACING TABLES*

*PAGE* *DESCRIPTION*

DESIGN SEISMIC FORCES G = [0.25, 0.50, 0.75, 1.0]
BRACE ANGLE A = [30°, 45°, 60°]

*SINGLE HUNG PIPE (COPPER)*

*SINGLE HUNG PIPE (STEEL SCH 40)*

*SINGLE HUNG PIPE (NO-HUB CAST IRON)*

*TRAPEZE SUPPORTED PIPING, 2-ROD VERTICAL SUPPORT*

*TRAPEZE SUPPORTED PIPING; 3-ROD VERTICAL SUPPORT*

*TRAPEZE SUPPORTED HVAC DUCT; 2-ROD VERTICAL SUPPORT*

*SUSPENDED EQUIPMENT*

*SINGLE HUNG PIPE (CONDUIT)*

*TRAPEZE SUPPORTED ELECTRICAL RACEWAYS; 2-ROD VERTICAL SUPPORT*
*(CONDUIT, CABLE TRAY, BUS DUCT)*

*TRAPEZE SUPPORTED ELECTRICAL RACEWAYS; 3-ROD VERTICAL SUPPORT*
*(CONDUIT, CABLE TRAY, BUS DUCT)*

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*Rev. 3*
*11/13/18*

## RIGID BRACING REQUIREMENTS [7]

**SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED) [9]** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 62 | 3/8 | 25 | 20 | R38AAEM306 | N1 | L1 | 76 | 60 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 110 | 3/8 | 28 | 34 | R38AAEM306 | N1 | L1 | 83 | 101 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 167 | 1/2 | 32 | 55 | R12AAEM306 | N1 | L1 | 97 | 165 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 242 | 1/2 | 37 | 85 | R12AAEM306 | N1 | L1 | 110 | 254 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 466 | 5/8 | 40 | 169 | R58AAEM306 | N2 | L2 | 119 | 506 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 662 | 5/8 | 50 | 423 | R58AAEM406 | N5 | L5 | 38 | 325 | R58AAEM409 | N4 | L4 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 25 | 10 | R38AAEM306 | N1 | L1 | 76 | 30 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 28 | 17 | R38AAEM306 | N1 | L1 | 83 | 51 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 79 | 1/2 | 32 | 28 | R12AAEM306 | N1 | L1 | 97 | 83 | R12AAEM306 | N1 | L1 |
| 3 | 10 | 108 | 1/2 | 37 | 42 | R12AAEM306 | N1 | L1 | 110 | 127 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 40 | 84 | R58AAEM306 | N1 | L1 | 119 | 253 | R58AAEM306 | N3 | L3 |
| 6 | 10 | 395 | 5/8 | 50 | 211 | R58AAEM306 | N3 | L3 | 38 | 163 | R58AAEM306 | N2 | L2 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 25 | 14 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 28 | 24 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 32 | 39 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 108 | 1/2 | 37 | 60 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 10 | 199 | 5/8 | 40 | 119 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 10 | 395 | 5/8 | 50 | 299 | R58AAEM306 | N3 | L3 | | | | | |
| **SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING) [10]** | | | | | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 36 | 3/8 | 35 | 14 | R38AAEM306 | N1 | L1 | 104 | 41 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 65 | 3/8 | 40 | 24 | R38AAEM306 | N1 | L1 | 119 | 71 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 98 | 1/2 | 44 | 37 | R12AAEM306 | N1 | L1 | 132 | 112 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 142 | 1/2 | 48 | 56 | R12AAEM306 | N1 | L1 | 145 | 167 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 253 | 5/8 | 55 | 104 | R58AAEM306 | N2 | L2 | 166 | 312 | R58AAEM409 | N4 | L4 |
| 6 | 10 | 399 | 5/8 | 68 | 271 | R58AAEM306 | N3 | L3 | 81 | 325 | R58AAEM409 | N4 | L4 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 35 | 7 | R38AAEM306 | N1 | L1 | 104 | 20 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 40 | 12 | R38AAEM306 | N1 | L1 | 119 | 35 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 39 | 1/2 | 44 | 19 | R12AAEM306 | N1 | L1 | 132 | 56 | R12AAEM306 | N1 | L1 |
| 3 | 10 | 54 | 1/2 | 48 | 28 | R12AAEM306 | N1 | L1 | 145 | 84 | R12AAEM306 | N1 | L1 |
| 4 | 10 | 88 | 5/8 | 55 | 52 | R58AAEM306 | N1 | L1 | 166 | 156 | R58AAEM306 | N2 | L2 |
| 6 | 10 | 187 | 5/8 | 68 | 135 | R58AAEM306 | N2 | L2 | 81 | 163 | R58AAEM306 | N2 | L2 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 35 | 10 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 40 | 17 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 44 | 26 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 54 | 1/2 | 48 | 39 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 10 | 88 | 5/8 | 55 | 74 | R58AAEM306 | N1 | L1 | | | | | |
| 6 | 10 | 187 | 5/8 | 68 | 192 | R58AAEM306 | N2 | L2 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## RIGID BRACING REQUIREMENTS [7]

**SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED) [9]** — **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 95 | 3/8 | 25 | 27 | R38AAEM306 | N1 | L1 | 76 | 81 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 167 | 3/8 | 28 | 45 | R38AAEM306 | N1 | L1 | 83 | 136 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 259 | 1/2 | 32 | 74 | R12AAEM306 | N1 | L1 | 97 | 223 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 385 | 1/2 | 37 | 114 | R12AAEM306 | N2 | L2 | 110 | 343 | R12AAEM406 | N4 | L4 |
| 4 | 10 | 750 | 5/8 | 40 | 227 | R58AAEM306 | N3 | L3 | 119 | 682 | R58AAEM509 | N7 | L7 |
| 6 | 10 | 944 | 5/8 | 50 | 570 | R58AAEM406 | N6 | L6 | 38 | 435 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 25 | 14 | R38AAEM306 | N1 | L1 | 76 | 41 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 28 | 23 | R38AAEM306 | N1 | L1 | 83 | 68 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 79 | 1/2 | 32 | 37 | R12AAEM306 | N1 | L1 | 97 | 111 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 37 | 57 | R12AAEM306 | N1 | L1 | 110 | 171 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 40 | 114 | R58AAEM306 | N2 | L2 | 119 | 341 | R58AAEM406 | N4 | L4 |
| 6 | 10 | 395 | 5/8 | 50 | 285 | R58AAEM306 | N3 | L3 | 38 | 218 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 25 | 19 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 28 | 32 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 32 | 53 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 108 | 1/2 | 37 | 81 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 10 | 199 | 5/8 | 40 | 161 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 10 | 395 | 5/8 | 50 | 403 | R58AAEM406 | N5 | L5 | | | | | |
| **SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING) [10]** | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's** | | | | | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 59 | 3/8 | 35 | 18 | R38AAEM306 | N1 | L1 | 104 | 55 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 105 | 3/8 | 40 | 32 | R38AAEM306 | N1 | L1 | 119 | 95 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 161 | 1/2 | 44 | 50 | R12AAEM306 | N1 | L1 | 132 | 150 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 236 | 1/2 | 48 | 75 | R12AAEM306 | N1 | L1 | 145 | 225 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 428 | 5/8 | 55 | 140 | R58AAEM306 | N2 | L2 | 166 | 421 | R58AAEM406 | N5 | L5 |
| 6 | 10 | 622 | 5/8 | 68 | 365 | R58AAEM406 | N4 | L4 | 81 | 435 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 35 | 9 | R38AAEM306 | N1 | L1 | 104 | 27 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 40 | 16 | R38AAEM306 | N1 | L1 | 119 | 48 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 39 | 1/2 | 44 | 25 | R12AAEM306 | N1 | L1 | 132 | 75 | R12AAEM306 | N1 | L1 |
| 3 | 10 | 54 | 1/2 | 48 | 38 | R12AAEM306 | N1 | L1 | 145 | 113 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 55 | 70 | R58AAEM306 | N1 | L1 | 166 | 210 | R58AAEM306 | N3 | L3 |
| 6 | 10 | 187 | 5/8 | 68 | 183 | R58AAEM306 | N2 | L2 | 81 | 218 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 35 | 13 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 40 | 22 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 44 | 35 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 54 | 1/2 | 48 | 53 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 10 | 88 | 5/8 | 55 | 99 | R58AAEM306 | N1 | L1 | | | | | |
| 6 | 10 | 187 | 5/8 | 68 | 258 | R58AAEM306 | N3 | L3 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times W_p$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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*RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 125 | 3/8 | 25 | 35 | R38AAEM306 | N1 | L1 | 76 | 104 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 217 | 3/8 | 28 | 58 | R38AAEM306 | N1 | L1 | 83 | 175 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 341 | 1/2 | 32 | 96 | R12AAEM306 | N1 | L1 | 97 | 287 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 510 | 1/2 | 37 | 147 | R12AAEM306 | N2 | L2 | 110 | 440 | R12AAEM406 | N5 | L5 |
| 4 | 10 | 1,000 | 5/8 | 40 | 292 | R58AAEM306 | N3 | L3 | 119 | 877 | R58AAEM506 | N9 | L9 |
| 6 | 10 | 1,113 | 5/8 | 45 | 665 | R58AAEM509 | N7 | L7 | 34 | 495 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 25 | 17 | R38AAEM306 | N1 | L1 | 76 | 52 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 28 | 29 | R38AAEM306 | N1 | L1 | 83 | 88 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 79 | 1/2 | 32 | 48 | R12AAEM306 | N1 | L1 | 97 | 143 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 37 | 73 | R12AAEM306 | N1 | L1 | 110 | 220 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 40 | 146 | R58AAEM306 | N2 | L2 | 119 | 438 | R58AAEM406 | N5 | L5 |
| 6 | 10 | 395 | 5/8 | 45 | 333 | R58AAEM406 | N4 | L4 | 34 | 248 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 25 | 25 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 28 | 41 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 32 | 68 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 108 | 1/2 | 37 | 104 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 199 | 5/8 | 40 | 207 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 395 | 5/8 | 45 | 470 | R58AAEM406 | N5 | L5 | | | | | |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 79 | 3/8 | 35 | 24 | R38AAEM306 | N1 | L1 | 104 | 71 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 140 | 3/8 | 40 | 41 | R38AAEM306 | N1 | L1 | 119 | 123 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 216 | 1/2 | 44 | 64 | R12AAEM306 | N1 | L1 | 132 | 193 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 319 | 1/2 | 48 | 97 | R12AAEM306 | N1 | L1 | 145 | 290 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 582 | 5/8 | 55 | 180 | R58AAEM306 | N2 | L2 | 166 | 541 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 778 | 5/8 | 68 | 469 | R58AAEM406 | N5 | L5 | 71 | 495 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 35 | 12 | R38AAEM306 | N1 | L1 | 104 | 35 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 40 | 20 | R38AAEM306 | N1 | L1 | 119 | 61 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 39 | 1/2 | 44 | 32 | R12AAEM306 | N1 | L1 | 132 | 97 | R12AAEM306 | N1 | L1 |
| 3 | 10 | 54 | 1/2 | 48 | 48 | R12AAEM306 | N1 | L1 | 145 | 145 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 55 | 90 | R58AAEM306 | N1 | L1 | 166 | 271 | R58AAEM306 | N3 | L3 |
| 6 | 10 | 187 | 5/8 | 68 | 235 | R58AAEM306 | N3 | L3 | 71 | 248 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 35 | 17 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 40 | 29 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 44 | 46 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 54 | 1/2 | 48 | 68 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 10 | 88 | 5/8 | 55 | 128 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 10 | 187 | 5/8 | 68 | 332 | R58AAEM406 | N4 | L4 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

Anthony A. Rubalcava
S 4710

### *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 75 | 3/8 | 18 | 28 | R38AAEM306 | N1 | L1 | 53 | 85 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 132 | 3/8 | 20 | 48 | R38AAEM306 | N1 | L1 | 59 | 143 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 203 | 1/2 | 23 | 78 | R12AAEM306 | N1 | L1 | 69 | 234 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 298 | 1/2 | 26 | 120 | R12AAEM306 | N2 | L2 | 78 | 360 | R12AAEM406 | N4 | L4 |
| 4 | 10 | 513 | 5/8 | 28 | 239 | R58AAEM306 | N3 | L3 | 68 | 580 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 667 | 5/8 | 26 | 435 | R58AAEM406 | N5 | L5 | 19 | 325 | R58AAEM409 | N4 | L4 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 18 | 14 | R38AAEM306 | N1 | L1 | 53 | 43 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 20 | 24 | R38AAEM306 | N1 | L1 | 59 | 72 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 79 | 1/2 | 23 | 39 | R12AAEM306 | N1 | L1 | 69 | 117 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 26 | 60 | R12AAEM306 | N1 | L1 | 78 | 180 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 28 | 119 | R58AAEM306 | N2 | L2 | 68 | 290 | R58AAEM306 | N3 | L3 |
| 6 | 10 | 395 | 5/8 | 26 | 218 | R58AAEM306 | N3 | L3 | 19 | 163 | R58AAEM306 | N2 | L2 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS**<br>**4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 18 | 20 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 20 | 34 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 23 | 55 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 108 | 1/2 | 26 | 85 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 10 | 199 | 5/8 | 28 | 169 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 10 | 395 | 5/8 | 26 | 308 | R58AAEM409 | N4 | L4 | | | | | |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING)*** [10] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*** | | | | | | | | | | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 50 | 3/8 | 28 | 22 | R38AAEM306 | N1 | L1 | 85 | 67 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 90 | 3/8 | 33 | 39 | R38AAEM306 | N1 | L1 | 100 | 118 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 138 | 1/2 | 37 | 63 | R12AAEM306 | N1 | L1 | 111 | 188 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 202 | 1/2 | 41 | 94 | R12AAEM306 | N1 | L1 | 122 | 281 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 365 | 5/8 | 47 | 175 | R58AAEM306 | N2 | L2 | 140 | 525 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 459 | 5/8 | 54 | 435 | R58AAEM406 | N5 | L5 | 41 | 325 | R58AAEM409 | N4 | L4 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 28 | 11 | R38AAEM306 | N1 | L1 | 85 | 33 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 33 | 20 | R38AAEM306 | N1 | L1 | 100 | 59 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 39 | 1/2 | 37 | 31 | R12AAEM306 | N1 | L1 | 111 | 94 | R12AAEM306 | N1 | L1 |
| 3 | 10 | 54 | 1/2 | 41 | 47 | R12AAEM306 | N1 | L1 | 122 | 141 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 47 | 88 | R58AAEM306 | N1 | L1 | 140 | 263 | R58AAEM306 | N3 | L3 |
| 6 | 10 | 187 | 5/8 | 54 | 218 | R58AAEM306 | N3 | L3 | 41 | 163 | R58AAEM306 | N2 | L2 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS**<br>**4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 28 | 16 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 33 | 28 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 37 | 44 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 54 | 1/2 | 41 | 66 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 10 | 88 | 5/8 | 31 | 81 | R58AAEM306 | N1 | L1 | | | | | |
| 6 | 10 | 187 | 5/8 | 26 | 146 | R58AAEM306 | N2 | L2 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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Rev. 2

03/12/19

## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 122 | 3/8 | 18 | 38 | R38AAEM306 | N1 | L1 | 53 | 115 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 213 | 3/8 | 20 | 64 | R38AAEM306 | N1 | L1 | 59 | 193 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 334 | 1/2 | 23 | 105 | R12AAEM306 | N2 | L2 | 69 | 315 | R12AAEM409 | N4 | L4 |
| 3 | 10 | 500 | 1/2 | 26 | 161 | R12AAEM306 | N2 | L2 | 78 | 484 | R12AAEM406 | N5 | L5 |
| 4 | 10 | 845 | 5/8 | 28 | 322 | R58AAEM409 | N4 | L4 | 68 | 780 | R58AAEM509 | N8 | L8 |
| 6 | 10 | 954 | 5/8 | 26 | 585 | R58AAEM406 | N6 | L6 | 19 | 435 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 18 | 19 | R38AAEM306 | N1 | L1 | 53 | 57 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 20 | 32 | R38AAEM306 | N1 | L1 | 59 | 96 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 79 | 1/2 | 23 | 53 | R12AAEM306 | N1 | L1 | 69 | 158 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 26 | 81 | R12AAEM306 | N1 | L1 | 78 | 242 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 28 | 161 | R58AAEM306 | N2 | L2 | 68 | 390 | R58AAEM406 | N4 | L4 |
| 6 | 10 | 395 | 5/8 | 26 | 293 | R58AAEM306 | N3 | L3 | 19 | 218 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 18 | 27 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 20 | 45 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 23 | 74 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 108 | 1/2 | 26 | 114 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 199 | 5/8 | 28 | 227 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 395 | 5/8 | 26 | 414 | R58AAEM406 | N5 | L5 | | | | | |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 87 | 3/8 | 28 | 30 | R38AAEM306 | N1 | L1 | 85 | 90 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 157 | 3/8 | 33 | 53 | R38AAEM306 | N1 | L1 | 100 | 160 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 244 | 1/2 | 37 | 84 | R12AAEM306 | N1 | L1 | 111 | 253 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 360 | 1/2 | 41 | 126 | R12AAEM306 | N2 | L2 | 122 | 379 | R12AAEM406 | N4 | L4 |
| 4 | 10 | 660 | 5/8 | 47 | 236 | R58AAEM306 | N3 | L3 | 140 | 708 | R58AAEM509 | N8 | L8 |
| 6 | 10 | 746 | 5/8 | 54 | 585 | R58AAEM406 | N6 | L6 | 40 | 435 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 28 | 15 | R38AAEM306 | N1 | L1 | 85 | 45 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 33 | 27 | R38AAEM306 | N1 | L1 | 100 | 80 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 39 | 1/2 | 37 | 42 | R12AAEM306 | N1 | L1 | 111 | 126 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 41 | 63 | R12AAEM306 | N1 | L1 | 122 | 190 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 47 | 118 | R58AAEM306 | N2 | L2 | 140 | 354 | R58AAEM406 | N4 | L4 |
| 6 | 10 | 187 | 5/8 | 54 | 293 | R58AAEM306 | N3 | L3 | 40 | 218 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 28 | 21 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 33 | 38 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 37 | 60 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 54 | 1/2 | 41 | 89 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 10 | 88 | 5/8 | 47 | 167 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 10 | 187 | 5/8 | 54 | 414 | R58AAEM406 | N5 | L5 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## RIGID BRACING REQUIREMENTS [7]

**SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)** [9] **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 164 | 3/8 | 18 | 49 | R38AAEM306 | N1 | L1 | 53 | 148 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 283 | 3/8 | 20 | 83 | R38AAEM306 | N1 | L1 | 59 | 248 | R38AAEM306 | N3 | L3 |
| 2.5 | 10 | 449 | 1/2 | 23 | 135 | R12AAEM306 | N2 | L2 | 69 | 405 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 634 | 1/2 | 26 | 208 | R12AAEM306 | N3 | L3 | 71 | 570 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 1,038 | 5/8 | 27 | 395 | R58AAEM406 | N4 | L4 | 60 | 885 | R58AAEM506 | N9 | L9 |
| 6 | 10 | 1,113 | 5/8 | 23 | 665 | R58AAEM509 | N7 | L7 | 17 | 495 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 18 | 25 | R38AAEM306 | N1 | L1 | 53 | 74 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 20 | 41 | R38AAEM306 | N1 | L1 | 59 | 124 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 79 | 1/2 | 23 | 68 | R12AAEM306 | N1 | L1 | 69 | 203 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 108 | 1/2 | 26 | 104 | R12AAEM306 | N2 | L2 | 71 | 285 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 27 | 198 | R58AAEM306 | N2 | L2 | 60 | 443 | R58AAEM406 | N5 | L5 |
| 6 | 10 | 395 | 5/8 | 23 | 333 | R58AAEM406 | N4 | L4 | 17 | 248 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 18 | 35 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 20 | 58 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 23 | 96 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 108 | 1/2 | 26 | 147 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 199 | 5/8 | 27 | 279 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 395 | 5/8 | 23 | 470 | R58AAEM406 | N5 | L5 | | | | | |
| **SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING)** [10] | | | | | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 120 | 3/8 | 28 | 38 | R38AAEM306 | N1 | L1 | 85 | 115 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 215 | 3/8 | 33 | 68 | R38AAEM306 | N1 | L1 | 100 | 205 | R38AAEM306 | N3 | L3 |
| 2.5 | 10 | 336 | 1/2 | 37 | 108 | R12AAEM306 | N2 | L2 | 111 | 325 | R12AAEM409 | N4 | L4 |
| 3 | 10 | 499 | 1/2 | 41 | 162 | R12AAEM306 | N2 | L2 | 122 | 487 | R12AAEM406 | N5 | L5 |
| 4 | 10 | 898 | 5/8 | 47 | 303 | R58AAEM409 | N4 | L4 | 136 | 885 | R58AAEM506 | N9 | L9 |
| 6 | 10 | 905 | 5/8 | 48 | 665 | R58AAEM509 | N7 | L7 | 36 | 495 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 28 | 19 | R38AAEM306 | N1 | L1 | 85 | 58 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 33 | 34 | R38AAEM306 | N1 | L1 | 100 | 103 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 39 | 1/2 | 37 | 54 | R12AAEM306 | N1 | L1 | 111 | 163 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 41 | 81 | R12AAEM306 | N1 | L1 | 122 | 244 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 88 | 5/8 | 47 | 152 | R58AAEM306 | N2 | L2 | 136 | 443 | R58AAEM406 | N5 | L5 |
| 6 | 10 | 187 | 5/8 | 48 | 333 | R58AAEM406 | N4 | L4 | 36 | 248 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 28 | 27 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 33 | 48 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 37 | 77 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 54 | 1/2 | 41 | 115 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 88 | 5/8 | 47 | 215 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 187 | 5/8 | 48 | 470 | R58AAEM406 | N5 | L5 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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ANTHONY A. ROBALCAVA

## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 83 | 3/8 | 15 | 35 | R38AAEM306 | N1 | L1 | 42 | 100 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 149 | 3/8 | 16 | 58 | R38AAEM306 | N1 | L1 | 48 | 175 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 230 | 1/2 | 19 | 96 | R12AAEM306 | N1 | L1 | 56 | 287 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 310 | 1/2 | 21 | 147 | R12AAEM306 | N2 | L2 | 54 | 375 | R12AAEM406 | N4 | L4 |
| 4 | 10 | 517 | 5/8 | 20 | 260 | R58AAEM306 | N3 | L3 | 45 | 580 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 667 | 5/8 | 17 | 435 | R58AAEM406 | N5 | L5 | 13 | 325 | R58AAEM409 | N4 | L4 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 15 | 17 | R38AAEM306 | N1 | L1 | 42 | 50 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 16 | 29 | R38AAEM306 | N1 | L1 | 48 | 88 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 79 | 1/2 | 19 | 48 | R12AAEM306 | N1 | L1 | 56 | 143 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 21 | 73 | R12AAEM306 | N1 | L1 | 54 | 188 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 20 | 130 | R58AAEM306 | N2 | L2 | 45 | 290 | R58AAEM306 | N3 | L3 |
| 6 | 10 | 395 | 5/8 | 17 | 218 | R58AAEM306 | N3 | L3 | 13 | 163 | R58AAEM306 | N2 | L2 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 15 | 25 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 16 | 41 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 19 | 68 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 108 | 1/2 | 21 | 104 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 199 | 5/8 | 20 | 184 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 10 | 395 | 5/8 | 17 | 308 | R58AAEM409 | N4 | L4 | | | | | |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 58 | 3/8 | 23 | 27 | R38AAEM306 | N1 | L1 | 69 | 82 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 104 | 3/8 | 27 | 48 | R38AAEM306 | N1 | L1 | 81 | 145 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 162 | 1/2 | 31 | 77 | R12AAEM306 | N1 | L1 | 92 | 232 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 239 | 1/2 | 34 | 117 | R12AAEM306 | N2 | L2 | 101 | 351 | R12AAEM406 | N4 | L4 |
| 4 | 10 | 398 | 5/8 | 39 | 221 | R58AAEM306 | N3 | L3 | 103 | 580 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 459 | 5/8 | 36 | 435 | R58AAEM406 | N5 | L5 | 27 | 325 | R58AAEM409 | N4 | L4 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 23 | 14 | R38AAEM306 | N1 | L1 | 69 | 41 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 27 | 24 | R38AAEM306 | N1 | L1 | 81 | 73 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 39 | 1/2 | 31 | 39 | R12AAEM306 | N1 | L1 | 92 | 116 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 34 | 58 | R12AAEM306 | N1 | L1 | 101 | 175 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 39 | 110 | R58AAEM306 | N2 | L2 | 103 | 290 | R58AAEM306 | N3 | L3 |
| 6 | 10 | 187 | 5/8 | 36 | 218 | R58AAEM306 | N3 | L3 | 27 | 163 | R58AAEM306 | N2 | L2 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 23 | 19 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 27 | 34 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 31 | 55 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 54 | 1/2 | 34 | 83 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 10 | 88 | 5/8 | 39 | 156 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 10 | 187 | 5/8 | 36 | 308 | R58AAEM409 | N4 | L4 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4$ x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## RIGID BRACING REQUIREMENTS[7]

**SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)[9]** *MAXIMUM SEISMIC DESIGN FORCE =* **0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod[1] Total Vertical Load (lbs)** | **Min.[8] Vertical Support Rod Dia. (in.)** | **Max.[2] Brace Spacing (ft.)** | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage[6]** | | **Max.[2] Brace Spacing (ft.)** | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage[6]** | |
| | | | | | | | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** | | | | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 139 | 3/8 | 15 | 47 | R38AAEM306 | N1 | L1 | 42 | 135 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 248 | 3/8 | 16 | 79 | R38AAEM306 | N1 | L1 | 48 | 236 | R38AAEM306 | N3 | L3 |
| 2.5 | 10 | 391 | 1/2 | 19 | 129 | R12AAEM306 | N2 | L2 | 56 | 386 | R12AAEM406 | N4 | L4 |
| 3 | 10 | 524 | 1/2 | 21 | 198 | R12AAEM306 | N2 | L2 | 54 | 505 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 854 | 5/8 | 20 | 350 | R58AAEM406 | N4 | L4 | 45 | 780 | R58AAEM509 | N8 | L8 |
| 6 | 10 | 954 | 5/8 | 17 | 585 | R58AAEM406 | N6 | L6 | 13 | 435 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 15 | 23 | R38AAEM306 | N1 | L1 | 42 | 68 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 16 | 39 | R38AAEM306 | N1 | L1 | 48 | 118 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 79 | 1/2 | 19 | 64 | R12AAEM306 | N1 | L1 | 56 | 193 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 21 | 99 | R12AAEM306 | N1 | L1 | 54 | 253 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 20 | 175 | R58AAEM306 | N2 | L2 | 45 | 390 | R58AAEM406 | N4 | L4 |
| 6 | 10 | 395 | 5/8 | 17 | 293 | R58AAEM306 | N3 | L3 | 13 | 218 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 15 | 33 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 16 | 56 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 19 | 91 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 108 | 1/2 | 21 | 140 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 199 | 5/8 | 20 | 247 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 395 | 5/8 | 17 | 414 | R58AAEM406 | N5 | L5 | | | | | |
| **SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING)[10]** | | | | | | | | | *MAXIMUM SEISMIC DESIGN FORCE =* | | **0.75 G's** | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 103 | 3/8 | 23 | 37 | R38AAEM306 | N1 | L1 | 69 | 110 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 186 | 3/8 | 27 | 65 | R38AAEM306 | N1 | L1 | 81 | 195 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 292 | 1/2 | 31 | 104 | R12AAEM306 | N2 | L2 | 92 | 312 | R12AAEM409 | N4 | L4 |
| 3 | 10 | 436 | 1/2 | 34 | 158 | R12AAEM306 | N2 | L2 | 101 | 473 | R12AAEM406 | N5 | L5 |
| 4 | 10 | 727 | 5/8 | 39 | 298 | R58AAEM306 | N3 | L3 | 103 | 780 | R58AAEM509 | N8 | L8 |
| 6 | 10 | 746 | 5/8 | 36 | 585 | R58AAEM406 | N6 | L6 | 27 | 435 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 23 | 18 | R38AAEM306 | N1 | L1 | 69 | 55 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 27 | 33 | R38AAEM306 | N1 | L1 | 81 | 98 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 39 | 1/2 | 31 | 52 | R12AAEM306 | N1 | L1 | 92 | 156 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 34 | 79 | R12AAEM306 | N1 | L1 | 101 | 236 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 88 | 5/8 | 39 | 149 | R58AAEM306 | N2 | L2 | 103 | 390 | R58AAEM406 | N4 | L4 |
| 6 | 10 | 187 | 5/8 | 36 | 293 | R58AAEM306 | N3 | L3 | 27 | 218 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 23 | 26 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 27 | 46 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 31 | 74 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 54 | 1/2 | 34 | 111 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 88 | 5/8 | 39 | 210 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 187 | 5/8 | 36 | 414 | R58AAEM406 | N5 | L5 | | | | | |

1. $TVL = DL + Fv + (0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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Rev. 2
03/12/19

*RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 170 | 3/8 | 15 | 60 | R38AAEM306 | N1 | L1 | 36 | 150 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 334 | 3/8 | 16 | 101 | R38AAEM306 | N2 | L2 | 48 | 304 | R38AAEM409 | N4 | L4 |
| 2.5 | 10 | 533 | 1/2 | 19 | 165 | R12AAEM306 | N2 | L2 | 56 | 496 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 649 | 1/2 | 21 | 254 | R12AAEM306 | N3 | L3 | 47 | 570 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 1,038 | 5/8 | 18 | 395 | R58AAEM406 | N4 | L4 | 40 | 885 | R58AAEM506 | N9 | L9 |
| 6 | 10 | 1,113 | 5/8 | 15 | 665 | R58AAEM509 | N7 | L7 | 11 | 495 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 15 | 30 | R38AAEM306 | N1 | L1 | 36 | 75 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 16 | 51 | R38AAEM306 | N1 | L1 | 48 | 152 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 79 | 1/2 | 19 | 83 | R12AAEM306 | N1 | L1 | 56 | 248 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 108 | 1/2 | 21 | 127 | R12AAEM306 | N2 | L2 | 47 | 285 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 18 | 198 | R58AAEM306 | N2 | L2 | 40 | 443 | R58AAEM406 | N5 | L5 |
| 6 | 10 | 395 | 5/8 | 15 | 333 | R58AAEM406 | N4 | L4 | 11 | 248 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 15 | 43 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 16 | 72 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 19 | 117 | R12AAEM306 | N2 | L2 | | | | | |
| 3 | 10 | 108 | 1/2 | 21 | 180 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 199 | 5/8 | 18 | 279 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 395 | 5/8 | 15 | 470 | R58AAEM406 | N5 | L5 | | | | | |

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING)*** [10] ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 144 | 3/8 | 23 | 47 | R38AAEM306 | N1 | L1 | 69 | 141 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 257 | 3/8 | 27 | 84 | R38AAEM306 | N1 | L1 | 81 | 251 | R38AAEM306 | N3 | L3 |
| 2.5 | 10 | 406 | 1/2 | 31 | 134 | R12AAEM306 | N2 | L2 | 92 | 402 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 578 | 1/2 | 34 | 203 | R12AAEM306 | N3 | L3 | 95 | 570 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 923 | 5/8 | 39 | 382 | R58AAEM406 | N4 | L4 | 91 | 885 | R58AAEM506 | N9 | L9 |
| 6 | 10 | 905 | 5/8 | 32 | 665 | R58AAEM509 | N7 | L7 | 24 | 495 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 23 | 24 | R38AAEM306 | N1 | L1 | 69 | 71 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 27 | 42 | R38AAEM306 | N1 | L1 | 81 | 126 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 39 | 1/2 | 31 | 67 | R12AAEM306 | N1 | L1 | 92 | 201 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 54 | 1/2 | 34 | 101 | R12AAEM306 | N2 | L2 | 95 | 285 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 88 | 5/8 | 39 | 191 | R58AAEM306 | N2 | L2 | 91 | 443 | R58AAEM406 | N5 | L5 |
| 6 | 10 | 187 | 5/8 | 32 | 333 | R58AAEM406 | N4 | L4 | 24 | 248 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 23 | 33 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 27 | 59 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 31 | 95 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 54 | 1/2 | 34 | 143 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 88 | 5/8 | 39 | 270 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 187 | 5/8 | 32 | 470 | R58AAEM406 | N5 | L5 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## RIGID BRACING REQUIREMENTS[7]

**SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)[9]** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 84 | 3/8 | 13 | 40 | R38AAEM306 | N1 | L1 | 31 | 100 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 164 | 3/8 | 14 | 67 | R38AAEM306 | N1 | L1 | 42 | 202 | R38AAEM306 | N3 | L3 |
| 2.5 | 10 | 254 | 1/2 | 16 | 110 | R12AAEM306 | N2 | L2 | 49 | 331 | R12AAEM406 | N4 | L4 |
| 3 | 10 | 314 | 1/2 | 18 | 169 | R12AAEM306 | N2 | L2 | 40 | 375 | R12AAEM406 | N4 | L4 |
| 4 | 10 | 517 | 5/8 | 15 | 260 | R58AAEM306 | N3 | L3 | 34 | 580 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 667 | 5/8 | 13 | 435 | R58AAEM406 | N5 | L5 | 10 | 325 | R58AAEM409 | N4 | L4 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 13 | 20 | R38AAEM306 | N1 | L1 | 31 | 50 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 14 | 34 | R38AAEM306 | N1 | L1 | 42 | 101 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 79 | 1/2 | 16 | 55 | R12AAEM306 | N1 | L1 | 49 | 165 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 18 | 85 | R12AAEM306 | N1 | L1 | 40 | 188 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 15 | 130 | R58AAEM306 | N2 | L2 | 34 | 290 | R58AAEM306 | N3 | L3 |
| 6 | 10 | 395 | 5/8 | 13 | 218 | R58AAEM306 | N3 | L3 | 10 | 163 | R58AAEM306 | N2 | L2 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 13 | 28 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 14 | 48 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 16 | 78 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 108 | 1/2 | 18 | 120 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 199 | 5/8 | 15 | 184 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 10 | 395 | 5/8 | 13 | 308 | R58AAEM409 | N4 | L4 | | | | | |
| **SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING)[10]** | | | | | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 64 | 3/8 | 20 | 31 | R38AAEM306 | N1 | L1 | 60 | 94 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 116 | 3/8 | 23 | 56 | R38AAEM306 | N1 | L1 | 70 | 167 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 181 | 1/2 | 26 | 89 | R12AAEM306 | N1 | L1 | 79 | 268 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 253 | 1/2 | 29 | 135 | R12AAEM306 | N2 | L2 | 81 | 375 | R12AAEM406 | N4 | L4 |
| 4 | 10 | 405 | 5/8 | 34 | 255 | R58AAEM306 | N3 | L3 | 77 | 580 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 459 | 5/8 | 27 | 435 | R58AAEM406 | N5 | L5 | 20 | 325 | R58AAEM409 | N4 | L4 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 20 | 16 | R38AAEM306 | N1 | L1 | 60 | 47 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 23 | 28 | R38AAEM306 | N1 | L1 | 70 | 84 | R38AAEM306 | N1 | L1 |
| 2.5 | 10 | 39 | 1/2 | 26 | 45 | R12AAEM306 | N1 | L1 | 79 | 134 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 29 | 68 | R12AAEM306 | N1 | L1 | 81 | 188 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 34 | 127 | R58AAEM306 | N2 | L2 | 77 | 290 | R58AAEM306 | N3 | L3 |
| 6 | 10 | 187 | 5/8 | 27 | 218 | R58AAEM306 | N3 | L3 | 20 | 163 | R58AAEM306 | N2 | L2 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 20 | 22 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 23 | 39 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 26 | 63 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 54 | 1/2 | 29 | 95 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 10 | 88 | 5/8 | 34 | 180 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 10 | 187 | 5/8 | 27 | 308 | R58AAEM409 | N4 | L4 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS*[7]

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)***[9] ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage**[6] | | | | | **Min. Brace Anchorage**[6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod**[1] **Total Vertical Load (lbs)** | **Min.**[8] **Vertical Support Rod Dia. (in.)** | **Max.**[2] **Brace Spacing (ft.)** | **Brace**[3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour**[4] **Deck Page D1** | **Metal**[5] **Deck Page D2** | **Max.**[2] **Brace Spacing (ft.)** | **Brace**[3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour**[4] **Deck Page D1** | **Metal**[5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 141 | 3/8 | 13 | 54 | R38AAEM306 | N1 | L1 | 31 | 135 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 277 | 3/8 | 14 | 91 | R38AAEM306 | N1 | L1 | 42 | 273 | R38AAEM306 | N3 | L3 |
| 2.5 | 10 | 439 | 1/2 | 16 | 149 | R12AAEM306 | N2 | L2 | 49 | 446 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 533 | 1/2 | 18 | 228 | R12AAEM306 | N3 | L3 | 40 | 505 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 854 | 5/8 | 15 | 350 | R58AAEM406 | N4 | L4 | 34 | 780 | R58AAEM509 | N8 | L8 |
| 6 | 10 | 954 | 5/8 | 13 | 585 | R58AAEM406 | N6 | L6 | 10 | 435 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 13 | 27 | R38AAEM306 | N1 | L1 | 31 | 68 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 14 | 45 | R38AAEM306 | N1 | L1 | 42 | 136 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 79 | 1/2 | 16 | 74 | R12AAEM306 | N1 | L1 | 49 | 223 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 108 | 1/2 | 18 | 114 | R12AAEM306 | N2 | L2 | 40 | 253 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 15 | 175 | R58AAEM306 | N2 | L2 | 34 | 390 | R58AAEM406 | N4 | L4 |
| 6 | 10 | 395 | 5/8 | 13 | 293 | R58AAEM306 | N3 | L3 | 10 | 218 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 13 | 38 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 14 | 64 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 16 | 105 | R12AAEM306 | N2 | L2 | | | | | |
| 3 | 10 | 108 | 1/2 | 18 | 161 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 199 | 5/8 | 15 | 247 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 395 | 5/8 | 13 | 414 | R58AAEM406 | N5 | L5 | | | | | |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING)***[10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 117 | 3/8 | 20 | 42 | R38AAEM306 | N1 | L1 | 60 | 127 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 210 | 3/8 | 23 | 75 | R38AAEM306 | N1 | L1 | 70 | 226 | R38AAEM306 | N3 | L3 |
| 2.5 | 10 | 331 | 1/2 | 26 | 120 | R12AAEM306 | N2 | L2 | 79 | 361 | R12AAEM406 | N4 | L4 |
| 3 | 10 | 465 | 1/2 | 29 | 182 | R12AAEM306 | N2 | L2 | 81 | 505 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 741 | 5/8 | 34 | 344 | R58AAEM406 | N4 | L4 | 77 | 780 | R58AAEM509 | N8 | L8 |
| 6 | 10 | 746 | 5/8 | 27 | 585 | R58AAEM406 | N6 | L6 | 20 | 435 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 20 | 21 | R38AAEM306 | N1 | L1 | 60 | 63 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 23 | 38 | R38AAEM306 | N1 | L1 | 70 | 113 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 39 | 1/2 | 26 | 60 | R12AAEM306 | N1 | L1 | 79 | 180 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 29 | 91 | R12AAEM306 | N1 | L1 | 81 | 253 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 88 | 5/8 | 34 | 172 | R58AAEM306 | N2 | L2 | 77 | 390 | R58AAEM406 | N4 | L4 |
| 6 | 10 | 187 | 5/8 | 27 | 293 | R58AAEM306 | N3 | L3 | 20 | 218 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 20 | 30 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 23 | 53 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 26 | 85 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 54 | 1/2 | 29 | 129 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 88 | 5/8 | 34 | 243 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 187 | 5/8 | 27 | 414 | R58AAEM406 | N5 | L5 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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### RIGID BRACING REQUIREMENTS [7]

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 173 | 3/8 | 13 | 70 | R38AAEM306 | N1 | L1 | 27 | 150 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 377 | 3/8 | 14 | 117 | R38AAEM306 | N2 | L2 | 42 | 351 | R38AAEM406 | N4 | L4 |
| 2.5 | 10 | 603 | 1/2 | 16 | 191 | R12AAEM306 | N2 | L2 | 49 | 573 | R12AAEM406 | N6 | L6 |
| 3 | 10 | 664 | 1/2 | 18 | 294 | R12AAEM306 | N3 | L3 | 35 | 570 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 1,038 | 5/8 | 13 | 395 | R58AAEM406 | N4 | L4 | 30 | 885 | R58AAEM506 | N9 | L9 |
| 6 | 10 | 1,113 | 5/8 | 11 | 665 | R58AAEM509 | N7 | L7 | 8 | 495 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 30 | 3/8 | 13 | 35 | R38AAEM306 | N1 | L1 | 27 | 75 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 14 | 58 | R38AAEM306 | N1 | L1 | 42 | 175 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 79 | 1/2 | 16 | 96 | R12AAEM306 | N1 | L1 | 49 | 287 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 108 | 1/2 | 18 | 147 | R12AAEM306 | N2 | L2 | 35 | 285 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 13 | 198 | R58AAEM306 | N2 | L2 | 30 | 443 | R58AAEM406 | N5 | L5 |
| 6 | 10 | 395 | 5/8 | 11 | 333 | R58AAEM406 | N4 | L4 | 8 | 248 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 30 | 3/8 | 13 | 49 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 57 | 3/8 | 14 | 83 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 79 | 1/2 | 16 | 135 | R12AAEM306 | N2 | L2 | | | | | |
| 3 | 10 | 108 | 1/2 | 18 | 208 | R12AAEM306 | N3 | L3 | | | | | |
| 4 | 10 | 199 | 5/8 | 13 | 279 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 395 | 5/8 | 11 | 470 | R58AAEM406 | N5 | L5 | | | | | |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS PIPING)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0,B3.1,B3.3)** | | | | |
| 1.5 | 8 | 153 | 3/8 | 20 | 54 | R38AAEM306 | N1 | L1 | 55 | 150 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 293 | 3/8 | 23 | 97 | R38AAEM306 | N1 | L1 | 70 | 290 | R38AAEM306 | N3 | L3 |
| 2.5 | 10 | 463 | 1/2 | 26 | 155 | R12AAEM306 | N2 | L2 | 79 | 464 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 588 | 1/2 | 29 | 234 | R12AAEM306 | N3 | L3 | 71 | 570 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 927 | 5/8 | 30 | 395 | R58AAEM406 | N4 | L4 | 68 | 885 | R58AAEM506 | N9 | L9 |
| 6 | 10 | 905 | 5/8 | 24 | 665 | R58AAEM509 | N7 | L7 | 18 | 495 | R58AAEM406 | N5 | L5 |
| | | | | **2-Way Transverse Brace Pattern (B2.12,B2.13)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0,B4.1,B4.3)** | | | | |
| 1.5 | 8 | 15 | 3/8 | 20 | 27 | R38AAEM306 | N1 | L1 | 55 | 75 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 23 | 48 | R38AAEM306 | N1 | L1 | 70 | 145 | R38AAEM306 | N2 | L2 |
| 2.5 | 10 | 39 | 1/2 | 26 | 77 | R12AAEM306 | N1 | L1 | 79 | 232 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 54 | 1/2 | 29 | 117 | R12AAEM306 | N2 | L2 | 71 | 285 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 88 | 5/8 | 30 | 198 | R58AAEM306 | N2 | L2 | 68 | 443 | R58AAEM406 | N5 | L5 |
| 6 | 10 | 187 | 5/8 | 24 | 333 | R58AAEM406 | N4 | L4 | 18 | 248 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13,B4.14)** | | | | | | | | | |
| 1.5 | 8 | 15 | 3/8 | 20 | 38 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 28 | 3/8 | 23 | 68 | R38AAEM306 | N1 | L1 | | | | | |
| 2.5 | 10 | 39 | 1/2 | 26 | 109 | R12AAEM306 | N2 | L2 | | | | | |
| 3 | 10 | 54 | 1/2 | 29 | 165 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 88 | 5/8 | 30 | 279 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 10 | 187 | 5/8 | 24 | 470 | R58AAEM406 | N5 | L5 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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Rev. 2
03/12/19

## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED) [9]*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 25 | 20 | C38AA04WS | N1 | L1 | 76 | 60 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 28 | 34 | C38AA04WS | N1 | L1 | 83 | 101 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 79 | 1/2 | 32 | 55 | C12AA04WS | N1 | L1 | 97 | 165 | C12AA04WS | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 37 | 85 | C12AA04WS | N1 | L1 | 110 | 254 | C12AA04WS | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 39 | 166 | C58AA04WS | N2 | L2 | 117 | 497 | C58AA04WS | N5 | L5 |
| 6 | 10 | 395 | 5/8 | 39 | 329 | C58AA04WS | N4 | L4 | 38 | 325 | C58AA04WS | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 25 | 20 | C38AA04WS | N1 | L1 | 25 | 20 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 28 | 34 | C38AA04WS | N1 | L1 | 28 | 34 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 79 | 1/2 | 32 | 55 | C12AA04WS | N1 | L1 | 32 | 55 | C12AA04WS | N1 | L1 |
| 3 | 10 | 108 | 1/2 | 37 | 85 | C12AA04WS | N1 | L1 | 37 | 85 | C12AA04WS | N1 | L1 |
| 4 | 10 | 199 | 5/8 | 40 | 169 | C58AA04WS | N2 | L2 | 40 | 169 | C58AA04WS | N2 | L2 |
| 6 | 10 | 395 | 5/8 | 38 | 325 | C58AA04WS | N4 | L4 | 38 | 325 | C58AA04WS | N4 | L4 |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED) [10]*** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 35 | 14 | C38AA04WS | N1 | L1 | 104 | 41 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 40 | 24 | C38AA04WS | N1 | L1 | 119 | 71 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 44 | 37 | C12AA04WS | N1 | L1 | 132 | 112 | C12AA04WS | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 48 | 56 | C12AA04WS | N1 | L1 | 145 | 167 | C12AA04WS | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 55 | 104 | C58AA04WS | N2 | L2 | 166 | 312 | C58AA04WS | N4 | L4 |
| 6 | 10 | 187 | 5/8 | 68 | 271 | C58AA04WS | N3 | L3 | 81 | 325 | C58AA04WS | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 35 | 14 | C38AA04WS | N1 | L1 | 35 | 14 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 40 | 24 | C38AA04WS | N1 | L1 | 40 | 32 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 44 | 37 | C12AA04WS | N1 | L1 | 44 | 50 | C12AA04WS | N1 | L1 |
| 3 | 10 | 54 | 1/2 | 48 | 56 | C12AA04WS | N1 | L1 | 48 | 75 | C12AA04WS | N1 | L1 |
| 4 | 10 | 88 | 5/8 | 55 | 104 | C58AA04WS | N2 | L2 | 55 | 140 | C58AA04WS | N2 | L2 |
| 6 | 10 | 187 | 5/8 | 68 | 271 | C58AA04WS | N3 | L3 | 68 | 364 | C58AA04WS | N4 | L4 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7]:*

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED) [9]*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 25 | 27 | C38AA04WS | N1 | L1 | 76 | 81 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 28 | 45 | C38AA04WS | N1 | L1 | 83 | 136 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 79 | 1/2 | 32 | 74 | C12AA04WS | N1 | L1 | 97 | 223 | C12AA04WS | N3 | L3 |
| 3 | 10 | 108 | 1/2 | 37 | 114 | C12AA04WS | N2 | L2 | 110 | 343 | C12AA04WS | N4 | L4 |
| 4 | 10 | 199 | 5/8 | 40 | 227 | C58AA04WS | N3 | L3 | 119 | 682 | C58AA06WS | N7 | L7 |
| 6 | 10 | 395 | 5/8 | 50 | 570 | C58AA04WS | N6 | L6 | 38 | 435 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 25 | 27 | C38AA04WS | N1 | L1 | 25 | 27 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 28 | 45 | C38AA04WS | N1 | L1 | 28 | 45 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 79 | 1/2 | 32 | 74 | C12AA04WS | N1 | L1 | 32 | 74 | C12AA04WS | N1 | L1 |
| 3 | 10 | 108 | 1/2 | 37 | 114 | C12AA04WS | N2 | L2 | 37 | 114 | C12AA04WS | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 40 | 227 | C58AA04WS | N3 | L3 | 40 | 227 | C58AA04WS | N3 | L3 |
| 6 | 10 | 395 | 5/8 | 38 | 435 | C58AA04WS | N5 | L5 | 38 | 435 | C58AA04WS | N5 | L5 |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED) [10]*** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 35 | 18 | C38AA04WS | N1 | L1 | 104 | 55 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 40 | 32 | C38AA04WS | N1 | L1 | 119 | 95 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 44 | 50 | C12AA04WS | N1 | L1 | 132 | 150 | C12AA04WS | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 48 | 75 | C12AA04WS | N1 | L1 | 145 | 225 | C12AA04WS | N3 | L3 |
| 4 | 10 | 88 | 5/8 | 55 | 140 | C58AA04WS | N2 | L2 | 166 | 421 | C58AA04WS | N5 | L5 |
| 6 | 10 | 187 | 5/8 | 68 | 365 | C58AA04WS | N4 | L4 | 81 | 435 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 35 | 18 | C38AA04WS | N1 | L1 | 35 | 18 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 40 | 32 | C38AA04WS | N1 | L1 | 40 | 32 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 44 | 50 | C12AA04WS | N1 | L1 | 44 | 50 | C12AA04WS | N1 | L1 |
| 3 | 10 | 54 | 1/2 | 48 | 75 | C12AA04WS | N1 | L1 | 48 | 75 | C12AA04WS | N1 | L1 |
| 4 | 10 | 88 | 5/8 | 55 | 140 | C58AA04WS | N2 | L2 | 55 | 140 | C58AA04WS | N2 | L2 |
| 6 | 10 | 187 | 5/8 | 68 | 365 | C58AA04WS | N4 | L4 | 68 | 365 | C58AA04WS | N4 | L4 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7]:*

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED) [9]*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS**<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS**<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 25 | 35 | C38AA04WS | N1 | L1 | 76 | 104 | C38AA04WS | N2 | L2 |
| 2 | 10 | 57 | 3/8 | 28 | 58 | C38AA04WS | N1 | L1 | 83 | 175 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 79 | 1/2 | 32 | 96 | C12AA04WS | N1 | L1 | 97 | 287 | C12AA04WS | N3 | L3 |
| 3 | 10 | 108 | 1/2 | 37 | 147 | C12AA04WS | N2 | L2 | 110 | 440 | C12AA04WS | N5 | L5 |
| 4 | 10 | 199 | 5/8 | 40 | 292 | C58AA04WS | N3 | L3 | 119 | 877 | C58AA06WS | N9 | L9 |
| 6 | 10 | 395 | 5/8 | 45 | 665 | C58AA04WS | N7 | L7 | 34 | 495 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 25 | 35 | C38AA04WS | N1 | L1 | 25 | 35 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 28 | 58 | C38AA04WS | N1 | L1 | 28 | 58 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 79 | 1/2 | 32 | 96 | C12AA04WS | N1 | L1 | 32 | 96 | C12AA04WS | N1 | L1 |
| 3 | 10 | 108 | 1/2 | 37 | 147 | C12AA04WS | N2 | L2 | 37 | 147 | C12AA04WS | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 40 | 292 | C58AA04WS | N3 | L3 | 40 | 292 | C58AA04WS | N3 | L3 |
| 6 | 10 | 395 | 5/8 | 34 | 495 | C58AA04WS | N5 | L5 | 34 | 495 | C58AA04WS | N5 | L5 |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED) [10]*** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 35 | 24 | C38AA04WS | N1 | L1 | 104 | 71 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 40 | 41 | C38AA04WS | N1 | L1 | 119 | 123 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 39 | 1/2 | 44 | 64 | C12AA04WS | N1 | L1 | 132 | 193 | C12AA04WS | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 48 | 97 | C12AA04WS | N1 | L1 | 145 | 290 | C12AA04WS | N3 | L3 |
| 4 | 10 | 88 | 5/8 | 55 | 180 | C58AA04WS | N2 | L2 | 166 | 541 | C58AA04WS | N6 | L6 |
| 6 | 10 | 187 | 5/8 | 68 | 469 | C58AA04WS | N5 | L5 | 71 | 495 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 35 | 24 | C38AA04WS | N1 | L1 | 35 | 24 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 40 | 41 | C38AA04WS | N1 | L1 | 40 | 41 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 44 | 64 | C12AA04WS | N1 | L1 | 44 | 64 | C12AA04WS | N1 | L1 |
| 3 | 10 | 54 | 1/2 | 48 | 97 | C12AA04WS | N1 | L1 | 48 | 97 | C12AA04WS | N1 | L1 |
| 4 | 10 | 88 | 5/8 | 55 | 180 | C58AA04WS | N2 | L2 | 55 | 180 | C58AA04WS | N2 | L2 |
| 6 | 10 | 187 | 5/8 | 68 | 469 | C58AA04WS | N5 | L5 | 68 | 469 | C58AA04WS | N5 | L5 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4$ x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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### CABLE BRACING REQUIREMENTS [7] :

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 18 | 28 | C38AA04WS | N1 | L1 | 53 | 85 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 20 | 48 | C38AA04WS | N1 | L1 | 59 | 143 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 79 | 1/2 | 23 | 78 | C12AA04WS | N1 | L1 | 69 | 234 | C12AA04WS | N3 | L3 |
| 3 | 10 | 108 | 1/2 | 26 | 120 | C12AA04WS | N2 | L2 | 78 | 360 | C12AA04WS | N4 | L4 |
| 4 | 10 | 199 | 5/8 | 28 | 239 | C58AA04WS | N3 | L3 | 68 | 580 | C58AA04WS | N6 | L6 |
| 6 | 10 | 395 | 5/8 | 26 | 435 | C58AA04WS | N5 | L5 | 19 | 325 | C58AA04WS | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 18 | 28 | C38AA04WS | N1 | L1 | 18 | 28 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 20 | 48 | C38AA04WS | N1 | L1 | 20 | 48 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 79 | 1/2 | 23 | 78 | C12AA04WS | N1 | L1 | 23 | 78 | C12AA04WS | N1 | L1 |
| 3 | 10 | 108 | 1/2 | 26 | 120 | C12AA04WS | N2 | L2 | 26 | 120 | C12AA04WS | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 28 | 239 | C58AA04WS | N3 | L3 | 28 | 239 | C58AA04WS | N3 | L3 |
| 6 | 10 | 395 | 5/8 | 19 | 325 | C58AA04WS | N4 | L4 | 19 | 325 | C58AA04WS | N4 | L4 |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 28 | 22 | C38AA04WS | N1 | L1 | 85 | 67 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 33 | 39 | C38AA04WS | N1 | L1 | 100 | 118 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 39 | 1/2 | 37 | 63 | C12AA04WS | N1 | L1 | 111 | 188 | C12AA04WS | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 41 | 94 | C12AA04WS | N1 | L1 | 122 | 281 | C12AA04WS | N3 | L3 |
| 4 | 10 | 88 | 5/8 | 47 | 175 | C58AA04WS | N2 | L2 | 140 | 525 | C58AA04WS | N6 | L6 |
| 6 | 10 | 187 | 5/8 | 54 | 435 | C58AA04WS | N5 | L5 | 41 | 325 | C58AA04WS | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 28 | 22 | C38AA04WS | N1 | L1 | 28 | 22 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 33 | 39 | C38AA04WS | N1 | L1 | 33 | 39 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 37 | 63 | C12AA04WS | N1 | L1 | 37 | 63 | C12AA04WS | N1 | L1 |
| 3 | 10 | 54 | 1/2 | 41 | 94 | C12AA04WS | N1 | L1 | 41 | 94 | C12AA04WS | N1 | L1 |
| 4 | 10 | 88 | 5/8 | 47 | 175 | C58AA04WS | N2 | L2 | 47 | 175 | C58AA04WS | N2 | L2 |
| 6 | 10 | 187 | 5/8 | 41 | 325 | C58AA04WS | N4 | L4 | 41 | 325 | C58AA04WS | N4 | L4 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED) [9]*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 18 | 38 | C38AA04WS | N1 | L1 | 53 | 115 | C38AA04WS | N2 | L2 |
| 2 | 10 | 57 | 3/8 | 20 | 64 | C38AA04WS | N1 | L1 | 59 | 193 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 79 | 1/2 | 23 | 105 | C12AA04WS | N2 | L2 | 69 | 315 | C12AA04WS | N4 | L4 |
| 3 | 10 | 108 | 1/2 | 26 | 161 | C12AA04WS | N2 | L2 | 78 | 484 | C12AA04WS | N5 | L5 |
| 4 | 10 | 199 | 5/8 | 28 | 322 | C58AA04WS | N4 | L4 | 68 | 780 | C58AA06WS | N8 | L8 |
| 6 | 10 | 395 | 5/8 | 26 | 585 | C58AA04WS | N6 | L6 | 19 | 435 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 18 | 38 | C38AA04WS | N1 | L1 | 18 | 38 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 20 | 64 | C38AA04WS | N1 | L1 | 20 | 64 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 79 | 1/2 | 23 | 105 | C12AA04WS | N2 | L2 | 23 | 105 | C12AA04WS | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 26 | 161 | C12AA04WS | N2 | L2 | 26 | 161 | C12AA04WS | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 28 | 322 | C58AA04WS | N4 | L4 | 28 | 322 | C58AA04WS | N4 | L4 |
| 6 | 10 | 395 | 5/8 | 19 | 435 | C58AA04WS | N5 | L5 | 19 | 435 | C58AA04WS | N5 | L5 |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED) [10]*** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 28 | 30 | C38AA04WS | N1 | L1 | 85 | 90 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 33 | 53 | C38AA04WS | N1 | L1 | 100 | 160 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 39 | 1/2 | 37 | 84 | C12AA04WS | N1 | L1 | 111 | 253 | C12AA04WS | N3 | L3 |
| 3 | 10 | 54 | 1/2 | 41 | 126 | C12AA04WS | N2 | L2 | 122 | 379 | C12AA04WS | N4 | L4 |
| 4 | 10 | 88 | 5/8 | 47 | 236 | C58AA04WS | N3 | L3 | 140 | 708 | C58AA06WS | N8 | L8 |
| 6 | 10 | 187 | 5/8 | 54 | 585 | C58AA04WS | N6 | L6 | 40 | 435 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 28 | 30 | C38AA04WS | N1 | L1 | 28 | 30 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 33 | 53 | C38AA04WS | N1 | L1 | 33 | 53 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 37 | 84 | C12AA04WS | N1 | L1 | 37 | 84 | C12AA04WS | N1 | L1 |
| 3 | 10 | 54 | 1/2 | 41 | 126 | C12AA04WS | N2 | L2 | 41 | 126 | C12AA04WS | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 47 | 236 | C58AA04WS | N3 | L3 | 47 | 236 | C58AA04WS | N3 | L3 |
| 6 | 10 | 187 | 5/8 | 40 | 435 | C58AA04WS | N5 | L5 | 40 | 435 | C58AA04WS | N5 | L5 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## CABLE BRACING REQUIREMENTS [7]:

**SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED) [9]** — MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 18 | 49 | C38AA04WS | N1 | L1 | 53 | 148 | C38AA04WS | N2 | L2 |
| 2 | 10 | 57 | 3/8 | 20 | 83 | C38AA04WS | N1 | L1 | 59 | 248 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 79 | 1/2 | 23 | 135 | C12AA04WS | N2 | L2 | 69 | 405 | C12AA04WS | N5 | L5 |
| 3 | 10 | 108 | 1/2 | 26 | 208 | C12AA04WS | N3 | L3 | 71 | 570 | C12AA04WS | N6 | L6 |
| 4 | 10 | 199 | 5/8 | 27 | 395 | C58AA04WS | N4 | L4 | 60 | 885 | C58AA06WS | N9 | L9 |
| 6 | 10 | 395 | 5/8 | 23 | 665 | C58AA04WS | N7 | L7 | 17 | 495 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 18 | 49 | C38AA04WS | N1 | L1 | 18 | 49 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 20 | 83 | C38AA04WS | N1 | L1 | 20 | 83 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 79 | 1/2 | 23 | 135 | C12AA04WS | N2 | L2 | 23 | 135 | C12AA04WS | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 26 | 208 | C12AA04WS | N3 | L3 | 26 | 208 | C12AA04WS | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 27 | 395 | C58AA04WS | N4 | L4 | 27 | 395 | C58AA04WS | N4 | L4 |
| 6 | 10 | 395 | 5/8 | 17 | 495 | C58AA04WS | N5 | L5 | 17 | 495 | C58AA04WS | N5 | L5 |
| **SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED) [10]** | | | | | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 28 | 38 | C38AA04WS | N1 | L1 | 85 | 115 | C38AA04WS | N2 | L2 |
| 2 | 10 | 28 | 3/8 | 33 | 68 | C38AA04WS | N1 | L1 | 100 | 205 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 39 | 1/2 | 37 | 108 | C12AA04WS | N2 | L2 | 111 | 325 | C12AA04WS | N4 | L4 |
| 3 | 10 | 54 | 1/2 | 41 | 162 | C12AA04WS | N2 | L2 | 122 | 487 | C12AA04WS | N5 | L5 |
| 4 | 10 | 88 | 5/8 | 47 | 303 | C58AA04WS | N4 | L4 | 136 | 885 | C58AA06WS | N9 | L9 |
| 6 | 10 | 187 | 5/8 | 48 | 665 | C58AA04WS | N7 | L7 | 36 | 495 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 28 | 38 | C38AA04WS | N1 | L1 | 28 | 38 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 33 | 68 | C38AA04WS | N1 | L1 | 33 | 68 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 37 | 108 | C12AA04WS | N2 | L2 | 37 | 108 | C12AA04WS | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 41 | 162 | C12AA04WS | N2 | L2 | 41 | 162 | C12AA04WS | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 47 | 303 | C58AA04WS | N4 | L4 | 47 | 303 | C58AA04WS | N4 | L4 |
| 6 | 10 | 187 | 5/8 | 36 | 495 | C58AA04WS | N5 | L5 | 36 | 495 | C58AA04WS | N5 | L5 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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*CABLE BRACING REQUIREMENTS [7]:*

*SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED) [9]* *MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 15 | 35 | C38AA04WS | N1 | L1 | 42 | 100 | C38AA04WS | N2 | L2 |
| 2 | 10 | 57 | 3/8 | 16 | 58 | C38AA04WS | N1 | L1 | 48 | 175 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 79 | 1/2 | 19 | 96 | C12AA04WS | N1 | L1 | 56 | 287 | C12AA04WS | N3 | L3 |
| 3 | 10 | 108 | 1/2 | 21 | 147 | C12AA04WS | N2 | L2 | 54 | 375 | C12AA04WS | N4 | L4 |
| 4 | 10 | 199 | 5/8 | 20 | 260 | C58AA04WS | N3 | L3 | 45 | 580 | C58AA04WS | N6 | L6 |
| 6 | 10 | 395 | 5/8 | 17 | 435 | C58AA04WS | N5 | L5 | 13 | 325 | C58AA04WS | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 15 | 35 | C38AA04WS | N1 | L1 | 15 | 35 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 16 | 58 | C38AA04WS | N1 | L1 | 16 | 58 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 79 | 1/2 | 19 | 96 | C12AA04WS | N1 | L1 | 19 | 96 | C12AA04WS | N1 | L1 |
| 3 | 10 | 108 | 1/2 | 21 | 147 | C12AA04WS | N2 | L2 | 21 | 147 | C12AA04WS | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 20 | 260 | C58AA04WS | N3 | L3 | 20 | 260 | C58AA04WS | N3 | L3 |
| 6 | 10 | 395 | 5/8 | 13 | 325 | C58AA04WS | N4 | L4 | 13 | 325 | C58AA04WS | N4 | L4 |
| *SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED) [10]* | | | | | | | | | *MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's* | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 23 | 27 | C38AA04WS | N1 | L1 | 69 | 82 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 27 | 48 | C38AA04WS | N1 | L1 | 81 | 145 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 39 | 1/2 | 31 | 77 | C12AA04WS | N1 | L1 | 92 | 232 | C12AA04WS | N3 | L3 |
| 3 | 10 | 54 | 1/2 | 34 | 117 | C12AA04WS | N2 | L2 | 101 | 351 | C12AA04WS | N4 | L4 |
| 4 | 10 | 88 | 5/8 | 39 | 221 | C58AA04WS | N3 | L3 | 103 | 580 | C58AA04WS | N6 | L6 |
| 6 | 10 | 187 | 5/8 | 36 | 435 | C58AA04WS | N5 | L5 | 27 | 325 | C58AA04WS | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 23 | 27 | C38AA04WS | N1 | L1 | 23 | 27 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 27 | 48 | C38AA04WS | N1 | L1 | 27 | 48 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 31 | 77 | C12AA04WS | N1 | L1 | 31 | 77 | C12AA04WS | N1 | L1 |
| 3 | 10 | 54 | 1/2 | 34 | 117 | C12AA04WS | N2 | L2 | 34 | 117 | C12AA04WS | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 39 | 221 | C58AA04WS | N3 | L3 | 39 | 221 | C58AA04WS | N3 | L3 |
| 6 | 10 | 187 | 5/8 | 27 | 325 | C58AA04WS | N4 | L4 | 27 | 325 | C58AA04WS | N4 | L4 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED) [9]*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 15 | 47 | C38AA04WS | N1 | L1 | 42 | 135 | C38AA04WS | N2 | L2 |
| 2 | 10 | 57 | 3/8 | 16 | 79 | C38AA04WS | N1 | L1 | 48 | 236 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 79 | 1/2 | 19 | 129 | C12AA04WS | N2 | L2 | 56 | 386 | C12AA04WS | N4 | L4 |
| 3 | 10 | 108 | 1/2 | 21 | 198 | C12AA04WS | N2 | L2 | 54 | 505 | C12AA04WS | N6 | L6 |
| 4 | 10 | 199 | 5/8 | 20 | 350 | C58AA04WS | N4 | L4 | 45 | 780 | C58AA06WS | N8 | L8 |
| 6 | 10 | 395 | 5/8 | 17 | 585 | C58AA04WS | N6 | L6 | 13 | 435 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 15 | 47 | C38AA04WS | N1 | L1 | 15 | 47 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 16 | 79 | C38AA04WS | N1 | L1 | 16 | 79 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 79 | 1/2 | 19 | 129 | C12AA04WS | N2 | L2 | 19 | 129 | C12AA04WS | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 21 | 198 | C12AA04WS | N2 | L2 | 21 | 198 | C12AA04WS | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 20 | 350 | C58AA04WS | N4 | L4 | 20 | 350 | C58AA04WS | N4 | L4 |
| 6 | 10 | 395 | 5/8 | 13 | 435 | C58AA04WS | N5 | L5 | 13 | 435 | C58AA04WS | N5 | L5 |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED) [10]*** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 23 | 37 | C38AA04WS | N1 | L1 | 69 | 110 | C38AA04WS | N2 | L2 |
| 2 | 10 | 28 | 3/8 | 27 | 65 | C38AA04WS | N1 | L1 | 81 | 195 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 39 | 1/2 | 31 | 104 | C12AA04WS | N2 | L2 | 92 | 312 | C12AA04WS | N4 | L4 |
| 3 | 10 | 54 | 1/2 | 34 | 158 | C12AA04WS | N2 | L2 | 101 | 473 | C12AA04WS | N5 | L5 |
| 4 | 10 | 88 | 5/8 | 39 | 298 | C58AA04WS | N3 | L3 | 103 | 780 | C58AA06WS | N8 | L8 |
| 6 | 10 | 187 | 5/8 | 36 | 585 | C58AA04WS | N6 | L6 | 27 | 435 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 23 | 37 | C38AA04WS | N1 | L1 | 23 | 37 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 27 | 65 | C38AA04WS | N1 | L1 | 27 | 65 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 31 | 104 | C12AA04WS | N2 | L2 | 31 | 104 | C12AA04WS | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 34 | 158 | C12AA04WS | N2 | L2 | 34 | 158 | C12AA04WS | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 39 | 298 | C58AA04WS | N3 | L3 | 39 | 298 | C58AA04WS | N3 | L3 |
| 6 | 10 | 187 | 5/8 | 27 | 435 | C58AA04WS | N5 | L5 | 27 | 435 | C58AA04WS | N5 | L5 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)* [9]** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 15 | 60 | C38AA04WS | N1 | L1 | 36 | 150 | C38AA04WS | N2 | L2 |
| 2 | 10 | 57 | 3/8 | 16 | 101 | C38AA04WS | N2 | L2 | 48 | 304 | C38AA04WS | N4 | L4 |
| 2 1/2 | 10 | 79 | 1/2 | 19 | 165 | C12AA04WS | N2 | L2 | 56 | 496 | C12AA04WS | N5 | L5 |
| 3 | 10 | 108 | 1/2 | 21 | 254 | C12AA04WS | N3 | L3 | 47 | 570 | C12AA04WS | N6 | L6 |
| 4 | 10 | 199 | 5/8 | 18 | 395 | C58AA04WS | N4 | L4 | 40 | 885 | C58AA06WS | N9 | L9 |
| 6 | 10 | 395 | 5/8 | 15 | 665 | C58AA04WS | N7 | L7 | 11 | 495 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 15 | 60 | C38AA04WS | N1 | L1 | 15 | 60 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 16 | 101 | C38AA04WS | N2 | L2 | 16 | 101 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 79 | 1/2 | 19 | 165 | C12AA04WS | N2 | L2 | 19 | 165 | C12AA04WS | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 21 | 254 | C12AA04WS | N3 | L3 | 21 | 254 | C12AA04WS | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 18 | 395 | C58AA04WS | N4 | L4 | 18 | 395 | C58AA04WS | N4 | L4 |
| 6 | 10 | 395 | 5/8 | 11 | 495 | C58AA04WS | N5 | L5 | 11 | 495 | C58AA04WS | N5 | L5 |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED)* [10]** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 23 | 47 | C38AA04WS | N1 | L1 | 69 | 141 | C38AA04WS | N2 | L2 |
| 2 | 10 | 28 | 3/8 | 27 | 84 | C38AA04WS | N1 | L1 | 81 | 251 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 39 | 1/2 | 31 | 134 | C12AA04WS | N2 | L2 | 92 | 402 | C12AA04WS | N5 | L5 |
| 3 | 10 | 54 | 1/2 | 34 | 203 | C12AA04WS | N3 | L3 | 95 | 570 | C12AA04WS | N6 | L6 |
| 4 | 10 | 88 | 5/8 | 39 | 382 | C58AA04WS | N4 | L4 | 91 | 885 | C58AA06WS | N9 | L9 |
| 6 | 10 | 187 | 5/8 | 32 | 665 | C58AA04WS | N7 | L7 | 24 | 495 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 23 | 47 | C38AA04WS | N1 | L1 | 23 | 47 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 27 | 84 | C38AA04WS | N1 | L1 | 27 | 84 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 31 | 134 | C12AA04WS | N2 | L2 | 31 | 134 | C12AA04WS | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 34 | 203 | C12AA04WS | N3 | L3 | 34 | 203 | C12AA04WS | N3 | L3 |
| 4 | 10 | 88 | 5/8 | 39 | 382 | C58AA04WS | N4 | L4 | 39 | 382 | C58AA04WS | N4 | L4 |
| 6 | 10 | 187 | 5/8 | 24 | 495 | C58AA04WS | N5 | L5 | 24 | 495 | C58AA04WS | N5 | L5 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7]:*

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED) [9]*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 13 | 40 | C38AA04WS | N1 | L1 | 31 | 100 | C38AA04WS | N2 | L2 |
| 2 | 10 | 57 | 3/8 | 14 | 67 | C38AA04WS | N1 | L1 | 42 | 202 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 79 | 1/2 | 16 | 110 | C12AA04WS | N2 | L2 | 49 | 331 | C12AA04WS | N4 | L4 |
| 3 | 10 | 108 | 1/2 | 18 | 169 | C12AA04WS | N2 | L2 | 40 | 375 | C12AA04WS | N4 | L4 |
| 4 | 10 | 199 | 5/8 | 15 | 260 | C58AA04WS | N3 | L3 | 34 | 580 | C58AA04WS | N6 | L6 |
| 6 | 10 | 395 | 5/8 | 13 | 435 | C58AA04WS | N5 | L5 | 10 | 325 | C58AA04WS | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 13 | 40 | C38AA04WS | N1 | L1 | 13 | 40 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 14 | 67 | C38AA04WS | N1 | L1 | 14 | 67 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 79 | 1/2 | 16 | 110 | C12AA04WS | N2 | L2 | 16 | 110 | C12AA04WS | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 18 | 169 | C12AA04WS | N2 | L2 | 18 | 169 | C12AA04WS | N2 | L2 |
| 4 | 10 | 199 | 5/8 | 15 | 260 | C58AA04WS | N3 | L3 | 15 | 260 | C58AA04WS | N3 | L3 |
| 6 | 10 | 395 | 5/8 | 10 | 325 | C58AA04WS | N4 | L4 | 10 | 325 | C58AA04WS | N4 | L4 |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED) [10]*** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 20 | 31 | C38AA04WS | N1 | L1 | 60 | 94 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 23 | 56 | C38AA04WS | N1 | L1 | 70 | 167 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 39 | 1/2 | 26 | 89 | C12AA04WS | N1 | L1 | 79 | 268 | C12AA04WS | N3 | L3 |
| 3 | 10 | 54 | 1/2 | 29 | 135 | C12AA04WS | N2 | L2 | 81 | 375 | C12AA04WS | N4 | L4 |
| 4 | 10 | 88 | 5/8 | 34 | 255 | C58AA04WS | N3 | L3 | 77 | 580 | C58AA04WS | N6 | L6 |
| 6 | 10 | 187 | 5/8 | 27 | 435 | C58AA04WS | N5 | L5 | 20 | 325 | C58AA04WS | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 20 | 31 | C38AA04WS | N1 | L1 | 20 | 31 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 23 | 56 | C38AA04WS | N1 | L1 | 23 | 56 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 26 | 89 | C12AA04WS | N1 | L1 | 26 | 89 | C12AA04WS | N1 | L1 |
| 3 | 10 | 54 | 1/2 | 29 | 135 | C12AA04WS | N2 | L2 | 29 | 135 | C12AA04WS | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 34 | 255 | C58AA04WS | N3 | L3 | 34 | 255 | C58AA04WS | N3 | L3 |
| 6 | 10 | 187 | 5/8 | 20 | 325 | C58AA04WS | N4 | L4 | 20 | 325 | C58AA04WS | N4 | L4 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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03/12/19

### *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)*** [9] — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 13 | 54 | C38AA04WS | N1 | L1 | 31 | 135 | C38AA04WS | N2 | L2 |
| 2 | 10 | 57 | 3/8 | 14 | 91 | C38AA04WS | N1 | L1 | 42 | 273 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 79 | 1/2 | 16 | 149 | C12AA04WS | N2 | L2 | 49 | 446 | C12AA04WS | N5 | L5 |
| 3 | 10 | 108 | 1/2 | 18 | 228 | C12AA04WS | N3 | L3 | 40 | 505 | C12AA04WS | N6 | L6 |
| 4 | 10 | 199 | 5/8 | 15 | 350 | C58AA04WS | N4 | L4 | 34 | 780 | C58AA06WS | N8 | L8 |
| 6 | 10 | 395 | 5/8 | 13 | 585 | C58AA04WS | N6 | L6 | 10 | 435 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 13 | 54 | C38AA04WS | N1 | L1 | 13 | 54 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 14 | 91 | C38AA04WS | N1 | L1 | 14 | 91 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 79 | 1/2 | 16 | 149 | C12AA04WS | N2 | L2 | 16 | 149 | C12AA04WS | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 18 | 228 | C12AA04WS | N3 | L3 | 18 | 228 | C12AA04WS | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 15 | 350 | C58AA04WS | N4 | L4 | 15 | 350 | C58AA04WS | N4 | L4 |
| 6 | 10 | 395 | 5/8 | 10 | 435 | C58AA04WS | N5 | L5 | 10 | 435 | C58AA04WS | N5 | L5 |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 20 | 42 | C38AA04WS | N1 | L1 | 60 | 127 | C38AA04WS | N2 | L2 |
| 2 | 10 | 28 | 3/8 | 23 | 75 | C38AA04WS | N1 | L1 | 70 | 226 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 39 | 1/2 | 26 | 120 | C12AA04WS | N2 | L2 | 79 | 361 | C12AA04WS | N4 | L4 |
| 3 | 10 | 54 | 1/2 | 29 | 182 | C12AA04WS | N2 | L2 | 81 | 505 | C12AA04WS | N6 | L6 |
| 4 | 10 | 88 | 5/8 | 34 | 344 | C58AA04WS | N4 | L4 | 77 | 780 | C58AA06WS | N8 | L8 |
| 6 | 10 | 187 | 5/8 | 27 | 585 | C58AA04WS | N6 | L6 | 20 | 435 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 20 | 42 | C38AA04WS | N1 | L1 | 20 | 42 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 23 | 75 | C38AA04WS | N1 | L1 | 23 | 75 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 26 | 120 | C12AA04WS | N2 | L2 | 26 | 120 | C12AA04WS | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 29 | 182 | C12AA04WS | N2 | L2 | 29 | 182 | C12AA04WS | N2 | L2 |
| 4 | 10 | 88 | 5/8 | 34 | 344 | C58AA04WS | N4 | L4 | 34 | 344 | C58AA04WS | N4 | L4 |
| 6 | 10 | 187 | 5/8 | 20 | 435 | C58AA04WS | N5 | L5 | 20 | 435 | C58AA04WS | N5 | L5 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## CABLE BRACING REQUIREMENTS [7] :

***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (WATER FILLED + INSULATED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 13 | 70 | C38AA04WS | N1 | L1 | 27 | 150 | C38AA04WS | N2 | L2 |
| 2 | 10 | 57 | 3/8 | 14 | 117 | C38AA04WS | N2 | L2 | 42 | 351 | C38AA04WS | N4 | L4 |
| 2 1/2 | 10 | 79 | 1/2 | 16 | 191 | C12AA04WS | N2 | L2 | 49 | 573 | C12AA04WS | N6 | L6 |
| 3 | 10 | 108 | 1/2 | 18 | 294 | C12AA04WS | N3 | L3 | 35 | 570 | C12AA04WS | N6 | L6 |
| 4 | 10 | 199 | 5/8 | 13 | 395 | C58AA04WS | N4 | L4 | 30 | 885 | C58AA06WS | N9 | L9 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 8 | 30 | 3/8 | 13 | 70 | C38AA04WS | N1 | L1 | 13 | 70 | C38AA04WS | N1 | L1 |
| 2 | 10 | 57 | 3/8 | 14 | 117 | C38AA04WS | N2 | L2 | 14 | 117 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 79 | 1/2 | 16 | 191 | C12AA04WS | N2 | L2 | 16 | 191 | C12AA04WS | N2 | L2 |
| 3 | 10 | 108 | 1/2 | 18 | 294 | C12AA04WS | N3 | L3 | 18 | 294 | C12AA04WS | N3 | L3 |
| 4 | 10 | 199 | 5/8 | 13 | 395 | C58AA04WS | N4 | L4 | 13 | 395 | C58AA04WS | N4 | L4 |
| ***SINGLE HUNG PIPE, TYPE K AND TYPE L COPPER TUBING (GAS FILLED)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 20 | 54 | C38AA04WS | N1 | L1 | 55 | 150 | C38AA04WS | N2 | L2 |
| 2 | 10 | 28 | 3/8 | 23 | 97 | C38AA04WS | N1 | L1 | 70 | 290 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 39 | 1/2 | 26 | 155 | C12AA04WS | N2 | L2 | 79 | 464 | C12AA04WS | N5 | L5 |
| 3 | 10 | 54 | 1/2 | 29 | 234 | C12AA04WS | N3 | L3 | 71 | 570 | C12AA04WS | N6 | L6 |
| 4 | 10 | 88 | 5/8 | 30 | 395 | C58AA04WS | N4 | L4 | 68 | 885 | C58AA06WS | N9 | L9 |
| 6 | 10 | 187 | 5/8 | 24 | 665 | C58AA04WS | N7 | L7 | 18 | 495 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 18 | 3/8 | 20 | 54 | C38AA04WS | N1 | L1 | 20 | 54 | C38AA04WS | N1 | L1 |
| 2 | 10 | 28 | 3/8 | 23 | 97 | C38AA04WS | N1 | L1 | 23 | 97 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 39 | 1/2 | 26 | 155 | C12AA04WS | N2 | L2 | 26 | 155 | C12AA04WS | N2 | L2 |
| 3 | 10 | 54 | 1/2 | 29 | 234 | C12AA04WS | N3 | L3 | 29 | 234 | C12AA04WS | N3 | L3 |
| 4 | 10 | 88 | 5/8 | 30 | 395 | C58AA04WS | N4 | L4 | 30 | 395 | C58AA04WS | N4 | L4 |
| 6 | 10 | 187 | 5/8 | 18 | 495 | C58AA04WS | N5 | L5 | 18 | 495 | C58AA04WS | N5 | L5 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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03/12/19

## RIGID BRACING REQUIREMENTS [7, 9, 10]

**SINGLE HUNG STEEL PIPE (SCHED. 40)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B1.4, B1.5) | | | | | 2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3) | | | | |
| 1 1/2 | 10 | 133 | 3/8 | 39 | 48 | R38AAEM306 | N1 | L1 | 117 | 143 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 196 | 3/8 | 43 | 74 | R38AAEM306 | N1 | L1 | 130 | 222 | R38AAEM306 | N3 | L3 |
| 2 1/2 | 10 | 314 | 1/2 | 48 | 123 | R12AAEM306 | N2 | L2 | 145 | 370 | R12AAEM406 | N4 | L4 |
| 3 | 10 | 448 | 1/2 | 53 | 182 | R12AAEM306 | N2 | L2 | 160 | 546 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 783 | 5/8 | 58 | 329 | R58AAEM409 | N4 | L4 | 175 | 987 | R58AAEM506 | N10 | L10 |
| 5 | 10 | 1,007 | 5/8 | 65 | 504 | R58AAEM406 | N6 | L6 | 153 | 1,185 | R58AAEM506 | N12 | L12 |
| 6 | 10 | 1,256 | 5/8 | 71 | 728 | R58AAEM509 | N8 | L8 | 132 | 1,365 | R58AAEM506 | N14 | L14 |
| 8 | 10 | 1,338 | 5/8 | 66 | 1,055 | R58AAEM506 | N11 | L11 | 34 | 540 | R58AAEM406 | N6 | L6 |
| 10 | 10 | 1,903 | 5/8 | 31 | 724 | R58AAEM509 | N8 | L8 | 62 | 1,449 | R58AAEM506 | N15 | L15 |
| 12 | 10 | 2,207 | 5/8 | 23 | 700 | R58AAEM509 | N8 | L8 | 46 | 1,401 | R58AAEM506 | N15 | L15 |
| 14 | 10 | 2,275 | 5/8 | 16 | 563 | R58AAEM406 | N6 | L6 | 32 | 1,126 | R58AAEM506 | N12 | L12 |
| | | | | 2-Way Transverse Brace Pattern (B2.12, B2.13 ) | | | | | 4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3) | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 24 | R38AAEM306 | N1 | L1 | 117 | 71 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 80 | 3/8 | 43 | 37 | R38AAEM306 | N1 | L1 | 130 | 111 | R38AAEM306 | N2 | L2 |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 62 | R12AAEM306 | N1 | L1 | 145 | 185 | R12AAEM306 | N2 | L2 |
| 3 | 10 | 160 | 1/2 | 53 | 91 | R12AAEM306 | N1 | L1 | 160 | 273 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 263 | 5/8 | 58 | 164 | R58AAEM306 | N2 | L2 | 175 | 493 | R58AAEM406 | N5 | L5 |
| 5 | 10 | 363 | 5/8 | 65 | 252 | R58AAEM306 | N3 | L3 | 153 | 593 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 482 | 5/8 | 71 | 364 | R58AAEM406 | N4 | L4 | 132 | 683 | R58AAEM509 | N7 | L7 |
| 8 | 10 | 746 | 5/8 | 66 | 528 | R58AAEM406 | N6 | L6 | 34 | 270 | R58AAEM306 | N3 | L3 |
| 10 | 10 | 1,093 | 5/8 | 41 | 479 | R58AAEM406 | N5 | L5 | 123 | 1,437 | R58AAEM506 | N15 | L15 |
| 12 | 10 | 1,424 | 5/8 | 31 | 472 | R58AAEM406 | N5 | L5 | 93 | 1,416 | R58AAEM506 | N15 | L15 |
| 16 | 10 | 2,028 | 5/8 | 22 | 477 | R58AAEM406 | N5 | L5 | 66 | 1,431 | R58AAEM506 | N15 | L15 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Splayed Brace Pattern (B4.13, B4.14) | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 34 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 80 | 3/8 | 43 | 52 | R38AAEM306 | N1 | L1 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 87 | R12AAEM306 | N1 | L1 | | | | | |
| 3 | 10 | 160 | 1/2 | 53 | 129 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 263 | 5/8 | 58 | 233 | R58AAEM306 | N3 | L3 | | | | | |
| 5 | 10 | 363 | 5/8 | 65 | 356 | R58AAEM406 | N4 | L4 | | | | | |
| 6 | 10 | 482 | 5/8 | 71 | 514 | R58AAEM406 | N6 | L6 | | | | | |
| 8 | 10 | 746 | 5/8 | 66 | 746 | R58AAEM509 | N8 | L8 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 77 | 1,269 | R58AAEM506 | N13 | L13 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 59 | 1,269 | R58AAEM506 | N13 | L13 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 52 | 1,283 | R58AAEM506 | N13 | L13 | | | | | |
| 16 | 10 | 2,028 | 5/8 | 42 | 1,292 | R58AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *RIGID BRACING REQUIREMENTS* [7, 9, 10]

***SINGLE HUNG STEEL PIPE (SCHED. 40)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3)** | | | | |
| 1 1/2 | 10 | 213 | 3/8 | 39 | 64 | R38AAEM306 | N1 | L1 | 117 | 193 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 321 | 3/8 | 43 | 99 | R38AAEM306 | N1 | L1 | 130 | 298 | R38AAEM306 | N3 | L3 |
| 2 1/2 | 10 | 522 | 1/2 | 48 | 166 | R12AAEM306 | N2 | L2 | 145 | 498 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 754 | 1/2 | 53 | 245 | R12AAEM306 | N3 | L3 | 160 | 736 | R12AAEM509 | N8 | L8 |
| 4 | 10 | 1,337 | 5/8 | 58 | 443 | R58AAEM406 | N5 | L5 | 175 | 1,329 | R58AAEM506 | N14 | L14 |
| 5 | 10 | 1,528 | 5/8 | 46 | 481 | R58AAEM406 | N5 | L5 | 138 | 1,443 | R58AAEM506 | N15 | L15 |
| 6 | 10 | 1,626 | 5/8 | 34 | 472 | R58AAEM406 | N5 | L5 | 102 | 1,417 | R58AAEM506 | N15 | L15 |
| 8 | 10 | 1,969 | 5/8 | 66 | 1,421 | R58AAEM506 | N15 | L15 | 34 | 728 | R58AAEM509 | N8 | L8 |
| 10 | 10 | 2,333 | 5/8 | 23 | 724 | R58AAEM509 | N8 | L8 | 46 | 1,448 | R58AAEM506 | N15 | L15 |
| 12 | 10 | 2,338 | 5/8 | 13 | 533 | R58AAEM406 | N6 | L6 | 26 | 1,067 | R58AAEM506 | N11 | L11 |
| 14 | 10 | 2,458 | 5/8 | 10 | 474 | R58AAEM406 | N5 | L5 | 20 | 948 | R58AAEM506 | N10 | L10 |
| | | | | **2-Way Transverse Brace Pattern (B2.12, B2.13 )** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 32 | R38AAEM306 | N1 | L1 | 117 | 96 | R38AAEM306 | N1 | L1 |
| 2 | 10 | 80 | 3/8 | 43 | 50 | R38AAEM306 | N1 | L1 | 130 | 149 | R38AAEM306 | N2 | L2 |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 83 | R12AAEM306 | N1 | L1 | 145 | 249 | R12AAEM306 | N3 | L3 |
| 3 | 10 | 160 | 1/2 | 53 | 123 | R12AAEM306 | N2 | L2 | 160 | 368 | R12AAEM406 | N4 | L4 |
| 4 | 10 | 263 | 5/8 | 58 | 222 | R58AAEM306 | N3 | L3 | 175 | 665 | R58AAEM509 | N7 | L7 |
| 5 | 10 | 363 | 5/8 | 65 | 339 | R58AAEM406 | N4 | L4 | 153 | 798 | R58AAEM506 | N8 | L8 |
| 6 | 10 | 482 | 5/8 | 71 | 490 | R58AAEM406 | N5 | L5 | 132 | 920 | R58AAEM506 | N10 | L10 |
| 8 | 10 | 746 | 5/8 | 66 | 711 | R58AAEM509 | N8 | L8 | 34 | 364 | R58AAEM406 | N4 | L4 |
| 10 | 10 | 1,093 | 5/8 | 30 | 472 | R58AAEM406 | N5 | L5 | 90 | 1,417 | R58AAEM506 | N15 | L15 |
| 12 | 10 | 1,424 | 5/8 | 23 | 472 | R58AAEM406 | N5 | L5 | 69 | 1,416 | R58AAEM506 | N15 | L15 |
| 16 | 10 | 2,028 | 5/8 | 16 | 467 | R58AAEM406 | N5 | L5 | 48 | 1,402 | R58AAEM506 | N15 | L15 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS**<br>**4-Way Splayed Brace Pattern (B4.13, B4.14)** | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 45 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 80 | 3/8 | 43 | 70 | R38AAEM306 | N1 | L1 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 117 | R12AAEM306 | N2 | L2 | | | | | |
| 3 | 10 | 160 | 1/2 | 53 | 173 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 263 | 5/8 | 58 | 313 | R58AAEM409 | N4 | L4 | | | | | |
| 5 | 10 | 363 | 5/8 | 65 | 480 | R58AAEM406 | N5 | L5 | | | | | |
| 6 | 10 | 482 | 5/8 | 71 | 693 | R58AAEM509 | N7 | L7 | | | | | |
| 8 | 10 | 746 | 5/8 | 66 | 1,005 | R58AAEM506 | N11 | L11 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 65 | 1,447 | R58AAEM506 | N15 | L15 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 49 | 1,422 | R58AAEM506 | N15 | L15 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 43 | 1,442 | R58AAEM506 | N15 | L15 | | | | | |
| 16 | 10 | 2,028 | 5/8 | 35 | 1,446 | R58AAEM506 | N15 | L15 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *RIGID BRACING REQUIREMENTS* [7, 9, 10]

***SINGLE HUNG STEEL PIPE (SCHED. 40)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6]: Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6]: Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3)** | | | | |
| 1 1/2 | 10 | 283 | 3/8 | 39 | 83 | R38AAEM306 | N1 | L1 | 117 | 248 | R38AAEM306 | N3 | L3 |
| 2 | 10 | 430 | 3/8 | 43 | 128 | R38AAEM306 | N2 | L2 | 130 | 384 | R38AAEM406 | N4 | L4 |
| 2 1/2 | 10 | 704 | 1/2 | 48 | 214 | R12AAEM306 | N3 | L3 | 145 | 641 | R12AAEM406 | N7 | L7 |
| 3 | 10 | 1,024 | 1/2 | 53 | 315 | R12AAEM409 | N4 | L4 | 160 | 946 | R12AAEM506 | N10 | L10 |
| 4 | 10 | 1,678 | 5/8 | 53 | 516 | R58AAEM406 | N6 | L6 | 159 | 1,549 | R58AAEM606 | N16 | L16 |
| 5 | 10 | 1,795 | 5/8 | 55 | 739 | R58AAEM509 | N8 | L8 | 110 | 1,479 | R58AAEM606 | N15 | L15 |
| 6 | 10 | 1,935 | 5/8 | 42 | 750 | R58AAEM509 | N8 | L8 | 84 | 1,500 | R58AAEM606 | N16 | L16 |
| 8 | 10 | 2,264 | 5/8 | 56 | 1,547 | R58AAEM606 | N16 | L16 | 30 | 825 | R58AAEM506 | N9 | L9 |
| 10 | 10 | 2,269 | 5/8 | 15 | 607 | R58AAEM406 | N7 | L7 | 30 | 1,214 | R58AAEM506 | N13 | L13 |
| | | | | **2-Way Transverse Brace Pattern (B2.12, B2.13 )** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 41 | R38AAEM306 | N1 | L1 | 117 | 124 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 43 | 64 | R38AAEM306 | N1 | L1 | 130 | 192 | R38AAEM306 | N2 | L2 |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 107 | R12AAEM306 | N2 | L2 | 145 | 320 | R12AAEM409 | N4 | L4 |
| 3 | 10 | 160 | 1/2 | 53 | 158 | R12AAEM306 | N2 | L2 | 160 | 473 | R12AAEM406 | N5 | L5 |
| 4 | 10 | 263 | 5/8 | 58 | 285 | R58AAEM306 | N3 | L3 | 175 | 854 | R58AAEM506 | N9 | L9 |
| 5 | 10 | 363 | 5/8 | 65 | 436 | R58AAEM406 | N5 | L5 | 134 | 903 | R58AAEM506 | N10 | L10 |
| 6 | 10 | 482 | 5/8 | 71 | 630 | R58AAEM406 | N7 | L7 | 116 | 1,040 | R58AAEM506 | N11 | L11 |
| 8 | 10 | 746 | 5/8 | 58 | 805 | R58AAEM506 | N9 | L9 | 30 | 413 | R58AAEM406 | N5 | L5 |
| 10 | 10 | 1,093 | 5/8 | 45 | 911 | R58AAEM506 | N10 | L10 | 103 | 2,093 | R58AAB2P09 | N21 | L21 |
| 12 | 10 | 1,424 | 5/8 | 36 | 950 | R58AAEM506 | N10 | L10 | 79 | 2,092 | R58AAB2P09 | N21 | L21 |
| 16 | 10 | 2,028 | 5/8 | 27 | 1,014 | R58AAEM506 | N11 | L11 | 57 | 2,130 | R58AAB2P09 | N22 | L22 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13, B4.14)** | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 58 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 80 | 3/8 | 43 | 90 | R38AAEM306 | N1 | L1 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 151 | R12AAEM306 | N2 | L2 | | | | | |
| 3 | 10 | 160 | 1/2 | 53 | 223 | R12AAEM306 | N3 | L3 | | | | | |
| 4 | 10 | 263 | 5/8 | 58 | 403 | R58AAEM406 | N5 | L5 | | | | | |
| 5 | 10 | 363 | 5/8 | 65 | 617 | R58AAEM406 | N7 | L7 | | | | | |
| 6 | 10 | 482 | 5/8 | 71 | 891 | R58AAEM506 | N9 | L9 | | | | | |
| 8 | 10 | 746 | 5/8 | 30 | 583 | R58AAEM406 | N6 | L6 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 65 | 1,867 | R58AAEM606 | N19 | L19 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 50 | 1,866 | R58AAEM606 | N19 | L19 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 44 | 1,887 | R58AAEM606 | N19 | L19 | | | | | |
| 16 | 10 | 2,028 | 5/8 | 36 | 1,900 | R58AAEM606 | N20 | L20 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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2013 CBC OSHPD

## *RIGID BRACING REQUIREMENTS* [7, 9, 10]

***SINGLE HUNG STEEL PIPE (SCHED. 40)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3)** | | | | |
| 1 1/2 | 10 | 184 | 3/8 | 33 | 80 | R38AAEM306 | N1 | L1 | 98 | 240 | R38AAEM306 | N3 | L3 |
| 2 | 10 | 276 | 3/8 | 37 | 124 | R38AAEM306 | N2 | L2 | 110 | 373 | R38AAEM406 | N4 | L4 |
| 2 1/2 | 10 | 447 | 1/2 | 41 | 207 | R12AAEM306 | N3 | L3 | 122 | 622 | R12AAEM406 | N7 | L7 |
| 3 | 10 | 644 | 1/2 | 45 | 306 | R12AAEM409 | N4 | L4 | 134 | 919 | R12AAEM506 | N10 | L10 |
| 4 | 10 | 945 | 5/8 | 48 | 535 | R58AAEM406 | N6 | L6 | 112 | 1,255 | R58AAEM506 | N13 | L13 |
| 5 | 10 | 1,079 | 5/8 | 52 | 803 | R58AAEM506 | N9 | L9 | 76 | 1,185 | R58AAEM506 | N12 | L12 |
| 6 | 10 | 1,374 | 5/8 | 56 | 1,148 | R58AAEM506 | N12 | L12 | 66 | 1,365 | R58AAEM506 | N14 | L14 |
| 8 | 10 | 1,338 | 5/8 | 33 | 1,055 | R58AAEM506 | N11 | L11 | 17 | 540 | R58AAEM406 | N6 | L6 |
| 10 | 10 | 1,877 | 5/8 | 15 | 701 | R58AAEM509 | N8 | L8 | 30 | 1,402 | R58AAEM506 | N15 | L15 |
| 12 | 10 | 2,173 | 5/8 | 11 | 670 | R58AAEM509 | N7 | L7 | 22 | 1,340 | R58AAEM506 | N14 | L14 |
| | | | | **2-Way Transverse Brace Pattern (B2.12, B2.13 )** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3)** | | | | |
| 10 | 10 | 1,093 | 5/8 | 20 | 467 | R58AAEM406 | N5 | L5 | 60 | 1,402 | R58AAEM506 | N15 | L15 |
| 12 | 10 | 1,424 | 5/8 | 15 | 457 | R58AAEM406 | N5 | L5 | 45 | 1,370 | R58AAEM506 | N14 | L14 |
| 16 | 10 | 2,028 | 5/8 | 11 | 477 | R58AAEM406 | N5 | L5 | 33 | 1,431 | R58AAEM506 | N15 | L15 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13, B4.14)** | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 33 | 57 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 80 | 3/8 | 37 | 88 | R38AAEM306 | N1 | L1 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 41 | 147 | R12AAEM306 | N2 | L2 | | | | | |
| 3 | 10 | 160 | 1/2 | 45 | 217 | R12AAEM306 | N3 | L3 | | | | | |
| 4 | 10 | 263 | 5/8 | 48 | 379 | R58AAEM406 | N4 | L4 | | | | | |
| 5 | 10 | 363 | 5/8 | 52 | 567 | R58AAEM406 | N6 | L6 | | | | | |
| 6 | 10 | 482 | 5/8 | 56 | 812 | R58AAEM506 | N9 | L9 | | | | | |
| 8 | 10 | 746 | 5/8 | 33 | 746 | R58AAEM509 | N8 | L8 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 38 | 1,269 | R58AAEM506 | N13 | L13 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 29 | 1,269 | R58AAEM506 | N13 | L13 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 26 | 1,283 | R58AAEM506 | N13 | L13 | | | | | |
| 16 | 10 | 2,028 | 5/8 | 21 | 1,292 | R58AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *RIGID BRACING REQUIREMENTS* [7, 9, 10]

***SINGLE HUNG STEEL PIPE (SCHED. 40)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3)** | | | | |
| 1 1/2 | 10 | 319 | 3/8 | 33 | 108 | R38AAEM306 | N2 | L2 | 98 | 324 | R38AAEM409 | N4 | L4 |
| 2 | 10 | 485 | 3/8 | 37 | 167 | R38AAEM306 | N2 | L2 | 110 | 502 | R38AAEM406 | N6 | L6 |
| 2 1/2 | 10 | 796 | 1/2 | 41 | 279 | R12AAEM306 | N3 | L3 | 122 | 838 | R12AAEM506 | N9 | L9 |
| 3 | 10 | 1,160 | 1/2 | 45 | 413 | R12AAEM406 | N5 | L5 | 134 | 1,238 | R12AAEM506 | N13 | L13 |
| 4 | 10 | 1,671 | 5/8 | 48 | 721 | R58AAEM509 | N8 | L8 | 111 | 1,690 | R58AAEM606 | N17 | L17 |
| 5 | 10 | 1,807 | 5/8 | 48 | 1,004 | R58AAEM506 | N11 | L11 | 76 | 1,595 | R58AAEM606 | N16 | L16 |
| 6 | 10 | 1,896 | 5/8 | 21 | 583 | R58AAEM406 | N6 | L6 | 63 | 1,750 | R58AAEM606 | N18 | L18 |
| 8 | 10 | 1,967 | 5/8 | 33 | 1,420 | R58AAEM506 | N15 | L15 | 17 | 725 | R58AAEM509 | N8 | L8 |
| | | | | **2-Way Transverse Brace Pattern (B2.12, B2.13 )** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3)** | | | | |
| 5 | 10 | 363 | 5/8 | 52 | 541 | R58AAEM406 | N6 | L6 | 76 | 798 | R58AAEM506 | N8 | L8 |
| 6 | 10 | 482 | 5/8 | 56 | 773 | R58AAEM509 | N8 | L8 | 66 | 918 | R58AAEM506 | N10 | L10 |
| 8 | 10 | 746 | 5/8 | 33 | 710 | R58AAEM509 | N8 | L8 | 17 | 363 | R58AAEM406 | N4 | L4 |
| 10 | 10 | 1,093 | 5/8 | 33 | 1,050 | R58AAEM506 | N11 | L11 | 57 | 1,800 | R58AAEM606 | N18 | L18 |
| 12 | 10 | 1,424 | 5/8 | 26 | 1,050 | R58AAEM506 | N11 | L11 | 44 | 1,799 | R58AAEM606 | N18 | L18 |
| 16 | 10 | 2,028 | 5/8 | 18 | 1,069 | R58AAEM506 | N11 | L11 | 31 | 1,832 | R58AAEM606 | N19 | L19 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13, B4.14)** | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 33 | 76 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 80 | 3/8 | 37 | 118 | R38AAEM306 | N2 | L2 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 41 | 198 | R12AAEM306 | N2 | L2 | | | | | |
| 3 | 10 | 160 | 1/2 | 45 | 292 | R12AAEM306 | N3 | L3 | | | | | |
| 4 | 10 | 263 | 5/8 | 48 | 510 | R58AAEM406 | N6 | L6 | | | | | |
| 5 | 10 | 363 | 5/8 | 52 | 765 | R58AAEM509 | N8 | L8 | | | | | |
| 6 | 10 | 482 | 5/8 | 56 | 1,094 | R58AAEM506 | N11 | L11 | | | | | |
| 8 | 10 | 746 | 5/8 | 17 | 513 | R58AAEM406 | N6 | L6 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 33 | 1,485 | R58AAEM606 | N15 | L15 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 26 | 1,485 | R58AAEM606 | N15 | L15 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 22 | 1,501 | R58AAEM606 | N16 | L16 | | | | | |
| 16 | 10 | 2,028 | 5/8 | 18 | 1,512 | R58AAEM606 | N16 | L16 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *RIGID BRACING REQUIREMENTS* [7, 9, 10]

***SINGLE HUNG STEEL PIPE (SCHED. 40)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | Max. | Rod [1] | Min. [8] | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum Pipe Diameter (in.) | Vertical Support Spacing (ft.) | Total Vertical Load (lbs) | Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B1.4, B1.5) | | | | | 2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3) | | | | |
| 1 1/2 | 10 | 437 | 3/8 | 33 | 139 | R38AAEM306 | N2 | L2 | 98 | 417 | R38AAEM406 | N5 | L5 |
| 2 | 10 | 467 | 3/8 | 34 | 200 | R38AAEM306 | N3 | L3 | 68 | 401 | R38AAEM406 | N5 | L5 |
| 2 1/2 | 10 | 1,040 | 1/2 | 41 | 359 | R12AAEM406 | N4 | L4 | 113 | 1,000 | R12AAEM506 | N10 | L10 |
| 3 | 10 | 1,171 | 1/2 | 44 | 522 | R12AAEM406 | N6 | L6 | 88 | 1,044 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 1,660 | 5/8 | 37 | 721 | R58AAEM509 | N8 | L8 | 74 | 1,442 | R58AAEM506 | N15 | L15 |
| 5 | 10 | 1,769 | 5/8 | 27 | 726 | R58AAEM509 | N8 | L8 | 54 | 1,452 | R58AAEM506 | N15 | L15 |
| 6 | 10 | 1,935 | 5/8 | 21 | 750 | R58AAEM509 | N8 | L8 | 42 | 1,500 | R58AAEM606 | N16 | L16 |
| 8 | 10 | 2,264 | 5/8 | 28 | 1,547 | R58AAEM606 | N16 | L16 | 15 | 825 | R58AAEM506 | N9 | L9 |
| | | | | 2-Way Transverse Brace Pattern (B2.12, B2.13 ) | | | | | 4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3) | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 33 | 69 | R38AAEM306 | N1 | L1 | 98 | 208 | R38AAEM306 | N3 | L3 |
| 2 | 10 | 80 | 3/8 | 37 | 108 | R38AAEM306 | N2 | L2 | 110 | 323 | R38AAEM409 | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 41 | 180 | R12AAEM306 | N2 | L2 | 113 | 500 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 160 | 1/2 | 45 | 265 | R12AAEM306 | N3 | L3 | 134 | 796 | R12AAEM506 | N8 | L8 |
| 4 | 10 | 263 | 5/8 | 48 | 464 | R58AAEM406 | N5 | L5 | 98 | 958 | R58AAEM506 | N10 | L10 |
| 5 | 10 | 363 | 5/8 | 52 | 695 | R58AAEM509 | N7 | L7 | 67 | 903 | R58AAEM506 | N10 | L10 |
| 6 | 10 | 482 | 5/8 | 47 | 839 | R58AAEM506 | N9 | L9 | 58 | 1,040 | R58AAEM506 | N11 | L11 |
| 8 | 10 | 746 | 5/8 | 29 | 805 | R58AAEM506 | N9 | L9 | 15 | 413 | R58AAEM406 | N5 | L5 |
| 10 | 10 | 1,093 | 5/8 | 22 | 890 | R58AAEM506 | N9 | L9 | 52 | 2,093 | R58AAB2P09 | N21 | L21 |
| 12 | 10 | 1,424 | 5/8 | 18 | 950 | R58AAEM506 | N10 | L10 | 40 | 2,092 | R58AAB2P09 | N21 | L21 |
| 16 | 10 | 2,028 | 5/8 | 13 | 976 | R58AAEM506 | N10 | L10 | 28 | 2,130 | R58AAB2P09 | N22 | L22 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS<br>4-Way Splayed Brace Pattern (B4.13, B4.14) | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 33 | 98 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 80 | 3/8 | 37 | 152 | R38AAEM306 | N2 | L2 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 41 | 254 | R12AAEM306 | N3 | L3 | | | | | |
| 3 | 10 | 160 | 1/2 | 45 | 375 | R12AAEM406 | N4 | L4 | | | | | |
| 4 | 10 | 263 | 5/8 | 48 | 656 | R58AAEM406 | N7 | L7 | | | | | |
| 5 | 10 | 363 | 5/8 | 52 | 983 | R58AAEM506 | N10 | L10 | | | | | |
| 6 | 10 | 482 | 5/8 | 52 | 1,308 | R58AAEM506 | N14 | L14 | | | | | |
| 8 | 10 | 746 | 5/8 | 29 | 1,138 | R58AAEM506 | N12 | L12 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 33 | 1,867 | R58AAEM606 | N19 | L19 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 25 | 1,866 | R58AAEM606 | N19 | L19 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 22 | 1,887 | R58AAEM606 | N19 | L19 | | | | | |
| 16 | 10 | 2,028 | 5/8 | 18 | 1,900 | R58AAEM606 | N20 | L20 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *RIGID BRACING REQUIREMENTS* [7, 9, 10]

***SINGLE HUNG STEEL PIPE (SCHED. 40)*** **MAXIMUM SEISMIC DESIGN FORCE =** ***0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3)** | | | | |
| 1 1/2 | 10 | 214 | 3/8 | 27 | 99 | R38AAEM306 | N1 | L1 | 81 | 297 | R38AAEM306 | N3 | L3 |
| 2 | 10 | 325 | 3/8 | 30 | 155 | R38AAEM306 | N2 | L2 | 91 | 465 | R38AAEM406 | N5 | L5 |
| 2 1/2 | 10 | 473 | 1/2 | 35 | 264 | R12AAEM306 | N3 | L3 | 86 | 655 | R12AAEM406 | N7 | L7 |
| 3 | 10 | 729 | 1/2 | 38 | 387 | R12AAEM406 | N4 | L4 | 104 | 1,070 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 971 | 5/8 | 39 | 656 | R58AAEM406 | N7 | L7 | 74 | 1,255 | R58AAEM506 | N13 | L13 |
| 5 | 10 | 1,133 | 5/8 | 42 | 983 | R58AAEM506 | N10 | L10 | 51 | 1,185 | R58AAEM506 | N12 | L12 |
| 6 | 10 | 1,396 | 5/8 | 39 | 1,215 | R58AAEM506 | N13 | L13 | 44 | 1,365 | R58AAEM506 | N14 | L14 |
| 8 | 10 | 1,338 | 5/8 | 22 | 1,055 | R58AAEM506 | N11 | L11 | 11 | 540 | R58AAEM406 | N6 | L6 |
| 10 | 10 | 1,877 | 5/8 | 10 | 701 | R58AAEM509 | N8 | L8 | 20 | 1,402 | R58AAEM506 | N15 | L15 |
| | | | | **2-Way Transverse Brace Pattern (B2.12, B2.13 )** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 27 | 50 | R38AAEM306 | N1 | L1 | 81 | 149 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 30 | 78 | R38AAEM306 | N1 | L1 | 91 | 233 | R38AAEM306 | N3 | L3 |
| 2 1/2 | 10 | 119 | 1/2 | 35 | 132 | R12AAEM306 | N2 | L2 | 86 | 328 | R12AAEM409 | N4 | L4 |
| 3 | 10 | 160 | 1/2 | 38 | 193 | R12AAEM306 | N2 | L2 | 104 | 535 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 263 | 5/8 | 39 | 328 | R58AAEM409 | N4 | L4 | 74 | 628 | R58AAEM406 | N7 | L7 |
| 5 | 10 | 363 | 5/8 | 42 | 491 | R58AAEM406 | N5 | L5 | 51 | 593 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 482 | 5/8 | 39 | 608 | R58AAEM406 | N7 | L7 | 44 | 683 | R58AAEM509 | N7 | L7 |
| 8 | 10 | 746 | 5/8 | 22 | 528 | R58AAEM406 | N6 | L6 | 11 | 270 | R58AAEM306 | N3 | L3 |
| 10 | 10 | 1,093 | 5/8 | 20 | 701 | R58AAEM509 | N8 | L8 | 40 | 1,402 | R58AAEM506 | N15 | L15 |
| 12 | 10 | 1,424 | 5/8 | 10 | 457 | R58AAEM406 | N5 | L5 | 30 | 1,370 | R58AAEM506 | N14 | L14 |
| 16 | 10 | 2,028 | 5/8 | 10 | 650 | R58AAEM406 | N7 | L7 | 20 | 1,301 | R58AAEM506 | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS**<br>**4-Way Splayed Brace Pattern (B4.13, B4.14)** | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 27 | 70 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 80 | 3/8 | 30 | 110 | R38AAEM306 | N2 | L2 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 35 | 187 | R12AAEM306 | N2 | L2 | | | | | |
| 3 | 10 | 160 | 1/2 | 38 | 273 | R12AAEM306 | N3 | L3 | | | | | |
| 4 | 10 | 263 | 5/8 | 39 | 464 | R58AAEM406 | N5 | L5 | | | | | |
| 5 | 10 | 363 | 5/8 | 42 | 695 | R58AAEM509 | N7 | L7 | | | | | |
| 6 | 10 | 482 | 5/8 | 39 | 859 | R58AAEM506 | N9 | L9 | | | | | |
| 8 | 10 | 746 | 5/8 | 22 | 746 | R58AAEM509 | N8 | L8 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 26 | 1,269 | R58AAEM506 | N13 | L13 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 20 | 1,269 | R58AAEM506 | N13 | L13 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 17 | 1,283 | R58AAEM506 | N13 | L13 | | | | | |
| 16 | 10 | 2,028 | 5/8 | 14 | 1,292 | R58AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *RIGID BRACING REQUIREMENTS* [7, 9, 10]

***SINGLE HUNG STEEL PIPE (SCHED. 40)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3)** | | | | |
| 1 1/2 | 10 | 381 | 3/8 | 27 | 134 | R38AAEM306 | N2 | L2 | 81 | 401 | R38AAEM406 | N5 | L5 |
| 2 | 10 | 438 | 3/8 | 30 | 209 | R38AAEM306 | N3 | L3 | 61 | 418 | R38AAEM406 | N5 | L5 |
| 2 1/2 | 10 | 847 | 1/2 | 35 | 356 | R12AAEM406 | N4 | L4 | 85 | 880 | R12AAEM506 | N9 | L9 |
| 3 | 10 | 1,053 | 1/2 | 38 | 521 | R12AAEM406 | N6 | L6 | 75 | 1,042 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 1,665 | 5/8 | 36 | 819 | R58AAEM506 | N9 | L9 | 72 | 1,637 | R58AAEM606 | N17 | L17 |
| 5 | 10 | 1,807 | 5/8 | 32 | 1,004 | R58AAEM506 | N11 | L11 | 51 | 1,595 | R58AAEM606 | N16 | L16 |
| 6 | 10 | 1,896 | 5/8 | 14 | 583 | R58AAEM406 | N6 | L6 | 42 | 1,750 | R58AAEM606 | N18 | L18 |
| 8 | 10 | 1,523 | 5/8 | 11 | 709 | R58AAEM509 | N8 | L8 | 11 | 725 | R58AAEM509 | N8 | L8 |
| | | | | **2-Way Transverse Brace Pattern (B2.12, B2.13 )** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 27 | 67 | R38AAEM306 | N1 | L1 | 81 | 200 | R38AAEM306 | N3 | L3 |
| 2 | 10 | 80 | 3/8 | 30 | 104 | R38AAEM306 | N2 | L2 | 91 | 313 | R38AAEM409 | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 35 | 178 | R12AAEM306 | N2 | L2 | 85 | 440 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 160 | 1/2 | 38 | 261 | R12AAEM306 | N3 | L3 | 104 | 720 | R12AAEM509 | N8 | L8 |
| 4 | 10 | 263 | 5/8 | 39 | 442 | R58AAEM406 | N5 | L5 | 74 | 845 | R58AAEM506 | N9 | L9 |
| 5 | 10 | 363 | 5/8 | 42 | 662 | R58AAEM509 | N7 | L7 | 51 | 798 | R58AAEM506 | N8 | L8 |
| 6 | 10 | 482 | 5/8 | 39 | 818 | R58AAEM506 | N9 | L9 | 44 | 918 | R58AAEM506 | N10 | L10 |
| 8 | 10 | 746 | 5/8 | 22 | 710 | R58AAEM509 | N8 | L8 | 11 | 363 | R58AAEM406 | N4 | L4 |
| 10 | 10 | 1,093 | 5/8 | 21 | 992 | R58AAEM506 | N10 | L10 | 38 | 1,800 | R58AAEM606 | N18 | L18 |
| 12 | 10 | 1,424 | 5/8 | 17 | 1,050 | R58AAEM506 | N11 | L11 | 29 | 1,799 | R58AAEM606 | N18 | L18 |
| 16 | 10 | 2,028 | 5/8 | 12 | 1,069 | R58AAEM506 | N11 | L11 | 21 | 1,832 | R58AAEM606 | N19 | L19 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS**<br>**4-Way Splayed Brace Pattern (B4.13, B4.14)** | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 27 | 94 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 80 | 3/8 | 30 | 148 | R38AAEM306 | N2 | L2 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 35 | 252 | R12AAEM306 | N3 | L3 | | | | | |
| 3 | 10 | 160 | 1/2 | 38 | 368 | R12AAEM406 | N4 | L4 | | | | | |
| 4 | 10 | 263 | 5/8 | 39 | 625 | R58AAEM406 | N7 | L7 | | | | | |
| 5 | 10 | 363 | 5/8 | 42 | 936 | R58AAEM506 | N10 | L10 | | | | | |
| 6 | 10 | 482 | 5/8 | 39 | 1,156 | R58AAEM506 | N12 | L12 | | | | | |
| 8 | 10 | 746 | 5/8 | 22 | 1,004 | R58AAEM506 | N11 | L11 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 22 | 1,485 | R58AAEM606 | N15 | L15 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 17 | 1,485 | R58AAEM606 | N15 | L15 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 15 | 1,501 | R58AAEM606 | N16 | L16 | | | | | |
| 16 | 10 | 2,028 | 5/8 | 12 | 1,512 | R58AAEM606 | N16 | L16 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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**ISAT**

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03/12/19

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***C11-0.75-45***

## *RIGID BRACING REQUIREMENTS* [7, 9, 10]

***SINGLE HUNG STEEL PIPE (SCHED. 40)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3)** | | | | |
| 1 1/2 | 10 | 390 | 3/8 | 27 | 172 | R38AAEM306 | N2 | L2 | 54 | 343 | R38AAEM406 | N4 | L4 |
| 2 | 10 | 473 | 3/8 | 23 | 203 | R38AAEM306 | N3 | L3 | 46 | 406 | R38AAEM406 | N5 | L5 |
| 2 1/2 | 10 | 1,072 | 1/2 | 35 | 458 | R12AAEM406 | N5 | L5 | 75 | 1,000 | R12AAEM506 | N10 | L10 |
| 3 | 10 | 1,135 | 1/2 | 20 | 356 | R12AAEM406 | N4 | L4 | 60 | 1,067 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 1,678 | 5/8 | 25 | 731 | R58AAEM509 | N8 | L8 | 50 | 1,462 | R58AAEM606 | N15 | L15 |
| 5 | 10 | 1,769 | 5/8 | 18 | 726 | R58AAEM509 | N8 | L8 | 36 | 1,452 | R58AAEM506 | N15 | L15 |
| 6 | 10 | 1,935 | 5/8 | 14 | 750 | R58AAEM509 | N8 | L8 | 28 | 1,500 | R58AAEM606 | N16 | L16 |
| 8 | 10 | 2,222 | 5/8 | 18 | 1,491 | R58AAEM606 | N15 | L15 | 10 | 825 | R58AAEM506 | N9 | L9 |
| | | | | **2-Way Transverse Brace Pattern (B2.12, B2.13 )** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 27 | 86 | R38AAEM306 | N1 | L1 | 75 | 238 | R38AAEM306 | N3 | L3 |
| 2 | 10 | 80 | 3/8 | 30 | 134 | R38AAEM306 | N2 | L2 | 83 | 365 | R38AAEM406 | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 35 | 229 | R12AAEM306 | N3 | L3 | 75 | 500 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 160 | 1/2 | 38 | 335 | R12AAEM406 | N4 | L4 | 92 | 815 | R12AAEM506 | N9 | L9 |
| 4 | 10 | 263 | 5/8 | 39 | 568 | R58AAEM406 | N6 | L6 | 66 | 958 | R58AAEM506 | N10 | L10 |
| 5 | 10 | 363 | 5/8 | 39 | 790 | R58AAEM509 | N8 | L8 | 45 | 903 | R58AAEM506 | N10 | L10 |
| 6 | 10 | 482 | 5/8 | 30 | 804 | R58AAEM506 | N9 | L9 | 39 | 1,040 | R58AAEM506 | N11 | L11 |
| 8 | 10 | 746 | 5/8 | 19 | 805 | R58AAEM506 | N9 | L9 | 10 | 413 | R58AAEM406 | N5 | L5 |
| 10 | 10 | 1,093 | 5/8 | 15 | 911 | R58AAEM506 | N10 | L10 | 34 | 2,093 | R58AAB2P09 | N21 | L21 |
| 12 | 10 | 1,424 | 5/8 | 12 | 950 | R58AAEM506 | N10 | L10 | 26 | 2,092 | R58AAB2P09 | N21 | L21 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13, B4.14)** | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 27 | 121 | R38AAEM306 | N2 | L2 | | | | | |
| 2 | 10 | 80 | 3/8 | 30 | 190 | R38AAEM306 | N2 | L2 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 35 | 324 | R12AAEM409 | N4 | L4 | | | | | |
| 3 | 10 | 160 | 1/2 | 38 | 474 | R12AAEM406 | N5 | L5 | | | | | |
| 4 | 10 | 263 | 5/8 | 39 | 803 | R58AAEM506 | N9 | L9 | | | | | |
| 5 | 10 | 363 | 5/8 | 39 | 1,117 | R58AAEM506 | N12 | L12 | | | | | |
| 6 | 10 | 482 | 5/8 | 35 | 1,308 | R58AAEM506 | N14 | L14 | | | | | |
| 8 | 10 | 746 | 5/8 | 19 | 1,138 | R58AAEM506 | N12 | L12 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 22 | 1,867 | R58AAEM606 | N19 | L19 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 17 | 1,866 | R58AAEM606 | N19 | L19 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 15 | 1,887 | R58AAEM606 | N19 | L19 | | | | | |
| 16 | 10 | 2,028 | 5/8 | 12 | 1,900 | R58AAEM606 | N20 | L20 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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S 4710

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2013 CBC OSHPD

## *RIGID BRACING REQUIREMENTS* [7, 9, 10]

***SINGLE HUNG STEEL PIPE (SCHED. 40)*** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3)** | | | | |
| 1 1/2 | 10 | 222 | 3/8 | 23 | 114 | R38AAEM306 | N2 | L2 | 63 | 310 | R38AAEM409 | N4 | L4 |
| 2 | 10 | 336 | 3/8 | 26 | 179 | R38AAEM306 | N2 | L2 | 71 | 480 | R38AAEM406 | N5 | L5 |
| 2 1/2 | 10 | 481 | 1/2 | 30 | 305 | R12AAEM409 | N4 | L4 | 64 | 655 | R12AAEM406 | N7 | L7 |
| 3 | 10 | 740 | 1/2 | 33 | 447 | R12AAEM406 | N5 | L5 | 78 | 1,070 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 996 | 5/8 | 34 | 757 | R58AAEM509 | N8 | L8 | 56 | 1,255 | R58AAEM506 | N13 | L13 |
| 5 | 10 | 1,150 | 5/8 | 33 | 1,035 | R58AAEM506 | N11 | L11 | 38 | 1,185 | R58AAEM506 | N12 | L12 |
| 6 | 10 | 1,396 | 5/8 | 29 | 1,215 | R58AAEM506 | N13 | L13 | 33 | 1,365 | R58AAEM506 | N14 | L14 |
| 8 | 10 | 1,338 | 5/8 | 17 | 1,055 | R58AAEM506 | N11 | L11 | 8 | 540 | R58AAEM406 | N6 | L6 |
| | | | | **2-Way Transverse Brace Pattern (B2.12, B2.13 )** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 23 | 57 | R38AAEM306 | N1 | L1 | 63 | 155 | R38AAEM306 | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 26 | 90 | R38AAEM306 | N1 | L1 | 71 | 240 | R38AAEM306 | N3 | L3 |
| 2 1/2 | 10 | 119 | 1/2 | 30 | 153 | R12AAEM306 | N2 | L2 | 64 | 328 | R12AAEM409 | N4 | L4 |
| 3 | 10 | 160 | 1/2 | 33 | 223 | R12AAEM306 | N3 | L3 | 78 | 535 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 263 | 5/8 | 34 | 379 | R58AAEM406 | N4 | L4 | 56 | 628 | R58AAEM406 | N7 | L7 |
| 5 | 10 | 363 | 5/8 | 33 | 518 | R58AAEM406 | N6 | L6 | 38 | 593 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 482 | 5/8 | 29 | 608 | R58AAEM406 | N7 | L7 | 33 | 683 | R58AAEM509 | N7 | L7 |
| 8 | 10 | 746 | 5/8 | 17 | 528 | R58AAEM406 | N6 | L6 | 8 | 270 | R58AAEM306 | N3 | L3 |
| 10 | 10 | 1,093 | 5/8 | 15 | 701 | R58AAEM509 | N8 | L8 | 30 | 1,402 | R58AAEM506 | N15 | L15 |
| 12 | 10 | 1,424 | 5/8 | 11 | 670 | R58AAEM509 | N7 | L7 | 22 | 1,340 | R58AAEM506 | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS**<br>**4-Way Splayed Brace Pattern (B4.13, B4.14)** | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 23 | 81 | R38AAEM306 | N1 | L1 | | | | | |
| 2 | 10 | 80 | 3/8 | 26 | 127 | R38AAEM306 | N2 | L2 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 30 | 216 | R12AAEM306 | N3 | L3 | | | | | |
| 3 | 10 | 160 | 1/2 | 33 | 316 | R12AAEM409 | N4 | L4 | | | | | |
| 4 | 10 | 263 | 5/8 | 34 | 535 | R58AAEM406 | N6 | L6 | | | | | |
| 5 | 10 | 363 | 5/8 | 33 | 732 | R58AAEM509 | N8 | L8 | | | | | |
| 6 | 10 | 482 | 5/8 | 29 | 859 | R58AAEM506 | N9 | L9 | | | | | |
| 8 | 10 | 746 | 5/8 | 17 | 746 | R58AAEM509 | N8 | L8 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 19 | 1,269 | R58AAEM506 | N13 | L13 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 15 | 1,269 | R58AAEM506 | N13 | L13 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 13 | 1,283 | R58AAEM506 | N13 | L13 | | | | | |
| 16 | 10 | 2,028 | 5/8 | 11 | 1,292 | R58AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *RIGID BRACING REQUIREMENTS* [7, 9, 10]

***SINGLE HUNG STEEL PIPE (SCHED. 40)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3)** | | | | |
| 1 1/2 | 10 | 396 | 3/8 | 23 | 154 | R38AAEM306 | N2 | L2 | 63 | 415 | R38AAEM406 | N5 | L5 |
| 2 | 10 | 472 | 3/8 | 25 | 229 | R38AAEM306 | N3 | L3 | 50 | 458 | R38AAEM406 | N5 | L5 |
| 2 1/2 | 10 | 863 | 1/2 | 30 | 411 | R12AAEM406 | N5 | L5 | 64 | 880 | R12AAEM506 | N9 | L9 |
| 3 | 10 | 1,171 | 1/2 | 32 | 590 | R12AAEM406 | N6 | L6 | 64 | 1,181 | R12AAEM506 | N12 | L12 |
| 4 | 10 | 1,665 | 5/8 | 27 | 819 | R58AAEM506 | N9 | L9 | 54 | 1,637 | R58AAEM606 | N17 | L17 |
| 5 | 10 | 1,743 | 5/8 | 20 | 837 | R58AAEM506 | N9 | L9 | 38 | 1,595 | R58AAEM606 | N16 | L16 |
| 6 | 10 | 1,910 | 5/8 | 15 | 834 | R58AAEM506 | N9 | L9 | 30 | 1,667 | R58AAEM606 | N17 | L17 |
| | | | | **2-Way Transverse Brace Pattern (B2.12, B2.13 )** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 23 | 77 | R38AAEM306 | N1 | L1 | 63 | 208 | R38AAEM306 | N3 | L3 |
| 2 | 10 | 80 | 3/8 | 26 | 121 | R38AAEM306 | N2 | L2 | 70 | 323 | R38AAEM409 | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 30 | 206 | R12AAEM306 | N3 | L3 | 64 | 440 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 160 | 1/2 | 33 | 301 | R12AAEM409 | N4 | L4 | 78 | 720 | R12AAEM509 | N8 | L8 |
| 4 | 10 | 263 | 5/8 | 34 | 510 | R58AAEM406 | N6 | L6 | 56 | 845 | R58AAEM506 | N9 | L9 |
| 5 | 10 | 363 | 5/8 | 32 | 673 | R58AAEM509 | N7 | L7 | 38 | 798 | R58AAEM506 | N8 | L8 |
| 6 | 10 | 482 | 5/8 | 29 | 818 | R58AAEM506 | N9 | L9 | 33 | 918 | R58AAEM506 | N10 | L10 |
| 8 | 10 | 746 | 5/8 | 17 | 710 | R58AAEM509 | N8 | L8 | 8 | 363 | R58AAEM406 | N4 | L4 |
| 10 | 10 | 1,093 | 5/8 | 16 | 1,007 | R58AAEM506 | N11 | L11 | 29 | 1,800 | R58AAEM606 | N18 | L18 |
| 12 | 10 | 1,424 | 5/8 | 13 | 1,050 | R58AAEM506 | N11 | L11 | 22 | 1,799 | R58AAEM606 | N18 | L18 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13, B4.14)** | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 23 | 109 | R38AAEM306 | N2 | L2 | | | | | |
| 2 | 10 | 80 | 3/8 | 26 | 171 | R38AAEM306 | N2 | L2 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 30 | 291 | R12AAEM306 | N3 | L3 | | | | | |
| 3 | 10 | 160 | 1/2 | 33 | 425 | R12AAEM406 | N5 | L5 | | | | | |
| 4 | 10 | 263 | 5/8 | 34 | 721 | R58AAEM509 | N8 | L8 | | | | | |
| 5 | 10 | 363 | 5/8 | 32 | 951 | R58AAEM506 | N10 | L10 | | | | | |
| 6 | 10 | 482 | 5/8 | 29 | 1,156 | R58AAEM506 | N12 | L12 | | | | | |
| 8 | 10 | 746 | 5/8 | 17 | 1,004 | R58AAEM506 | N11 | L11 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 17 | 1,485 | R58AAEM606 | N15 | L15 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 13 | 1,485 | R58AAEM606 | N15 | L15 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 11 | 1,501 | R58AAEM606 | N16 | L16 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *RIGID BRACING REQUIREMENTS* [7, 9, 10]

***SINGLE HUNG STEEL PIPE (SCHED. 40)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1, B3.3)** | | | | |
| 1 1/2 | 10 | 441 | 3/8 | 23 | 198 | R38AAEM306 | N2 | L2 | 47 | 397 | R38AAEM406 | N4 | L4 |
| 2 | 10 | 467 | 3/8 | 17 | 200 | R38AAEM306 | N3 | L3 | 34 | 401 | R38AAEM406 | N5 | L5 |
| 2 1/2 | 10 | 1,099 | 1/2 | 30 | 529 | R12AAEM406 | N6 | L6 | 57 | 1,000 | R12AAEM506 | N10 | L10 |
| 3 | 10 | 1,171 | 1/2 | 22 | 522 | R12AAEM406 | N6 | L6 | 44 | 1,044 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 1,622 | 5/8 | 18 | 702 | R58AAEM509 | N8 | L8 | 36 | 1,403 | R58AAEM506 | N15 | L15 |
| 5 | 10 | 1,717 | 5/8 | 13 | 699 | R58AAEM509 | N7 | L7 | 26 | 1,398 | R58AAEM506 | N14 | L14 |
| 6 | 10 | 1,866 | 5/8 | 10 | 714 | R58AAEM509 | N8 | L8 | 20 | 1,429 | R58AAEM506 | N15 | L15 |
| | | | | **2-Way Transverse Brace Pattern (B2.12, B2.13 )** | | | | | **4-Way Transverse, Longit. Brace Pattern (B4.0, B4.1, B4.3)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 23 | 99 | R38AAEM306 | N1 | L1 | 56 | 238 | R38AAEM306 | N3 | L3 |
| 2 | 10 | 80 | 3/8 | 26 | 155 | R38AAEM306 | N2 | L2 | 62 | 365 | R38AAEM406 | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 30 | 264 | R12AAEM306 | N3 | L3 | 57 | 500 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 160 | 1/2 | 33 | 387 | R12AAEM406 | N4 | L4 | 69 | 815 | R12AAEM506 | N9 | L9 |
| 4 | 10 | 263 | 5/8 | 34 | 655 | R58AAEM406 | N7 | L7 | 49 | 958 | R58AAEM506 | N10 | L10 |
| 5 | 10 | 363 | 5/8 | 29 | 790 | R58AAEM509 | N8 | L8 | 34 | 903 | R58AAEM506 | N10 | L10 |
| 6 | 10 | 482 | 5/8 | 23 | 822 | R58AAEM506 | N9 | L9 | 29 | 1,040 | R58AAEM506 | N11 | L11 |
| 8 | 10 | 746 | 5/8 | 15 | 805 | R58AAEM506 | N9 | L9 | 7 | 413 | R58AAEM406 | N5 | L5 |
| 10 | 10 | 1,093 | 5/8 | 10 | 810 | R58AAEM506 | N9 | L9 | 26 | 2,093 | R58AAB2P09 | N21 | L21 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.13, B4.14)** | | | | | | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 23 | 140 | R38AAEM306 | N2 | L2 | | | | | |
| 2 | 10 | 80 | 3/8 | 26 | 219 | R38AAEM306 | N3 | L3 | | | | | |
| 2 1/2 | 10 | 119 | 1/2 | 30 | 374 | R12AAEM406 | N4 | L4 | | | | | |
| 3 | 10 | 160 | 1/2 | 33 | 547 | R12AAEM406 | N6 | L6 | | | | | |
| 4 | 10 | 263 | 5/8 | 34 | 926 | R58AAEM506 | N10 | L10 | | | | | |
| 5 | 10 | 363 | 5/8 | 29 | 1,117 | R58AAEM506 | N12 | L12 | | | | | |
| 6 | 10 | 482 | 5/8 | 26 | 1,308 | R58AAEM506 | N14 | L14 | | | | | |
| 8 | 10 | 746 | 5/8 | 15 | 1,138 | R58AAEM506 | N12 | L12 | | | | | |
| 10 | 10 | 1,093 | 5/8 | 16 | 1,867 | R58AAEM606 | N19 | L19 | | | | | |
| 12 | 10 | 1,424 | 5/8 | 13 | 1,866 | R58AAEM606 | N19 | L19 | | | | | |
| 14 | 10 | 1,646 | 5/8 | 11 | 1,887 | R58AAEM606 | N19 | L19 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer To Page X Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *CABLE BRACING REQUIREMENTS [7, 9, 10] :*

***SINGLE HUNG PIPE, SCHEDULE 40 STEEL*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6]: Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6]: Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 48 | C38AA04WS | N1 | L1 | 117 | 143 | C38AA04WS | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 43 | 74 | C38AA04WS | N1 | L1 | 130 | 222 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 123 | C12AA04WS | N2 | L2 | 145 | 370 | C12AA04WS | N4 | L4 |
| 3 | 10 | 160 | 1/2 | 53 | 182 | C12AA04WS | N2 | L2 | 160 | 546 | C12AA04WS | N6 | L6 |
| 4 | 10 | 263 | 5/8 | 58 | 329 | C58AA04WS | N4 | L4 | 175 | 987 | C58AA06WS | N10 | L10 |
| 5 | 10 | 363 | 5/8 | 65 | 504 | C58AA04WS | N6 | L6 | 153 | 1,185 | C58AA06WS | N12 | L12 |
| 6 | 10 | 482 | 5/8 | 71 | 728 | C58AA06WS | N8 | L8 | 132 | 1,365 | C58AA06WS | N14 | L14 |
| 8 | 10 | 746 | 5/8 | 66 | 1,055 | C58AA06WS | N11 | L11 | 34 | 540 | C58AA04WS | N6 | L6 |
| 10 | 10 | 1,093 | 5/8 | 31 | 724 | C58AA06WS | N8 | L8 | 62 | 1,449 | C58AA06WS | N15 | L15 |
| 12 | 10 | 1,425 | 5/8 | 23 | 701 | C58AA06WS | N8 | L8 | 46 | 1,401 | C58AA06WS | N15 | L15 |
| 14 | 10 | 1,628 | 5/8 | 20 | 696 | C58AA06WS | N7 | L7 | 40 | 1,393 | C58AA06WS | N14 | L14 |
| 16 | 10 | 1,992 | 5/8 | 17 | 724 | C58AA06WS | N8 | L8 | 34 | 1,448 | C58AA06WS | N15 | L15 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details ( B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 48 | C38AA04WS | N1 | L1 | 39 | 48 | C38AA04WS | N1 | L1 |
| 2 | 10 | 80 | 3/8 | 43 | 74 | C38AA04WS | N1 | L1 | 43 | 74 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 123 | C12AA04WS | N2 | L2 | 48 | 123 | C12AA04WS | N2 | L2 |
| 3 | 10 | 160 | 1/2 | 53 | 182 | C12AA04WS | N2 | L2 | 53 | 182 | C12AA04WS | N2 | L2 |
| 4 | 10 | 263 | 5/8 | 58 | 329 | C58AA04WS | N4 | L4 | 58 | 329 | C58AA04WS | N4 | L4 |
| 5 | 10 | 363 | 5/8 | 65 | 504 | C58AA04WS | N6 | L6 | 65 | 504 | C58AA04WS | N6 | L6 |
| 6 | 10 | 482 | 5/8 | 71 | 728 | C58AA06WS | N8 | L8 | 71 | 728 | C58AA06WS | N8 | L8 |
| 8 | 10 | 746 | 5/8 | 34 | 540 | C58AA04WS | N6 | L6 | 34 | 540 | C58AA04WS | N6 | L6 |
| 10 | 10 | 1,093 | 5/8 | 62 | 1,449 | C58AA06WS | N15 | L15 | 62 | 1,449 | C58AA06WS | N15 | L15 |
| 12 | 10 | 1,425 | 5/8 | 47 | 1,432 | C58AA06WS | N15 | L15 | 47 | 1,432 | C58AA06WS | N15 | L15 |
| 14 | 10 | 1,628 | 5/8 | 41 | 1,428 | C58AA06WS | N15 | L15 | 41 | 1,428 | C58AA06WS | N15 | L15 |
| 16 | 10 | 1,992 | 5/8 | 34 | 1,448 | C58AA06WS | N15 | L15 | 34 | 1,448 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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***C12-0.25-30***

## *CABLE BRACING REQUIREMENTS [7, 9, 10] :*

***SINGLE HUNG PIPE, SCHEDULE 40 STEEL*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 64 | C38AA04WS | N1 | L1 | 117 | 193 | C38AA04WS | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 43 | 99 | C38AA04WS | N1 | L1 | 130 | 298 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 166 | C12AA04WS | N2 | L2 | 145 | 498 | C12AA04WS | N5 | L5 |
| 3 | 10 | 160 | 1/2 | 53 | 245 | C12AA04WS | N3 | L3 | 160 | 736 | C12AA06WS | N8 | L8 |
| 4 | 10 | 263 | 5/8 | 58 | 440 | C58AA04WS | N5 | L5 | 174 | 1,319 | C58AA06WS | N14 | L14 |
| 5 | 10 | 363 | 5/8 | 42 | 439 | C58AA04WS | N5 | L5 | 126 | 1,318 | C58AA06WS | N14 | L14 |
| 6 | 10 | 482 | 5/8 | 32 | 445 | C58AA04WS | N5 | L5 | 96 | 1,334 | C58AA06WS | N14 | L14 |
| 8 | 10 | 746 | 5/8 | 66 | 1,420 | C58AA06WS | N15 | L15 | 34 | 725 | C58AA06WS | N8 | L8 |
| 10 | 10 | 1,093 | 5/8 | 23 | 724 | C58AA06WS | N8 | L8 | 46 | 1,448 | C58AA06WS | N15 | L15 |
| 12 | 10 | 1,425 | 5/8 | 18 | 739 | C58AA06WS | N8 | L8 | 36 | 1,478 | C58AA06WS | N15 | L15 |
| 14 | 10 | 1,628 | 5/8 | 16 | 751 | C58AA06WS | N8 | L8 | 32 | 1,501 | C58DG06TS | N16 | L16 |
| 16 | 10 | 1,992 | 5/8 | 14 | 803 | C58AA06WS | N9 | L9 | 28 | 1,607 | C58DG06TS | N17 | L17 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details ( B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 64 | C38AA04WS | N1 | L1 | 39 | 64 | C38AA04WS | N1 | L1 |
| 2 | 10 | 80 | 3/8 | 43 | 99 | C38AA04WS | N1 | L1 | 43 | 99 | C38AA04WS | N1 | L1 |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 166 | C12AA04WS | N2 | L2 | 48 | 166 | C12AA04WS | N2 | L2 |
| 3 | 10 | 160 | 1/2 | 53 | 245 | C12AA04WS | N3 | L3 | 53 | 245 | C12AA04WS | N3 | L3 |
| 4 | 10 | 263 | 5/8 | 58 | 443 | C58AA04WS | N5 | L5 | 58 | 443 | C58AA04WS | N5 | L5 |
| 5 | 10 | 363 | 5/8 | 65 | 679 | C58AA06WS | N7 | L7 | 65 | 679 | C58AA06WS | N7 | L7 |
| 6 | 10 | 482 | 5/8 | 71 | 980 | C58AA06WS | N10 | L10 | 71 | 980 | C58AA06WS | N10 | L10 |
| 8 | 10 | 746 | 5/8 | 34 | 725 | C58AA06WS | N8 | L8 | 34 | 725 | C58AA06WS | N8 | L8 |
| 10 | 10 | 1,093 | 5/8 | 46 | 1,448 | C58AA06WS | N15 | L15 | 46 | 1,448 | C58AA06WS | N15 | L15 |
| 12 | 10 | 1,425 | 5/8 | 37 | 1,519 | C58DG06TS | N16 | L16 | 37 | 1,519 | C58DG06TS | N16 | L16 |
| 14 | 10 | 1,628 | 5/8 | 33 | 1,548 | C58DG06TS | N16 | L16 | 33 | 1,548 | C58DG06TS | N16 | L16 |
| 16 | 10 | 1,992 | 5/8 | 28 | 1,607 | C58DG06TS | N17 | L17 | 28 | 1,607 | C58DG06TS | N17 | L17 |

1. $TVL = DL + Fv + (0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *CABLE BRACING REQUIREMENTS* $^{7, 9, 10}$*:*

***SINGLE HUNG PIPE, SCHEDULE 40 STEEL*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 83 | C38AA04WS | N1 | L1 | 117 | 248 | C38AA04WS | N3 | L3 |
| 2 | 10 | 80 | 3/8 | 43 | 128 | C38AA04WS | N2 | L2 | 87 | 256 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 214 | C12AA04WS | N3 | L3 | 145 | 641 | C12AA04WS | N7 | L7 |
| 3 | 10 | 160 | 1/2 | 46 | 273 | C12AA04WS | N3 | L3 | 138 | 818 | C12AA06WS | N9 | L9 |
| 4 | 10 | 263 | 5/8 | 40 | 390 | C58AA04WS | N4 | L4 | 120 | 1,169 | C58AA06WS | N12 | L12 |
| 5 | 10 | 363 | 5/8 | 44 | 592 | C58AA04WS | N6 | L6 | 88 | 1,183 | C58AA06WS | N12 | L12 |
| 6 | 10 | 482 | 5/8 | 33 | 589 | C58AA04WS | N6 | L6 | 66 | 1,179 | C58AA06WS | N12 | L12 |
| 8 | 10 | 746 | 5/8 | 52 | 1,436 | C58AA06WS | N15 | L15 | 30 | 825 | C58AA06WS | N9 | L9 |
| 10 | 10 | 1,093 | 5/8 | 16 | 648 | C58AA04WS | N7 | L7 | 32 | 1,295 | C58AA06WS | N13 | L13 |
| 12 | 10 | 1,425 | 5/8 | 12 | 633 | C58AA04WS | N7 | L7 | 24 | 1,266 | C58AA06WS | N13 | L13 |
| 14 | 10 | 1,628 | 5/8 | 11 | 663 | C58AA04WS | N7 | L7 | 22 | 1,327 | C58AA06WS | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details ( B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 39 | 83 | C38AA04WS | N1 | L1 | 39 | 83 | C38AA04WS | N1 | L1 |
| 2 | 10 | 80 | 3/8 | 43 | 128 | C38AA04WS | N2 | L2 | 43 | 128 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 119 | 1/2 | 48 | 214 | C12AA04WS | N3 | L3 | 48 | 214 | C12AA04WS | N3 | L3 |
| 3 | 10 | 160 | 1/2 | 53 | 315 | C12AA04WS | N4 | L4 | 53 | 315 | C12AA04WS | N4 | L4 |
| 4 | 10 | 263 | 5/8 | 58 | 570 | C58AA04WS | N6 | L6 | 58 | 570 | C58AA04WS | N6 | L6 |
| 5 | 10 | 363 | 5/8 | 65 | 873 | C58AA06WS | N9 | L9 | 65 | 873 | C58AA06WS | N9 | L9 |
| 6 | 10 | 482 | 5/8 | 66 | 1,179 | C58AA06WS | N12 | L12 | 66 | 1,179 | C58AA06WS | N12 | L12 |
| 8 | 10 | 746 | 5/8 | 30 | 825 | C58AA06WS | N9 | L9 | 30 | 825 | C58AA06WS | N9 | L9 |
| 10 | 10 | 1,093 | 5/8 | 32 | 1,295 | C58AA06WS | N13 | L13 | 32 | 1,295 | C58AA06WS | N13 | L13 |
| 12 | 10 | 1,425 | 5/8 | 25 | 1,319 | C58AA06WS | N14 | L14 | 25 | 1,319 | C58AA06WS | N14 | L14 |
| 14 | 10 | 1,628 | 5/8 | 22 | 1,327 | C58AA06WS | N14 | L14 | 22 | 1,327 | C58AA06WS | N14 | L14 |
| 16 | 10 | 1,992 | 5/8 | 19 | 1,402 | C58AA06WS | N15 | L15 | 19 | 1,402 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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***C12-0.25-60***

## *CABLE BRACING REQUIREMENTS [7, 9, 10]:*

***SINGLE HUNG PIPE, SCHEDULE 40 STEEL*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 33 | 80 | C38AA04WS | N1 | L1 | 98 | 240 | C38AA04WS | N3 | L3 |
| 2 | 10 | 80 | 3/8 | 37 | 124 | C38AA04WS | N2 | L2 | 110 | 373 | C38AA04WS | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 41 | 207 | C12AA04WS | N3 | L3 | 122 | 622 | C12AA04WS | N7 | L7 |
| 3 | 10 | 160 | 1/2 | 45 | 306 | C12AA04WS | N4 | L4 | 134 | 919 | C12AA06WS | N10 | L10 |
| 4 | 10 | 263 | 5/8 | 48 | 535 | C58AA04WS | N6 | L6 | 112 | 1,255 | C58AA06WS | N13 | L13 |
| 5 | 10 | 363 | 5/8 | 52 | 803 | C58AA06WS | N9 | L9 | 76 | 1,185 | C58AA06WS | N12 | L12 |
| 6 | 10 | 482 | 5/8 | 56 | 1,148 | C58AA06WS | N12 | L12 | 66 | 1,365 | C58AA06WS | N14 | L14 |
| 8 | 10 | 746 | 5/8 | 33 | 1,055 | C58AA06WS | N11 | L11 | 17 | 540 | C58AA04WS | N6 | L6 |
| 10 | 10 | 1,093 | 5/8 | 15 | 701 | C58AA06WS | N8 | L8 | 30 | 1,402 | C58AA06WS | N15 | L15 |
| 12 | 10 | 1,425 | 5/8 | 11 | 670 | C58AA06WS | N7 | L7 | 22 | 1,340 | C58AA06WS | N14 | L14 |
| 14 | 10 | 1,628 | 5/8 | 10 | 696 | C58AA06WS | N7 | L7 | 20 | 1,393 | C58AA06WS | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details ( B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 33 | 80 | C38AA04WS | N1 | L1 | 33 | 80 | C38AA04WS | N1 | L1 |
| 2 | 10 | 80 | 3/8 | 37 | 124 | C38AA04WS | N2 | L2 | 37 | 124 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 119 | 1/2 | 41 | 207 | C12AA04WS | N3 | L3 | 41 | 207 | C12AA04WS | N3 | L3 |
| 3 | 10 | 160 | 1/2 | 45 | 306 | C12AA04WS | N4 | L4 | 45 | 306 | C12AA04WS | N4 | L4 |
| 4 | 10 | 263 | 5/8 | 48 | 535 | C58AA04WS | N6 | L6 | 48 | 535 | C58AA04WS | N6 | L6 |
| 5 | 10 | 363 | 5/8 | 52 | 803 | C58AA06WS | N9 | L9 | 52 | 803 | C58AA06WS | N9 | L9 |
| 6 | 10 | 482 | 5/8 | 56 | 1,148 | C58AA06WS | N12 | L12 | 56 | 1,148 | C58AA06WS | N12 | L12 |
| 8 | 10 | 746 | 5/8 | 17 | 540 | C58AA04WS | N6 | L6 | 17 | 540 | C58AA04WS | N6 | L6 |
| 10 | 10 | 1,093 | 5/8 | 31 | 1,449 | C58AA06WS | N15 | L15 | 31 | 1,449 | C58AA06WS | N15 | L15 |
| 12 | 10 | 1,425 | 5/8 | 23 | 1,401 | C58AA06WS | N15 | L15 | 23 | 1,401 | C58AA06WS | N15 | L15 |
| 14 | 10 | 1,628 | 5/8 | 20 | 1,393 | C58AA06WS | N14 | L14 | 20 | 1,393 | C58AA06WS | N14 | L14 |
| 16 | 10 | 1,992 | 5/8 | 17 | 1,448 | C58AA06WS | N15 | L15 | 17 | 1,448 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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2013 CBC OSHPD

## *CABLE BRACING REQUIREMENTS [7, 9, 10]:*

***SINGLE HUNG PIPE, SCHEDULE 40 STEEL*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 33 | 108 | C38AA04WS | N2 | L2 | 98 | 324 | C38AA04WS | N4 | L4 |
| 2 | 10 | 80 | 3/8 | 37 | 167 | C38AA04WS | N2 | L2 | 73 | 335 | C38AA04WS | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 41 | 279 | C12AA04WS | N3 | L3 | 122 | 838 | C12AA06WS | N9 | L9 |
| 3 | 10 | 160 | 1/2 | 45 | 413 | C12AA04WS | N5 | L5 | 89 | 825 | C12AA06WS | N9 | L9 |
| 4 | 10 | 263 | 5/8 | 43 | 652 | C58AA04WS | N7 | L7 | 86 | 1,304 | C58AA06WS | N14 | L14 |
| 5 | 10 | 363 | 5/8 | 32 | 669 | C58AA04WS | N7 | L7 | 64 | 1,339 | C58AA06WS | N14 | L14 |
| 6 | 10 | 482 | 5/8 | 24 | 667 | C58AA04WS | N7 | L7 | 48 | 1,334 | C58AA06WS | N14 | L14 |
| 8 | 10 | 746 | 5/8 | 33 | 1,420 | C58AA06WS | N15 | L15 | 17 | 725 | C58AA06WS | N8 | L8 |
| 10 | 10 | 1,093 | 5/8 | 11 | 693 | C58AA06WS | N7 | L7 | 22 | 1,385 | C58AA06WS | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details ( B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 33 | 108 | C38AA04WS | N2 | L2 | 33 | 108 | C38AA04WS | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 37 | 167 | C38AA04WS | N2 | L2 | 37 | 167 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 119 | 1/2 | 41 | 279 | C12AA04WS | N3 | L3 | 41 | 279 | C12AA04WS | N3 | L3 |
| 3 | 10 | 160 | 1/2 | 45 | 413 | C12AA04WS | N5 | L5 | 45 | 413 | C12AA04WS | N5 | L5 |
| 4 | 10 | 263 | 5/8 | 48 | 721 | C58AA06WS | N8 | L8 | 48 | 721 | C58AA06WS | N8 | L8 |
| 5 | 10 | 363 | 5/8 | 52 | 1,081 | C58AA06WS | N11 | L11 | 52 | 1,081 | C58AA06WS | N11 | L11 |
| 6 | 10 | 482 | 5/8 | 48 | 1,334 | C58AA06WS | N14 | L14 | 48 | 1,334 | C58AA06WS | N14 | L14 |
| 8 | 10 | 746 | 5/8 | 17 | 725 | C58AA06WS | N8 | L8 | 17 | 725 | C58AA06WS | N8 | L8 |
| 10 | 10 | 1,093 | 5/8 | 23 | 1,448 | C58AA06WS | N15 | L15 | 23 | 1,448 | C58AA06WS | N15 | L15 |
| 12 | 10 | 1,425 | 5/8 | 18 | 1,478 | C58AA06WS | N15 | L15 | 18 | 1,478 | C58AA06WS | N15 | L15 |
| 14 | 10 | 1,628 | 5/8 | 16 | 1,501 | C58DG06TS | N16 | L16 | 16 | 1,501 | C58DG06TS | N16 | L16 |
| 16 | 10 | 1,992 | 5/8 | 14 | 1,607 | C58DG06TS | N17 | L17 | 14 | 1,607 | C58DG06TS | N17 | L17 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *CABLE BRACING REQUIREMENTS* [7, 9, 10] *:*

***SINGLE HUNG PIPE, SCHEDULE 40 STEEL*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 33 | 139 | C38AA04WS | N2 | L2 | 65 | 278 | C38AA04WS | N3 | L3 |
| 2 | 10 | 80 | 3/8 | 27 | 159 | C38AA04WS | N2 | L2 | 54 | 318 | C38AA04WS | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 41 | 359 | C12AA04WS | N4 | L4 | 81 | 718 | C12AA06WS | N8 | L8 |
| 3 | 10 | 160 | 1/2 | 34 | 403 | C12AA04WS | N5 | L5 | 68 | 806 | C12AA06WS | N9 | L9 |
| 4 | 10 | 263 | 5/8 | 30 | 585 | C58AA04WS | N6 | L6 | 60 | 1,169 | C58AA06WS | N12 | L12 |
| 5 | 10 | 363 | 5/8 | 22 | 592 | C58AA04WS | N6 | L6 | 44 | 1,183 | C58AA06WS | N12 | L12 |
| 6 | 10 | 482 | 5/8 | 16 | 572 | C58AA04WS | N6 | L6 | 32 | 1,143 | C58AA06WS | N12 | L12 |
| 8 | 10 | 746 | 5/8 | 26 | 1,436 | C58AA06WS | N15 | L15 | 15 | 825 | C58AA06WS | N9 | L9 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details ( B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 33 | 139 | C38AA04WS | N2 | L2 | 33 | 139 | C38AA04WS | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 37 | 215 | C38AA04WS | N3 | L3 | 37 | 215 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 119 | 1/2 | 41 | 359 | C12AA04WS | N4 | L4 | 41 | 359 | C12AA04WS | N4 | L4 |
| 3 | 10 | 160 | 1/2 | 45 | 530 | C12AA04WS | N6 | L6 | 45 | 530 | C12AA04WS | N6 | L6 |
| 4 | 10 | 263 | 5/8 | 48 | 927 | C58AA06WS | N10 | L10 | 48 | 927 | C58AA06WS | N10 | L10 |
| 5 | 10 | 363 | 5/8 | 44 | 1,183 | C58AA06WS | N12 | L12 | 44 | 1,183 | C58AA06WS | N12 | L12 |
| 6 | 10 | 482 | 5/8 | 33 | 1,179 | C58AA06WS | N12 | L12 | 33 | 1,179 | C58AA06WS | N12 | L12 |
| 8 | 10 | 746 | 5/8 | 15 | 825 | C58AA06WS | N9 | L9 | 15 | 825 | C58AA06WS | N9 | L9 |
| 10 | 10 | 1,093 | 5/8 | 16 | 1,295 | C58AA06WS | N13 | L13 | 16 | 1,295 | C58AA06WS | N13 | L13 |
| 12 | 10 | 1,425 | 5/8 | 12 | 1,266 | C58AA06WS | N13 | L13 | 12 | 1,266 | C58AA06WS | N13 | L13 |
| 14 | 10 | 1,628 | 5/8 | 10 | 1,206 | C58AA06WS | N13 | L13 | 10 | 1,206 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
10. Pipe Sizes 12" and Greater Are Sched STD

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## CABLE BRACING REQUIREMENTS [7, 9, 10]:

**SINGLE HUNG PIPE, SCHEDULE 40 STEEL** — **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B6.4, B6.5) | | | | | 4-Way T/L Details (B7.0, B7.1, B7.2, B8.4) | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 27 | 99 | C38AA04WS | N1 | L1 | 81 | 297 | C38AA04WS | N3 | L3 |
| 2 | 10 | 80 | 3/8 | 30 | 155 | C38AA04WS | N2 | L2 | 91 | 465 | C38AA04WS | N5 | L5 |
| 2 1/2 | 10 | 119 | 1/2 | 35 | 264 | C12AA04WS | N3 | L3 | 86 | 655 | C12AA04WS | N7 | L7 |
| 3 | 10 | 160 | 1/2 | 38 | 387 | C12AA04WS | N4 | L4 | 104 | 1,070 | C12AA06WS | N11 | L11 |
| 4 | 10 | 263 | 5/8 | 39 | 656 | C58AA04WS | N7 | L7 | 74 | 1,255 | C58AA06WS | N13 | L13 |
| 5 | 10 | 363 | 5/8 | 42 | 983 | C58AA06WS | N10 | L10 | 51 | 1,185 | C58AA06WS | N12 | L12 |
| 6 | 10 | 482 | 5/8 | 39 | 1,215 | C58AA06WS | N13 | L13 | 44 | 1,365 | C58AA06WS | N14 | L14 |
| 8 | 10 | 746 | 5/8 | 22 | 1,055 | C58AA06WS | N11 | L11 | 11 | 540 | C58AA04WS | N6 | L6 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY) | | | | | | | | | |
| | | | | 4-Way T/L Details (B7.0, B7.1, B7.2, B8.4) | | | | | 4-Way Splay Details ( B9.0, B9.1, B9.1.1) | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 27 | 99 | C38AA04WS | N1 | L1 | 27 | 99 | C38AA04WS | N1 | L1 |
| 2 | 10 | 80 | 3/8 | 30 | 155 | C38AA04WS | N2 | L2 | 30 | 155 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 119 | 1/2 | 35 | 264 | C12AA04WS | N3 | L3 | 35 | 264 | C12AA04WS | N3 | L3 |
| 3 | 10 | 160 | 1/2 | 38 | 387 | C12AA04WS | N4 | L4 | 38 | 387 | C12AA04WS | N4 | L4 |
| 4 | 10 | 263 | 5/8 | 39 | 656 | C58AA04WS | N7 | L7 | 39 | 656 | C58AA04WS | N7 | L7 |
| 5 | 10 | 363 | 5/8 | 42 | 983 | C58AA06WS | N10 | L10 | 42 | 983 | C58AA06WS | N10 | L10 |
| 6 | 10 | 482 | 5/8 | 39 | 1,215 | C58AA06WS | N13 | L13 | 39 | 1,215 | C58AA06WS | N13 | L13 |
| 8 | 10 | 746 | 5/8 | 11 | 540 | C58AA04WS | N6 | L6 | 11 | 540 | C58AA04WS | N6 | L6 |
| 10 | 10 | 1,093 | 5/8 | 20 | 1,402 | C58AA06WS | N15 | L15 | 20 | 1,402 | C58AA06WS | N15 | L15 |
| 12 | 10 | 1,425 | 5/8 | 15 | 1,371 | C58AA06WS | N14 | L14 | 15 | 1,371 | C58AA06WS | N14 | L14 |
| 14 | 10 | 1,628 | 5/8 | 13 | 1,358 | C58AA06WS | N14 | L14 | 13 | 1,358 | C58AA06WS | N14 | L14 |
| 16 | 10 | 1,992 | 5/8 | 11 | 1,406 | C58AA06WS | N15 | L15 | 11 | 1,406 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *CABLE BRACING REQUIREMENTS [7, 9, 10] :*

***SINGLE HUNG PIPE, SCHEDULE 40 STEEL*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 27 | 134 | C38AA04WS | N2 | L2 | 54 | 267 | C38AA04WS | N3 | L3 |
| 2 | 10 | 80 | 3/8 | 26 | 179 | C38AA04WS | N2 | L2 | 52 | 357 | C38AA04WS | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 35 | 356 | C12AA04WS | N4 | L4 | 69 | 712 | C12AA06WS | N8 | L8 |
| 3 | 10 | 160 | 1/2 | 33 | 457 | C12AA04WS | N5 | L5 | 66 | 913 | C12AA06WS | N10 | L10 |
| 4 | 10 | 263 | 5/8 | 29 | 659 | C58AA04WS | N7 | L7 | 58 | 1,319 | C58AA06WS | N14 | L14 |
| 5 | 10 | 363 | 5/8 | 21 | 659 | C58AA04WS | N7 | L7 | 42 | 1,318 | C58AA06WS | N14 | L14 |
| 6 | 10 | 482 | 5/8 | 16 | 667 | C58AA04WS | N7 | L7 | 32 | 1,334 | C58AA06WS | N14 | L14 |
| 8 | 10 | 746 | 5/8 | 22 | 1,420 | C58AA06WS | N15 | L15 | 11 | 725 | C58AA06WS | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details ( B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 27 | 134 | C38AA04WS | N2 | L2 | 27 | 134 | C38AA04WS | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 30 | 209 | C38AA04WS | N3 | L3 | 30 | 209 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 119 | 1/2 | 35 | 356 | C12AA04WS | N4 | L4 | 35 | 356 | C12AA04WS | N4 | L4 |
| 3 | 10 | 160 | 1/2 | 38 | 521 | C12AA04WS | N6 | L6 | 38 | 521 | C12AA04WS | N6 | L6 |
| 4 | 10 | 263 | 5/8 | 39 | 883 | C58AA06WS | N9 | L9 | 39 | 883 | C58AA06WS | N9 | L9 |
| 5 | 10 | 363 | 5/8 | 42 | 1,324 | C58AA06WS | N14 | L14 | 42 | 1,324 | C58AA06WS | N14 | L14 |
| 6 | 10 | 482 | 5/8 | 32 | 1,334 | C58AA06WS | N14 | L14 | 32 | 1,334 | C58AA06WS | N14 | L14 |
| 8 | 10 | 746 | 5/8 | 11 | 725 | C58AA06WS | N8 | L8 | 11 | 725 | C58AA06WS | N8 | L8 |
| 10 | 10 | 1,093 | 5/8 | 15 | 1,417 | C58AA06WS | N15 | L15 | 15 | 1,417 | C58AA06WS | N15 | L15 |
| 12 | 10 | 1,425 | 5/8 | 12 | 1,478 | C58AA06WS | N15 | L15 | 12 | 1,478 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *CABLE BRACING REQUIREMENTS* [7, 9, 10] *:*

***SINGLE HUNG PIPE, SCHEDULE 40 STEEL*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 25 | 159 | C38AA04WS | N2 | L2 | 50 | 318 | C38AA04WS | N4 | L4 |
| 2 | 10 | 80 | 3/8 | 18 | 159 | C38AA04WS | N2 | L2 | 36 | 318 | C38AA04WS | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 31 | 411 | C12AA04WS | N5 | L5 | 62 | 822 | C12AA06WS | N9 | L9 |
| 3 | 10 | 160 | 1/2 | 23 | 409 | C12AA04WS | N5 | L5 | 46 | 818 | C12AA06WS | N9 | L9 |
| 4 | 10 | 263 | 5/8 | 20 | 585 | C58AA04WS | N6 | L6 | 40 | 1,169 | C58AA06WS | N12 | L12 |
| 5 | 10 | 363 | 5/8 | 14 | 565 | C58AA04WS | N6 | L6 | 28 | 1,129 | C58AA06WS | N12 | L12 |
| 6 | 10 | 482 | 5/8 | 11 | 589 | C58AA04WS | N6 | L6 | 22 | 1,179 | C58AA06WS | N12 | L12 |
| 8 | 10 | 746 | 5/8 | 17 | 1,409 | C58AA06WS | N15 | L15 | 10 | 825 | C58AA06WS | N9 | L9 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details ( B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 27 | 172 | C38AA04WS | N2 | L2 | 27 | 172 | C38AA04WS | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 30 | 269 | C38AA04WS | N3 | L3 | 30 | 269 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 119 | 1/2 | 35 | 458 | C12AA04WS | N5 | L5 | 35 | 458 | C12AA04WS | N5 | L5 |
| 3 | 10 | 160 | 1/2 | 38 | 670 | C12AA04WS | N7 | L7 | 38 | 670 | C12AA04WS | N7 | L7 |
| 4 | 10 | 263 | 5/8 | 39 | 1,136 | C58AA06WS | N12 | L12 | 39 | 1,136 | C58AA06WS | N12 | L12 |
| 5 | 10 | 363 | 5/8 | 29 | 1,170 | C58AA06WS | N12 | L12 | 29 | 1,170 | C58AA06WS | N12 | L12 |
| 6 | 10 | 482 | 5/8 | 22 | 1,179 | C58AA06WS | N12 | L12 | 22 | 1,179 | C58AA06WS | N12 | L12 |
| 8 | 10 | 746 | 5/8 | 10 | 825 | C58AA06WS | N9 | L9 | 10 | 825 | C58AA06WS | N9 | L9 |
| 10 | 10 | 1,093 | 5/8 | 10 | 1,214 | C58AA06WS | N13 | L13 | 10 | 1,214 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## CABLE BRACING REQUIREMENTS [7, 9, 10]:

**SINGLE HUNG PIPE, SCHEDULE 40 STEEL** — **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6]: Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6]: Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 23 | 114 | C38AA04WS | N2 | L2 | 63 | 310 | C38AA04WS | N4 | L4 |
| 2 | 10 | 80 | 3/8 | 26 | 179 | C38AA04WS | N2 | L2 | 71 | 480 | C38AA04WS | N5 | L5 |
| 2 1/2 | 10 | 119 | 1/2 | 30 | 305 | C12AA04WS | N4 | L4 | 64 | 655 | C12AA04WS | N7 | L7 |
| 3 | 10 | 160 | 1/2 | 33 | 447 | C12AA04WS | N5 | L5 | 78 | 1,070 | C12AA06WS | N11 | L11 |
| 4 | 10 | 263 | 5/8 | 34 | 757 | C58AA06WS | N8 | L8 | 56 | 1,255 | C58AA06WS | N13 | L13 |
| 5 | 10 | 363 | 5/8 | 33 | 1,035 | C58AA06WS | N11 | L11 | 38 | 1,185 | C58AA06WS | N12 | L12 |
| 6 | 10 | 482 | 5/8 | 29 | 1,215 | C58AA06WS | N13 | L13 | 33 | 1,365 | C58AA06WS | N14 | L14 |
| 8 | 10 | 746 | 5/8 | 17 | 1,055 | C58AA06WS | N11 | L11 | 8 | 540 | C58AA04WS | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details ( B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 23 | 114 | C38AA04WS | N2 | L2 | 23 | 114 | C38AA04WS | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 26 | 179 | C38AA04WS | N2 | L2 | 26 | 179 | C38AA04WS | N2 | L2 |
| 2 1/2 | 10 | 119 | 1/2 | 30 | 305 | C12AA04WS | N4 | L4 | 30 | 305 | C12AA04WS | N4 | L4 |
| 3 | 10 | 160 | 1/2 | 33 | 447 | C12AA04WS | N5 | L5 | 33 | 447 | C12AA04WS | N5 | L5 |
| 4 | 10 | 263 | 5/8 | 34 | 757 | C58AA06WS | N8 | L8 | 34 | 757 | C58AA06WS | N8 | L8 |
| 5 | 10 | 363 | 5/8 | 33 | 1,035 | C58AA06WS | N11 | L11 | 33 | 1,035 | C58AA06WS | N11 | L11 |
| 6 | 10 | 482 | 5/8 | 29 | 1,215 | C58AA06WS | N13 | L13 | 29 | 1,215 | C58AA06WS | N13 | L13 |
| 8 | 10 | 746 | 5/8 | 8 | 540 | C58AA04WS | N6 | L6 | 8 | 540 | C58AA04WS | N6 | L6 |
| 10 | 10 | 1,093 | 5/8 | 15 | 1,402 | C58AA06WS | N15 | L15 | 15 | 1,402 | C58AA06WS | N15 | L15 |
| 12 | 10 | 1,425 | 5/8 | 11 | 1,340 | C58AA06WS | N14 | L14 | 11 | 1,340 | C58AA06WS | N14 | L14 |
| 14 | 10 | 1,628 | 5/8 | 10 | 1,393 | C58AA06WS | N14 | L14 | 10 | 1,393 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *CABLE BRACING REQUIREMENTS* [7, 9, 10] *:*

***SINGLE HUNG PIPE, SCHEDULE 40 STEEL*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 23 | 154 | C38AA04WS | N2 | L2 | 47 | 308 | C38AA04WS | N4 | L4 |
| 2 | 10 | 80 | 3/8 | 19 | 174 | C38AA04WS | N2 | L2 | 38 | 348 | C38AA04WS | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 30 | 411 | C12AA04WS | N5 | L5 | 60 | 823 | C12AA06WS | N9 | L9 |
| 3 | 10 | 160 | 1/2 | 25 | 461 | C12AA04WS | N5 | L5 | 50 | 923 | C12AA06WS | N10 | L10 |
| 4 | 10 | 263 | 5/8 | 21 | 637 | C58AA04WS | N7 | L7 | 42 | 1,273 | C58AA06WS | N13 | L13 |
| 5 | 10 | 363 | 5/8 | 16 | 669 | C58AA04WS | N7 | L7 | 32 | 1,339 | C58AA06WS | N14 | L14 |
| 6 | 10 | 482 | 5/8 | 12 | 667 | C58AA04WS | N7 | L7 | 24 | 1,334 | C58AA06WS | N14 | L14 |
| 8 | 10 | 746 | 5/8 | 17 | 1,420 | C58AA06WS | N15 | L15 | 8 | 725 | C58AA06WS | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details ( B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 23 | 154 | C38AA04WS | N2 | L2 | 23 | 154 | C38AA04WS | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 26 | 241 | C38AA04WS | N3 | L3 | 26 | 241 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 119 | 1/2 | 30 | 411 | C12AA04WS | N5 | L5 | 30 | 411 | C12AA04WS | N5 | L5 |
| 3 | 10 | 160 | 1/2 | 33 | 602 | C12AA04WS | N7 | L7 | 33 | 602 | C12AA04WS | N7 | L7 |
| 4 | 10 | 263 | 5/8 | 34 | 1,020 | C58AA06WS | N11 | L11 | 34 | 1,020 | C58AA06WS | N11 | L11 |
| 5 | 10 | 363 | 5/8 | 32 | 1,339 | C58AA06WS | N14 | L14 | 32 | 1,339 | C58AA06WS | N14 | L14 |
| 6 | 10 | 482 | 5/8 | 24 | 1,334 | C58AA06WS | N14 | L14 | 24 | 1,334 | C58AA06WS | N14 | L14 |
| 8 | 10 | 746 | 5/8 | 8 | 725 | C58AA06WS | N8 | L8 | 8 | 725 | C58AA06WS | N8 | L8 |
| 10 | 10 | 1,093 | 5/8 | 11 | 1,385 | C58AA06WS | N14 | L14 | 11 | 1,385 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## *CABLE BRACING REQUIREMENTS* [7, 9, 10] *:*

***SINGLE HUNG PIPE, SCHEDULE 40 STEEL*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 18 | 153 | C38AA04WS | N2 | L2 | 36 | 305 | C38AA04WS | N4 | L4 |
| 2 | 10 | 80 | 3/8 | 12 | 141 | C38AA04WS | N2 | L2 | 24 | 283 | C38AA04WS | N3 | L3 |
| 2 1/2 | 10 | 119 | 1/2 | 22 | 389 | C12AA04WS | N4 | L4 | 44 | 778 | C12AA06WS | N8 | L8 |
| 3 | 10 | 160 | 1/2 | 16 | 380 | C12AA04WS | N4 | L4 | 32 | 759 | C12AA06WS | N8 | L8 |
| 4 | 10 | 263 | 5/8 | 14 | 546 | C58AA04WS | N6 | L6 | 28 | 1,091 | C58AA06WS | N11 | L11 |
| 5 | 10 | 363 | 5/8 | 10 | 538 | C58AA04WS | N6 | L6 | 20 | 1,076 | C58AA06WS | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details ( B9.0, B9.1, B9.1.1)** | | | | |
| 1 1/2 | 10 | 57 | 3/8 | 23 | 198 | C38AA04WS | N2 | L2 | 23 | 198 | C38AA04WS | N2 | L2 |
| 2 | 10 | 80 | 3/8 | 26 | 310 | C38AA04WS | N4 | L4 | 26 | 310 | C38AA04WS | N4 | L4 |
| 2 1/2 | 10 | 119 | 1/2 | 30 | 529 | C12AA04WS | N6 | L6 | 30 | 529 | C12AA04WS | N6 | L6 |
| 3 | 10 | 160 | 1/2 | 33 | 774 | C12AA06WS | N8 | L8 | 33 | 774 | C12AA06WS | N8 | L8 |
| 4 | 10 | 263 | 5/8 | 30 | 1,169 | C58AA06WS | N12 | L12 | 30 | 1,169 | C58AA06WS | N12 | L12 |
| 5 | 10 | 363 | 5/8 | 22 | 1,183 | C58AA06WS | N12 | L12 | 22 | 1,183 | C58AA06WS | N12 | L12 |
| 6 | 10 | 482 | 5/8 | 16 | 1,143 | C58AA06WS | N12 | L12 | 16 | 1,143 | C58AA06WS | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1. and 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled + Insulated Pipe Weight. Refer to X-Series Weight Charts.
10. Pipe Sizes 12" and Greater Are Sched STD

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## RIGID BRACING REQUIREMENTS [7]

### SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED) [9] MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B1.4, B1.5) | | | | | 2-Way Trans., Longit. Brace Pattern (B3.0, B3.1) | | | | |
| 2 | 8 | 86 | 3/8 | 20 | 29 | R38AAEM306 | N1 | L1 | 40 | 58 | R38AAEM306 | N1 | L1 |
| 3 | 8 | 146 | 1/2 | 24 | 58 | R12AAEM306 | N1 | L1 | 40 | 96 | R12AAEM306 | N1 | L1 |
| 4 | 8 | 225 | 5/8 | 25 | 91 | R58AAEM306 | N1 | L1 | 40 | 148 | R58AAEM306 | N2 | L2 |
| 5 | 8 | 313 | 5/8 | 23 | 121 | R58AAEM306 | N2 | L2 | 40 | 207 | R58AAEM306 | N3 | L3 |
| 6 | 8 | 406 | 5/8 | 23 | 157 | R58AAEM306 | N2 | L2 | 40 | 268 | R58AAEM306 | N3 | L3 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Splayed Brace Pattern (B4.14) | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 20 | 20 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 24 | 41 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 138 | 5/8 | 25 | 64 | R58AAEM306 | N1 | L1 | | | | | |
| 5 | 8 | 193 | 5/8 | 23 | 85 | R58AAEM306 | N1 | L1 | | | | | |
| 6 | 8 | 251 | 5/8 | 23 | 111 | R58AAEM306 | N2 | L2 | | | | | |

### SINGLE HUNG PIPE CAST IRON PIPE (EMPTY) [10] MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1-Way Transverse Brace Pattern (B1.4, B1.5) | | | | | 2-Way Trans., Longit. Brace Pattern (B3.0, B3.1) | | | | |
| 2 | 8 | 64 | 3/8 | 26 | 27 | R38AAEM306 | N1 | L1 | 40 | 42 | R38AAEM306 | N1 | L1 |
| 3 | 8 | 94 | 1/2 | 31 | 46 | R12AAEM306 | N1 | L1 | 40 | 60 | R12AAEM306 | N1 | L1 |
| 4 | 8 | 135 | 5/8 | 32 | 69 | R58AAEM306 | N1 | L1 | 40 | 85 | R58AAEM306 | N1 | L1 |
| 5 | 8 | 171 | 5/8 | 32 | 88 | R58AAEM306 | N1 | L1 | 40 | 109 | R58AAEM306 | N2 | L2 |
| 6 | 8 | 202 | 5/8 | 34 | 108 | R58AAEM306 | N2 | L2 | 40 | 127 | R58AAEM306 | N2 | L2 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Splayed Brace Pattern (B4.14) | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 26 | 19 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 31 | 33 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 80 | 5/8 | 32 | 49 | R58AAEM306 | N1 | L1 | | | | | |
| 5 | 8 | 102 | 5/8 | 32 | 62 | R58AAEM306 | N1 | L1 | | | | | |
| 6 | 8 | 119 | 5/8 | 34 | 77 | R58AAEM306 | N1 | L1 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## RIGID BRACING REQUIREMENTS[7]

**SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)[9]** MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 120 | 3/8 | 20 | 39 | R38AAEM306 | N1 | L1 | 40 | 77 | R38AAEM306 | N1 | L1 |
| 3 | 8 | 205 | 1/2 | 24 | 78 | R12AAEM306 | N1 | L1 | 40 | 129 | R12AAEM306 | N2 | L2 |
| 4 | 8 | 317 | 5/8 | 25 | 123 | R58AAEM306 | N2 | L2 | 40 | 199 | R58AAEM306 | N2 | L2 |
| 5 | 8 | 440 | 5/8 | 23 | 163 | R58AAEM306 | N2 | L2 | 40 | 278 | R58AAEM306 | N3 | L3 |
| 6 | 8 | 571 | 5/8 | 23 | 212 | R58AAEM306 | N3 | L3 | 40 | 361 | R58AAEM406 | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 20 | 27 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 24 | 55 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 138 | 5/8 | 25 | 87 | R58AAEM306 | N1 | L1 | | | | | |
| 5 | 8 | 193 | 5/8 | 23 | 115 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 251 | 5/8 | 23 | 150 | R58AAEM306 | N2 | L2 | | | | | |
| **SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)[10]** | | | | | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 90 | 3/8 | 26 | 36 | R38AAEM306 | N1 | L1 | 40 | 56 | R38AAEM306 | N1 | L1 |
| 3 | 8 | 134 | 1/2 | 31 | 62 | R12AAEM306 | N1 | L1 | 40 | 81 | R12AAEM306 | N1 | L1 |
| 4 | 8 | 194 | 5/8 | 32 | 94 | R58AAEM306 | N1 | L1 | 40 | 115 | R58AAEM306 | N2 | L2 |
| 5 | 8 | 245 | 5/8 | 32 | 118 | R58AAEM306 | N2 | L2 | 40 | 146 | R58AAEM306 | N2 | L2 |
| 6 | 8 | 291 | 5/8 | 34 | 146 | R58AAEM306 | N2 | L2 | 40 | 171 | R58AAEM306 | N2 | L2 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 26 | 26 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 31 | 44 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 80 | 5/8 | 32 | 66 | R58AAEM306 | N1 | L1 | | | | | |
| 5 | 8 | 102 | 5/8 | 32 | 83 | R58AAEM306 | N1 | L1 | | | | | |
| 6 | 8 | 119 | 5/8 | 34 | 103 | R58AAEM306 | N2 | L2 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 150 | 3/8 | 20 | 50 | R38AAEM306 | N1 | L1 | 40 | 100 | R38AAEM306 | N1 | L1 |
| 3 | 8 | 258 | 1/2 | 24 | 101 | R12AAEM306 | N2 | L2 | 40 | 166 | R12AAEM306 | N2 | L2 |
| 4 | 8 | 399 | 5/8 | 25 | 158 | R58AAEM306 | N2 | L2 | 40 | 256 | R58AAEM306 | N3 | L3 |
| 5 | 8 | 552 | 5/8 | 23 | 209 | R58AAEM306 | N3 | L3 | 40 | 358 | R58AAEM406 | N4 | L4 |
| 6 | 8 | 717 | 5/8 | 23 | 273 | R58AAEM306 | N3 | L3 | 40 | 464 | R58AAEM406 | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 20 | 35 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 24 | 71 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 138 | 5/8 | 25 | 112 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 193 | 5/8 | 23 | 148 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 251 | 5/8 | 23 | 193 | R58AAEM306 | N2 | L2 | | | | | |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 113 | 3/8 | 26 | 47 | R38AAEM306 | N1 | L1 | 40 | 72 | R38AAEM306 | N1 | L1 |
| 3 | 8 | 170 | 1/2 | 31 | 80 | R12AAEM306 | N1 | L1 | 40 | 104 | R12AAEM306 | N2 | L2 |
| 4 | 8 | 245 | 5/8 | 32 | 120 | R58AAEM306 | N2 | L2 | 40 | 148 | R58AAEM306 | N2 | L2 |
| 5 | 8 | 311 | 5/8 | 32 | 152 | R58AAEM306 | N2 | L2 | 40 | 188 | R58AAEM306 | N2 | L2 |
| 6 | 8 | 369 | 5/8 | 34 | 188 | R58AAEM306 | N2 | L2 | 40 | 220 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 26 | 33 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 31 | 56 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 80 | 5/8 | 32 | 85 | R58AAEM306 | N1 | L1 | | | | | |
| 5 | 8 | 102 | 5/8 | 32 | 107 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 119 | 5/8 | 34 | 133 | R58AAEM306 | N2 | L2 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4$ x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

*SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)* [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 99 | 3/8 | 14 | 41 | R38AAEM306 | N1 | L1 | 28 | 81 | R38AAEM306 | N1 | L1 |
| 3 | 8 | 182 | 1/2 | 17 | 82 | R12AAEM306 | N1 | L1 | 34 | 165 | R12AAEM306 | N2 | L2 |
| 4 | 8 | 282 | 5/8 | 17 | 129 | R58AAEM306 | N2 | L2 | 35 | 258 | R58AAEM306 | N3 | L3 |
| 5 | 8 | 384 | 5/8 | 17 | 171 | R58AAEM306 | N2 | L2 | 33 | 342 | R58AAEM406 | N4 | L4 |
| 6 | 8 | 499 | 5/8 | 17 | 223 | R58AAEM306 | N3 | L3 | 33 | 445 | R58AAEM406 | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 14 | 29 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 17 | 58 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 138 | 5/8 | 17 | 91 | R58AAEM306 | N1 | L1 | | | | | |
| 5 | 8 | 193 | 5/8 | 17 | 121 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 251 | 5/8 | 17 | 157 | R58AAEM306 | N2 | L2 | | | | | |
| *SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)* [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 82 | 3/8 | 18 | 38 | R38AAEM306 | N1 | L1 | 37 | 76 | R38AAEM306 | N1 | L1 |
| 3 | 8 | 124 | 1/2 | 22 | 65 | R12AAEM306 | N1 | L1 | 40 | 120 | R12AAEM306 | N2 | L2 |
| 4 | 8 | 178 | 5/8 | 23 | 98 | R58AAEM306 | N1 | L1 | 40 | 171 | R58AAEM306 | N2 | L2 |
| 5 | 8 | 226 | 5/8 | 23 | 124 | R58AAEM306 | N2 | L2 | 40 | 217 | R58AAEM306 | N3 | L3 |
| 6 | 8 | 267 | 5/8 | 24 | 153 | R58AAEM306 | N2 | L2 | 40 | 254 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 18 | 27 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 22 | 46 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 80 | 5/8 | 23 | 69 | R58AAEM306 | N1 | L1 | | | | | |
| 5 | 8 | 102 | 5/8 | 23 | 88 | R58AAEM306 | N1 | L1 | | | | | |
| 6 | 8 | 119 | 5/8 | 24 | 108 | R58AAEM306 | N2 | L2 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 148 | 3/8 | 14 | 55 | R38AAEM306 | N1 | L1 | 28 | 110 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 280 | 1/2 | 17 | 111 | R12AAEM306 | N2 | L2 | 34 | 222 | R12AAEM306 | N3 | L3 |
| 4 | 8 | 436 | 5/8 | 17 | 174 | R58AAEM306 | N2 | L2 | 35 | 347 | R58AAEM406 | N4 | L4 |
| 5 | 8 | 588 | 5/8 | 17 | 230 | R58AAEM306 | N3 | L3 | 33 | 460 | R58AAEM406 | N5 | L5 |
| 6 | 8 | 764 | 5/8 | 17 | 300 | R58AAEM306 | N3 | L3 | 33 | 600 | R58AAEM406 | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 14 | 39 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 17 | 78 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 138 | 5/8 | 17 | 123 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 193 | 5/8 | 17 | 163 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 251 | 5/8 | 17 | 212 | R58AAEM306 | N3 | L3 | | | | | |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 127 | 3/8 | 18 | 52 | R38AAEM306 | N1 | L1 | 37 | 103 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 197 | 1/2 | 22 | 88 | R12AAEM306 | N1 | L1 | 40 | 162 | R12AAEM306 | N2 | L2 |
| 4 | 8 | 283 | 5/8 | 23 | 132 | R58AAEM306 | N2 | L2 | 40 | 230 | R58AAEM306 | N3 | L3 |
| 5 | 8 | 359 | 5/8 | 23 | 167 | R58AAEM306 | N2 | L2 | 40 | 292 | R58AAEM306 | N3 | L3 |
| 6 | 8 | 425 | 5/8 | 24 | 207 | R58AAEM306 | N3 | L3 | 40 | 342 | R58AAEM406 | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 18 | 36 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 22 | 62 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 80 | 5/8 | 23 | 94 | R58AAEM306 | N1 | L1 | | | | | |
| 5 | 8 | 102 | 5/8 | 23 | 118 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 119 | 5/8 | 24 | 146 | R58AAEM306 | N2 | L2 | | | | | |

1. TVL = DL + Fv + $(0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 190 | 3/8 | 14 | 70 | R38AAEM306 | N1 | L1 | 28 | 141 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 366 | 1/2 | 17 | 143 | R12AAEM306 | N2 | L2 | 34 | 285 | R12AAEM306 | N3 | L3 |
| 4 | 8 | 571 | 5/8 | 17 | 223 | R58AAEM306 | N3 | L3 | 35 | 447 | R58AAEM406 | N5 | L5 |
| 5 | 8 | 766 | 5/8 | 17 | 296 | R58AAEM306 | N3 | L3 | 33 | 592 | R58AAEM406 | N6 | L6 |
| 6 | 8 | 997 | 5/8 | 17 | 385 | R58AAEM406 | N4 | L4 | 33 | 771 | R58AAEM509 | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 14 | 50 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 17 | 101 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 8 | 138 | 5/8 | 17 | 158 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 193 | 5/8 | 17 | 209 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 8 | 251 | 5/8 | 17 | 273 | R58AAEM306 | N3 | L3 | | | | | |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)*** [10] | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 167 | 3/8 | 18 | 66 | R38AAEM306 | N1 | L1 | 37 | 132 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 261 | 1/2 | 22 | 113 | R12AAEM306 | N2 | L2 | 40 | 208 | R12AAEM306 | N3 | L3 |
| 4 | 8 | 376 | 5/8 | 23 | 170 | R58AAEM306 | N2 | L2 | 40 | 296 | R58AAEM306 | N3 | L3 |
| 5 | 8 | 476 | 5/8 | 23 | 214 | R58AAEM306 | N3 | L3 | 40 | 376 | R58AAEM406 | N4 | L4 |
| 6 | 8 | 564 | 5/8 | 24 | 266 | R58AAEM306 | N3 | L3 | 40 | 440 | R58AAEM406 | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 18 | 47 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 22 | 80 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 80 | 5/8 | 23 | 120 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 102 | 5/8 | 23 | 152 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 119 | 5/8 | 24 | 188 | R58AAEM306 | N2 | L2 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS**<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS**<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 110 | 3/8 | 12 | 50 | R38AAEM306 | N1 | L1 | 23 | 100 | R38AAEM306 | N1 | L1 |
| 3 | 8 | 202 | 1/2 | 14 | 101 | R12AAEM306 | N2 | L2 | 28 | 202 | R12AAEM306 | N3 | L3 |
| 4 | 8 | 315 | 5/8 | 14 | 158 | R58AAEM306 | N2 | L2 | 28 | 316 | R58AAEM409 | N4 | L4 |
| 5 | 8 | 427 | 5/8 | 13 | 209 | R58AAEM306 | N3 | L3 | 27 | 419 | R58AAEM406 | N5 | L5 |
| 6 | 8 | 555 | 5/8 | 14 | 273 | R58AAEM306 | N3 | L3 | 27 | 545 | R58AAEM406 | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS**<br>**4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 12 | 35 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 14 | 71 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 138 | 5/8 | 14 | 112 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 193 | 5/8 | 13 | 148 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 251 | 5/8 | 14 | 193 | R58AAEM306 | N2 | L2 | | | | | |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 91 | 3/8 | 15 | 47 | R38AAEM306 | N1 | L1 | 30 | 94 | R38AAEM306 | N1 | L1 |
| 3 | 8 | 145 | 1/2 | 18 | 80 | R12AAEM306 | N1 | L1 | 35 | 159 | R12AAEM306 | N2 | L2 |
| 4 | 8 | 214 | 5/8 | 19 | 120 | R58AAEM306 | N2 | L2 | 38 | 240 | R58AAEM306 | N3 | L3 |
| 5 | 8 | 271 | 5/8 | 19 | 152 | R58AAEM306 | N2 | L2 | 37 | 303 | R58AAEM409 | N4 | L4 |
| 6 | 8 | 329 | 5/8 | 20 | 188 | R58AAEM306 | N2 | L2 | 39 | 376 | R58AAEM406 | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS**<br>**4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 15 | 33 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 18 | 56 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 80 | 5/8 | 19 | 85 | R58AAEM306 | N1 | L1 | | | | | |
| 5 | 8 | 102 | 5/8 | 19 | 107 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 119 | 5/8 | 20 | 133 | R58AAEM306 | N2 | L2 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 169 | 3/8 | 12 | 67 | R38AAEM306 | N1 | L1 | 23 | 134 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 322 | 1/2 | 14 | 136 | R12AAEM306 | N2 | L2 | 28 | 272 | R12AAEM306 | N3 | L3 |
| 4 | 8 | 503 | 5/8 | 14 | 213 | R58AAEM306 | N3 | L3 | 28 | 425 | R58AAEM406 | N5 | L5 |
| 5 | 8 | 676 | 5/8 | 13 | 282 | R58AAEM306 | N3 | L3 | 27 | 564 | R58AAEM406 | N6 | L6 |
| 6 | 8 | 880 | 5/8 | 14 | 367 | R58AAEM406 | N4 | L4 | 27 | 734 | R58AAEM509 | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 12 | 47 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 14 | 96 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 138 | 5/8 | 14 | 150 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 193 | 5/8 | 13 | 199 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 251 | 5/8 | 14 | 260 | R58AAEM306 | N3 | L3 | | | | | |

***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)*** [10] ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 147 | 3/8 | 15 | 63 | R38AAEM306 | N1 | L1 | 30 | 126 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 240 | 1/2 | 18 | 107 | R12AAEM306 | N2 | L2 | 35 | 215 | R12AAEM306 | N3 | L3 |
| 4 | 8 | 357 | 5/8 | 19 | 162 | R58AAEM306 | N2 | L2 | 38 | 324 | R58AAEM409 | N4 | L4 |
| 5 | 8 | 452 | 5/8 | 19 | 204 | R58AAEM306 | N3 | L3 | 37 | 409 | R58AAEM406 | N5 | L5 |
| 6 | 8 | 552 | 5/8 | 20 | 253 | R58AAEM306 | N3 | L3 | 39 | 506 | R58AAEM406 | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 15 | 45 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 18 | 76 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 80 | 5/8 | 19 | 115 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 102 | 5/8 | 19 | 144 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 119 | 5/8 | 20 | 179 | R58AAEM306 | N2 | L2 | | | | | |

1. TVL = DL + Fv + $(0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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ANTHONY A. RUBALCAVA

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## RIGID BRACING REQUIREMENTS [7]

**SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED) [9]** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 221 | 3/8 | 12 | 86 | R38AAEM306 | N1 | L1 | 23 | 173 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 428 | 1/2 | 14 | 175 | R12AAEM306 | N2 | L2 | 28 | 349 | R12AAEM406 | N4 | L4 |
| 4 | 8 | 668 | 5/8 | 14 | 273 | R58AAEM306 | N3 | L3 | 28 | 547 | R58AAEM406 | N6 | L6 |
| 5 | 8 | 895 | 5/8 | 13 | 362 | R58AAEM406 | N4 | L4 | 27 | 725 | R58AAEM509 | N8 | L8 |
| 6 | 8 | 1,165 | 5/8 | 14 | 472 | R58AAEM406 | N5 | L5 | 27 | 944 | R58AAEM506 | N10 | L10 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 12 | 61 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 14 | 124 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 8 | 138 | 5/8 | 14 | 193 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 193 | 5/8 | 13 | 256 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 8 | 251 | 5/8 | 14 | 334 | R58AAEM406 | N4 | L4 | | | | | |
| **SINGLE HUNG PIPE CAST IRON PIPE (EMPTY) [10]** | | | | | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 196 | 3/8 | 15 | 81 | R38AAEM306 | N1 | L1 | 30 | 162 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 323 | 1/2 | 18 | 138 | R12AAEM306 | N2 | L2 | 35 | 276 | R12AAEM306 | N3 | L3 |
| 4 | 8 | 483 | 5/8 | 19 | 208 | R58AAEM306 | N3 | L3 | 38 | 416 | R58AAEM406 | N5 | L5 |
| 5 | 8 | 610 | 5/8 | 19 | 263 | R58AAEM306 | N3 | L3 | 37 | 525 | R58AAEM406 | N6 | L6 |
| 6 | 8 | 749 | 5/8 | 20 | 325 | R58AAEM409 | N4 | L4 | 39 | 651 | R58AAEM406 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 15 | 57 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 18 | 98 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 80 | 5/8 | 19 | 147 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 102 | 5/8 | 19 | 186 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 119 | 5/8 | 20 | 230 | R58AAEM306 | N3 | L3 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## RIGID BRACING REQUIREMENTS [7]

**SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED) [9]** — **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage[6] | | | | | Min. Brace Anchorage[6] | |
| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 112 | 3/8 | 10 | 58 | R38AAEM306 | N1 | L1 | 17 | 101 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 207 | 1/2 | 12 | 116 | R12AAEM306 | N2 | L2 | 21 | 205 | R12AAEM306 | N3 | L3 |
| 4 | 8 | 334 | 5/8 | 12 | 182 | R58AAEM306 | N2 | L2 | 23 | 347 | R58AAEM406 | N4 | L4 |
| 5 | 8 | 463 | 5/8 | 12 | 242 | R58AAEM306 | N3 | L3 | 23 | 483 | R58AAEM406 | N5 | L5 |
| 6 | 8 | 602 | 5/8 | 12 | 315 | R58AAEM409 | N4 | L4 | 23 | 629 | R58AAEM406 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 10 | 41 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 12 | 82 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 138 | 5/8 | 12 | 129 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 193 | 5/8 | 12 | 171 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 251 | 5/8 | 12 | 223 | R58AAEM306 | N3 | L3 | | | | | |
| **SINGLE HUNG PIPE CAST IRON PIPE (EMPTY) [10]** | | | | | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 96 | 3/8 | 13 | 54 | R38AAEM306 | N1 | L1 | 24 | 100 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 159 | 1/2 | 15 | 92 | R12AAEM306 | N1 | L1 | 31 | 184 | R12AAEM306 | N2 | L2 |
| 4 | 8 | 235 | 5/8 | 16 | 139 | R58AAEM306 | N2 | L2 | 32 | 278 | R58AAEM306 | N3 | L3 |
| 5 | 8 | 297 | 5/8 | 16 | 175 | R58AAEM306 | N2 | L2 | 32 | 350 | R58AAEM406 | N4 | L4 |
| 6 | 8 | 361 | 5/8 | 17 | 217 | R58AAEM306 | N3 | L3 | 34 | 434 | R58AAEM406 | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 13 | 38 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 15 | 65 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 80 | 5/8 | 16 | 98 | R58AAEM306 | N1 | L1 | | | | | |
| 5 | 8 | 102 | 5/8 | 16 | 124 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 119 | 5/8 | 17 | 153 | R58AAEM306 | N2 | L2 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

## RIGID BRACING REQUIREMENTS [7]

**SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED) [9]** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 174 | 3/8 | 10 | 78 | R38AAEM306 | N1 | L1 | 17 | 136 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 333 | 1/2 | 12 | 157 | R12AAEM306 | N2 | L2 | 21 | 276 | R12AAEM306 | N3 | L3 |
| 4 | 8 | 543 | 5/8 | 12 | 246 | R58AAEM306 | N3 | L3 | 23 | 467 | R58AAEM406 | N5 | L5 |
| 5 | 8 | 751 | 5/8 | 12 | 326 | R58AAEM409 | N4 | L4 | 23 | 651 | R58AAEM406 | N7 | L7 |
| 6 | 8 | 977 | 5/8 | 12 | 424 | R58AAEM406 | N5 | L5 | 23 | 848 | R58AAEM506 | N9 | L9 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 10 | 55 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 12 | 111 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 8 | 138 | 5/8 | 12 | 174 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 193 | 5/8 | 12 | 230 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 8 | 251 | 5/8 | 12 | 300 | R58AAEM306 | N3 | L3 | | | | | |
| **SINGLE HUNG PIPE CAST IRON PIPE (EMPTY) [10]** | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's** | | | | | | | | |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 156 | 3/8 | 13 | 73 | R38AAEM306 | N1 | L1 | 24 | 135 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 268 | 1/2 | 15 | 124 | R12AAEM306 | N2 | L2 | 31 | 248 | R12AAEM306 | N3 | L3 |
| 4 | 8 | 400 | 5/8 | 16 | 187 | R58AAEM306 | N2 | L2 | 32 | 374 | R58AAEM406 | N4 | L4 |
| 5 | 8 | 506 | 5/8 | 16 | 236 | R58AAEM306 | N3 | L3 | 32 | 472 | R58AAEM406 | N5 | L5 |
| 6 | 8 | 619 | 5/8 | 17 | 292 | R58AAEM306 | N3 | L3 | 34 | 584 | R58AAEM406 | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 13 | 52 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 15 | 88 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 8 | 80 | 5/8 | 16 | 132 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 102 | 5/8 | 16 | 167 | R58AAEM306 | N2 | L2 | | | | | |
| 6 | 8 | 119 | 5/8 | 17 | 207 | R58AAEM306 | N3 | L3 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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# *RIGID BRACING REQUIREMENTS* [7]

## *SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)* [9] *MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 228 | 3/8 | 10 | 100 | R38AAEM306 | N1 | L1 | 17 | 175 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 443 | 1/2 | 12 | 202 | R12AAEM306 | N3 | L3 | 21 | 354 | R12AAEM406 | N4 | L4 |
| 4 | 8 | 726 | 5/8 | 12 | 316 | R58AAEM409 | N4 | L4 | 23 | 601 | R58AAEM406 | N7 | L7 |
| 5 | 8 | 1,004 | 5/8 | 12 | 419 | R58AAEM406 | N5 | L5 | 23 | 837 | R58AAEM506 | N9 | L9 |
| 6 | 8 | 1,306 | 5/8 | 12 | 545 | R58AAEM406 | N6 | L6 | 23 | 1,090 | R58AAEM506 | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 54 | 3/8 | 10 | 71 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 90 | 1/2 | 12 | 143 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 8 | 138 | 5/8 | 12 | 223 | R58AAEM306 | N3 | L3 | | | | | |
| 5 | 8 | 193 | 5/8 | 12 | 296 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 8 | 251 | 5/8 | 12 | 385 | R58AAEM406 | N4 | L4 | | | | | |

## *SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)* [10] *MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*

| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B1.4, B1.5)** | | | | | **2-Way Trans., Longit. Brace Pattern (B3.0, B3.1)** | | | | |
| 2 | 8 | 210 | 3/8 | 13 | 94 | R38AAEM306 | N1 | L1 | 24 | 173 | R38AAEM306 | N2 | L2 |
| 3 | 8 | 365 | 1/2 | 15 | 159 | R12AAEM306 | N2 | L2 | 31 | 319 | R12AAEM409 | N4 | L4 |
| 4 | 8 | 546 | 5/8 | 16 | 240 | R58AAEM306 | N3 | L3 | 32 | 481 | R58AAEM406 | N5 | L5 |
| 5 | 8 | 689 | 5/8 | 16 | 303 | R58AAEM409 | N4 | L4 | 32 | 607 | R58AAEM406 | N7 | L7 |
| 6 | 8 | 846 | 5/8 | 17 | 376 | R58AAEM406 | N4 | L4 | 34 | 751 | R58AAEM509 | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B4.14)** | | | | | | | | | |
| 2 | 8 | 39 | 3/8 | 13 | 66 | R38AAEM306 | N1 | L1 | | | | | |
| 3 | 8 | 56 | 1/2 | 15 | 113 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 8 | 80 | 5/8 | 16 | 170 | R58AAEM306 | N2 | L2 | | | | | |
| 5 | 8 | 102 | 5/8 | 16 | 214 | R58AAEM306 | N3 | L3 | | | | | |
| 6 | 8 | 119 | 5/8 | 17 | 266 | R58AAEM306 | N3 | L3 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## CABLE BRACING REQUIREMENTS [7]:

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 54 | 3/8 | 20 | 29 | C38AA04WS | N1 | L1 | 40 | 58 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 24 | 58 | C12AA04WS | N1 | L1 | 40 | 96 | C12AA04WS | N1 | L1 |
| 4 | 8 | 138 | 5/8 | 25 | 91 | C58AA04WS | N1 | L1 | 40 | 148 | C58AA04WS | N2 | L2 |
| 5 | 8 | 193 | 5/8 | 23 | 121 | C58AA04WS | N2 | L2 | 40 | 207 | C58AA04WS | N3 | L3 |
| 6 | 8 | 251 | 5/8 | 23 | 157 | C58AA04WS | N2 | L2 | 40 | 268 | C58AA04WS | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 54 | 3/8 | 20 | 29 | C38AA04WS | N1 | L1 | 20 | 39 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 24 | 58 | C12AA04WS | N1 | L1 | 24 | 78 | C12AA04WS | N1 | L1 |
| 4 | 8 | 138 | 5/8 | 25 | 91 | C58AA04WS | N1 | L1 | 25 | 122 | C58AA04WS | N2 | L2 |
| 5 | 8 | 193 | 5/8 | 23 | 121 | C58AA04WS | N2 | L2 | 23 | 162 | C58AA04WS | N2 | L2 |
| 6 | 8 | 251 | 5/8 | 23 | 157 | C58AA04WS | N2 | L2 | 23 | 211 | C58AA04WS | N3 | L3 |

***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)*** [10] ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 39 | 3/8 | 26 | 27 | C38AA04WS | N1 | L1 | 40 | 42 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 31 | 46 | C12AA04WS | N1 | L1 | 40 | 60 | C12AA04WS | N1 | L1 |
| 4 | 8 | 80 | 5/8 | 32 | 69 | C58AA04WS | N1 | L1 | 40 | 85 | C58AA04WS | N1 | L1 |
| 5 | 8 | 102 | 5/8 | 32 | 88 | C58AA04WS | N1 | L1 | 40 | 109 | C58AA04WS | N2 | L2 |
| 6 | 8 | 119 | 5/8 | 34 | 108 | C58AA04WS | N2 | L2 | 40 | 127 | C58AA04WS | N2 | L2 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 39 | 3/8 | 26 | 27 | C38AA04WS | N1 | L1 | 26 | 36 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 31 | 46 | C12AA04WS | N1 | L1 | 31 | 62 | C12AA04WS | N1 | L1 |
| 4 | 8 | 80 | 5/8 | 32 | 69 | C58AA04WS | N1 | L1 | 32 | 93 | C58AA04WS | N1 | L1 |
| 5 | 8 | 102 | 5/8 | 32 | 88 | C58AA04WS | N1 | L1 | 32 | 117 | C58AA04WS | N2 | L2 |
| 6 | 8 | 119 | 5/8 | 34 | 108 | C58AA04WS | N2 | L2 | 34 | 146 | C58AA04WS | N2 | L2 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

*SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED) [9]* — *MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's*

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 54 | 3/8 | 20 | 39 | C38AA04WS | N1 | L1 | 40 | 77 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 24 | 78 | C12AA04WS | N1 | L1 | 40 | 129 | C12AA04WS | N2 | L2 |
| 4 | 8 | 138 | 5/8 | 25 | 123 | C58AA04WS | N2 | L2 | 40 | 199 | C58AA04WS | N2 | L2 |
| 5 | 8 | 193 | 5/8 | 23 | 163 | C58AA04WS | N2 | L2 | 40 | 278 | C58AA04WS | N3 | L3 |
| 6 | 8 | 251 | 5/8 | 23 | 212 | C58AA04WS | N3 | L3 | 40 | 361 | C58AA04WS | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 54 | 3/8 | 20 | 39 | C38AA04WS | N1 | L1 | 20 | 52 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 24 | 78 | C12AA04WS | N1 | L1 | 24 | 105 | C12AA04WS | N2 | L2 |
| 4 | 8 | 138 | 5/8 | 25 | 123 | C58AA04WS | N2 | L2 | 25 | 165 | C58AA04WS | N2 | L2 |
| 5 | 8 | 193 | 5/8 | 23 | 163 | C58AA04WS | N2 | L2 | 23 | 218 | C58AA04WS | N3 | L3 |
| 6 | 8 | 251 | 5/8 | 23 | 212 | C58AA04WS | N3 | L3 | 23 | 285 | C58AA04WS | N3 | L3 |
| *SINGLE HUNG PIPE CAST IRON PIPE (EMPTY) [10]* | | | | | | | | | *MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's* | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 39 | 3/8 | 26 | 36 | C38AA04WS | N1 | L1 | 40 | 56 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 31 | 62 | C12AA04WS | N1 | L1 | 40 | 81 | C12AA04WS | N1 | L1 |
| 4 | 8 | 80 | 5/8 | 32 | 94 | C58AA04WS | N1 | L1 | 40 | 115 | C58AA04WS | N2 | L2 |
| 5 | 8 | 102 | 5/8 | 32 | 118 | C58AA04WS | N2 | L2 | 40 | 146 | C58AA04WS | N2 | L2 |
| 6 | 8 | 119 | 5/8 | 34 | 146 | C58AA04WS | N2 | L2 | 40 | 171 | C58AA04WS | N2 | L2 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 39 | 3/8 | 26 | 36 | C38AA04WS | N1 | L1 | 26 | 49 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 31 | 62 | C12AA04WS | N1 | L1 | 31 | 83 | C12AA04WS | N1 | L1 |
| 4 | 8 | 80 | 5/8 | 32 | 94 | C58AA04WS | N1 | L1 | 32 | 125 | C58AA04WS | N2 | L2 |
| 5 | 8 | 102 | 5/8 | 32 | 118 | C58AA04WS | N2 | L2 | 32 | 158 | C58AA04WS | N2 | L2 |
| 6 | 8 | 119 | 5/8 | 34 | 146 | C58AA04WS | N2 | L2 | 34 | 196 | C58AA04WS | N2 | L2 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7]:*

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED) [9]*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 54 | 3/8 | 20 | 50 | C38AA04WS | N1 | L1 | 40 | 100 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 24 | 101 | C12AA04WS | N2 | L2 | 40 | 166 | C12AA04WS | N2 | L2 |
| 4 | 8 | 138 | 5/8 | 25 | 158 | C58AA04WS | N2 | L2 | 40 | 256 | C58AA04WS | N3 | L3 |
| 5 | 8 | 193 | 5/8 | 23 | 209 | C58AA04WS | N3 | L3 | 40 | 358 | C58AA04WS | N4 | L4 |
| 6 | 8 | 251 | 5/8 | 23 | 273 | C58AA04WS | N3 | L3 | 40 | 464 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 54 | 3/8 | 20 | 50 | C38AA04WS | N1 | L1 | 20 | 67 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 24 | 101 | C12AA04WS | N2 | L2 | 24 | 135 | C12AA04WS | N2 | L2 |
| 4 | 8 | 138 | 5/8 | 25 | 158 | C58AA04WS | N2 | L2 | 25 | 212 | C58AA04WS | N3 | L3 |
| 5 | 8 | 193 | 5/8 | 23 | 209 | C58AA04WS | N3 | L3 | 23 | 281 | C58AA04WS | N3 | L3 |
| 6 | 8 | 251 | 5/8 | 23 | 273 | C58AA04WS | N3 | L3 | 23 | 366 | C58AA04WS | N4 | L4 |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY) [10]*** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 39 | 3/8 | 26 | 47 | C38AA04WS | N1 | L1 | 40 | 72 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 31 | 80 | C12AA04WS | N1 | L1 | 40 | 104 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 32 | 120 | C58AA04WS | N2 | L2 | 40 | 148 | C58AA04WS | N2 | L2 |
| 5 | 8 | 102 | 5/8 | 32 | 152 | C58AA04WS | N2 | L2 | 40 | 188 | C58AA04WS | N2 | L2 |
| 6 | 8 | 119 | 5/8 | 34 | 188 | C58AA04WS | N2 | L2 | 40 | 220 | C58AA04WS | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 39 | 3/8 | 26 | 47 | C38AA04WS | N1 | L1 | 26 | 63 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 31 | 80 | C12AA04WS | N1 | L1 | 31 | 107 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 32 | 120 | C58AA04WS | N2 | L2 | 32 | 161 | C58AA04WS | N2 | L2 |
| 5 | 8 | 102 | 5/8 | 32 | 152 | C58AA04WS | N2 | L2 | 32 | 204 | C58AA04WS | N3 | L3 |
| 6 | 8 | 119 | 5/8 | 34 | 188 | C58AA04WS | N2 | L2 | 34 | 252 | C58AA04WS | N3 | L3 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7]:*

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 54 | 3/8 | 14 | 41 | C38AA04WS | N1 | L1 | 28 | 81 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 17 | 82 | C12AA04WS | N1 | L1 | 34 | 165 | C12AA04WS | N2 | L2 |
| 4 | 8 | 138 | 5/8 | 17 | 129 | C58AA04WS | N2 | L2 | 35 | 258 | C58AA04WS | N3 | L3 |
| 5 | 8 | 193 | 5/8 | 17 | 171 | C58AA04WS | N2 | L2 | 33 | 342 | C58AA04WS | N4 | L4 |
| 6 | 8 | 251 | 5/8 | 17 | 223 | C58AA04WS | N3 | L3 | 33 | 445 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 54 | 3/8 | 14 | 41 | C38AA04WS | N1 | L1 | 14 | 55 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 17 | 82 | C12AA04WS | N1 | L1 | 17 | 111 | C12AA04WS | N2 | L2 |
| 4 | 8 | 138 | 5/8 | 17 | 129 | C58AA04WS | N2 | L2 | 17 | 173 | C58AA04WS | N2 | L2 |
| 5 | 8 | 193 | 5/8 | 17 | 171 | C58AA04WS | N2 | L2 | 17 | 229 | C58AA04WS | N3 | L3 |
| 6 | 8 | 251 | 5/8 | 17 | 223 | C58AA04WS | N3 | L3 | 17 | 299 | C58AA04WS | N3 | L3 |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 39 | 3/8 | 18 | 38 | C38AA04WS | N1 | L1 | 37 | 76 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 22 | 65 | C12AA04WS | N1 | L1 | 40 | 120 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 23 | 98 | C58AA04WS | N1 | L1 | 40 | 171 | C58AA04WS | N2 | L2 |
| 5 | 8 | 102 | 5/8 | 23 | 124 | C58AA04WS | N2 | L2 | 40 | 217 | C58AA04WS | N3 | L3 |
| 6 | 8 | 119 | 5/8 | 24 | 153 | C58AA04WS | N2 | L2 | 40 | 254 | C58AA04WS | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 39 | 3/8 | 18 | 38 | C38AA04WS | N1 | L1 | 18 | 51 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 22 | 65 | C12AA04WS | N1 | L1 | 22 | 87 | C12AA04WS | N1 | L1 |
| 4 | 8 | 80 | 5/8 | 23 | 98 | C58AA04WS | N1 | L1 | 23 | 132 | C58AA04WS | N2 | L2 |
| 5 | 8 | 102 | 5/8 | 23 | 124 | C58AA04WS | N2 | L2 | 23 | 166 | C58AA04WS | N2 | L2 |
| 6 | 8 | 119 | 5/8 | 24 | 153 | C58AA04WS | N2 | L2 | 24 | 206 | C58AA04WS | N3 | L3 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times W_p$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS* [7] *:*

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 54 | 3/8 | 14 | 55 | C38AA04WS | N1 | L1 | 28 | 110 | C38AA04WS | N2 | L2 |
| 3 | 8 | 90 | 1/2 | 17 | 111 | C12AA04WS | N2 | L2 | 34 | 222 | C12AA04WS | N3 | L3 |
| 4 | 8 | 138 | 5/8 | 17 | 174 | C58AA04WS | N2 | L2 | 35 | 347 | C58AA04WS | N4 | L4 |
| 5 | 8 | 193 | 5/8 | 17 | 230 | C58AA04WS | N3 | L3 | 33 | 460 | C58AA04WS | N5 | L5 |
| 6 | 8 | 251 | 5/8 | 17 | 300 | C58AA04WS | N3 | L3 | 33 | 600 | C58AA04WS | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 54 | 3/8 | 14 | 55 | C38AA04WS | N1 | L1 | 14 | 74 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 17 | 111 | C12AA04WS | N2 | L2 | 17 | 149 | C12AA04WS | N2 | L2 |
| 4 | 8 | 138 | 5/8 | 17 | 174 | C58AA04WS | N2 | L2 | 17 | 233 | C58AA04WS | N3 | L3 |
| 5 | 8 | 193 | 5/8 | 17 | 230 | C58AA04WS | N3 | L3 | 17 | 309 | C58AA04WS | N4 | L4 |
| 6 | 8 | 251 | 5/8 | 17 | 300 | C58AA04WS | N3 | L3 | 17 | 402 | C58AA04WS | N5 | L5 |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 39 | 3/8 | 18 | 52 | C38AA04WS | N1 | L1 | 37 | 103 | C38AA04WS | N2 | L2 |
| 3 | 8 | 56 | 1/2 | 22 | 88 | C12AA04WS | N1 | L1 | 40 | 162 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 23 | 132 | C58AA04WS | N2 | L2 | 40 | 230 | C58AA04WS | N3 | L3 |
| 5 | 8 | 102 | 5/8 | 23 | 167 | C58AA04WS | N2 | L2 | 40 | 292 | C58AA04WS | N3 | L3 |
| 6 | 8 | 119 | 5/8 | 24 | 207 | C58AA04WS | N3 | L3 | 40 | 342 | C58AA04WS | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 39 | 3/8 | 18 | 52 | C38AA04WS | N1 | L1 | 18 | 69 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 22 | 88 | C12AA04WS | N1 | L1 | 22 | 118 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 23 | 132 | C58AA04WS | N2 | L2 | 23 | 177 | C58AA04WS | N2 | L2 |
| 5 | 8 | 102 | 5/8 | 23 | 167 | C58AA04WS | N2 | L2 | 23 | 224 | C58AA04WS | N3 | L3 |
| 6 | 8 | 119 | 5/8 | 24 | 207 | C58AA04WS | N3 | L3 | 24 | 277 | C58AA04WS | N3 | L3 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## CABLE BRACING REQUIREMENTS [7]:

**SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED) [9]** — **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS |  |  |  |  | LONGITUDINAL BRACING REQUIREMENTS |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|  |  |  |  | **2-Way Transverse Brace Pattern (B6.4, B6.5)** |  |  |  |  | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** |  |  |  |  |
| 2 | 8 | 54 | 3/8 | 14 | 70 | C38AA04WS | N1 | L1 | 28 | 141 | C38AA04WS | N2 | L2 |
| 3 | 8 | 90 | 1/2 | 17 | 143 | C12AA04WS | N2 | L2 | 34 | 285 | C12AA04WS | N3 | L3 |
| 4 | 8 | 138 | 5/8 | 17 | 223 | C58AA04WS | N3 | L3 | 35 | 447 | C58AA04WS | N5 | L5 |
| 5 | 8 | 193 | 5/8 | 17 | 296 | C58AA04WS | N3 | L3 | 33 | 592 | C58AA04WS | N6 | L6 |
| 6 | 8 | 251 | 5/8 | 17 | 385 | C58AA04WS | N4 | L4 | 33 | 771 | C58AA06WS | N8 | L8 |
|  |  |  |  | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** |  |  |  |  |  |  |  |  |  |
|  |  |  |  | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** |  |  |  |  | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** |  |  |  |  |
| 2 | 8 | 54 | 3/8 | 14 | 70 | C38AA04WS | N1 | L1 | 14 | 95 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 17 | 143 | C12AA04WS | N2 | L2 | 17 | 191 | C12AA04WS | N2 | L2 |
| 4 | 8 | 138 | 5/8 | 17 | 223 | C58AA04WS | N3 | L3 | 17 | 300 | C58AA04WS | N3 | L3 |
| 5 | 8 | 193 | 5/8 | 17 | 296 | C58AA04WS | N3 | L3 | 17 | 397 | C58AA04WS | N4 | L4 |
| 6 | 8 | 251 | 5/8 | 17 | 385 | C58AA04WS | N4 | L4 | 17 | 517 | C58AA04WS | N6 | L6 |
| **SINGLE HUNG PIPE CAST IRON PIPE (EMPTY) [10]** |  |  |  |  | **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's** |  |  |  |  |
|  |  |  |  | **2-Way Transverse Brace Pattern (B6.4, B6.5)** |  |  |  |  | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** |  |  |  |  |
| 2 | 8 | 39 | 3/8 | 18 | 66 | C38AA04WS | N1 | L1 | 37 | 132 | C38AA04WS | N2 | L2 |
| 3 | 8 | 56 | 1/2 | 22 | 113 | C12AA04WS | N2 | L2 | 40 | 208 | C12AA04WS | N3 | L3 |
| 4 | 8 | 80 | 5/8 | 23 | 170 | C58AA04WS | N2 | L2 | 40 | 296 | C58AA04WS | N3 | L3 |
| 5 | 8 | 102 | 5/8 | 23 | 214 | C58AA04WS | N3 | L3 | 40 | 376 | C58AA04WS | N4 | L4 |
| 6 | 8 | 119 | 5/8 | 24 | 266 | C58AA04WS | N3 | L3 | 40 | 440 | C58AA04WS | N5 | L5 |
|  |  |  |  | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** |  |  |  |  |  |  |  |  |  |
|  |  |  |  | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** |  |  |  |  | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** |  |  |  |  |
| 2 | 8 | 39 | 3/8 | 18 | 66 | C38AA04WS | N1 | L1 | 18 | 89 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 22 | 113 | C12AA04WS | N2 | L2 | 22 | 151 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 23 | 170 | C58AA04WS | N2 | L2 | 23 | 228 | C58AA04WS | N3 | L3 |
| 5 | 8 | 102 | 5/8 | 23 | 214 | C58AA04WS | N3 | L3 | 23 | 288 | C58AA04WS | N3 | L3 |
| 6 | 8 | 119 | 5/8 | 24 | 266 | C58AA04WS | N3 | L3 | 24 | 356 | C58AA04WS | N4 | L4 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED) [9]*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 54 | 3/8 | 12 | 50 | C38AA04WS | N1 | L1 | 23 | 100 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 14 | 101 | C12AA04WS | N2 | L2 | 28 | 202 | C12AA04WS | N3 | L3 |
| 4 | 8 | 138 | 5/8 | 14 | 158 | C58AA04WS | N2 | L2 | 28 | 316 | C58AA04WS | N4 | L4 |
| 5 | 8 | 193 | 5/8 | 13 | 209 | C58AA04WS | N3 | L3 | 27 | 419 | C58AA04WS | N5 | L5 |
| 6 | 8 | 251 | 5/8 | 14 | 273 | C58AA04WS | N3 | L3 | 27 | 545 | C58AA04WS | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 54 | 3/8 | 12 | 50 | C38AA04WS | N1 | L1 | 12 | 67 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 14 | 101 | C12AA04WS | N2 | L2 | 14 | 135 | C12AA04WS | N2 | L2 |
| 4 | 8 | 138 | 5/8 | 14 | 158 | C58AA04WS | N2 | L2 | 14 | 212 | C58AA04WS | N3 | L3 |
| 5 | 8 | 193 | 5/8 | 13 | 209 | C58AA04WS | N3 | L3 | 13 | 281 | C58AA04WS | N3 | L3 |
| 6 | 8 | 251 | 5/8 | 14 | 273 | C58AA04WS | N3 | L3 | 14 | 366 | C58AA04WS | N4 | L4 |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY) [10]*** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 39 | 3/8 | 15 | 47 | C38AA04WS | N1 | L1 | 30 | 94 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 18 | 80 | C12AA04WS | N1 | L1 | 35 | 159 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 19 | 120 | C58AA04WS | N2 | L2 | 38 | 240 | C58AA04WS | N3 | L3 |
| 5 | 8 | 102 | 5/8 | 19 | 152 | C58AA04WS | N2 | L2 | 37 | 303 | C58AA04WS | N4 | L4 |
| 6 | 8 | 119 | 5/8 | 20 | 188 | C58AA04WS | N2 | L2 | 39 | 376 | C58AA04WS | N4 | L4 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 39 | 3/8 | 15 | 47 | C38AA04WS | N1 | L1 | 15 | 63 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 18 | 80 | C12AA04WS | N1 | L1 | 18 | 107 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 19 | 120 | C58AA04WS | N2 | L2 | 19 | 161 | C58AA04WS | N2 | L2 |
| 5 | 8 | 102 | 5/8 | 19 | 152 | C58AA04WS | N2 | L2 | 19 | 204 | C58AA04WS | N3 | L3 |
| 6 | 8 | 119 | 5/8 | 20 | 188 | C58AA04WS | N2 | L2 | 20 | 252 | C58AA04WS | N3 | L3 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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***C14-0.75-30***

## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)*** [9] — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 54 | 3/8 | 12 | 67 | C38AA04WS | N1 | L1 | 23 | 134 | C38AA04WS | N2 | L2 |
| 3 | 8 | 90 | 1/2 | 14 | 136 | C12AA04WS | N2 | L2 | 28 | 272 | C12AA04WS | N3 | L3 |
| 4 | 8 | 138 | 5/8 | 14 | 213 | C58AA04WS | N3 | L3 | 28 | 425 | C58AA04WS | N5 | L5 |
| 5 | 8 | 193 | 5/8 | 13 | 282 | C58AA04WS | N3 | L3 | 27 | 564 | C58AA04WS | N6 | L6 |
| 6 | 8 | 251 | 5/8 | 14 | 367 | C58AA04WS | N4 | L4 | 27 | 734 | C58AA06WS | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 54 | 3/8 | 12 | 67 | C38AA04WS | N1 | L1 | 12 | 90 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 14 | 136 | C12AA04WS | N2 | L2 | 14 | 182 | C12AA04WS | N2 | L2 |
| 4 | 8 | 138 | 5/8 | 14 | 213 | C58AA04WS | N3 | L3 | 14 | 285 | C58AA04WS | N3 | L3 |
| 5 | 8 | 193 | 5/8 | 13 | 282 | C58AA04WS | N3 | L3 | 13 | 378 | C58AA04WS | N4 | L4 |
| 6 | 8 | 251 | 5/8 | 14 | 367 | C58AA04WS | N4 | L4 | 14 | 493 | C58AA04WS | N5 | L5 |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)*** [10] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 39 | 3/8 | 15 | 63 | C38AA04WS | N1 | L1 | 30 | 126 | C38AA04WS | N2 | L2 |
| 3 | 8 | 56 | 1/2 | 18 | 107 | C12AA04WS | N2 | L2 | 35 | 215 | C12AA04WS | N3 | L3 |
| 4 | 8 | 80 | 5/8 | 19 | 162 | C58AA04WS | N2 | L2 | 38 | 324 | C58AA04WS | N4 | L4 |
| 5 | 8 | 102 | 5/8 | 19 | 204 | C58AA04WS | N3 | L3 | 37 | 409 | C58AA04WS | N5 | L5 |
| 6 | 8 | 119 | 5/8 | 20 | 253 | C58AA04WS | N3 | L3 | 39 | 506 | C58AA04WS | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 39 | 3/8 | 15 | 63 | C38AA04WS | N1 | L1 | 15 | 85 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 18 | 107 | C12AA04WS | N2 | L2 | 18 | 144 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 19 | 162 | C58AA04WS | N2 | L2 | 19 | 217 | C58AA04WS | N3 | L3 |
| 5 | 8 | 102 | 5/8 | 19 | 204 | C58AA04WS | N3 | L3 | 19 | 274 | C58AA04WS | N3 | L3 |
| 6 | 8 | 119 | 5/8 | 20 | 253 | C58AA04WS | N3 | L3 | 20 | 340 | C58AA04WS | N4 | L4 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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***C14-0.75-45***

## *CABLE BRACING REQUIREMENTS [7]:*

*SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED) [9]* — *MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 54 | 3/8 | 12 | 86 | C38AA04WS | N1 | L1 | 23 | 173 | C38AA04WS | N2 | L2 |
| 3 | 8 | 90 | 1/2 | 14 | 175 | C12AA04WS | N2 | L2 | 28 | 349 | C12AA04WS | N4 | L4 |
| 4 | 8 | 138 | 5/8 | 14 | 273 | C58AA04WS | N3 | L3 | 28 | 547 | C58AA04WS | N6 | L6 |
| 5 | 8 | 193 | 5/8 | 13 | 362 | C58AA04WS | N4 | L4 | 27 | 725 | C58AA06WS | N8 | L8 |
| 6 | 8 | 251 | 5/8 | 14 | 472 | C58AA04WS | N5 | L5 | 27 | 944 | C58AA06WS | N10 | L10 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 54 | 3/8 | 12 | 86 | C38AA04WS | N1 | L1 | 12 | 116 | C38AA04WS | N2 | L2 |
| 3 | 8 | 90 | 1/2 | 14 | 175 | C12AA04WS | N2 | L2 | 14 | 234 | C12AA04WS | N3 | L3 |
| 4 | 8 | 138 | 5/8 | 14 | 273 | C58AA04WS | N3 | L3 | 14 | 367 | C58AA04WS | N4 | L4 |
| 5 | 8 | 193 | 5/8 | 13 | 362 | C58AA04WS | N4 | L4 | 13 | 486 | C58AA04WS | N5 | L5 |
| 6 | 8 | 251 | 5/8 | 14 | 472 | C58AA04WS | N5 | L5 | 14 | 634 | C58AA04WS | N7 | L7 |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY) [10]*** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 39 | 3/8 | 15 | 81 | C38AA04WS | N1 | L1 | 30 | 162 | C38AA04WS | N2 | L2 |
| 3 | 8 | 56 | 1/2 | 18 | 138 | C12AA04WS | N2 | L2 | 35 | 276 | C12AA04WS | N3 | L3 |
| 4 | 8 | 80 | 5/8 | 19 | 208 | C58AA04WS | N3 | L3 | 38 | 416 | C58AA04WS | N5 | L5 |
| 5 | 8 | 102 | 5/8 | 19 | 263 | C58AA04WS | N3 | L3 | 37 | 525 | C58AA04WS | N6 | L6 |
| 6 | 8 | 119 | 5/8 | 20 | 325 | C58AA04WS | N4 | L4 | 39 | 651 | C58AA04WS | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 39 | 3/8 | 15 | 81 | C38AA04WS | N1 | L1 | 15 | 109 | C38AA04WS | N2 | L2 |
| 3 | 8 | 56 | 1/2 | 18 | 138 | C12AA04WS | N2 | L2 | 18 | 185 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 19 | 208 | C58AA04WS | N3 | L3 | 19 | 279 | C58AA04WS | N3 | L3 |
| 5 | 8 | 102 | 5/8 | 19 | 263 | C58AA04WS | N3 | L3 | 19 | 352 | C58AA04WS | N4 | L4 |
| 6 | 8 | 119 | 5/8 | 20 | 325 | C58AA04WS | N4 | L4 | 20 | 437 | C58AA04WS | N5 | L5 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)* [9]** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 54 | 3/8 | 10 | 58 | C38AA04WS | N1 | L1 | 17 | 101 | C38AA04WS | N2 | L2 |
| 3 | 8 | 90 | 1/2 | 12 | 116 | C12AA04WS | N2 | L2 | 21 | 205 | C12AA04WS | N3 | L3 |
| 4 | 8 | 138 | 5/8 | 12 | 182 | C58AA04WS | N2 | L2 | 23 | 347 | C58AA04WS | N4 | L4 |
| 5 | 8 | 193 | 5/8 | 12 | 242 | C58AA04WS | N3 | L3 | 23 | 483 | C58AA04WS | N5 | L5 |
| 6 | 8 | 251 | 5/8 | 12 | 315 | C58AA04WS | N4 | L4 | 23 | 629 | C58AA04WS | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 54 | 3/8 | 10 | 58 | C38AA04WS | N1 | L1 | 10 | 77 | C38AA04WS | N1 | L1 |
| 3 | 8 | 90 | 1/2 | 12 | 116 | C12AA04WS | N2 | L2 | 12 | 156 | C12AA04WS | N2 | L2 |
| 4 | 8 | 138 | 5/8 | 12 | 182 | C58AA04WS | N2 | L2 | 12 | 245 | C58AA04WS | N3 | L3 |
| 5 | 8 | 193 | 5/8 | 12 | 242 | C58AA04WS | N3 | L3 | 12 | 324 | C58AA04WS | N4 | L4 |
| 6 | 8 | 251 | 5/8 | 12 | 315 | C58AA04WS | N4 | L4 | 12 | 422 | C58AA04WS | N5 | L5 |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)* [10]** | | | | | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 39 | 3/8 | 13 | 54 | C38AA04WS | N1 | L1 | 24 | 100 | C38AA04WS | N2 | L2 |
| 3 | 8 | 56 | 1/2 | 15 | 92 | C12AA04WS | N1 | L1 | 31 | 184 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 16 | 139 | C58AA04WS | N2 | L2 | 32 | 278 | C58AA04WS | N3 | L3 |
| 5 | 8 | 102 | 5/8 | 16 | 175 | C58AA04WS | N2 | L2 | 32 | 350 | C58AA04WS | N4 | L4 |
| 6 | 8 | 119 | 5/8 | 17 | 217 | C58AA04WS | N3 | L3 | 34 | 434 | C58AA04WS | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 39 | 3/8 | 13 | 54 | C38AA04WS | N1 | L1 | 13 | 73 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 15 | 92 | C12AA04WS | N1 | L1 | 15 | 123 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 16 | 139 | C58AA04WS | N2 | L2 | 16 | 186 | C58AA04WS | N2 | L2 |
| 5 | 8 | 102 | 5/8 | 16 | 175 | C58AA04WS | N2 | L2 | 16 | 235 | C58AA04WS | N3 | L3 |
| 6 | 8 | 119 | 5/8 | 17 | 217 | C58AA04WS | N3 | L3 | 17 | 291 | C58AA04WS | N3 | L3 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## CABLE BRACING REQUIREMENTS [7] :

**SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)** [9] **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 54 | 3/8 | 10 | 78 | C38AA04WS | N1 | L1 | 17 | 136 | C38AA04WS | N2 | L2 |
| 3 | 8 | 90 | 1/2 | 12 | 157 | C12AA04WS | N2 | L2 | 21 | 276 | C12AA04WS | N3 | L3 |
| 4 | 8 | 138 | 5/8 | 12 | 246 | C58AA04WS | N3 | L3 | 23 | 467 | C58AA04WS | N5 | L5 |
| 5 | 8 | 193 | 5/8 | 12 | 326 | C58AA04WS | N4 | L4 | 23 | 651 | C58AA04WS | N7 | L7 |
| 6 | 8 | 251 | 5/8 | 12 | 424 | C58AA04WS | N5 | L5 | 23 | 848 | C58AA06WS | N9 | L9 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 54 | 3/8 | 10 | 78 | C38AA04WS | N1 | L1 | 10 | 104 | C38AA04WS | N2 | L2 |
| 3 | 8 | 90 | 1/2 | 12 | 157 | C12AA04WS | N2 | L2 | 12 | 211 | C12AA04WS | N3 | L3 |
| 4 | 8 | 138 | 5/8 | 12 | 246 | C58AA04WS | N3 | L3 | 12 | 330 | C58AA04WS | N4 | L4 |
| 5 | 8 | 193 | 5/8 | 12 | 326 | C58AA04WS | N4 | L4 | 12 | 437 | C58AA04WS | N5 | L5 |
| 6 | 8 | 251 | 5/8 | 12 | 424 | C58AA04WS | N5 | L5 | 12 | 569 | C58AA04WS | N6 | L6 |
| **SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)** [10] | | | | | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 39 | 3/8 | 13 | 73 | C38AA04WS | N1 | L1 | 24 | 135 | C38AA04WS | N2 | L2 |
| 3 | 8 | 56 | 1/2 | 15 | 124 | C12AA04WS | N2 | L2 | 31 | 248 | C12AA04WS | N3 | L3 |
| 4 | 8 | 80 | 5/8 | 16 | 187 | C58AA04WS | N2 | L2 | 32 | 374 | C58AA04WS | N4 | L4 |
| 5 | 8 | 102 | 5/8 | 16 | 236 | C58AA04WS | N3 | L3 | 32 | 472 | C58AA04WS | N5 | L5 |
| 6 | 8 | 119 | 5/8 | 17 | 292 | C58AA04WS | N3 | L3 | 34 | 584 | C58AA04WS | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 39 | 3/8 | 13 | 73 | C38AA04WS | N1 | L1 | 13 | 98 | C38AA04WS | N1 | L1 |
| 3 | 8 | 56 | 1/2 | 15 | 124 | C12AA04WS | N2 | L2 | 15 | 166 | C12AA04WS | N2 | L2 |
| 4 | 8 | 80 | 5/8 | 16 | 187 | C58AA04WS | N2 | L2 | 16 | 251 | C58AA04WS | N3 | L3 |
| 5 | 8 | 102 | 5/8 | 16 | 236 | C58AA04WS | N3 | L3 | 16 | 317 | C58AA04WS | N4 | L4 |
| 6 | 8 | 119 | 5/8 | 17 | 292 | C58AA04WS | N3 | L3 | 17 | 392 | C58AA04WS | N4 | L4 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG PIPE CAST IRON PIPE (WATER FILLED)*** **[9]** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 54 | 3/8 | 10 | 100 | C38AA04WS | N1 | L1 | 17 | 175 | C38AA04WS | N2 | L2 |
| 3 | 8 | 90 | 1/2 | 12 | 202 | C12AA04WS | N3 | L3 | 21 | 354 | C12AA04WS | N4 | L4 |
| 4 | 8 | 138 | 5/8 | 12 | 316 | C58AA04WS | N4 | L4 | 23 | 601 | C58AA04WS | N7 | L7 |
| 5 | 8 | 193 | 5/8 | 12 | 419 | C58AA04WS | N5 | L5 | 23 | 837 | C58AA06WS | N9 | L9 |
| 6 | 8 | 251 | 5/8 | 12 | 545 | C58AA04WS | N6 | L6 | 23 | 1,090 | C58AA06WS | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 54 | 3/8 | 10 | 100 | C38AA04WS | N1 | L1 | 10 | 134 | C38AA04WS | N2 | L2 |
| 3 | 8 | 90 | 1/2 | 12 | 202 | C12AA04WS | N3 | L3 | 12 | 271 | C12AA04WS | N3 | L3 |
| 4 | 8 | 138 | 5/8 | 12 | 316 | C58AA04WS | N4 | L4 | 12 | 424 | C58AA04WS | N5 | L5 |
| 5 | 8 | 193 | 5/8 | 12 | 419 | C58AA04WS | N5 | L5 | 12 | 562 | C58AA04WS | N6 | L6 |
| 6 | 8 | 251 | 5/8 | 12 | 545 | C58AA04WS | N6 | L6 | 12 | 732 | C58AA06WS | N8 | L8 |
| ***SINGLE HUNG PIPE CAST IRON PIPE (EMPTY)*** **[10]** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B6.4, B6.5)** | | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | |
| 2 | 8 | 39 | 3/8 | 13 | 94 | C38AA04WS | N1 | L1 | 24 | 173 | C38AA04WS | N2 | L2 |
| 3 | 8 | 56 | 1/2 | 15 | 159 | C12AA04WS | N2 | L2 | 31 | 319 | C12AA04WS | N4 | L4 |
| 4 | 8 | 80 | 5/8 | 16 | 240 | C58AA04WS | N3 | L3 | 32 | 481 | C58AA04WS | N5 | L5 |
| 5 | 8 | 102 | 5/8 | 16 | 303 | C58AA04WS | N4 | L4 | 32 | 607 | C58AA04WS | N7 | L7 |
| 6 | 8 | 119 | 5/8 | 17 | 376 | C58AA04WS | N4 | L4 | 34 | 751 | C58AA06WS | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B7.0, B7.1, B7.2, B8.4)** | | | | | **4-Way Splay Details (B9.0, B9.1, B9.1.1)** | | | | |
| 2 | 8 | 39 | 3/8 | 13 | 94 | C38AA04WS | N1 | L1 | 13 | 126 | C38AA04WS | N2 | L2 |
| 3 | 8 | 56 | 1/2 | 15 | 159 | C12AA04WS | N2 | L2 | 15 | 214 | C12AA04WS | N3 | L3 |
| 4 | 8 | 80 | 5/8 | 16 | 240 | C58AA04WS | N3 | L3 | 16 | 323 | C58AA04WS | N4 | L4 |
| 5 | 8 | 102 | 5/8 | 16 | 303 | C58AA04WS | N4 | L4 | 16 | 407 | C58AA04WS | N5 | L5 |
| 6 | 8 | 119 | 5/8 | 17 | 376 | C58AA04WS | N4 | L4 | 17 | 504 | C58AA04WS | N6 | L6 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Water Filled Pipe Weight. Refer to X-Series Weight Charts.
10. Based on Empty Pipe Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 201 | 3/8 | 40 | 127 | R38AAEM306 | N2 | L2 | 80 | 165 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 456 | 1/2 | 40 | 289 | R12AAEM306 | N3 | L3 | 80 | 375 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 639 | 1/2 | 40 | 404 | R12AAEM406 | N5 | L5 | 80 | 525 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 912 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 751 | R12AAEM509 | N8 | L8 |
| 65.0 | 10 | 1,186 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | 80 | 976 | R12AAEM506 | N10 | L10 |
| 75.0 | 10 | 1,368 | 1/2 | 40 | 866 | R12AAEM506 | N9 | L9 | 80 | 1,126 | R12AAEM506 | N12 | L12 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 100.0 | 10 | 1,351 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | | | | | |
| 125.0 | 10 | 1,689 | 5/8 | 40 | 938 | R58AAEM506 | N10 | L10 | | | | | |
| 150.0 | 10 | 2,026 | 5/8 | 40 | 1,126 | R58AAEM506 | N12 | L12 | | | | | |
| 175.0 | 10 | 2,364 | 3/4 | 40 | 1,313 | R34CFB1S06 | N14 | L14 | | | | | |
| 200.0 | 10 | 2,702 | 3/4 | 40 | 1,501 | R34CFB2P12 | N16 | L16 | | | | | |
| 225.0 | 10 | 3,040 | 3/4 | 40 | 1,689 | R34CFB2P09 | N17 | L17 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = *0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B11.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B11.2) | | | | |
| 11.0 | 10 | 312 | 3/8 | 40 | 171 | R38AAEM306 | N2 | L2 | 80 | 222 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 708 | 1/2 | 40 | 389 | R12AAEM406 | N4 | L4 | 80 | 506 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 991 | 1/2 | 40 | 545 | R12AAEM406 | N6 | L6 | 80 | 708 | R12AAEM509 | N8 | L8 |
| 50.0 | 10 | 1,416 | 1/2 | 40 | 778 | R12AAEM509 | N8 | L8 | 80 | 1,011 | R12AAEM506 | N11 | L11 |
| 65.0 | 10 | 1,841 | 5/8 | 40 | 1,011 | R58AAEM506 | N11 | L11 | 80 | 1,315 | R58AAEM506 | N14 | L14 |
| 75.0 | 10 | 2,124 | 3/4 | 40 | 1,167 | R34CFB1P06 | N12 | L12 | 80 | 1,517 | R34CFB2P12 | N16 | L16 |
| 100.0 | 10 | 2,832 | 3/4 | 40 | 1,556 | R34CFB2P12 | N16 | L16 | 80 | 2,022 | R34DGB2P09 | N21 | L21 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Transverse, Longitudinal Brace Pattern (B11.3) | | | | | | | | | |
| 125.0 | 10 | 2,319 | 5/8 | 40 | 1,264 | R58AAEM506 | N13 | L13 | | | | | |
| 150.0 | 10 | 2,782 | 3/4 | 40 | 1,517 | R34CFB2P12 | N16 | L16 | | | | | |
| 175.0 | 10 | 3,246 | 3/4 | 40 | 1,770 | R34DGB2P09 | N18 | L18 | | | | | |
| 200.0 | 10 | 3,465 | 3/4 | 35 | 1,770 | R34DGB2P09 | N18 | L18 | | | | | |
| 225.0 | 10 | 3,459 | 3/4 | 27 | 1,536 | R34CFB2P12 | N16 | L16 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

ANTHONY A. RUBALCAVA S 4710

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## *RIGID BRACING REQUIREMENTS*[7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage[6] | | | | | Min. Brace Anchorage[6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod[1] Total Vertical Load (lbs)** | **Min.[8] Vertical Support Rod Dia. (in.)** | **Max.[2] Brace Spacing (ft.)** | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** | **Max.[2] Brace Spacing (ft.)** | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 220 | R38AAEM306 | N3 | L3 | 80 | 286 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 930 | 1/2 | 40 | 500 | R12AAEM406 | N5 | L5 | 80 | 650 | R12AAEM406 | N7 | L7 |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 700 | R12AAEM509 | N7 | L7 | 80 | 910 | R12AAEM506 | N10 | L10 |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 1,000 | R58AAEM506 | N10 | L10 | 80 | 1,300 | R58AAEM506 | N13 | L13 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 975 | R58AAEM506 | N10 | L10 | | | | | |
| 100.0 | 10 | 2,298 | 5/8 | 40 | 1,300 | R58AAEM506 | N13 | L13 | | | | | |
| 125.0 | 10 | 2,606 | 3/4 | 34 | 1,381 | R34DGB1S06 | N14 | L14 | | | | | |
| 150.0 | 10 | 2,808 | 3/4 | 28 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 175.0 | 10 | 3,027 | 3/4 | 24 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 200.0 | 10 | 3,246 | 3/4 | 21 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 225.0 | 10 | 3,492 | 3/4 | 19 | 1,389 | R34DGB1S06 | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

OPM-0403-13
BY: Ali Sumer
DATE: 12/30/2019

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## *RIGID BRACING REQUIREMENTS*[7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6]: Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6]: Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 305 | 3/8 | 40 | 254 | R38AAEM306 | N3 | L3 | 80 | 330 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 693 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 751 | R12AAEM509 | N8 | L8 |
| 35.0 | 10 | 970 | 1/2 | 40 | 808 | R12AAEM506 | N9 | L9 | 80 | 1,051 | R12AAEM506 | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 50.0 | 10 | 912 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | | | | | |
| 65.0 | 10 | 1,186 | 1/2 | 40 | 976 | R12AAEM506 | N10 | L10 | | | | | |
| 75.0 | 10 | 1,368 | 1/2 | 40 | 1,126 | R12AAEM506 | N12 | L12 | | | | | |
| 100.0 | 10 | 1,824 | 5/8 | 40 | 1,501 | R58AAEM606 | N16 | L16 | | | | | |
| 125.0 | 10 | 2,281 | 5/8 | 40 | 1,876 | R58AAEM606 | N19 | L19 | | | | | |
| 150.0 | 10 | 2,737 | 3/4 | 40 | 2,252 | R34DGB2P09 | N23 | L23 | | | | | |
| 175.0 | 10 | 3,110 | 3/4 | 38 | 2,496 | R34DGB2P06 | N25 | L25 | | | | | |
| 200.0 | 10 | 3,317 | 3/4 | 33 | 2,477 | R34DGB2P06 | N25 | L25 | | | | | |
| 225.0 | 10 | 3,466 | 3/4 | 28 | 2,364 | R34DGB2P09 | N24 | L24 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B11.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B11.2) | | | | |
| 11.0 | 10 | 446 | 3/8 | 40 | 311 | R38AAEM409 | N4 | L4 | 80 | 404 | R38AAEM406 | N5 | L5 |
| 25.0 | 10 | 1,014 | 1/2 | 40 | 707 | R12AAEM509 | N8 | L8 | 80 | 919 | R12AAEM506 | N10 | L10 |
| 35.0 | 10 | 1,420 | 5/8 | 40 | 990 | R58AAEM506 | N10 | L10 | 80 | 1,287 | R58AAEM506 | N13 | L13 |
| 50.0 | 10 | 2,029 | 3/4 | 40 | 1,414 | R34CFB1S06 | N15 | L15 | 80 | 1,838 | R34DGB2P09 | N19 | L19 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Transverse, Longitudinal Brace Pattern (B11.3) | | | | | | | | | |
| 50.0 | 10 | 1,209 | 1/2 | 40 | 919 | R12AAEM506 | N10 | L10 | | | | | |
| 65.0 | 10 | 1,571 | 5/8 | 40 | 1,195 | R58AAEM506 | N12 | L12 | | | | | |
| 75.0 | 10 | 1,813 | 5/8 | 40 | 1,379 | R58AAEM506 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,418 | 3/4 | 40 | 1,838 | R34DGB2P09 | N19 | L19 | | | | | |
| 125.0 | 10 | 2,612 | 3/4 | 32 | 1,838 | R34DGB2P09 | N19 | L19 | | | | | |
| 150.0 | 10 | 2,827 | 3/4 | 27 | 1,861 | R34DGB2P09 | N19 | L19 | | | | | |
| 175.0 | 10 | 2,939 | 3/4 | 22 | 1,770 | R34DGB2P09 | N18 | L18 | | | | | |
| 200.0 | 10 | 2,949 | 3/4 | 17 | 1,563 | R34CFB2P12 | N16 | L16 | | | | | |
| 225.0 | 10 | 3,041 | 3/4 | 14 | 1,448 | R34CFB2P12 | N15 | L15 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 45 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 721 | 1/2 | 40 | 440 | R12AAEM406 | N5 | L5 | 80 | 572 | R12AAEM406 | N6 | L6 |
| 25.0 | 10 | 1,640 | 3/4 | 40 | 1,000 | R34DGB1P06 | N10 | L10 | 80 | 1,300 | R34DGB1S06 | N13 | L13 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 910 | R12AAEM506 | N10 | L10 | | | | | |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 1,300 | R58AAEM506 | N13 | L13 | | | | | |
| 65.0 | 10 | 2,048 | 3/4 | 32 | 1,352 | R34DGB1S06 | N14 | L14 | | | | | |
| 75.0 | 10 | 2,150 | 3/4 | 28 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,369 | 3/4 | 21 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 125.0 | 10 | 2,606 | 3/4 | 17 | 1,381 | R34DGB1S06 | N14 | L14 | | | | | |
| 150.0 | 10 | 2,808 | 3/4 | 14 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 175.0 | 10 | 3,027 | 3/4 | 12 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 200.0 | 10 | 3,175 | 3/4 | 10 | 1,300 | R34DGB1S06 | N13 | L13 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **_MAXIMUM SEISMIC DESIGN FORCE =_ _0.75 G's_**

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 381 | R38AAEM406 | N4 | L4 | 80 | 495 | R38AAEM406 | N5 | L5 |
| 25.0 | 10 | 930 | 1/2 | 40 | 866 | R12AAEM506 | N9 | L9 | 80 | 1,126 | R12AAEM506 | N12 | L12 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 35.0 | 10 | 804 | 1/2 | 40 | 788 | R12AAEM509 | N8 | L8 | | | | | |
| 50.0 | 10 | 1,149 | 1/2 | 40 | 1,126 | R12AAEM506 | N12 | L12 | | | | | |
| 65.0 | 10 | 1,494 | 5/8 | 40 | 1,464 | R58AAEM606 | N15 | L15 | | | | | |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 1,689 | R58AAEM606 | N17 | L17 | | | | | |
| 100.0 | 10 | 2,298 | 5/8 | 40 | 2,252 | R58DGB2P09 | N23 | L23 | | | | | |
| 125.0 | 10 | 2,650 | 3/4 | 35 | 2,463 | R34DGB2P06 | N25 | L25 | | | | | |
| 150.0 | 10 | 2,861 | 3/4 | 29 | 2,449 | R34DGB2P06 | N25 | L25 | | | | | |
| 175.0 | 10 | 3,089 | 3/4 | 25 | 2,463 | R34DGB2P06 | N25 | L25 | | | | | |
| 200.0 | 10 | 3,317 | 3/4 | 22 | 2,477 | R34DGB2P06 | N25 | L25 | | | | | |
| 225.0 | 10 | 3,492 | 3/4 | 19 | 2,406 | R34DGB2P06 | N25 | L25 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 742 | 1/2 | 40 | 513 | R12AAEM406 | N6 | L6 | 80 | 667 | R12AAEM509 | N7 | L7 |
| 25.0 | 10 | 1,685 | 3/4 | 40 | 1,167 | R34CFB1P06 | N12 | L12 | 80 | 1,517 | R34CFB2P12 | N16 | L16 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 35.0 | 10 | 1,333 | 5/8 | 40 | 1,062 | R58AAEM506 | N11 | L11 | | | | | |
| 50.0 | 10 | 1,905 | 3/4 | 40 | 1,517 | R34CFB2P12 | N16 | L16 | | | | | |
| 65.0 | 10 | 2,476 | 3/4 | 40 | 1,972 | R34DGB2P09 | N20 | L20 | | | | | |
| 75.0 | 10 | 2,582 | 3/4 | 35 | 1,991 | R34DGB2P09 | N20 | L20 | | | | | |
| 100.0 | 10 | 2,857 | 3/4 | 27 | 2,048 | R34DGB2P09 | N21 | L21 | | | | | |
| 125.0 | 10 | 3,021 | 3/4 | 21 | 1,991 | R34DGB2P09 | N20 | L20 | | | | | |
| 150.0 | 10 | 3,295 | 3/4 | 18 | 2,048 | R34DGB2P09 | N21 | L21 | | | | | |
| 175.0 | 10 | 3,460 | 3/4 | 15 | 1,991 | R34DGB2P09 | N20 | L20 | | | | | |
| 200.0 | 10 | 3,368 | 3/4 | 11 | 1,669 | R34CFB2P09 | N17 | L17 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 1,034 | 1/2 | 40 | 660 | R12AAEM406 | N7 | L7 | 80 | 858 | R12AAEM506 | N9 | L9 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 25.0 | 10 | 1,285 | 5/8 | 40 | 975 | R58AAEM506 | N10 | L10 | | | | | |
| 35.0 | 10 | 1,799 | 3/4 | 40 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 50.0 | 10 | 1,930 | 3/4 | 28 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 65.0 | 10 | 2,024 | 3/4 | 21 | 1,331 | R34DGB1S06 | N14 | L14 | | | | | |
| 75.0 | 10 | 2,176 | 3/4 | 19 | 1,389 | R34DGB1S06 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,369 | 3/4 | 14 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 125.0 | 10 | 2,562 | 3/4 | 11 | 1,341 | R34DGB1S06 | N14 | L14 | | | | | |

1. TVL = DL + Fv + $(0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 513 | 1/2 | 40 | 508 | R12AAEM406 | N6 | L6 | 80 | 660 | R12AAEM509 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 25.0 | 10 | 693 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | | | | | |
| 35.0 | 10 | 970 | 1/2 | 40 | 1,051 | R12AAEM506 | N11 | L11 | | | | | |
| 50.0 | 10 | 1,386 | 1/2 | 40 | 1,501 | R12AAEM606 | N16 | L16 | | | | | |
| 65.0 | 10 | 1,801 | 5/8 | 40 | 1,951 | R58AAEM606 | N20 | L20 | | | | | |
| 75.0 | 10 | 2,079 | 5/8 | 40 | 2,252 | R58DGB2P09 | N23 | L23 | | | | | |
| 100.0 | 10 | 2,440 | 3/4 | 33 | 2,477 | R34DGB2P06 | N25 | L25 | | | | | |
| 125.0 | 10 | 2,636 | 3/4 | 26 | 2,439 | R34DGB2P06 | N25 | L25 | | | | | |
| 150.0 | 10 | 2,879 | 3/4 | 22 | 2,477 | R34DGB2P06 | N25 | L25 | | | | | |
| 175.0 | 10 | 3,110 | 3/4 | 19 | 2,496 | R34DGB2P06 | N25 | L25 | | | | | |
| 200.0 | 10 | 3,270 | 3/4 | 16 | 2,402 | R34DGB2P06 | N25 | L25 | | | | | |
| 225.0 | 10 | 3,466 | 3/4 | 14 | 2,364 | R34DGB2P09 | N24 | L24 | | | | | |

1. $TVL = DL + Fv + (0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = *1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 957 | 1/2 | 40 | 685 | R12AAEM509 | N7 | L7 | 80 | 890 | R12AAEM506 | N9 | L9 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 25.0 | 10 | 1,197 | 1/2 | 40 | 1,011 | R12AAEM506 | N11 | L11 | | | | | |
| 35.0 | 10 | 1,675 | 5/8 | 40 | 1,416 | R58AAEM506 | N15 | L15 | | | | | |
| 50.0 | 10 | 2,345 | 3/4 | 39 | 1,972 | R34DGB2P09 | N20 | L20 | | | | | |
| 65.0 | 10 | 2,476 | 3/4 | 30 | 1,972 | R34DGB2P09 | N20 | L20 | | | | | |
| 75.0 | 10 | 2,564 | 3/4 | 26 | 1,972 | R34DGB2P09 | N20 | L20 | | | | | |
| 100.0 | 10 | 2,832 | 3/4 | 20 | 2,022 | R34DGB2P09 | N21 | L21 | | | | | |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 2,022 | R34DGB2P09 | N21 | L21 | | | | | |
| 150.0 | 10 | 3,222 | 3/4 | 13 | 1,972 | R34DGB2P09 | N20 | L20 | | | | | |
| 175.0 | 10 | 3,417 | 3/4 | 11 | 1,947 | R34DGB2P09 | N20 | L20 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### RIGID BRACING REQUIREMENTS [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS**<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS**<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 1,346 | 5/8 | 40 | 880 | R58AAEM506 | N9 | L9 | 80 | 1,144 | R58AAEM506 | N12 | L12 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS**<br>**4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 25.0 | 10 | 1,640 | 3/4 | 40 | 1,300 | R34DGB1S06 | N13 | L13 | | | | | |
| 35.0 | 10 | 1,799 | 3/4 | 30 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 50.0 | 10 | 1,930 | 3/4 | 21 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 65.0 | 10 | 2,048 | 3/4 | 16 | 1,352 | R34DGB1S06 | N14 | L14 | | | | | |
| 75.0 | 10 | 2,150 | 3/4 | 14 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,298 | 5/8 | 10 | 1,300 | R58AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

**TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** — **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B11.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B11.2) | | | | |
| 11.0 | 10 | 201 | 3/8 | 40 | 64 | R38AAEM306 | N1 | L1 | 80 | 83 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 456 | 1/2 | 40 | 144 | R12AAEM306 | N2 | L2 | 80 | 188 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 639 | 1/2 | 40 | 202 | R12AAEM306 | N3 | L3 | 80 | 263 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 912 | 1/2 | 40 | 289 | R12AAEM306 | N3 | L3 | 80 | 375 | R12AAEM406 | N4 | L4 |
| 65.0 | 10 | 1,186 | 1/2 | 40 | 375 | R12AAEM406 | N4 | L4 | 80 | 488 | R12AAEM406 | N5 | L5 |
| 75.0 | 10 | 1,368 | 1/2 | 40 | 433 | R12AAEM406 | N5 | L5 | 80 | 563 | R12AAEM406 | N6 | L6 |
| 100.0 | 10 | 1,824 | 5/8 | 40 | 577 | R58AAEM406 | N6 | L6 | 80 | 751 | R58AAEM509 | N8 | L8 |
| 125.0 | 10 | 2,281 | 5/8 | 40 | 722 | R58AAEM509 | N8 | L8 | 80 | 938 | R58AAEM506 | N10 | L10 |
| 150.0 | 10 | 2,737 | 3/4 | 40 | 866 | R34DGB1P09 | N9 | L9 | 80 | 1,126 | R34DGB1P06 | N12 | L12 |
| 175.0 | 10 | 3,027 | 3/4 | 36 | 909 | R34DGB1P09 | N10 | L10 | 72 | 1,182 | R34DGB1P06 | N12 | L12 |
| 200.0 | 10 | 3,175 | 3/4 | 30 | 866 | R34DGB1P09 | N9 | L9 | 60 | 1,126 | R34DGB1P06 | N12 | L12 |
| 225.0 | 10 | 3,466 | 3/4 | 28 | 909 | R34DGB1P09 | N10 | L10 | 56 | 1,182 | R34DGB1P06 | N12 | L12 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Transverse, Longitudinal Brace Pattern (B11.3) | | | | | | | | | |
| 175.0 | 10 | 2,364 | 3/4 | 40 | 657 | R34CFB1P12 | N7 | L7 | | | | | |
| 200.0 | 10 | 2,702 | 3/4 | 40 | 751 | R34CFB1P09 | N8 | L8 | | | | | |
| 225.0 | 10 | 3,040 | 3/4 | 40 | 844 | R34DGB1P09 | N9 | L9 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

**TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** — **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS |  |  |  |  | LONGITUDINAL BRACING REQUIREMENTS |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
|  |  |  |  | 1-Way Transverse Brace Pattern (B11.0) |  |  |  |  | 3-Way Transverse, Longitudinal Brace Pattern (B11.2) |  |  |  |  |
| 11.0 | 10 | 312 | 3/8 | 40 | 86 | R38AAEM306 | N1 | L1 | 80 | 111 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 708 | 1/2 | 40 | 194 | R12AAEM306 | N2 | L2 | 80 | 253 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 991 | 1/2 | 40 | 272 | R12AAEM306 | N3 | L3 | 80 | 354 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 1,416 | 1/2 | 40 | 389 | R12AAEM406 | N4 | L4 | 80 | 506 | R12AAEM406 | N6 | L6 |
| 65.0 | 10 | 1,841 | 5/8 | 40 | 506 | R58AAEM406 | N6 | L6 | 80 | 657 | R58AAEM406 | N7 | L7 |
| 75.0 | 10 | 2,124 | 3/4 | 40 | 583 | R34CFB1P12 | N6 | L6 | 80 | 758 | R34CFB1P09 | N8 | L8 |
| 100.0 | 10 | 2,832 | 3/4 | 40 | 778 | R34CFB1P09 | N8 | L8 | 80 | 1,011 | R34CFB1P06 | N11 | L11 |
| 125.0 | 10 | 3,051 | 3/4 | 32 | 778 | R34CFB1P09 | N8 | L8 | 64 | 1,011 | R34CFB1P06 | N11 | L11 |
| 150.0 | 10 | 3,295 | 3/4 | 27 | 788 | R34CFB1P09 | N8 | L8 | 54 | 1,024 | R34CFB1P06 | N11 | L11 |
| 175.0 | 10 | 3,417 | 3/4 | 22 | 749 | R34CFB1P09 | N8 | L8 | 44 | 973 | R34CFB1P06 | N10 | L10 |
| 200.0 | 10 | 3,416 | 3/4 | 17 | 661 | R34CFB1P12 | N7 | L7 | 34 | 860 | R34CFB1P09 | N9 | L9 |
| 225.0 | 10 | 3,404 | 3/4 | 13 | 569 | R34CFB1P12 | N6 | L6 | 26 | 739 | R34CFB1P09 | N8 | L8 |

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod Total Vertical Load (lbs) | Min. Vertical Support Rod Dia. (in.) | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
|  |  |  |  | 4-Way Transverse, Longitudinal Brace Pattern (B11.3) |  |  |  |  |
| 125.0 | 10 | 2,319 | 5/8 | 40 | 632 | R58AAEM406 | N7 | L7 |
| 150.0 | 10 | 2,782 | 3/4 | 40 | 758 | R34CFB1P09 | N8 | L8 |
| 175.0 | 10 | 3,246 | 3/4 | 40 | 885 | R34CFB1P09 | N9 | L9 |
| 200.0 | 10 | 3,465 | 3/4 | 35 | 885 | R34CFB1P09 | N9 | L9 |
| 225.0 | 10 | 3,459 | 3/4 | 27 | 768 | R34CFB1P09 | N8 | L8 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 110 | R38AAEM306 | N2 | L2 | 80 | 143 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 930 | 1/2 | 40 | 250 | R12AAEM306 | N3 | L3 | 80 | 325 | R12AAEM409 | N4 | L4 |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 350 | R12AAEM406 | N4 | L4 | 80 | 455 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 500 | R58AAEM406 | N5 | L5 | 80 | 650 | R58AAEM406 | N7 | L7 |
| 65.0 | 10 | 2,417 | 3/4 | 40 | 650 | R34CFB1P12 | N7 | L7 | 80 | 845 | R34CFB1P09 | N9 | L9 |
| 75.0 | 10 | 2,576 | 3/4 | 36 | 675 | R34CFB1P12 | N7 | L7 | 72 | 878 | R34DGB1P09 | N9 | L9 |
| 100.0 | 10 | 2,724 | 3/4 | 26 | 650 | R34CFB1P12 | N7 | L7 | 52 | 845 | R34CFB1P09 | N9 | L9 |
| 125.0 | 10 | 3,050 | 3/4 | 22 | 688 | R34CFB1P09 | N7 | L7 | 44 | 894 | R34DGB1P09 | N9 | L9 |
| 150.0 | 10 | 3,234 | 3/4 | 18 | 675 | R34CFB1P12 | N7 | L7 | 36 | 878 | R34DGB1P09 | N9 | L9 |
| 175.0 | 10 | 3,276 | 3/4 | 14 | 613 | R34CFB1P12 | N7 | L7 | 28 | 796 | R34CFB1P09 | N8 | L8 |
| 200.0 | 10 | 3,459 | 3/4 | 12 | 600 | R34CFB1P12 | N6 | L6 | 24 | 780 | R34CFB1P09 | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 488 | R58AAEM406 | N5 | L5 | | | | | |
| 100.0 | 10 | 2,298 | 5/8 | 40 | 650 | R58AAEM406 | N7 | L7 | | | | | |
| 125.0 | 10 | 2,872 | 3/4 | 40 | 813 | R34CFB1P09 | N9 | L9 | | | | | |
| 150.0 | 10 | 3,340 | 3/4 | 38 | 926 | R34DGB1P06 | N10 | L10 | | | | | |
| 175.0 | 10 | 3,462 | 3/4 | 31 | 882 | R34DGB1P09 | N9 | L9 | | | | | |
| 200.0 | 10 | 3,459 | 3/4 | 24 | 780 | R34CFB1P09 | N8 | L8 | | | | | |
| 225.0 | 10 | 3,492 | 3/4 | 19 | 695 | R34CFB1P09 | N7 | L7 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 305 | 3/8 | 40 | 127 | R38AAEM306 | N2 | L2 | 80 | 165 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 693 | 1/2 | 40 | 289 | R12AAEM306 | N3 | L3 | 80 | 375 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 970 | 1/2 | 40 | 404 | R12AAEM406 | N5 | L5 | 80 | 525 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 1,386 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 751 | R12AAEM509 | N8 | L8 |
| 65.0 | 10 | 1,801 | 5/8 | 40 | 751 | R58AAEM509 | N8 | L8 | 80 | 976 | R58AAEM506 | N10 | L10 |
| 75.0 | 10 | 2,079 | 5/8 | 40 | 866 | R58AAEM506 | N9 | L9 | 80 | 1,126 | R58AAEM506 | N12 | L12 |
| 100.0 | 10 | 2,298 | 5/8 | 30 | 866 | R58AAEM506 | N9 | L9 | 60 | 1,126 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 2,517 | 3/4 | 24 | 866 | R34DGB1P09 | N9 | L9 | 48 | 1,126 | R34DGB1P06 | N12 | L12 |
| 150.0 | 10 | 2,737 | 3/4 | 20 | 866 | R34DGB1P09 | N9 | L9 | 40 | 1,126 | R34DGB1P06 | N12 | L12 |
| 175.0 | 10 | 3,027 | 3/4 | 18 | 909 | R34DGB1P09 | N10 | L10 | 36 | 1,182 | R34DGB1P06 | N12 | L12 |
| 200.0 | 10 | 3,081 | 3/4 | 14 | 808 | R34DGB1P09 | N9 | L9 | 28 | 1,051 | R34DGB1P06 | N11 | L11 |
| 225.0 | 10 | 3,253 | 3/4 | 12 | 779 | R34DGB1P09 | N8 | L8 | 24 | 1,013 | R34DGB1P06 | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 100.0 | 10 | 1,824 | 5/8 | 40 | 751 | R58AAEM509 | N8 | L8 | | | | | |
| 125.0 | 10 | 2,281 | 5/8 | 40 | 938 | R58AAEM506 | N10 | L10 | | | | | |
| 150.0 | 10 | 2,737 | 3/4 | 40 | 1,126 | R34DGB1P06 | N12 | L12 | | | | | |
| 175.0 | 10 | 3,027 | 3/4 | 36 | 1,182 | R34DGB1P06 | N12 | L12 | | | | | |
| 200.0 | 10 | 3,175 | 3/4 | 30 | 1,126 | R34DGB1P06 | N12 | L12 | | | | | |
| 225.0 | 10 | 3,466 | 3/4 | 28 | 1,182 | R34DGB1P06 | N12 | L12 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)***

***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B11.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B11.2) | | | | |
| 11.0 | 10 | 527 | 1/2 | 40 | 171 | R12AAEM306 | N2 | L2 | 80 | 222 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,197 | 1/2 | 40 | 389 | R12AAEM406 | N4 | L4 | 80 | 506 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 1,675 | 5/8 | 40 | 545 | R58AAEM406 | N6 | L6 | 80 | 708 | R58AAEM509 | N8 | L8 |
| 50.0 | 10 | 2,345 | 3/4 | 39 | 758 | R34CFB1P09 | N8 | L8 | 78 | 986 | R34CFB1P06 | N10 | L10 |
| 65.0 | 10 | 2,476 | 3/4 | 30 | 758 | R34CFB1P09 | N8 | L8 | 60 | 986 | R34CFB1P06 | N10 | L10 |
| 75.0 | 10 | 2,564 | 3/4 | 26 | 758 | R34CFB1P09 | N8 | L8 | 52 | 986 | R34CFB1P06 | N10 | L10 |
| 100.0 | 10 | 2,832 | 3/4 | 20 | 778 | R34CFB1P09 | N8 | L8 | 40 | 1,011 | R34CFB1P06 | N11 | L11 |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 778 | R34CFB1P09 | N8 | L8 | 32 | 1,011 | R34CFB1P06 | N11 | L11 |
| 150.0 | 10 | 3,222 | 3/4 | 13 | 758 | R34CFB1P09 | N8 | L8 | 26 | 986 | R34CFB1P06 | N10 | L10 |
| 175.0 | 10 | 3,417 | 3/4 | 11 | 749 | R34CFB1P09 | N8 | L8 | 22 | 973 | R34CFB1P06 | N10 | L10 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Transverse, Longitudinal Brace Pattern (B11.3) | | | | | | | | | |
| 50.0 | 10 | 1,416 | 1/2 | 40 | 506 | R12AAEM406 | N6 | L6 | | | | | |
| 65.0 | 10 | 1,841 | 5/8 | 40 | 657 | R58AAEM406 | N7 | L7 | | | | | |
| 75.0 | 10 | 2,124 | 3/4 | 40 | 758 | R34CFB1P09 | N8 | L8 | | | | | |
| 100.0 | 10 | 2,832 | 3/4 | 40 | 1,011 | R34CFB1P06 | N11 | L11 | | | | | |
| 125.0 | 10 | 3,051 | 3/4 | 32 | 1,011 | R34CFB1P06 | N11 | L11 | | | | | |
| 150.0 | 10 | 3,295 | 3/4 | 27 | 1,024 | R34CFB1P06 | N11 | L11 | | | | | |
| 175.0 | 10 | 3,417 | 3/4 | 22 | 973 | R34CFB1P06 | N10 | L10 | | | | | |
| 200.0 | 10 | 3,416 | 3/4 | 17 | 860 | R34CFB1P09 | N9 | L9 | | | | | |
| 225.0 | 10 | 3,404 | 3/4 | 13 | 739 | R34CFB1P09 | N8 | L8 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

|  |  |  |  | **TRANSVERSE BRACING REQUIREMENTS** |  |  |  |  | **LONGITUDINAL BRACING REQUIREMENTS** |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  | **Min. Brace Anchorage** [6] |  |  |  |  | **Min. Brace Anchorage** [6] |  |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
|  |  |  |  | **1-Way Transverse Brace Pattern (B11.0)** |  |  |  |  | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** |  |  |  |  |
| 11.0 | 10 | 721 | 1/2 | 40 | 220 | R12AAEM306 | N3 | L3 | 80 | 286 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,640 | 3/4 | 40 | 500 | R34CFA1P06 | N5 | L5 | 80 | 650 | R34CFB1P12 | N7 | L7 |
| 35.0 | 10 | 2,196 | 3/4 | 38 | 665 | R34CFB1P12 | N7 | L7 | 76 | 865 | R34CFB1P09 | N9 | L9 |
| 50.0 | 10 | 2,285 | 3/4 | 26 | 650 | R34CFB1P12 | N7 | L7 | 52 | 845 | R34CFB1P09 | N9 | L9 |
| 65.0 | 10 | 2,417 | 3/4 | 20 | 650 | R34CFB1P12 | N7 | L7 | 40 | 845 | R34CFB1P09 | N9 | L9 |
| 75.0 | 10 | 2,576 | 3/4 | 18 | 675 | R34CFB1P12 | N7 | L7 | 36 | 878 | R34DGB1P09 | N9 | L9 |
| 100.0 | 10 | 2,582 | 3/4 | 12 | 600 | R34CFB1P12 | N6 | L6 | 24 | 780 | R34CFB1P09 | N8 | L8 |
| 125.0 | 10 | 2,872 | 3/4 | 10 | 625 | R34CFB1P12 | N7 | L7 | 20 | 813 | R34CFB1P09 | N9 | L9 |
|  |  |  |  | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** |  |  |  |  |  |  |  |  |  |
|  |  |  |  | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** |  |  |  |  |  |  |  |  |  |
| 150.0 | 10 | 3,234 | 3/4 | 18 | 878 | R34DGB1P09 | N9 | L9 |  |  |  |  |  |
| 175.0 | 10 | 3,276 | 3/4 | 14 | 796 | R34CFB1P09 | N8 | L8 |  |  |  |  |  |
| 200.0 | 10 | 3,459 | 3/4 | 12 | 780 | R34CFB1P09 | N8 | L8 |  |  |  |  |  |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B11.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B11.2) | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 191 | R38AAEM306 | N2 | L2 | 80 | 248 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 930 | 1/2 | 40 | 433 | R12AAEM406 | N5 | L5 | 80 | 563 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 606 | R12AAEM406 | N7 | L7 | 80 | 788 | R12AAEM509 | N8 | L8 |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 866 | R58AAEM506 | N9 | L9 | 80 | 1,126 | R58AAEM506 | N12 | L12 |
| 65.0 | 10 | 2,048 | 3/4 | 32 | 901 | R34DGB1P09 | N10 | L10 | 64 | 1,171 | R34DGB1P06 | N12 | L12 |
| 75.0 | 10 | 2,150 | 3/4 | 28 | 909 | R34DGB1P09 | N10 | L10 | 56 | 1,182 | R34DGB1P06 | N12 | L12 |
| 100.0 | 10 | 2,298 | 5/8 | 20 | 866 | R58AAEM506 | N9 | L9 | 40 | 1,126 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 2,517 | 3/4 | 16 | 866 | R34DGB1P09 | N9 | L9 | 32 | 1,126 | R34DGB1P06 | N12 | L12 |
| 150.0 | 10 | 2,808 | 3/4 | 14 | 909 | R34DGB1P09 | N10 | L10 | 28 | 1,182 | R34DGB1P06 | N12 | L12 |
| 175.0 | 10 | 3,027 | 3/4 | 12 | 909 | R34DGB1P09 | N10 | L10 | 24 | 1,182 | R34DGB1P06 | N12 | L12 |
| 200.0 | 10 | 3,175 | 3/4 | 10 | 866 | R34DGB1P09 | N9 | L9 | 20 | 1,126 | R34DGB1P06 | N12 | L12 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Transverse, Longitudinal Brace Pattern (B11.3) | | | | | | | | | |
| 225.0 | 10 | 3,413 | 3/4 | 18 | 1,140 | R34DGB1P06 | N12 | L12 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 742 | 1/2 | 40 | 257 | R12AAEM306 | N3 | L3 | 80 | 334 | R12AAEM406 | N4 | L4 |
| 25.0 | 10 | 1,685 | 3/4 | 40 | 583 | R34CFB1P12 | N6 | L6 | 80 | 758 | R34CFB1P09 | N8 | L8 |
| 35.0 | 10 | 2,206 | 3/4 | 37 | 755 | R34CFB1P09 | N8 | L8 | 74 | 982 | R34CFB1P06 | N10 | L10 |
| 50.0 | 10 | 2,345 | 3/4 | 26 | 758 | R34CFB1P09 | N8 | L8 | 52 | 986 | R34CFB1P06 | N10 | L10 |
| 65.0 | 10 | 2,476 | 3/4 | 20 | 758 | R34CFB1P09 | N8 | L8 | 40 | 986 | R34CFB1P06 | N10 | L10 |
| 75.0 | 10 | 2,527 | 3/4 | 17 | 744 | R34CFB1P09 | N8 | L8 | 34 | 967 | R34CFB1P06 | N10 | L10 |
| 100.0 | 10 | 2,783 | 3/4 | 13 | 758 | R34CFB1P09 | N8 | L8 | 26 | 986 | R34CFB1P06 | N10 | L10 |
| 125.0 | 10 | 2,929 | 3/4 | 10 | 729 | R34CFB1P09 | N8 | L8 | 20 | 948 | R34CFB1P06 | N10 | L10 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 150.0 | 10 | 3,295 | 3/4 | 18 | 1,024 | R34CFB1P06 | N11 | L11 | | | | | |
| 175.0 | 10 | 3,460 | 3/4 | 15 | 995 | R34CFB1P06 | N10 | L10 | | | | | |
| 200.0 | 10 | 3,368 | 3/4 | 11 | 834 | R34CFB1P09 | N9 | L9 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 1,034 | 1/2 | 40 | 330 | R12AAEM409 | N4 | L4 | 80 | 429 | R12AAEM406 | N5 | L5 |
| 25.0 | 10 | 2,030 | 3/4 | 34 | 638 | R34CFB1P12 | N7 | L7 | 68 | 829 | R34CFB1P09 | N9 | L9 |
| 35.0 | 10 | 2,097 | 3/4 | 24 | 630 | R34CFB1P12 | N7 | L7 | 48 | 819 | R34CFB1P09 | N9 | L9 |
| 50.0 | 10 | 2,356 | 3/4 | 18 | 675 | R34CFB1P12 | N7 | L7 | 36 | 878 | R34DGB1P09 | N9 | L9 |
| 65.0 | 10 | 2,509 | 3/4 | 14 | 683 | R34CFB1P09 | N7 | L7 | 28 | 887 | R34DGB1P09 | N9 | L9 |
| 75.0 | 10 | 2,576 | 3/4 | 12 | 675 | R34CFB1P12 | N7 | L7 | 24 | 878 | R34DGB1P09 | N9 | L9 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 100.0 | 10 | 2,795 | 3/4 | 18 | 878 | R34DGB1P09 | N9 | L9 | | | | | |
| 125.0 | 10 | 2,961 | 3/4 | 14 | 853 | R34CFB1P09 | N9 | L9 | | | | | |
| 150.0 | 10 | 3,234 | 3/4 | 12 | 878 | R34DGB1P09 | N9 | L9 | | | | | |
| 175.0 | 10 | 3,400 | 3/4 | 10 | 853 | R34CFB1P09 | N9 | L9 | | | | | |

1. $TVL = DL + Fv + (0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 513 | 1/2 | 40 | 254 | R12AAEM306 | N3 | L3 | 80 | 330 | R12AAEM406 | N4 | L4 |
| 25.0 | 10 | 1,166 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 751 | R12AAEM509 | N8 | L8 |
| 35.0 | 10 | 1,633 | 5/8 | 40 | 808 | R58AAEM506 | N9 | L9 | 80 | 1,051 | R58AAEM506 | N11 | L11 |
| 50.0 | 10 | 1,859 | 5/8 | 30 | 866 | R58AAEM506 | N9 | L9 | 60 | 1,126 | R58AAEM506 | N12 | L12 |
| 65.0 | 10 | 2,048 | 3/4 | 24 | 901 | R34DGB1P09 | N10 | L10 | 48 | 1,171 | R34DGB1P06 | N12 | L12 |
| 75.0 | 10 | 2,079 | 5/8 | 20 | 866 | R58AAEM506 | N9 | L9 | 40 | 1,126 | R58AAEM506 | N12 | L12 |
| 100.0 | 10 | 2,203 | 5/8 | 14 | 808 | R58AAEM506 | N9 | L9 | 28 | 1,051 | R58AAEM506 | N11 | L11 |
| 125.0 | 10 | 2,517 | 3/4 | 12 | 866 | R34DGB1P09 | N9 | L9 | 24 | 1,126 | R34DGB1P06 | N12 | L12 |
| 150.0 | 10 | 2,737 | 3/4 | 10 | 866 | R34DGB1P09 | N9 | L9 | 20 | 1,126 | R34DGB1P06 | N12 | L12 |
| 175.0 | 10 | 3,193 | 3/4 | 10 | 1,010 | R34DGB1P06 | N11 | L11 | 20 | 1,313 | #N/A | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 200.0 | 10 | 3,081 | 3/4 | 14 | 1,051 | R34DGB1P06 | N11 | L11 | | | | | |
| 225.0 | 10 | 3,253 | 3/4 | 12 | 1,013 | R34DGB1P06 | N11 | L11 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4$ x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B11.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B11.2)** | | | | |
| 11.0 | 10 | 957 | 1/2 | 40 | 342 | R12AAEM406 | N4 | L4 | 80 | 445 | R12AAEM406 | N5 | L5 |
| 25.0 | 10 | 2,125 | 3/4 | 39 | 758 | R34CFB1P09 | N8 | L8 | 78 | 986 | R34CFB1P06 | N10 | L10 |
| 35.0 | 10 | 2,223 | 3/4 | 28 | 762 | R34CFB1P09 | N8 | L8 | 56 | 991 | R34CFB1P06 | N10 | L10 |
| 50.0 | 10 | 2,296 | 3/4 | 19 | 739 | R34CFB1P09 | N8 | L8 | 38 | 961 | R34CFB1P06 | N10 | L10 |
| 65.0 | 10 | 2,476 | 3/4 | 15 | 758 | R34CFB1P09 | N8 | L8 | 30 | 986 | R34CFB1P06 | N10 | L10 |
| 75.0 | 10 | 2,564 | 3/4 | 13 | 758 | R34CFB1P09 | N8 | L8 | 26 | 986 | R34CFB1P06 | N10 | L10 |
| 100.0 | 10 | 2,832 | 3/4 | 10 | 778 | R34CFB1P09 | N8 | L8 | 20 | 1,011 | R34CFB1P06 | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B11.3)** | | | | | | | | | |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 1,011 | R34CFB1P06 | N11 | L11 | | | | | |
| 150.0 | 10 | 3,222 | 3/4 | 13 | 986 | R34CFB1P06 | N10 | L10 | | | | | |
| 175.0 | 10 | 3,417 | 3/4 | 11 | 973 | R34CFB1P06 | N10 | L10 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B11.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B11.2) | | | | |
| 11.0 | 10 | 1,346 | 5/8 | 40 | 440 | R58AAEM406 | N5 | L5 | 80 | 572 | R58AAEM406 | N6 | L6 |
| 25.0 | 10 | 2,066 | 3/4 | 26 | 650 | R34CFB1P12 | N7 | L7 | 52 | 845 | R34CFB1P09 | N9 | L9 |
| 35.0 | 10 | 2,097 | 3/4 | 18 | 630 | R34CFB1P12 | N7 | L7 | 36 | 819 | R34CFB1P09 | N9 | L9 |
| 50.0 | 10 | 2,143 | 3/4 | 12 | 600 | R34CFB1P12 | N6 | L6 | 24 | 780 | R34CFB1P09 | N8 | L8 |
| 65.0 | 10 | 2,417 | 3/4 | 10 | 650 | R34CFB1P12 | N7 | L7 | 20 | 845 | R34CFB1P09 | N9 | L9 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Transverse, Longitudinal Brace Pattern (B11.3) | | | | | | | | | |
| 75.0 | 10 | 2,576 | 3/4 | 18 | 878 | R34DGB1P09 | N9 | L9 | | | | | |
| 100.0 | 10 | 2,582 | 3/4 | 12 | 780 | R34CFB1P09 | N8 | L8 | | | | | |
| 125.0 | 10 | 2,872 | 3/4 | 10 | 813 | R34CFB1P09 | N9 | L9 | | | | | |

1. TVL = DL + Fv + $(0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7] :

**TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** — **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B15.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B15.1) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 127 | C38AA04WS | N2 | L2 | 80 | 165 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 289 | C12AA04WS | N3 | L3 | 80 | 375 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 307 | 1/2 | 40 | 404 | C12AA04WS | N5 | L5 | 80 | 525 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 439 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 751 | C12AA06WS | N8 | L8 |
| 65.0 | 10 | 570 | 1/2 | 40 | 751 | C12AA06WS | N8 | L8 | 80 | 976 | C12AA06WS | N10 | L10 |
| 75.0 | 10 | 658 | 1/2 | 40 | 866 | C12AA06WS | N9 | L9 | 80 | 1,126 | C12AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 1/2 | 38 | 1,097 | C12AA06WS | N11 | L11 | 76 | 1,426 | C12AA06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 1/2 | 30 | 1,083 | C12AA06WS | N11 | L11 | 60 | 1,407 | C12AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 1/2 | 25 | 1,083 | C12AA06WS | N11 | L11 | 50 | 1,407 | C12AA06WS | N15 | L15 |
| 175.0 | 10 | 1,536 | 5/8 | 21 | 1,061 | C58AA06WS | N11 | L11 | 42 | 1,379 | C58AA06WS | N14 | L14 |
| 200.0 | 10 | 1,755 | 5/8 | 19 | 1,097 | C58AA06WS | N11 | L11 | 38 | 1,426 | C58AA06WS | N15 | L15 |
| 225.0 | 10 | 1,974 | 5/8 | 17 | 1,104 | C58AA06WS | N12 | L12 | 34 | 1,435 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B15.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B15.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 171 | C38AA04WS | N2 | L2 | 80 | 222 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 389 | C12AA04WS | N4 | L4 | 80 | 506 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 1/2 | 40 | 545 | C12AA04WS | N6 | L6 | 80 | 708 | C12AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 1/2 | 40 | 778 | C12AA06WS | N8 | L8 | 80 | 1,011 | C12AA06WS | N11 | L11 |
| 65.0 | 10 | 570 | 5/8 | 40 | 1,011 | C58AA06WS | N11 | L11 | 80 | 1,315 | C58AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 3/4 | 40 | 1,167 | C34DG06WS | N12 | L12 | 80 | 1,517 | C34DG06TS | N16 | L16 |
| 100.0 | 10 | 878 | 5/8 | 30 | 1,167 | C58AA06WS | N12 | L12 | 60 | 1,517 | C58DG06TS | N16 | L16 |
| 125.0 | 10 | 1,097 | 5/8 | 24 | 1,167 | C58AA06WS | N12 | L12 | 48 | 1,517 | C58DG06TS | N16 | L16 |
| 150.0 | 10 | 1,316 | 5/8 | 20 | 1,167 | C58AA06WS | N12 | L12 | 40 | 1,517 | C58DG06TS | N16 | L16 |
| 175.0 | 10 | 1,536 | 5/8 | 16 | 1,089 | C58AA06WS | N11 | L11 | 32 | 1,416 | C58AA06WS | N15 | L15 |
| 200.0 | 10 | 1,755 | 5/8 | 14 | 1,089 | C58AA06WS | N11 | L11 | 28 | 1,416 | C58AA06WS | N15 | L15 |
| 225.0 | 10 | 1,974 | 5/8 | 14 | 1,225 | C58AA06WS | N13 | L13 | 28 | 1,593 | C58DG06TS | N16 | L16 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B15.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B15.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 220 | C38AA04WS | N3 | L3 | 80 | 286 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 500 | C12AA04WS | N5 | L5 | 80 | 650 | C12AA04WS | N7 | L7 |
| 35.0 | 10 | 307 | 1/2 | 40 | 700 | C12AA06WS | N7 | L7 | 80 | 910 | C12AA06WS | N10 | L10 |
| 50.0 | 10 | 439 | 5/8 | 40 | 1,000 | C58AA06WS | N10 | L10 | 80 | 1,300 | C58AA06WS | N13 | L13 |
| 65.0 | 10 | 570 | 3/4 | 35 | 1,138 | C34DG06WS | N12 | L12 | 70 | 1,479 | C34DG06WS | N15 | L15 |
| 75.0 | 10 | 658 | 3/4 | 30 | 1,125 | C34DG06WS | N12 | L12 | 60 | 1,463 | C34DG06WS | N15 | L15 |
| 100.0 | 10 | 878 | 3/4 | 22 | 1,100 | C34DG06WS | N11 | L11 | 44 | 1,430 | C34DG06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 3/4 | 18 | 1,125 | C34DG06WS | N12 | L12 | 36 | 1,463 | C34DG06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 3/4 | 15 | 1,125 | C34DG06WS | N12 | L12 | 30 | 1,463 | C34DG06WS | N15 | L15 |
| 175.0 | 10 | 1,536 | 3/4 | 13 | 1,138 | C34DG06WS | N12 | L12 | 26 | 1,479 | C34DG06WS | N15 | L15 |
| 200.0 | 10 | 1,755 | 3/4 | 11 | 1,100 | C34DG06WS | N11 | L11 | 22 | 1,430 | C34DG06WS | N15 | L15 |
| 225.0 | 10 | 1,974 | 3/4 | 10 | 1,125 | C34DG06WS | N12 | L12 | 20 | 1,463 | C34DG06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***C16-0.25-60***

## *CABLE BRACING REQUIREMENTS* [7] *:*

### ***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)***

***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | TRANSVERSE: Brace [3] Reaction P (lbs) | TRANSVERSE: Min. Brace Assembly E - Pages | TRANSVERSE: Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | TRANSVERSE: Min. Brace Anchorage [6]: Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | LONGITUDINAL: Brace [3] Reaction P (lbs) | LONGITUDINAL: Min. Brace Assembly E - Pages | LONGITUDINAL: Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | LONGITUDINAL: Min. Brace Anchorage [6]: Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2-Way Transverse Brace Pattern (B15.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B15.1) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 254 | C38AA04WS | N3 | L3 | 80 | 330 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 751 | C12AA06WS | N8 | L8 |
| 35.0 | 10 | 307 | 1/2 | 40 | 808 | C12AA06WS | N9 | L9 | 80 | 1,051 | C12AA06WS | N11 | L11 |
| 50.0 | 10 | 439 | 1/2 | 38 | 1,097 | C12AA06WS | N11 | L11 | 76 | 1,426 | C12AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 1/2 | 29 | 1,088 | C12AA06WS | N11 | L11 | 58 | 1,415 | C12AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 1/2 | 25 | 1,083 | C12AA06WS | N11 | L11 | 50 | 1,407 | C12AA06WS | N15 | L15 |
| 100.0 | 10 | 878 | 1/2 | 19 | 1,097 | C12AA06WS | N11 | L11 | 38 | 1,426 | C12AA06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 1/2 | 15 | 1,083 | C12AA06WS | N11 | L11 | 30 | 1,407 | C12AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 1/2 | 12 | 1,039 | C12AA06WS | N11 | L11 | 24 | 1,351 | C12AA06WS | N14 | L14 |
| 175.0 | 10 | 1,536 | 5/8 | 11 | 1,111 | C58AA06WS | N12 | L12 | 22 | 1,445 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B15.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B15.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 342 | C12AA04WS | N4 | L4 | 80 | 445 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 1/2 | 40 | 778 | C12AA06WS | N8 | L8 | 80 | 1,011 | C12AA06WS | N11 | L11 |
| 35.0 | 10 | 307 | 5/8 | 40 | 1,089 | C58AA06WS | N11 | L11 | 80 | 1,416 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 30 | 1,167 | C34AA06WS | N12 | L12 | 60 | 1,517 | C34DG06TS | N16 | L16 |
| 65.0 | 10 | 570 | 5/8 | 22 | 1,112 | C58AA06WS | N12 | L12 | 44 | 1,446 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 3/4 | 20 | 1,167 | C34AA06WS | N12 | L12 | 40 | 1,517 | C34DG06TS | N16 | L16 |
| 100.0 | 10 | 878 | 5/8 | 14 | 1,089 | C58AA06WS | N11 | L11 | 28 | 1,416 | C58AA06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 5/8 | 12 | 1,167 | C58AA06WS | N12 | L12 | 24 | 1,517 | C58DG06TS | N16 | L16 |
| 150.0 | 10 | 1,316 | 5/8 | 10 | 1,167 | C58AA06WS | N12 | L12 | 20 | 1,517 | C58DG06TS | N16 | L16 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B15.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B15.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 440 | C12AA04WS | N5 | L5 | 80 | 572 | C12AA04WS | N6 | L6 |
| 25.0 | 10 | 219 | 3/4 | 40 | 1,000 | C34DG06WS | N10 | L10 | 80 | 1,300 | C34DG06WS | N13 | L13 |
| 35.0 | 10 | 307 | 3/4 | 32 | 1,120 | C34DG06WS | N12 | L12 | 64 | 1,456 | C34DG06WS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 22 | 1,100 | C34DG06WS | N11 | L11 | 44 | 1,430 | C34DG06WS | N15 | L15 |
| 65.0 | 10 | 570 | 3/4 | 17 | 1,105 | C34DG06WS | N12 | L12 | 34 | 1,437 | C34DG06WS | N15 | L15 |
| 75.0 | 10 | 658 | 3/4 | 15 | 1,125 | C34DG06WS | N12 | L12 | 30 | 1,463 | C34DG06WS | N15 | L15 |
| 100.0 | 10 | 878 | 3/4 | 11 | 1,100 | C34DG06WS | N11 | L11 | 22 | 1,430 | C34DG06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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2013 CBC OSHPD

*CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B15.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B15.1) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 381 | C38AA04WS | N4 | L4 | 80 | 495 | C38AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 1/2 | 40 | 866 | C12AA06WS | N9 | L9 | 80 | 1,126 | C12AA06WS | N12 | L12 |
| 35.0 | 10 | 307 | 1/2 | 36 | 1,091 | C12AA06WS | N11 | L11 | 72 | 1,419 | C12AA06WS | N15 | L15 |
| 50.0 | 10 | 439 | 1/2 | 25 | 1,083 | C12AA06WS | N11 | L11 | 50 | 1,407 | C12AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 1/2 | 19 | 1,070 | C12AA06WS | N11 | L11 | 38 | 1,390 | C12AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 1/2 | 17 | 1,104 | C12AA06WS | N12 | L12 | 34 | 1,435 | C12AA06WS | N15 | L15 |
| 100.0 | 10 | 878 | 1/2 | 12 | 1,039 | C12AA06WS | N11 | L11 | 24 | 1,351 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,097 | 1/2 | 10 | 1,083 | C12AA06WS | N11 | L11 | 20 | 1,407 | C12AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B15.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B15.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 513 | C12AA04WS | N6 | L6 | 80 | 667 | C12AA04WS | N7 | L7 |
| 25.0 | 10 | 219 | 3/4 | 40 | 1,167 | C34DG06WS | N12 | L12 | 80 | 1,517 | C34DG06TS | N16 | L16 |
| 35.0 | 10 | 307 | 3/4 | 28 | 1,143 | C34DG06WS | N12 | L12 | 56 | 1,486 | C34DG06TS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 20 | 1,167 | C34DG06WS | N12 | L12 | 40 | 1,517 | C34DG06TS | N16 | L16 |
| 65.0 | 10 | 570 | 5/8 | 14 | 1,062 | C58AA06WS | N11 | L11 | 28 | 1,380 | C58AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 5/8 | 12 | 1,050 | C58AA06WS | N11 | L11 | 24 | 1,365 | C58AA06WS | N14 | L14 |
| 100.0 | 10 | 878 | 5/8 | 10 | 1,167 | C58AA06WS | N12 | L12 | 20 | 1,517 | C58DG06TS | N16 | L16 |

1. $TVL = DL + Fv + (0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]:

**TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B15.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B15.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 660 | C12AA04WS | N7 | L7 | 80 | 858 | C12AA06WS | N9 | L9 |
| 25.0 | 10 | 219 | 3/4 | 30 | 1,125 | C34DG06WS | N12 | L12 | 60 | 1,463 | C34DG06WS | N15 | L15 |
| 35.0 | 10 | 307 | 3/4 | 21 | 1,103 | C34DG06WS | N12 | L12 | 42 | 1,433 | C34DG06WS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 15 | 1,125 | C34DG06WS | N12 | L12 | 30 | 1,463 | C34DG06WS | N15 | L15 |
| 65.0 | 10 | 570 | 3/4 | 11 | 1,073 | C34DG06WS | N11 | L11 | 22 | 1,394 | C34DG06WS | N14 | L14 |
| 75.0 | 10 | 658 | 3/4 | 10 | 1,125 | C34DG06WS | N12 | L12 | 20 | 1,463 | C34DG06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7] *:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B15.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B15.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 508 | C12AA04WS | N6 | L6 | 80 | 660 | C12AA04WS | N7 | L7 |
| 25.0 | 10 | 219 | 1/2 | 38 | 1,097 | C12AA06WS | N11 | L11 | 76 | 1,426 | C12AA06WS | N15 | L15 |
| 35.0 | 10 | 307 | 1/2 | 27 | 1,091 | C12AA06WS | N11 | L11 | 54 | 1,419 | C12AA06WS | N15 | L15 |
| 50.0 | 10 | 439 | 1/2 | 19 | 1,097 | C12AA06WS | N11 | L11 | 38 | 1,426 | C12AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 1/2 | 14 | 1,051 | C12AA06WS | N11 | L11 | 28 | 1,366 | C12AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 1/2 | 12 | 1,039 | C12AA06WS | N11 | L11 | 24 | 1,351 | C12AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B15.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B15.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 685 | C12AA06WS | N7 | L7 | 80 | 890 | C12AA06WS | N9 | L9 |
| 25.0 | 10 | 219 | 3/4 | 30 | 1,167 | C34DG06WS | N12 | L12 | 60 | 1,517 | C34DG06TS | N16 | L16 |
| 35.0 | 10 | 307 | 3/4 | 22 | 1,198 | C34DG06WS | N12 | L12 | 44 | 1,557 | C34DG06TS | N16 | L16 |
| 50.0 | 10 | 439 | 5/8 | 14 | 1,089 | C58AA06WS | N11 | L11 | 28 | 1,416 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 5/8 | 10 | 1,011 | C58AA06WS | N11 | L11 | 20 | 1,315 | C58AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 3/4 | 10 | 1,167 | C34DG06WS | N12 | L12 | 20 | 1,517 | C34DG06TS | N16 | L16 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B15.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B15.1)** | | | | |
| 11.0 | 10 | 97 | 5/8 | 40 | 880 | C58AA06WS | N9 | L9 | 80 | 1,144 | C58AA06WS | N12 | L12 |
| 25.0 | 10 | 219 | 3/4 | 20 | 1,000 | C34DG06WS | N10 | L10 | 40 | 1,300 | C34DG06WS | N13 | L13 |
| 35.0 | 10 | 307 | 3/4 | 16 | 1,120 | C34DG06WS | N12 | L12 | 32 | 1,456 | C34DG06WS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 11 | 1,100 | C34DG06WS | N11 | L11 | 22 | 1,430 | C34DG06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** Form Pour [4] Deck Page D1 | **Min. Brace Anchorage [6]** Metal [5] Deck Page D2 | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** Form Pour [4] Deck Page D1 | **Min. Brace Anchorage [6]** Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B16.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B16.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 64 | C38AA04WS | N1 | L1 | 80 | 83 | C38AA04WS | N1 | L1 |
| 25.0 | 10 | 219 | 1/2 | 40 | 144 | C12AA04WS | N2 | L2 | 80 | 188 | C12AA04WS | N2 | L2 |
| 35.0 | 10 | 307 | 1/2 | 40 | 202 | C12AA04WS | N3 | L3 | 80 | 263 | C12AA04WS | N3 | L3 |
| 50.0 | 10 | 439 | 1/2 | 40 | 289 | C12AA04WS | N3 | L3 | 80 | 375 | C12AA04WS | N4 | L4 |
| 65.0 | 10 | 570 | 1/2 | 40 | 375 | C12AA04WS | N4 | L4 | 80 | 488 | C12AA04WS | N5 | L5 |
| 75.0 | 10 | 658 | 1/2 | 40 | 433 | C12AA04WS | N5 | L5 | 80 | 563 | C12AA04WS | N6 | L6 |
| 100.0 | 10 | 878 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 751 | C12AA06WS | N8 | L8 |
| 125.0 | 10 | 1,097 | 5/8 | 40 | 722 | C58AA06WS | N8 | L8 | 80 | 938 | C58AA06WS | N10 | L10 |
| 150.0 | 10 | 1,316 | 5/8 | 40 | 866 | C58AA06WS | N9 | L9 | 80 | 1,126 | C58AA06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 5/8 | 37 | 935 | C58AA06WS | N10 | L10 | 74 | 1,215 | C58AA06WS | N13 | L13 |
| 200.0 | 10 | 1,755 | 5/8 | 32 | 924 | C58AA06WS | N10 | L10 | 64 | 1,201 | C58AA06WS | N13 | L13 |
| 225.0 | 10 | 1,974 | 5/8 | 29 | 942 | C58AA06WS | N10 | L10 | 58 | 1,224 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
   Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
   A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***2- Tier***

## *CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B16.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B16.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 86 | C38AA04WS | N1 | L1 | 80 | 111 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 194 | C12AA04WS | N2 | L2 | 80 | 253 | C12AA04WS | N3 | L3 |
| 35.0 | 10 | 307 | 1/2 | 40 | 272 | C12AA04WS | N3 | L3 | 80 | 354 | C12AA04WS | N4 | L4 |
| 50.0 | 10 | 439 | 1/2 | 40 | 389 | C12AA04WS | N4 | L4 | 80 | 506 | C12AA04WS | N6 | L6 |
| 65.0 | 10 | 570 | 5/8 | 40 | 506 | C58AA04WS | N6 | L6 | 80 | 657 | C58AA04WS | N7 | L7 |
| 75.0 | 10 | 658 | 3/4 | 40 | 583 | C34CF04WS | N6 | L6 | 80 | 758 | C34DG06WS | N8 | L8 |
| 100.0 | 10 | 878 | 3/4 | 40 | 778 | C34DG06WS | N8 | L8 | 80 | 1,011 | C34DG06WS | N11 | L11 |
| 125.0 | 10 | 1,097 | 3/4 | 32 | 778 | C34DG06WS | N8 | L8 | 64 | 1,011 | C34DG06WS | N11 | L11 |
| 150.0 | 10 | 1,316 | 3/4 | 27 | 788 | C34DG06WS | N8 | L8 | 54 | 1,024 | C34DG06WS | N11 | L11 |
| 175.0 | 10 | 1,536 | 3/4 | 23 | 783 | C34DG06WS | N8 | L8 | 46 | 1,018 | C34DG06WS | N11 | L11 |
| 200.0 | 10 | 1,755 | 3/4 | 21 | 817 | C34DG06WS | N9 | L9 | 42 | 1,062 | C34DG06WS | N11 | L11 |
| 225.0 | 10 | 1,974 | 3/4 | 19 | 831 | C34DG06WS | N9 | L9 | 38 | 1,081 | C34DG06WS | N11 | L11 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
   Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
   A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

ANTHONY A. RUBALCAVA
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***2- Tier***

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## *CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E -Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E -Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B16.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B16.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 110 | C38AA04WS | N2 | L2 | 80 | 143 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 250 | C12AA04WS | N3 | L3 | 80 | 325 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 307 | 1/2 | 40 | 350 | C12AA04WS | N4 | L4 | 80 | 455 | C12AA04WS | N5 | L5 |
| 50.0 | 10 | 439 | 5/8 | 40 | 500 | C58AA04WS | N5 | L5 | 80 | 650 | C58AA04WS | N7 | L7 |
| 65.0 | 10 | 570 | 3/4 | 40 | 650 | C34CF04WS | N7 | L7 | 80 | 845 | C34DG06WS | N9 | L9 |
| 75.0 | 10 | 658 | 3/4 | 36 | 675 | C34DG06WS | N7 | L7 | 72 | 878 | C34DG06WS | N9 | L9 |
| 100.0 | 10 | 878 | 3/4 | 27 | 675 | C34DG06WS | N7 | L7 | 54 | 878 | C34DG06WS | N9 | L9 |
| 125.0 | 10 | 1,097 | 3/4 | 22 | 688 | C34DG06WS | N7 | L7 | 44 | 894 | C34DG06WS | N9 | L9 |
| 150.0 | 10 | 1,316 | 3/4 | 19 | 713 | C34DG06WS | N8 | L8 | 38 | 926 | C34DG06WS | N10 | L10 |
| 175.0 | 10 | 1,536 | 3/4 | 16 | 700 | C34DG06WS | N7 | L7 | 32 | 910 | C34DG06WS | N10 | L10 |
| 200.0 | 10 | 1,755 | 3/4 | 14 | 700 | C34DG06WS | N7 | L7 | 28 | 910 | C34DG06WS | N10 | L10 |
| 225.0 | 10 | 1,974 | 3/4 | 13 | 731 | C34DG06WS | N8 | L8 | 26 | 951 | C34DG06WS | N10 | L10 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown. A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***2- Tier***

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### *CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B16.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B16.1) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 127 | C38AA04WS | N2 | L2 | 80 | 165 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 289 | C12AA04WS | N3 | L3 | 80 | 375 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 307 | 1/2 | 40 | 404 | C12AA04WS | N5 | L5 | 80 | 525 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 439 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 751 | C12AA06WS | N8 | L8 |
| 65.0 | 10 | 570 | 5/8 | 40 | 751 | C58AA06WS | N8 | L8 | 80 | 976 | C58AA06WS | N10 | L10 |
| 75.0 | 10 | 658 | 5/8 | 40 | 866 | C58AA06WS | N9 | L9 | 80 | 1,126 | C58AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 5/8 | 31 | 895 | C58AA06WS | N9 | L9 | 62 | 1,163 | C58AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 5/8 | 25 | 902 | C58AA06WS | N10 | L10 | 50 | 1,173 | C58AA06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 5/8 | 21 | 909 | C58AA06WS | N10 | L10 | 42 | 1,182 | C58AA06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 5/8 | 18 | 909 | C58AA06WS | N10 | L10 | 36 | 1,182 | C58AA06WS | N12 | L12 |
| 200.0 | 10 | 1,755 | 5/8 | 16 | 924 | C58AA06WS | N10 | L10 | 32 | 1,201 | C58AA06WS | N13 | L13 |
| 225.0 | 10 | 1,974 | 5/8 | 14 | 909 | C58AA06WS | N10 | L10 | 28 | 1,182 | C58AA06WS | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown. A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***2- Tier***

### CABLE BRACING REQUIREMENTS [7] :

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** — **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2-Way Transverse Brace Pattern (B16.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B16.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 171 | C12AA04WS | N2 | L2 | 80 | 222 | C12AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 389 | C12AA04WS | N4 | L4 | 80 | 506 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 5/8 | 40 | 545 | C58AA04WS | N6 | L6 | 80 | 708 | C58AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 3/4 | 39 | 758 | C34DG06WS | N8 | L8 | 78 | 986 | C34DG06WS | N10 | L10 |
| 65.0 | 10 | 570 | 3/4 | 30 | 758 | C34DG06WS | N8 | L8 | 60 | 986 | C34DG06WS | N10 | L10 |
| 75.0 | 10 | 658 | 3/4 | 26 | 758 | C34DG06WS | N8 | L8 | 52 | 986 | C34DG06WS | N10 | L10 |
| 100.0 | 10 | 878 | 3/4 | 20 | 778 | C34DG06WS | N8 | L8 | 40 | 1,011 | C34DG06WS | N11 | L11 |
| 125.0 | 10 | 1,097 | 3/4 | 16 | 778 | C34DG06WS | N8 | L8 | 32 | 1,011 | C34DG06WS | N11 | L11 |
| 150.0 | 10 | 1,316 | 3/4 | 13 | 758 | C34DG06WS | N8 | L8 | 26 | 986 | C34DG06WS | N10 | L10 |
| 175.0 | 10 | 1,536 | 3/4 | 11 | 749 | C34DG06WS | N8 | L8 | 22 | 973 | C34DG06WS | N10 | L10 |
| 200.0 | 10 | 1,755 | 3/4 | 10 | 778 | C34DG06WS | N8 | L8 | 20 | 1,011 | C34DG06WS | N11 | L11 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown. A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2- Tier**

## *CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E -Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E -Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B16.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B16.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 220 | C12AA04WS | N3 | L3 | 80 | 286 | C12AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 3/4 | 40 | 500 | C34CF04WS | N5 | L5 | 80 | 650 | C34CF04WS | N7 | L7 |
| 35.0 | 10 | 307 | 3/4 | 38 | 665 | C34CF04WS | N7 | L7 | 76 | 865 | C34DG06WS | N9 | L9 |
| 50.0 | 10 | 439 | 3/4 | 27 | 675 | C34DG06WS | N7 | L7 | 54 | 878 | C34DG06WS | N9 | L9 |
| 65.0 | 10 | 570 | 3/4 | 21 | 683 | C34DG06WS | N7 | L7 | 42 | 887 | C34DG06WS | N9 | L9 |
| 75.0 | 10 | 658 | 3/4 | 18 | 675 | C34DG06WS | N7 | L7 | 36 | 878 | C34DG06WS | N9 | L9 |
| 100.0 | 10 | 878 | 3/4 | 13 | 650 | C34CF04WS | N7 | L7 | 26 | 845 | C34DG06WS | N9 | L9 |
| 125.0 | 10 | 1,097 | 3/4 | 11 | 688 | C34DG06WS | N7 | L7 | 22 | 894 | C34DG06WS | N9 | L9 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown. A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7] *:*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B16.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B16.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 191 | C38AA04WS | N2 | L2 | 80 | 248 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 433 | C12AA04WS | N5 | L5 | 80 | 563 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 1/2 | 40 | 606 | C12AA04WS | N7 | L7 | 80 | 788 | C12AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 5/8 | 40 | 866 | C58AA06WS | N9 | L9 | 80 | 1,126 | C58AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 3/4 | 32 | 901 | C34DG06WS | N10 | L10 | 64 | 1,171 | C34DG06WS | N12 | L12 |
| 75.0 | 10 | 658 | 3/4 | 28 | 909 | C34DG06WS | N10 | L10 | 56 | 1,182 | C34DG06WS | N12 | L12 |
| 100.0 | 10 | 878 | 3/4 | 21 | 909 | C34DG06WS | N10 | L10 | 42 | 1,182 | C34DG06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 3/4 | 17 | 920 | C34DG06WS | N10 | L10 | 34 | 1,196 | C34DG06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 5/8 | 14 | 909 | C58AA06WS | N10 | L10 | 28 | 1,182 | C58AA06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 5/8 | 12 | 909 | C58AA06WS | N10 | L10 | 24 | 1,182 | C58AA06WS | N12 | L12 |
| 200.0 | 10 | 1,755 | 5/8 | 10 | 866 | C58AA06WS | N9 | L9 | 20 | 1,126 | C58AA06WS | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown. A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

Anthony A. Rubalcava
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***CABLE BRACING REQUIREMENTS [7]:***

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B16.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B16.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 257 | C12AA04WS | N3 | L3 | 80 | 334 | C12AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 3/4 | 40 | 583 | C34CF04WS | N6 | L6 | 80 | 758 | C34DG06WS | N8 | L8 |
| 35.0 | 10 | 307 | 3/4 | 37 | 755 | C34DG06WS | N8 | L8 | 74 | 982 | C34DG06WS | N10 | L10 |
| 50.0 | 10 | 439 | 3/4 | 26 | 758 | C34DG06WS | N8 | L8 | 52 | 986 | C34DG06WS | N10 | L10 |
| 65.0 | 10 | 570 | 3/4 | 20 | 758 | C34DG06WS | N8 | L8 | 40 | 986 | C34DG06WS | N10 | L10 |
| 75.0 | 10 | 658 | 3/4 | 17 | 744 | C34DG06WS | N8 | L8 | 34 | 967 | C34DG06WS | N10 | L10 |
| 100.0 | 10 | 878 | 3/4 | 13 | 758 | C34DG06WS | N8 | L8 | 26 | 986 | C34DG06WS | N10 | L10 |
| 125.0 | 10 | 1,097 | 3/4 | 10 | 729 | C34DG06WS | N8 | L8 | 20 | 948 | C34DG06WS | N10 | L10 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
   A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E -Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E -Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B16.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B16.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 330 | C12AA04WS | N4 | L4 | 80 | 429 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 3/4 | 35 | 656 | C34CF04WS | N7 | L7 | 70 | 853 | C34DG06WS | N9 | L9 |
| 35.0 | 10 | 307 | 3/4 | 25 | 656 | C34CF04WS | N7 | L7 | 50 | 853 | C34DG06WS | N9 | L9 |
| 50.0 | 10 | 439 | 3/4 | 18 | 675 | C34DG06WS | N7 | L7 | 36 | 878 | C34DG06WS | N9 | L9 |
| 65.0 | 10 | 570 | 3/4 | 14 | 683 | C34DG06WS | N7 | L7 | 28 | 887 | C34DG06WS | N9 | L9 |
| 75.0 | 10 | 658 | 3/4 | 12 | 675 | C34DG06WS | N7 | L7 | 24 | 878 | C34DG06WS | N9 | L9 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown. A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B16.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B16.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 254 | C12AA04WS | N3 | L3 | 80 | 330 | C12AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 751 | C12AA06WS | N8 | L8 |
| 35.0 | 10 | 307 | 5/8 | 40 | 808 | C58AA06WS | N9 | L9 | 80 | 1,051 | C58AA06WS | N11 | L11 |
| 50.0 | 10 | 439 | 3/4 | 31 | 895 | C34DG06WS | N9 | L9 | 62 | 1,163 | C34DG06WS | N12 | L12 |
| 65.0 | 10 | 570 | 3/4 | 24 | 901 | C34DG06WS | N10 | L10 | 48 | 1,171 | C34DG06WS | N12 | L12 |
| 75.0 | 10 | 658 | 3/4 | 21 | 909 | C34DG06WS | N10 | L10 | 42 | 1,182 | C34DG06WS | N12 | L12 |
| 100.0 | 10 | 878 | 5/8 | 15 | 866 | C58AA06WS | N9 | L9 | 30 | 1,126 | C58AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 5/8 | 12 | 866 | C58AA06WS | N9 | L9 | 24 | 1,126 | C58AA06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 5/8 | 10 | 866 | C58AA06WS | N9 | L9 | 20 | 1,126 | C58AA06WS | N12 | L12 |

Spacing

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown. A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B16.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B16.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 342 | C12AA04WS | N4 | L4 | 80 | 445 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 3/4 | 39 | 758 | C34DG06WS | N8 | L8 | 78 | 986 | C34DG06WS | N10 | L10 |
| 35.0 | 10 | 307 | 3/4 | 28 | 762 | C34DG06WS | N8 | L8 | 56 | 991 | C34DG06WS | N10 | L10 |
| 50.0 | 10 | 439 | 3/4 | 19 | 739 | C34DG06WS | N8 | L8 | 38 | 961 | C34DG06WS | N10 | L10 |
| 65.0 | 10 | 570 | 3/4 | 15 | 758 | C34DG06WS | N8 | L8 | 30 | 986 | C34DG06WS | N10 | L10 |
| 75.0 | 10 | 658 | 3/4 | 13 | 758 | C34DG06WS | N8 | L8 | 26 | 986 | C34DG06WS | N10 | L10 |
| 100.0 | 10 | 878 | 3/4 | 10 | 778 | C34DG06WS | N8 | L8 | 20 | 1,011 | C34DG06WS | N11 | L11 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown. A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E -Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E -Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B16.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B16.1)** | | | | |
| 11.0 | 10 | 97 | 5/8 | 40 | 440 | C58AA04WS | N5 | L5 | 80 | 572 | C58AA04WS | N6 | L6 |
| 25.0 | 10 | 219 | 3/4 | 26 | 650 | C34CF04WS | N7 | L7 | 52 | 845 | C34DG06WS | N9 | L9 |
| 35.0 | 10 | 307 | 3/4 | 19 | 665 | C34CF04WS | N7 | L7 | 38 | 865 | C34DG06WS | N9 | L9 |
| 50.0 | 10 | 439 | 3/4 | 13 | 650 | C34CF04WS | N7 | L7 | 26 | 845 | C34DG06WS | N9 | L9 |
| 65.0 | 10 | 570 | 3/4 | 10 | 650 | C34CF04WS | N7 | L7 | 20 | 845 | C34DG06WS | N9 | L9 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown. A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | **4-Way Splayed Brace Pattern (B11.4)** | | | | |
| 11.0 | 10 | 149 | 3/8 | 40 | 90 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 338 | 1/2 | 40 | 204 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 473 | 1/2 | 40 | 286 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 675 | 1/2 | 40 | 408 | R12AAEM406 | N5 | L5 |
| 65.0 | 10 | 878 | 1/2 | 40 | 531 | R12AAEM406 | N6 | L6 |
| 75.0 | 10 | 1,013 | 1/2 | 40 | 612 | R12AAEM406 | N7 | L7 |
| 100.0 | 10 | 1,351 | 1/2 | 40 | 816 | R12AAEM506 | N9 | L9 |
| 125.0 | 10 | 1,689 | 5/8 | 40 | 1,021 | R58AAEM506 | N11 | L11 |
| 150.0 | 10 | 1,991 | 5/8 | 38 | 1,164 | R58AAEM506 | N12 | L12 |
| 175.0 | 10 | 2,198 | 5/8 | 32 | 1,143 | R58AAEM506 | N12 | L12 |
| 200.0 | 10 | 2,323 | 5/8 | 24 | 980 | R58AAEM506 | N10 | L10 |
| 225.0 | 10 | 2,507 | 3/4 | 20 | 919 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Max.** | **Rod [1]** | **Min. [8]** | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Vertical Support Spacing (ft.)** | **Total Vertical Load (lbs)** | **Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B11.4)** | | | | |
| 11.0 | 10 | 204 | 3/8 | 40 | 121 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 464 | 1/2 | 40 | 275 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 649 | 1/2 | 40 | 385 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 927 | 1/2 | 40 | 550 | R12AAEM406 | N6 | L6 |
| 65.0 | 10 | 1,206 | 1/2 | 40 | 715 | R12AAEM509 | N8 | L8 |
| 75.0 | 10 | 1,391 | 1/2 | 40 | 825 | R12AAEM506 | N9 | L9 |
| 100.0 | 10 | 1,855 | 5/8 | 40 | 1,100 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 2,319 | 5/8 | 40 | 1,375 | R58AAEM506 | N14 | L14 |
| 150.0 | 10 | 2,782 | 3/4 | 40 | 1,650 | R34CFB2P12 | N17 | L17 |
| 175.0 | 10 | 3,246 | 3/4 | 40 | 1,925 | R34DGB2P09 | N20 | L20 |
| 200.0 | 10 | 3,465 | 3/4 | 35 | 1,925 | R34DGB2P09 | N20 | L20 |
| 225.0 | 10 | 3,459 | 3/4 | 27 | 1,671 | R34CFB2P09 | N17 | L17 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B11.4) | | | | |
| 11.0 | 10 | 253 | 3/8 | 40 | 156 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 574 | 1/2 | 40 | 354 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 804 | 1/2 | 40 | 495 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 1,149 | 1/2 | 40 | 707 | R12AAEM509 | N8 | L8 |
| 65.0 | 10 | 1,494 | 5/8 | 40 | 919 | R58AAEM506 | N10 | L10 |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 1,061 | R58AAEM506 | N11 | L11 |
| 100.0 | 10 | 2,298 | 5/8 | 40 | 1,414 | R58AAEM506 | N15 | L15 |
| 125.0 | 10 | 2,473 | 3/4 | 31 | 1,370 | R34DGB1S06 | N14 | L14 |
| 150.0 | 10 | 2,701 | 3/4 | 26 | 1,379 | R34DGB1S06 | N14 | L14 |
| 175.0 | 10 | 2,903 | 3/4 | 22 | 1,361 | R34DGB1S06 | N14 | L14 |
| 200.0 | 10 | 3,104 | 3/4 | 19 | 1,344 | R34DGB1S06 | N14 | L14 |
| 225.0 | 10 | 3,333 | 3/4 | 17 | 1,352 | R34DGB1S06 | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | 4-Way Splayed Brace Pattern (B11.4) | | | | |
| 11.0 | 10 | 201 | 3/8 | 40 | 180 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 456 | 1/2 | 40 | 408 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 639 | 1/2 | 40 | 572 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 912 | 1/2 | 40 | 816 | R12AAEM506 | N9 | L9 |
| 65.0 | 10 | 1,186 | 1/2 | 40 | 1,061 | R12AAEM506 | N11 | L11 |
| 75.0 | 10 | 1,333 | 1/2 | 38 | 1,164 | R12AAEM506 | N12 | L12 |
| 100.0 | 10 | 1,564 | 5/8 | 29 | 1,184 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 1,777 | 5/8 | 23 | 1,174 | R58AAEM506 | N12 | L12 |
| 150.0 | 10 | 1,991 | 5/8 | 19 | 1,164 | R58AAEM506 | N12 | L12 |
| 175.0 | 10 | 2,198 | 5/8 | 16 | 1,143 | R58AAEM506 | N12 | L12 |
| 200.0 | 10 | 2,323 | 5/8 | 12 | 980 | R58AAEM506 | N10 | L10 |
| 225.0 | 10 | 2,507 | 3/4 | 10 | 919 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS*[7]*:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage**[6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod**[1] **Total Vertical Load (lbs)** | **Min.**[8] **Vertical Support Rod Dia. (in.)** | **Max.**[2] **Brace Spacing (ft.)** | **Brace**[3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour**[4] **Deck Page D1** | **Metal**[5] **Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B11.4)** | | | | |
| 11.0 | 10 | 312 | 3/8 | 40 | 242 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 708 | 1/2 | 40 | 550 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 991 | 1/2 | 40 | 770 | R12AAEM509 | N8 | L8 |
| 50.0 | 10 | 1,416 | 1/2 | 40 | 1,100 | R12AAEM506 | N12 | L12 |
| 65.0 | 10 | 1,841 | 5/8 | 40 | 1,430 | R58AAEM506 | N15 | L15 |
| 75.0 | 10 | 2,124 | 3/4 | 40 | 1,650 | R34CFB2P12 | N17 | L17 |
| 100.0 | 10 | 2,832 | 3/4 | 40 | 2,200 | R34DGB2P09 | N23 | L23 |
| 125.0 | 10 | 3,051 | 3/4 | 32 | 2,200 | R34DGB2P09 | N23 | L23 |
| 150.0 | 10 | 3,295 | 3/4 | 27 | 2,228 | R34DGB2P09 | N23 | L23 |
| 175.0 | 10 | 3,417 | 3/4 | 22 | 2,118 | R34DGB2P09 | N22 | L22 |
| 200.0 | 10 | 3,416 | 3/4 | 17 | 1,870 | R34DGB2P09 | N19 | L19 |
| 225.0 | 10 | 3,404 | 3/4 | 13 | 1,609 | R34CFB2P12 | N17 | L17 |

1. TVL = DL + Fv + $(0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B11.4)** | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 311 | R38AAEM409 | N4 | L4 |
| 25.0 | 10 | 930 | 1/2 | 40 | 707 | R12AAEM509 | N8 | L8 |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 990 | R12AAEM506 | N10 | L10 |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 1,414 | R58AAEM506 | N15 | L15 |
| 65.0 | 10 | 2,001 | 5/8 | 31 | 1,425 | R58AAEM506 | N15 | L15 |
| 75.0 | 10 | 2,096 | 5/8 | 27 | 1,432 | R58AAEM506 | N15 | L15 |
| 100.0 | 10 | 2,298 | 5/8 | 20 | 1,414 | R58AAEM506 | N15 | L15 |
| 125.0 | 10 | 2,428 | 3/4 | 15 | 1,326 | R34DGB1S06 | N14 | L14 |
| 150.0 | 10 | 2,701 | 3/4 | 13 | 1,379 | R34DGB1S06 | N14 | L14 |
| 175.0 | 10 | 2,903 | 3/4 | 11 | 1,361 | R34DGB1S06 | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times W_p$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B11.4)** | | | | |
| 11.0 | 10 | 253 | 3/8 | 40 | 269 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 574 | 1/2 | 40 | 612 | R12AAEM406 | N7 | L7 |
| 35.0 | 10 | 804 | 1/2 | 40 | 857 | R12AAEM506 | N9 | L9 |
| 50.0 | 10 | 1,113 | 1/2 | 38 | 1,164 | R12AAEM506 | N12 | L12 |
| 65.0 | 10 | 1,240 | 1/2 | 29 | 1,154 | R12AAEM506 | N12 | L12 |
| 75.0 | 10 | 1,324 | 1/2 | 25 | 1,148 | R12AAEM506 | N12 | L12 |
| 100.0 | 10 | 1,552 | 5/8 | 19 | 1,164 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 1,763 | 5/8 | 15 | 1,148 | R58AAEM506 | N12 | L12 |
| 150.0 | 10 | 1,955 | 5/8 | 12 | 1,102 | R58AAEM506 | N12 | L12 |
| 175.0 | 10 | 2,219 | 5/8 | 11 | 1,179 | R58AAEM506 | N12 | L12 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B11.4) | | | | |
| 11.0 | 10 | 419 | 3/8 | 40 | 363 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 952 | 1/2 | 40 | 825 | R12AAEM506 | N9 | L9 |
| 35.0 | 10 | 1,333 | 5/8 | 40 | 1,155 | R58AAEM506 | N12 | L12 |
| 50.0 | 10 | 1,905 | 3/4 | 40 | 1,650 | R34CFB2P12 | N17 | L17 |
| 65.0 | 10 | 2,476 | 3/4 | 40 | 2,145 | R34DGB2P09 | N22 | L22 |
| 75.0 | 10 | 2,582 | 3/4 | 35 | 2,166 | R34DGB2P09 | N22 | L22 |
| 100.0 | 10 | 2,857 | 3/4 | 27 | 2,228 | R34DGB2P09 | N23 | L23 |
| 125.0 | 10 | 3,021 | 3/4 | 21 | 2,166 | R34DGB2P09 | N22 | L22 |
| 150.0 | 10 | 3,295 | 3/4 | 18 | 2,228 | R34DGB2P09 | N23 | L23 |
| 175.0 | 10 | 3,460 | 3/4 | 15 | 2,166 | R34DGB2P09 | N22 | L22 |
| 200.0 | 10 | 3,368 | 3/4 | 11 | 1,815 | R34DGB2P09 | N19 | L19 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS*[7] *:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage**[6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod**[1] **Total Vertical Load (lbs)** | **Min.**[8] **Vertical Support Rod Dia. (in.)** | **Max.**[2] **Brace Spacing (ft.)** | **Brace**[3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour**[4] **Deck Page D1** | **Metal**[5] **Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B11.4)** | | | | |
| 11.0 | 10 | 565 | 1/2 | 40 | 467 | R12AAEM406 | N5 | L5 |
| 25.0 | 10 | 1,285 | 5/8 | 40 | 1,061 | R58AAEM506 | N11 | L11 |
| 35.0 | 10 | 1,649 | 5/8 | 36 | 1,336 | R58AAEM506 | N14 | L14 |
| 50.0 | 10 | 1,824 | 5/8 | 26 | 1,379 | R58AAEM506 | N14 | L14 |
| 65.0 | 10 | 1,955 | 5/8 | 20 | 1,379 | R58AAEM506 | N14 | L14 |
| 75.0 | 10 | 2,096 | 5/8 | 18 | 1,432 | R58AAEM506 | N15 | L15 |
| 100.0 | 10 | 2,262 | 5/8 | 13 | 1,379 | R58AAEM506 | N14 | L14 |
| 125.0 | 10 | 2,428 | 3/4 | 10 | 1,326 | R34DGB1S06 | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS* [7] *:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B11.4)** | | | | |
| 11.0 | 10 | 305 | 3/8 | 40 | 359 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 693 | 1/2 | 40 | 816 | R12AAEM506 | N9 | L9 |
| 35.0 | 10 | 970 | 1/2 | 40 | 1,143 | R12AAEM506 | N12 | L12 |
| 50.0 | 10 | 1,125 | 1/2 | 29 | 1,184 | R12AAEM506 | N12 | L12 |
| 65.0 | 10 | 1,247 | 1/2 | 22 | 1,168 | R12AAEM506 | N12 | L12 |
| 75.0 | 10 | 1,333 | 1/2 | 19 | 1,164 | R12AAEM506 | N12 | L12 |
| 100.0 | 10 | 1,540 | 5/8 | 14 | 1,143 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 1,748 | 5/8 | 11 | 1,123 | R58AAEM506 | N12 | L12 |
| 150.0 | 10 | 2,026 | 5/8 | 10 | 1,225 | R58AAEM506 | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B11.4)** | | | | |
| 11.0 | 10 | 527 | 1/2 | 40 | 484 | R12AAEM406 | N5 | L5 |
| 25.0 | 10 | 1,197 | 1/2 | 40 | 1,100 | R12AAEM506 | N12 | L12 |
| 35.0 | 10 | 1,675 | 5/8 | 40 | 1,540 | R58AAEM606 | N16 | L16 |
| 50.0 | 10 | 2,345 | 3/4 | 39 | 2,145 | R34DGB2P09 | N22 | L22 |
| 65.0 | 10 | 2,476 | 3/4 | 30 | 2,145 | R34DGB2P09 | N22 | L22 |
| 75.0 | 10 | 2,564 | 3/4 | 26 | 2,145 | R34DGB2P09 | N22 | L22 |
| 100.0 | 10 | 2,832 | 3/4 | 20 | 2,200 | R34DGB2P09 | N23 | L23 |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 2,200 | R34DGB2P09 | N23 | L23 |
| 150.0 | 10 | 3,222 | 3/4 | 13 | 2,145 | R34DGB2P09 | N22 | L22 |
| 175.0 | 10 | 3,417 | 3/4 | 11 | 2,118 | R34DGB2P09 | N22 | L22 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *4-WAY SPLAYED RIGID BRACING REQUIREMENTS* [7] *:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B11.4)** | | | | |
| 11.0 | 10 | 721 | 1/2 | 40 | 622 | R12AAEM406 | N7 | L7 |
| 25.0 | 10 | 1,604 | 5/8 | 39 | 1,379 | R58AAEM506 | N14 | L14 |
| 35.0 | 10 | 1,699 | 5/8 | 28 | 1,386 | R58AAEM506 | N14 | L14 |
| 50.0 | 10 | 1,859 | 5/8 | 20 | 1,414 | R58AAEM506 | N15 | L15 |
| 65.0 | 10 | 1,955 | 5/8 | 15 | 1,379 | R58AAEM506 | N14 | L14 |
| 75.0 | 10 | 2,043 | 5/8 | 13 | 1,379 | R58AAEM506 | N14 | L14 |
| 100.0 | 10 | 2,298 | 5/8 | 10 | 1,414 | R58AAEM506 | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Total Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B12.4)** | | | | |
| 11.0 | 10 | 149 | 3/8 | 40 | 45 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 338 | 1/2 | 40 | 102 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 473 | 1/2 | 40 | 143 | R12AAEM306 | N2 | L2 |
| 50.0 | 10 | 675 | 1/2 | 40 | 204 | R12AAEM306 | N3 | L3 |
| 65.0 | 10 | 878 | 1/2 | 40 | 265 | R12AAEM306 | N3 | L3 |
| 75.0 | 10 | 1,013 | 1/2 | 40 | 306 | R12AAEM409 | N4 | L4 |
| 100.0 | 10 | 1,351 | 1/2 | 40 | 408 | R12AAEM406 | N5 | L5 |
| 125.0 | 10 | 1,689 | 5/8 | 40 | 510 | R58AAEM406 | N6 | L6 |
| 150.0 | 10 | 2,026 | 5/8 | 40 | 612 | R58AAEM406 | N7 | L7 |
| 175.0 | 10 | 2,364 | 3/4 | 40 | 714 | R34CFB1P09 | N8 | L8 |
| 200.0 | 10 | 2,702 | 3/4 | 40 | 816 | R34DGB1P09 | N9 | L9 |
| 225.0 | 10 | 3,040 | 3/4 | 40 | 919 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Total Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B12.4) | | | | |
| 11.0 | 10 | 204 | 3/8 | 40 | 61 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 464 | 1/2 | 40 | 138 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 649 | 1/2 | 40 | 193 | R12AAEM306 | N2 | L2 |
| 50.0 | 10 | 927 | 1/2 | 40 | 275 | R12AAEM306 | N3 | L3 |
| 65.0 | 10 | 1,206 | 1/2 | 40 | 358 | R12AAEM406 | N4 | L4 |
| 75.0 | 10 | 1,391 | 1/2 | 40 | 413 | R12AAEM406 | N5 | L5 |
| 100.0 | 10 | 1,855 | 5/8 | 40 | 550 | R58AAEM406 | N6 | L6 |
| 125.0 | 10 | 2,319 | 5/8 | 40 | 688 | R58AAEM509 | N7 | L7 |
| 150.0 | 10 | 2,782 | 3/4 | 40 | 825 | R34CFB1P09 | N9 | L9 |
| 175.0 | 10 | 3,246 | 3/4 | 40 | 963 | R34CFB1P06 | N10 | L10 |
| 200.0 | 10 | 3,465 | 3/4 | 35 | 963 | R34CFB1P06 | N10 | L10 |
| 225.0 | 10 | 3,404 | 3/4 | 26 | 804 | R34CFB1P09 | N9 | L9 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Combined 2-Tier Maximum Total Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B12.4) | | | | |
| 11.0 | 10 | 253 | 3/8 | 40 | 78 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 574 | 1/2 | 40 | 177 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 804 | 1/2 | 40 | 247 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 1,149 | 1/2 | 40 | 354 | R12AAEM406 | N4 | L4 |
| 65.0 | 10 | 1,494 | 5/8 | 40 | 460 | R58AAEM406 | N5 | L5 |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 530 | R58AAEM406 | N6 | L6 |
| 100.0 | 10 | 2,298 | 5/8 | 40 | 707 | R58AAEM509 | N8 | L8 |
| 125.0 | 10 | 2,872 | 3/4 | 40 | 884 | R34DGB1P09 | N9 | L9 |
| 150.0 | 10 | 3,340 | 3/4 | 38 | 1,008 | R34DGB1P06 | N11 | L11 |
| 175.0 | 10 | 3,462 | 3/4 | 31 | 959 | R34DGB1P06 | N10 | L10 |
| 200.0 | 10 | 3,459 | 3/4 | 24 | 849 | R34CFB1P09 | N9 | L9 |
| 225.0 | 10 | 3,492 | 3/4 | 19 | 756 | R34CFB1P09 | N8 | L8 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7]:

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Combined 2-Tier Maximum Total Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B12.4) | | | | |
| 11.0 | 10 | 201 | 3/8 | 40 | 90 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 456 | 1/2 | 40 | 204 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 639 | 1/2 | 40 | 286 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 912 | 1/2 | 40 | 408 | R12AAEM406 | N5 | L5 |
| 65.0 | 10 | 1,186 | 1/2 | 40 | 531 | R12AAEM406 | N6 | L6 |
| 75.0 | 10 | 1,368 | 1/2 | 40 | 612 | R12AAEM406 | N7 | L7 |
| 100.0 | 10 | 1,824 | 5/8 | 40 | 816 | R58AAEM506 | N9 | L9 |
| 125.0 | 10 | 2,281 | 5/8 | 40 | 1,021 | R58AAEM506 | N11 | L11 |
| 150.0 | 10 | 2,453 | 3/4 | 32 | 980 | R34DGB1P06 | N10 | L10 |
| 175.0 | 10 | 2,654 | 3/4 | 27 | 964 | R34DGB1P06 | N10 | L10 |
| 200.0 | 10 | 2,891 | 3/4 | 24 | 980 | R34DGB1P06 | N10 | L10 |
| 225.0 | 10 | 3,093 | 3/4 | 21 | 964 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**C17-0.5-30**

**2-Tier**

## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Total Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B12.4) | | | | |
| 11.0 | 10 | 312 | 3/8 | 40 | 121 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 708 | 1/2 | 40 | 275 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 991 | 1/2 | 40 | 385 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 1,416 | 1/2 | 40 | 550 | R12AAEM406 | N6 | L6 |
| 65.0 | 10 | 1,841 | 5/8 | 40 | 715 | R58AAEM509 | N8 | L8 |
| 75.0 | 10 | 2,124 | 3/4 | 40 | 825 | R34CFB1P09 | N9 | L9 |
| 100.0 | 10 | 2,832 | 3/4 | 40 | 1,100 | R34CFB1P06 | N12 | L12 |
| 125.0 | 10 | 3,051 | 3/4 | 32 | 1,100 | R34CFB1P06 | N12 | L12 |
| 150.0 | 10 | 3,295 | 3/4 | 27 | 1,114 | R34CFB1P06 | N12 | L12 |
| 175.0 | 10 | 3,417 | 3/4 | 22 | 1,059 | R34CFB1P06 | N11 | L11 |
| 200.0 | 10 | 3,416 | 3/4 | 17 | 935 | R34CFB1P06 | N10 | L10 |
| 225.0 | 10 | 3,404 | 3/4 | 13 | 804 | R34CFB1P09 | N9 | L9 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Total Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B12.4) | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 156 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 930 | 1/2 | 40 | 354 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 495 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 707 | R58AAEM509 | N8 | L8 |
| 65.0 | 10 | 2,417 | 3/4 | 40 | 919 | R34DGB1P06 | N10 | L10 |
| 75.0 | 10 | 2,576 | 3/4 | 36 | 955 | R34DGB1P06 | N10 | L10 |
| 100.0 | 10 | 2,795 | 3/4 | 27 | 955 | R34DGB1P06 | N10 | L10 |
| 125.0 | 10 | 3,050 | 3/4 | 22 | 972 | R34DGB1P06 | N10 | L10 |
| 150.0 | 10 | 3,340 | 3/4 | 19 | 1,008 | R34DGB1P06 | N11 | L11 |
| 175.0 | 10 | 3,400 | 3/4 | 15 | 928 | R34DGB1P06 | N10 | L10 |
| 200.0 | 10 | 3,459 | 3/4 | 12 | 849 | R34CFB1P09 | N9 | L9 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
   Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

ANTHONY P. RUBALCAVA
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***2-Tier***

## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Total Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]**<br>**Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B12.4)** | | | | |
| 11.0 | 10 | 253 | 3/8 | 40 | 135 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 574 | 1/2 | 40 | 306 | R12AAEM409 | N4 | L4 |
| 35.0 | 10 | 804 | 1/2 | 40 | 429 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 1,149 | 1/2 | 40 | 612 | R12AAEM406 | N7 | L7 |
| 65.0 | 10 | 1,494 | 5/8 | 40 | 796 | R58AAEM506 | N8 | L8 |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 919 | R58AAEM506 | N10 | L10 |
| 100.0 | 10 | 2,227 | 5/8 | 38 | 1,164 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 2,340 | 5/8 | 28 | 1,072 | R58AAEM506 | N11 | L11 |
| 150.0 | 10 | 2,435 | 3/4 | 21 | 964 | R34DGB1P06 | N10 | L10 |
| 175.0 | 10 | 2,654 | 3/4 | 18 | 964 | R34DGB1P06 | N10 | L10 |
| 200.0 | 10 | 2,891 | 3/4 | 16 | 980 | R34DGB1P06 | N10 | L10 |
| 225.0 | 10 | 3,093 | 3/4 | 14 | 964 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Combined 2-Tier Maximum Total Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B12.4) | | | | |
| 11.0 | 10 | 419 | 3/8 | 40 | 182 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 952 | 1/2 | 40 | 413 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 1,333 | 5/8 | 40 | 578 | R58AAEM406 | N6 | L6 |
| 50.0 | 10 | 1,905 | 3/4 | 40 | 825 | R34CFB1P09 | N9 | L9 |
| 65.0 | 10 | 2,476 | 3/4 | 40 | 1,073 | R34CFB1P06 | N11 | L11 |
| 75.0 | 10 | 2,582 | 3/4 | 35 | 1,083 | R34CFB1P06 | N11 | L11 |
| 100.0 | 10 | 2,857 | 3/4 | 27 | 1,114 | R34CFB1P06 | N12 | L12 |
| 125.0 | 10 | 3,021 | 3/4 | 21 | 1,083 | R34CFB1P06 | N11 | L11 |
| 150.0 | 10 | 3,295 | 3/4 | 18 | 1,114 | R34CFB1P06 | N12 | L12 |
| 175.0 | 10 | 3,460 | 3/4 | 15 | 1,083 | R34CFB1P06 | N11 | L11 |
| 200.0 | 10 | 3,368 | 3/4 | 11 | 908 | R34CFB1P09 | N10 | L10 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
   Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS[7] :

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Total Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B12.4) | | | | |
| 11.0 | 10 | 565 | 1/2 | 40 | 233 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,285 | 5/8 | 40 | 530 | R58AAEM406 | N6 | L6 |
| 35.0 | 10 | 1,799 | 3/4 | 40 | 742 | R34CFB1P09 | N8 | L8 |
| 50.0 | 10 | 2,356 | 3/4 | 36 | 955 | R34DGB1P06 | N10 | L10 |
| 65.0 | 10 | 2,509 | 3/4 | 28 | 965 | R34DGB1P06 | N10 | L10 |
| 75.0 | 10 | 2,576 | 3/4 | 24 | 955 | R34DGB1P06 | N10 | L10 |
| 100.0 | 10 | 2,795 | 3/4 | 18 | 955 | R34DGB1P06 | N10 | L10 |
| 125.0 | 10 | 3,094 | 3/4 | 15 | 994 | R34DGB1P06 | N10 | L10 |
| 150.0 | 10 | 3,234 | 3/4 | 12 | 955 | R34DGB1P06 | N10 | L10 |
| 175.0 | 10 | 3,400 | 3/4 | 10 | 928 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Total Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B12.4) | | | | |
| 11.0 | 10 | 305 | 3/8 | 40 | 180 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 693 | 1/2 | 40 | 408 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 970 | 1/2 | 40 | 572 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 1,386 | 1/2 | 40 | 816 | R12AAEM506 | N9 | L9 |
| 65.0 | 10 | 1,801 | 5/8 | 40 | 1,061 | R58AAEM506 | N11 | L11 |
| 75.0 | 10 | 2,007 | 5/8 | 38 | 1,164 | R58AAEM506 | N12 | L12 |
| 100.0 | 10 | 2,251 | 5/8 | 29 | 1,184 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 2,340 | 5/8 | 21 | 1,072 | R58AAEM506 | N11 | L11 |
| 150.0 | 10 | 2,453 | 3/4 | 16 | 980 | R34DGB1P06 | N10 | L10 |
| 175.0 | 10 | 2,613 | 3/4 | 13 | 929 | R34DGB1P06 | N10 | L10 |
| 200.0 | 10 | 2,891 | 3/4 | 12 | 980 | R34DGB1P06 | N10 | L10 |
| 225.0 | 10 | 3,040 | 3/4 | 10 | 919 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Total Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | 4-Way Splayed Brace Pattern (B12.4) | | | | |
| 11.0 | 10 | 527 | 1/2 | 40 | 242 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,197 | 1/2 | 40 | 550 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 1,675 | 5/8 | 40 | 770 | R58AAEM509 | N8 | L8 |
| 50.0 | 10 | 2,345 | 3/4 | 39 | 1,073 | R34CFB1P06 | N11 | L11 |
| 65.0 | 10 | 2,476 | 3/4 | 30 | 1,073 | R34CFB1P06 | N11 | L11 |
| 75.0 | 10 | 2,564 | 3/4 | 26 | 1,073 | R34CFB1P06 | N11 | L11 |
| 100.0 | 10 | 2,832 | 3/4 | 20 | 1,100 | R34CFB1P06 | N12 | L12 |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 1,100 | R34CFB1P06 | N12 | L12 |
| 150.0 | 10 | 3,222 | 3/4 | 13 | 1,073 | R34CFB1P06 | N11 | L11 |
| 175.0 | 10 | 3,417 | 3/4 | 11 | 1,059 | R34CFB1P06 | N11 | L11 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Total Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B12.4) | | | | |
| 11.0 | 10 | 721 | 1/2 | 40 | 311 | R12AAEM409 | N4 | L4 |
| 25.0 | 10 | 1,640 | 3/4 | 40 | 707 | R34CFB1P09 | N8 | L8 |
| 35.0 | 10 | 2,196 | 3/4 | 38 | 940 | R34DGB1P06 | N10 | L10 |
| 50.0 | 10 | 2,356 | 3/4 | 27 | 955 | R34DGB1P06 | N10 | L10 |
| 65.0 | 10 | 2,509 | 3/4 | 21 | 965 | R34DGB1P06 | N10 | L10 |
| 75.0 | 10 | 2,576 | 3/4 | 18 | 955 | R34DGB1P06 | N10 | L10 |
| 100.0 | 10 | 2,724 | 3/4 | 13 | 919 | R34DGB1P06 | N10 | L10 |
| 125.0 | 10 | 3,050 | 3/4 | 11 | 972 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS* [7] *:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B15.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 180 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 408 | C12AA04WS | N5 | L5 |
| 35.0 | 10 | 307 | 1/2 | 40 | 572 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 439 | 1/2 | 40 | 816 | C12AA06WS | N9 | L9 |
| 65.0 | 10 | 570 | 1/2 | 40 | 1,061 | C12AA06WS | N11 | L11 |
| 75.0 | 10 | 658 | 1/2 | 38 | 1,164 | C12AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 1/2 | 29 | 1,184 | C12AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 1/2 | 23 | 1,174 | C12AA06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 1/2 | 19 | 1,164 | C12AA06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 5/8 | 16 | 1,143 | C58AA06WS | N12 | L12 |
| 200.0 | 10 | 1,755 | 5/8 | 14 | 1,143 | C58AA06WS | N12 | L12 |
| 225.0 | 10 | 1,974 | 5/8 | 12 | 1,102 | C58AA06WS | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **4-Way Splayed Brace Pattern (B15.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 242 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 550 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 1/2 | 40 | 770 | C12AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 1/2 | 40 | 1,100 | C12AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 5/8 | 40 | 1,430 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 5/8 | 40 | 1,650 | C58DG06TS | N17 | L17 |
| 100.0 | 10 | 878 | 5/8 | 33 | 1,815 | C58DG06TS | N19 | L19 |
| 125.0 | 10 | 1,097 | 5/8 | 26 | 1,788 | C58DG06TS | N18 | L18 |
| 150.0 | 10 | 1,316 | 5/8 | 22 | 1,815 | C58DG06TS | N19 | L19 |
| 175.0 | 10 | 1,536 | 5/8 | 19 | 1,829 | C58DG06TS | N19 | L19 |
| 200.0 | 10 | 1,755 | 5/8 | 16 | 1,760 | C58DG06TS | N18 | L18 |
| 225.0 | 10 | 1,974 | 5/8 | 14 | 1,733 | C58DG06TS | N18 | L18 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

**TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B15.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 311 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 40 | 707 | C12AA06WS | N8 | L8 |
| 35.0 | 10 | 307 | 1/2 | 40 | 990 | C12AA06WS | N10 | L10 |
| 50.0 | 10 | 439 | 5/8 | 40 | 1,414 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 5/8 | 32 | 1,471 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 5/8 | 27 | 1,432 | C58AA06WS | N15 | L15 |
| 100.0 | 10 | 878 | 5/8 | 20 | 1,414 | C58AA06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 5/8 | 16 | 1,414 | C58AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 5/8 | 13 | 1,379 | C58AA06WS | N14 | L14 |
| 175.0 | 10 | 1,536 | 5/8 | 11 | 1,361 | C58AA06WS | N14 | L14 |
| 200.0 | 10 | 1,755 | 5/8 | 10 | 1,414 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B15.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 359 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 40 | 816 | C12AA06WS | N9 | L9 |
| 35.0 | 10 | 307 | 1/2 | 40 | 1,143 | C12AA06WS | N12 | L12 |
| 50.0 | 10 | 439 | 1/2 | 29 | 1,184 | C12AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 1/2 | 22 | 1,168 | C12AA06WS | N12 | L12 |
| 75.0 | 10 | 658 | 1/2 | 19 | 1,164 | C12AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 1/2 | 14 | 1,143 | C12AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 1/2 | 11 | 1,123 | C12AA06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 1/2 | 10 | 1,225 | C12AA06WS | N13 | L13 |
| 175.0 | 10 | 1,536 | 5/8 | 10 | 1,429 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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# *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **4-Way Splayed Brace Pattern (B15.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 484 | C38AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 1/2 | 40 | 1,100 | C12AA06WS | N12 | L12 |
| 35.0 | 10 | 307 | 5/8 | 40 | 1,540 | C58DG06TS | N16 | L16 |
| 50.0 | 10 | 439 | 5/8 | 33 | 1,815 | C58DG06TS | N19 | L19 |
| 65.0 | 10 | 570 | 5/8 | 24 | 1,716 | C58DG06TS | N18 | L18 |
| 75.0 | 10 | 658 | 5/8 | 22 | 1,815 | C58DG06TS | N19 | L19 |
| 100.0 | 10 | 878 | 5/8 | 16 | 1,760 | C58DG06TS | N18 | L18 |
| 125.0 | 10 | 1,097 | 5/8 | 13 | 1,788 | C58DG06TS | N18 | L18 |
| 150.0 | 10 | 1,316 | 5/8 | 11 | 1,815 | C58DG06TS | N19 | L19 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B15.2)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 622 | C12AA04WS | N7 | L7 |
| 25.0 | 10 | 219 | 5/8 | 40 | 1,414 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 307 | 5/8 | 29 | 1,435 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 439 | 5/8 | 20 | 1,414 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 5/8 | 16 | 1,471 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 5/8 | 13 | 1,379 | C58AA06WS | N14 | L14 |
| 100.0 | 10 | 878 | 5/8 | 10 | 1,414 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

**TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B15.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 539 | C38AA04WS | N6 | L6 |
| 25.0 | 10 | 219 | 1/2 | 38 | 1,164 | C12AA06WS | N12 | L12 |
| 35.0 | 10 | 307 | 1/2 | 27 | 1,157 | C12AA06WS | N12 | L12 |
| 50.0 | 10 | 439 | 1/2 | 19 | 1,164 | C12AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 1/2 | 14 | 1,115 | C12AA06WS | N12 | L12 |
| 75.0 | 10 | 658 | 1/2 | 12 | 1,102 | C12AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 1/2 | 10 | 1,225 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B15.2)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 726 | C12AA06WS | N8 | L8 |
| 25.0 | 10 | 219 | 5/8 | 40 | 1,650 | C58DG06TS | N17 | L17 |
| 35.0 | 10 | 307 | 5/8 | 31 | 1,790 | C58DG06TS | N18 | L18 |
| 50.0 | 10 | 439 | 5/8 | 22 | 1,815 | C58DG06TS | N19 | L19 |
| 65.0 | 10 | 570 | 5/8 | 17 | 1,823 | C58DG06TS | N19 | L19 |
| 75.0 | 10 | 658 | 5/8 | 14 | 1,733 | C58DG06TS | N18 | L18 |
| 100.0 | 10 | 878 | 5/8 | 11 | 1,815 | C58DG06TS | N19 | L19 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B15.2)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 933 | C12AA06WS | N10 | L10 |
| 25.0 | 10 | 219 | 5/8 | 27 | 1,432 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 307 | 5/8 | 19 | 1,411 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 439 | 5/8 | 13 | 1,379 | C58AA06WS | N14 | L14 |
| 65.0 | 10 | 570 | 5/8 | 10 | 1,379 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | 4-Way Splayed Brace Pattern (B15.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 719 | C38AA06WS | N8 | L8 |
| 25.0 | 10 | 219 | 1/2 | 29 | 1,184 | C12AA06WS | N12 | L12 |
| 35.0 | 10 | 307 | 1/2 | 20 | 1,143 | C12AA06WS | N12 | L12 |
| 50.0 | 10 | 439 | 1/2 | 14 | 1,143 | C12AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 1/2 | 11 | 1,168 | C12AA06WS | N12 | L12 |
| 75.0 | 10 | 658 | 1/2 | 10 | 1,225 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B15.2)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 968 | C12AA06WS | N10 | L10 |
| 25.0 | 10 | 219 | 5/8 | 33 | 1,815 | C58DG06TS | N19 | L19 |
| 35.0 | 10 | 307 | 5/8 | 23 | 1,771 | C58DG06TS | N18 | L18 |
| 50.0 | 10 | 439 | 5/8 | 16 | 1,760 | C58DG06TS | N18 | L18 |
| 65.0 | 10 | 570 | 5/8 | 12 | 1,716 | C58DG06TS | N18 | L18 |
| 75.0 | 10 | 658 | 5/8 | 11 | 1,815 | C58DG06TS | N19 | L19 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B15.2)** | | | | |
| 11.0 | 10 | 97 | 5/8 | 40 | 1,245 | C58AA06WS | N13 | L13 |
| 25.0 | 10 | 219 | 5/8 | 20 | 1,414 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 307 | 5/8 | 14 | 1,386 | C58AA06WS | N14 | L14 |
| 50.0 | 10 | 439 | 5/8 | 10 | 1,414 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B16.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 90 | C38AA04WS | N1 | L1 |
| 25.0 | 10 | 219 | 1/2 | 40 | 204 | C12AA04WS | N3 | L3 |
| 35.0 | 10 | 307 | 1/2 | 40 | 286 | C12AA04WS | N3 | L3 |
| 50.0 | 10 | 439 | 1/2 | 40 | 408 | C12AA04WS | N5 | L5 |
| 65.0 | 10 | 570 | 1/2 | 40 | 531 | C12AA04WS | N6 | L6 |
| 75.0 | 10 | 658 | 1/2 | 40 | 612 | C12AA04WS | N7 | L7 |
| 100.0 | 10 | 878 | 1/2 | 40 | 816 | C12AA06WS | N9 | L9 |
| 125.0 | 10 | 1,097 | 1/2 | 40 | 1,021 | C12AA06WS | N11 | L11 |
| 150.0 | 10 | 1,316 | 5/8 | 38 | 1,164 | C58AA06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 5/8 | 33 | 1,179 | C58AA06WS | N12 | L12 |
| 200.0 | 10 | 1,755 | 5/8 | 29 | 1,184 | C58AA06WS | N12 | L12 |
| 225.0 | 10 | 1,974 | 5/8 | 25 | 1,148 | C58AA06WS | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4$ x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B16.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 121 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 275 | C12AA04WS | N3 | L3 |
| 35.0 | 10 | 307 | 1/2 | 40 | 385 | C12AA04WS | N4 | L4 |
| 50.0 | 10 | 439 | 1/2 | 40 | 550 | C12AA04WS | N6 | L6 |
| 65.0 | 10 | 570 | 5/8 | 40 | 715 | C58AA06WS | N8 | L8 |
| 75.0 | 10 | 658 | 5/8 | 40 | 825 | C58AA06WS | N9 | L9 |
| 100.0 | 10 | 878 | 3/4 | 40 | 1,100 | C34DG06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 3/4 | 38 | 1,306 | C34DG06WS | N14 | L14 |
| 150.0 | 10 | 1,316 | 3/4 | 32 | 1,320 | C34DG06WS | N14 | L14 |
| 175.0 | 10 | 1,536 | 3/4 | 26 | 1,251 | C34DG06WS | N13 | L13 |
| 200.0 | 10 | 1,755 | 3/4 | 24 | 1,320 | C34DG06WS | N14 | L14 |
| 225.0 | 10 | 1,974 | 3/4 | 22 | 1,361 | C34DG06WS | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
   Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***2-Tier***

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B16.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 156 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 354 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 307 | 1/2 | 40 | 495 | C12AA04WS | N5 | L5 |
| 50.0 | 10 | 439 | 5/8 | 40 | 707 | C58AA06WS | N8 | L8 |
| 65.0 | 10 | 570 | 3/4 | 40 | 919 | C34DG06WS | N10 | L10 |
| 75.0 | 10 | 658 | 3/4 | 40 | 1,061 | C34DG06WS | N11 | L11 |
| 100.0 | 10 | 878 | 3/4 | 32 | 1,131 | C34DG06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 3/4 | 26 | 1,149 | C34DG06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 3/4 | 22 | 1,167 | C34DG06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 3/4 | 19 | 1,176 | C34DG06WS | N12 | L12 |
| 200.0 | 10 | 1,755 | 3/4 | 16 | 1,131 | C34DG06WS | N12 | L12 |
| 225.0 | 10 | 1,974 | 3/4 | 15 | 1,193 | C34DG06WS | N12 | L12 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B16.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 180 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 408 | C12AA04WS | N5 | L5 |
| 35.0 | 10 | 307 | 1/2 | 40 | 572 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 439 | 1/2 | 40 | 816 | C12AA06WS | N9 | L9 |
| 65.0 | 10 | 570 | 5/8 | 40 | 1,061 | C58AA06WS | N11 | L11 |
| 75.0 | 10 | 658 | 5/8 | 38 | 1,164 | C58AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 5/8 | 29 | 1,184 | C58AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 5/8 | 23 | 1,174 | C58AA06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 5/8 | 19 | 1,164 | C58AA06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 5/8 | 16 | 1,143 | C58AA06WS | N12 | L12 |
| 200.0 | 10 | 1,755 | 5/8 | 14 | 1,143 | C58AA06WS | N12 | L12 |
| 225.0 | 10 | 1,974 | 5/8 | 12 | 1,102 | C58AA06WS | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
   Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B16.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 242 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 550 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 5/8 | 40 | 770 | C58AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 3/4 | 40 | 1,100 | C34DG06WS | N12 | L12 |
| 65.0 | 10 | 570 | 3/4 | 35 | 1,251 | C34DG06WS | N13 | L13 |
| 75.0 | 10 | 658 | 3/4 | 30 | 1,238 | C34DG06WS | N13 | L13 |
| 100.0 | 10 | 878 | 3/4 | 22 | 1,210 | C34DG06WS | N13 | L13 |
| 125.0 | 10 | 1,097 | 3/4 | 18 | 1,238 | C34DG06WS | N13 | L13 |
| 150.0 | 10 | 1,316 | 3/4 | 14 | 1,155 | C34DG06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 3/4 | 12 | 1,155 | C34DG06WS | N12 | L12 |
| 200.0 | 10 | 1,755 | 3/4 | 12 | 1,320 | C34DG06WS | N14 | L14 |
| 225.0 | 10 | 1,974 | 3/4 | 11 | 1,361 | C34DG06WS | N14 | L14 |

1. TVL = DL + Fv + $(0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B16.2) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 311 | C12AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 5/8 | 40 | 707 | C58AA06WS | N8 | L8 |
| 35.0 | 10 | 307 | 3/4 | 40 | 990 | C34DG06WS | N10 | L10 |
| 50.0 | 10 | 439 | 3/4 | 31 | 1,096 | C34DG06WS | N11 | L11 |
| 65.0 | 10 | 570 | 3/4 | 24 | 1,103 | C34DG06WS | N12 | L12 |
| 75.0 | 10 | 658 | 3/4 | 21 | 1,114 | C34DG06WS | N12 | L12 |
| 100.0 | 10 | 878 | 3/4 | 16 | 1,131 | C34DG06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 3/4 | 13 | 1,149 | C34DG06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 3/4 | 11 | 1,167 | C34DG06WS | N12 | L12 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B16.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 269 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 612 | C12AA04WS | N7 | L7 |
| 35.0 | 10 | 307 | 1/2 | 40 | 857 | C12AA06WS | N9 | L9 |
| 50.0 | 10 | 439 | 5/8 | 38 | 1,164 | C58AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 5/8 | 29 | 1,154 | C58AA06WS | N12 | L12 |
| 75.0 | 10 | 658 | 5/8 | 25 | 1,148 | C58AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 5/8 | 19 | 1,164 | C58AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 5/8 | 15 | 1,148 | C58AA06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 1/2 | 12 | 1,102 | C12AA06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 5/8 | 11 | 1,179 | C58AA06WS | N12 | L12 |
| 200.0 | 10 | 1,755 | 5/8 | 10 | 1,225 | C58AA06WS | N13 | L13 |
| 225.0 | 10 | 1,974 | 5/8 | 10 | 1,378 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B16.2) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 363 | C12AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 5/8 | 40 | 825 | C58AA06WS | N9 | L9 |
| 35.0 | 10 | 307 | 3/4 | 40 | 1,155 | C34DG06WS | N12 | L12 |
| 50.0 | 10 | 439 | 3/4 | 30 | 1,238 | C34DG06WS | N13 | L13 |
| 65.0 | 10 | 570 | 3/4 | 23 | 1,233 | C34DG06WS | N13 | L13 |
| 75.0 | 10 | 658 | 3/4 | 20 | 1,238 | C34DG06WS | N13 | L13 |
| 100.0 | 10 | 878 | 3/4 | 15 | 1,238 | C34DG06WS | N13 | L13 |
| 125.0 | 10 | 1,097 | 3/4 | 12 | 1,238 | C34DG06WS | N13 | L13 |
| 150.0 | 10 | 1,316 | 3/4 | 10 | 1,238 | C34DG06WS | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | 4-Way Splayed Brace Pattern (B16.2) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 467 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 3/4 | 40 | 1,061 | C34DG06WS | N11 | L11 |
| 35.0 | 10 | 307 | 3/4 | 29 | 1,077 | C34DG06WS | N11 | L11 |
| 50.0 | 10 | 439 | 3/4 | 21 | 1,114 | C34DG06WS | N12 | L12 |
| 65.0 | 10 | 570 | 3/4 | 16 | 1,103 | C34DG06WS | N12 | L12 |
| 75.0 | 10 | 658 | 3/4 | 14 | 1,114 | C34DG06WS | N12 | L12 |
| 100.0 | 10 | 878 | 3/4 | 10 | 1,061 | C34DG06WS | N11 | L11 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

**2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B16.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 359 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 40 | 816 | C12AA06WS | N9 | L9 |
| 35.0 | 10 | 307 | 5/8 | 40 | 1,143 | C58AA06WS | N12 | L12 |
| 50.0 | 10 | 439 | 5/8 | 29 | 1,184 | C58AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 5/8 | 22 | 1,168 | C58AA06WS | N12 | L12 |
| 75.0 | 10 | 658 | 5/8 | 19 | 1,164 | C58AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 5/8 | 14 | 1,143 | C58AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 5/8 | 11 | 1,123 | C58AA06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 5/8 | 10 | 1,225 | C58AA06WS | N13 | L13 |
| 175.0 | 10 | 1,536 | 5/8 | 10 | 1,429 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***2-Tier***

### *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B16.2)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 484 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 3/4 | 40 | 1,100 | C34DG06WS | N12 | L12 |
| 35.0 | 10 | 307 | 3/4 | 32 | 1,232 | C34DG06WS | N13 | L13 |
| 50.0 | 10 | 439 | 3/4 | 23 | 1,265 | C34DG06WS | N13 | L13 |
| 65.0 | 10 | 570 | 3/4 | 17 | 1,216 | C34DG06WS | N13 | L13 |
| 75.0 | 10 | 658 | 3/4 | 15 | 1,238 | C34DG06WS | N13 | L13 |
| 100.0 | 10 | 878 | 3/4 | 11 | 1,210 | C34DG06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS* [7] *:*

***2-TIERED TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B16.2)** | | | | |
| 11.0 | 10 | 97 | 5/8 | 40 | 622 | C58AA04WS | N7 | L7 |
| 25.0 | 10 | 219 | 3/4 | 31 | 1,096 | C34DG06WS | N11 | L11 |
| 35.0 | 10 | 307 | 3/4 | 22 | 1,089 | C34DG06WS | N11 | L11 |
| 50.0 | 10 | 439 | 3/4 | 15 | 1,061 | C34DG06WS | N11 | L11 |
| 65.0 | 10 | 570 | 3/4 | 12 | 1,103 | C34DG06WS | N12 | L12 |
| 75.0 | 10 | 658 | 3/4 | 10 | 1,061 | C34DG06WS | N11 | L11 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination. Assumes 50% Of Total Trapeze Load Per Tier.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard** [1] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.3)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 54 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 287 | 1/2 | 40 | 123 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 402 | 1/2 | 40 | 172 | R12AAEM306 | N2 | L2 |
| 50.0 | 10 | 574 | 1/2 | 40 | 245 | R12AAEM306 | N3 | L3 |
| 65.0 | 10 | 746 | 1/2 | 40 | 319 | R12AAEM409 | N4 | L4 |
| 75.0 | 10 | 861 | 1/2 | 40 | 368 | R12AAEM406 | N4 | L4 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 491 | R12AAEM406 | N5 | L5 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 613 | R12AAEM406 | N7 | L7 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | |
| 150.0 | 10 | 1,721 | 5/8 | 40 | 736 | R58AAEM509 | N8 | L8 |
| 175.0 | 10 | 2,008 | 5/8 | 40 | 859 | R58AAEM506 | N9 | L9 |
| 200.0 | 10 | 2,295 | 5/8 | 40 | 981 | R58AAEM506 | N10 | L10 |
| 225.0 | 10 | 2,582 | 3/4 | 40 | 1,104 | R34DGB1P06 | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard** [1] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.3)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 73 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 287 | 1/2 | 40 | 165 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 402 | 1/2 | 40 | 231 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 574 | 1/2 | 40 | 331 | R12AAEM406 | N4 | L4 |
| 65.0 | 10 | 746 | 1/2 | 40 | 430 | R12AAEM406 | N5 | L5 |
| 75.0 | 10 | 861 | 1/2 | 40 | 496 | R12AAEM406 | N5 | L5 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 661 | R12AAEM509 | N7 | L7 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 826 | R12AAEM506 | N9 | L9 |
| 150.0 | 10 | 1,721 | 5/8 | 40 | 992 | R58AAEM506 | N10 | L10 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | |
| 175.0 | 10 | 2,008 | 5/8 | 40 | 1,157 | R58AAEM506 | N12 | L12 |
| 200.0 | 10 | 2,295 | 5/8 | 40 | 1,322 | R58AAEM506 | N14 | L14 |
| 225.0 | 10 | 2,582 | 3/4 | 40 | 1,488 | R34CFB2P12 | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard [1] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.3)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 94 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 287 | 1/2 | 40 | 213 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 402 | 1/2 | 40 | 298 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 574 | 1/2 | 40 | 425 | R12AAEM406 | N5 | L5 |
| 65.0 | 10 | 746 | 1/2 | 40 | 553 | R12AAEM406 | N6 | L6 |
| 75.0 | 10 | 861 | 1/2 | 40 | 638 | R12AAEM406 | N7 | L7 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 850 | R12AAEM506 | N9 | L9 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 1,063 | R12AAEM506 | N11 | L11 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | |
| 150.0 | 10 | 1,721 | 5/8 | 40 | 1,275 | R58AAEM506 | N13 | L13 |
| 175.0 | 10 | 2,008 | 5/8 | 40 | 1,488 | R58AAEM606 | N15 | L15 |
| 200.0 | 10 | 2,295 | 5/8 | 40 | 1,700 | R58AAEM606 | N17 | L17 |
| 225.0 | 10 | 2,582 | 3/4 | 28 | 1,339 | R34DGB1S06 | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard** [1] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.3)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 108 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 287 | 1/2 | 40 | 245 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 402 | 1/2 | 40 | 344 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 574 | 1/2 | 40 | 491 | R12AAEM406 | N5 | L5 |
| 65.0 | 10 | 746 | 1/2 | 40 | 638 | R12AAEM406 | N7 | L7 |
| 75.0 | 10 | 861 | 1/2 | 40 | 736 | R12AAEM509 | N8 | L8 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 981 | R12AAEM506 | N10 | L10 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 1,227 | R12AAEM506 | N13 | L13 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | |
| 150.0 | 10 | 1,721 | 5/8 | 39 | 1,435 | R58AAEM506 | N15 | L15 |
| 175.0 | 10 | 2,008 | 5/8 | 33 | 1,417 | R58AAEM506 | N15 | L15 |
| 200.0 | 10 | 2,295 | 5/8 | 29 | 1,423 | R58AAEM506 | N15 | L15 |
| 225.0 | 10 | 2,582 | 3/4 | 21 | 1,159 | R34DGB1P06 | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard** [1] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.3)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 145 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 287 | 1/2 | 40 | 331 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 402 | 1/2 | 40 | 463 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 574 | 1/2 | 40 | 661 | R12AAEM509 | N7 | L7 |
| 65.0 | 10 | 746 | 1/2 | 40 | 860 | R12AAEM506 | N9 | L9 |
| 75.0 | 10 | 861 | 1/2 | 40 | 992 | R12AAEM506 | N10 | L10 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 1,322 | R12AAEM506 | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 1,653 | R12AAEM606 | N17 | L17 |
| 150.0 | 10 | 1,721 | 5/8 | 40 | 1,984 | R58AAEM606 | N20 | L20 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | |
| 175.0 | 10 | 2,008 | 5/8 | 40 | 2,314 | R58DGB2P09 | N24 | L24 |
| 200.0 | 10 | 2,295 | 5/8 | 36 | 2,380 | R58DGB2P09 | N24 | L24 |
| 225.0 | 10 | 2,582 | 3/4 | 32 | 2,380 | R34DGB2P09 | N24 | L24 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | 5-Way Transverse, Longitudinal Brace Pattern (B13.3) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 187 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 287 | 1/2 | 40 | 425 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 402 | 1/2 | 40 | 595 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 574 | 1/2 | 40 | 850 | R12AAEM506 | N9 | L9 |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,105 | R12AAEM506 | N12 | L12 |
| 75.0 | 10 | 861 | 1/2 | 40 | 1,275 | R12AAEM506 | N13 | L13 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 1,700 | R12AAEM606 | N17 | L17 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 2,125 | R12AAB2P09 | N22 | L22 |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B13.5) | | | | |
| 150.0 | 10 | 1,721 | 5/8 | 38 | 2,423 | R58AAB2P06 | N25 | L25 |
| 175.0 | 10 | 2,008 | 5/8 | 33 | 2,454 | R58AAB2P06 | N25 | L25 |
| 200.0 | 10 | 2,295 | 5/8 | 29 | 2,465 | R58AAB2P06 | N25 | L25 |
| 225.0 | 10 | 2,582 | 3/4 | 14 | 1,339 | R34DGB1S06 | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.3)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 162 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 287 | 1/2 | 40 | 368 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 402 | 1/2 | 40 | 515 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 574 | 1/2 | 40 | 736 | R12AAEM509 | N8 | L8 |
| 65.0 | 10 | 746 | 1/2 | 40 | 957 | R12AAEM506 | N10 | L10 |
| 75.0 | 10 | 861 | 1/2 | 40 | 1,104 | R12AAEM506 | N12 | L12 |
| 100.0 | 10 | 1,148 | 1/2 | 38 | 1,399 | R12AAEM506 | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 30 | 1,380 | R12AAEM506 | N14 | L14 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | |
| 150.0 | 10 | 1,721 | 5/8 | 26 | 1,435 | R58AAEM506 | N15 | L15 |
| 175.0 | 10 | 2,008 | 5/8 | 22 | 1,417 | R58AAEM506 | N15 | L15 |
| 200.0 | 10 | 2,295 | 5/8 | 19 | 1,399 | R58AAEM506 | N14 | L14 |
| 225.0 | 10 | 2,582 | 3/4 | 14 | 1,159 | R34DGB1P06 | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE =*** ***0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.3)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 218 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 40 | 496 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 402 | 1/2 | 40 | 694 | R12AAEM509 | N7 | L7 |
| 50.0 | 10 | 574 | 1/2 | 40 | 992 | R12AAEM506 | N10 | L10 |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,289 | R12AAEM506 | N13 | L13 |
| 75.0 | 10 | 861 | 1/2 | 40 | 1,488 | R12AAEM606 | N15 | L15 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 1,984 | R12AAEM606 | N20 | L20 |
| 125.0 | 10 | 1,434 | 1/2 | 36 | 2,231 | R12BGB2P09 | N23 | L23 |
| 150.0 | 10 | 1,721 | 5/8 | 32 | 2,380 | R58DGB2P09 | N24 | L24 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | |
| 175.0 | 10 | 2,008 | 5/8 | 28 | 2,430 | R58DGB2P06 | N25 | L25 |
| 200.0 | 10 | 2,295 | 5/8 | 24 | 2,380 | R58DGB2P09 | N24 | L24 |
| 225.0 | 10 | 2,582 | 3/4 | 22 | 2,455 | R34DGB2P06 | N25 | L25 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.3)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 281 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 40 | 638 | R12AAEM406 | N7 | L7 |
| 35.0 | 10 | 402 | 1/2 | 40 | 893 | R12AAEM506 | N9 | L9 |
| 50.0 | 10 | 574 | 1/2 | 40 | 1,275 | R12AAEM506 | N13 | L13 |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,658 | R12AAEM606 | N17 | L17 |
| 75.0 | 10 | 861 | 1/2 | 40 | 1,913 | R12AAEM606 | N20 | L20 |
| 100.0 | 10 | 1,148 | 1/2 | 38 | 2,423 | R12AAB2P06 | N25 | L25 |
| 125.0 | 10 | 1,434 | 1/2 | 30 | 2,391 | R12AAB2P06 | N24 | L24 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | |
| 150.0 | 10 | 1,721 | 5/8 | 25 | 2,391 | R58AAB2P06 | N24 | L24 |
| 175.0 | 10 | 2,008 | 5/8 | 22 | 2,454 | R58AAB2P06 | N25 | L25 |
| 200.0 | 10 | 2,295 | 5/8 | 19 | 2,423 | R58AAB2P06 | N25 | L25 |
| 225.0 | 10 | 2,582 | 3/4 | 9 | 1,291 | R34DGB1S06 | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 5-Way Transverse, Longitudinal Brace Pattern (B13.3) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 216 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 40 | 491 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 402 | 1/2 | 40 | 687 | R12AAEM509 | N7 | L7 |
| 50.0 | 10 | 574 | 1/2 | 40 | 981 | R12AAEM506 | N10 | L10 |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,276 | R12AAEM506 | N13 | L13 |
| 75.0 | 10 | 861 | 1/2 | 38 | 1,399 | R12AAEM506 | N14 | L14 |
| 100.0 | 10 | 1,148 | 1/2 | 28 | 1,374 | R12AAEM506 | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 22 | 1,350 | R12AAEM506 | N14 | L14 |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B13.5) | | | | |
| 150.0 | 10 | 1,721 | 5/8 | 19 | 1,399 | R58AAEM506 | N14 | L14 |
| 175.0 | 10 | 2,008 | 5/8 | 16 | 1,374 | R58AAEM506 | N14 | L14 |
| 200.0 | 10 | 2,295 | 5/8 | 14 | 1,374 | R58AAEM506 | N14 | L14 |
| 225.0 | 10 | 2,582 | 3/4 | 10 | 1,104 | R34DGB1P06 | N12 | L12 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 5-Way Transverse, Longitudinal Brace Pattern (B13.3) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 291 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 40 | 661 | R12AAEM509 | N7 | L7 |
| 35.0 | 10 | 402 | 1/2 | 40 | 926 | R12AAEM506 | N10 | L10 |
| 50.0 | 10 | 574 | 1/2 | 40 | 1,322 | R12AAEM506 | N14 | L14 |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,719 | R12AAEM606 | N18 | L18 |
| 75.0 | 10 | 861 | 1/2 | 40 | 1,984 | R12AAEM606 | N20 | L20 |
| 100.0 | 10 | 1,148 | 1/2 | 34 | 2,248 | R12BGB2P09 | N23 | L23 |
| 125.0 | 10 | 1,434 | 1/2 | 26 | 2,149 | R12BGB2P09 | N22 | L22 |
| 150.0 | 10 | 1,721 | 5/8 | 24 | 2,380 | R58DGB2P09 | N24 | L24 |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B13.5) | | | | |
| 175.0 | 10 | 2,008 | 5/8 | 20 | 2,314 | R58DGB2P09 | N24 | L24 |
| 200.0 | 10 | 2,295 | 5/8 | 18 | 2,380 | R58DGB2P09 | N24 | L24 |
| 225.0 | 10 | 2,582 | 3/4 | 16 | 2,380 | R34DGB2P09 | N24 | L24 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 5-Way Transverse, Longitudinal Brace Pattern (B13.3) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 374 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 287 | 1/2 | 40 | 850 | R12AAEM506 | N9 | L9 |
| 35.0 | 10 | 402 | 1/2 | 40 | 1,190 | R12AAEM506 | N12 | L12 |
| 50.0 | 10 | 574 | 1/2 | 40 | 1,700 | R12AAEM606 | N17 | L17 |
| 65.0 | 10 | 746 | 1/2 | 40 | 2,210 | R12AAB2P09 | N23 | L23 |
| 75.0 | 10 | 861 | 1/2 | 38 | 2,423 | R12AAB2P06 | N25 | L25 |
| 100.0 | 10 | 1,148 | 1/2 | 28 | 2,380 | R12AAB2P09 | N24 | L24 |
| 125.0 | 10 | 1,434 | 1/2 | 22 | 2,338 | R12AAB2P09 | N24 | L24 |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B13.5) | | | | |
| 150.0 | 10 | 1,721 | 5/8 | 19 | 2,423 | R58AAB2P06 | N25 | L25 |
| 175.0 | 10 | 2,008 | 5/8 | 16 | 2,380 | R58AAB2P09 | N24 | L24 |
| 200.0 | 10 | 2,295 | 5/8 | 14 | 2,380 | R58AAB2P09 | N24 | L24 |
| 225.0 | 10 | 2,582 | 3/4 | 7 | 1,339 | R34DGB1S06 | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**C19-1-60**
**Inboard**

2013 CBC OSHPD

## *RIGID BRACING REQUIREMENTS* [7]

*3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)* *MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's*

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard [1] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B13.0)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.4)** | | | | |
| 11.0 | 10 | 108 | 3/8 | 40 | 127 | R38AAEM306 | N2 | L2 | 80 | 64 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 246 | 1/2 | 40 | 289 | R12AAEM306 | N3 | L3 | 80 | 144 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 344 | 1/2 | 40 | 404 | R12AAEM406 | N5 | L5 | 80 | 202 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 491 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 289 | R12AAEM306 | N3 | L3 |
| 65.0 | 10 | 639 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | 80 | 375 | R12AAEM406 | N4 | L4 |
| 75.0 | 10 | 737 | 1/2 | 40 | 866 | R12AAEM506 | N9 | L9 | 80 | 433 | R12AAEM406 | N5 | L5 |
| 100.0 | 10 | 983 | 1/2 | 40 | 1,155 | R12AAEM506 | N12 | L12 | 80 | 577 | R12AAEM406 | N6 | L6 |
| 125.0 | 10 | 1,229 | 1/2 | 40 | 1,443 | R12AAEM506 | N15 | L15 | 80 | 722 | R12AAEM509 | N8 | L8 |
| 150.0 | 10 | 1,281 | 1/2 | 32 | 1,386 | R12AAEM506 | N14 | L14 | 64 | 693 | R12AAEM509 | N7 | L7 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR.** | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | | | | | | |
| 175.0 | 10 | 1,155 | 1/2 | 40 | 1,010 | R12AAEM506 | N11 | L11 | | | | | |
| 200.0 | 10 | 1,320 | 1/2 | 40 | 1,155 | R12AAEM506 | N12 | L12 | | | | | |
| 225.0 | 10 | 1,486 | 5/8 | 40 | 1,299 | R58AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**C19-0.25-30**

***Outboard***

2013 CBC OSHPD

## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B13.0)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.4)** | | | | |
| 11.0 | 10 | 184 | 3/8 | 40 | 171 | R38AAEM306 | N2 | L2 | 80 | 86 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 417 | 1/2 | 40 | 389 | R12AAEM406 | N4 | L4 | 80 | 194 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 584 | 1/2 | 40 | 545 | R12AAEM406 | N6 | L6 | 80 | 272 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 835 | 1/2 | 40 | 778 | R12AAEM509 | N8 | L8 | 80 | 389 | R12AAEM406 | N4 | L4 |
| 65.0 | 10 | 1,085 | 1/2 | 40 | 1,011 | R12AAEM506 | N11 | L11 | 80 | 506 | R12AAEM406 | N6 | L6 |
| 75.0 | 10 | 1,252 | 1/2 | 40 | 1,167 | R12AAEM506 | N12 | L12 | 80 | 583 | R12AAEM406 | N6 | L6 |
| 100.0 | 10 | 1,670 | 5/8 | 40 | 1,556 | R58AAEM606 | N16 | L16 | 80 | 778 | R58AAEM509 | N8 | L8 |
| 125.0 | 10 | 2,087 | 3/4 | 40 | 1,945 | R34DGB2P09 | N20 | L20 | 80 | 972 | R34CFB1P06 | N10 | L10 |
| 150.0 | 10 | 2,405 | 3/4 | 38 | 2,217 | R34DGB2P09 | N23 | L23 | 76 | 1,108 | R34CFB1P06 | N12 | L12 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR.** | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | | | | | | |
| 175.0 | 10 | 1,756 | 5/8 | 40 | 1,361 | R58AAEM506 | N14 | L14 | | | | | |
| 200.0 | 10 | 2,007 | 5/8 | 40 | 1,556 | R58AAEM606 | N16 | L16 | | | | | |
| 225.0 | 10 | 2,258 | 3/4 | 40 | 1,750 | R34DGB2P09 | N18 | L18 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***Outboard***

## RIGID BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B13.0) | | | | | 5-Way Transverse, Longitudinal Brace Pattern (B13.4) | | | | |
| 11.0 | 10 | 250 | 3/8 | 40 | 220 | R38AAEM306 | N3 | L3 | 80 | 110 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 568 | 1/2 | 40 | 500 | R12AAEM406 | N5 | L5 | 80 | 250 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 796 | 1/2 | 40 | 700 | R12AAEM509 | N7 | L7 | 80 | 350 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 1,137 | 1/2 | 40 | 1,000 | R12AAEM506 | N10 | L10 | 80 | 500 | R12AAEM406 | N5 | L5 |
| 65.0 | 10 | 1,478 | 5/8 | 40 | 1,300 | R58AAEM506 | N13 | L13 | 80 | 650 | R58AAEM406 | N7 | L7 |
| 75.0 | 10 | 1,633 | 5/8 | 38 | 1,425 | R58AAEM506 | N15 | L15 | 76 | 713 | R58AAEM509 | N8 | L8 |
| 100.0 | 10 | 1,693 | 5/8 | 28 | 1,400 | R58AAEM506 | N14 | L14 | 56 | 700 | R58AAEM509 | N7 | L7 |
| 125.0 | 10 | 1,753 | 5/8 | 22 | 1,375 | R58AAEM506 | N14 | L14 | 44 | 688 | R58AAEM509 | N7 | L7 |
| 150.0 | 10 | 1,813 | 5/8 | 18 | 1,350 | R58AAEM506 | N14 | L14 | 36 | 675 | R58AAEM509 | N7 | L7 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR. | | | | | | | | | |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B13.5) | | | | | | | | | |
| 175.0 | 10 | 1,946 | 5/8 | 32 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 200.0 | 10 | 2,031 | 5/8 | 28 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 225.0 | 10 | 2,175 | 5/8 | 26 | 1,463 | R58AAEM606 | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***Outboard***

## RIGID BRACING REQUIREMENTS[7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage[6]** | | | | | **Min. Brace Anchorage[6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard[1] Rod Total Vertical Load (lbs)** | **Min.[8] Vertical Support Rod Dia. (in.)** | **Max.[2] Brace Spacing (ft.)** | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** | **Max.[2] Brace Spacing (ft.)** | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B13.0)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.4)** | | | | |
| 11.0 | 10 | 179 | 3/8 | 40 | 254 | R38AAEM306 | N3 | L3 | 80 | 127 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 407 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 289 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 570 | 1/2 | 40 | 808 | R12AAEM506 | N9 | L9 | 80 | 404 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 814 | 1/2 | 40 | 1,155 | R12AAEM506 | N12 | L12 | 80 | 577 | R12AAEM406 | N6 | L6 |
| 65.0 | 10 | 1,017 | 1/2 | 38 | 1,426 | R12AAEM506 | N15 | L15 | 76 | 713 | R12AAEM509 | N8 | L8 |
| 75.0 | 10 | 1,028 | 1/2 | 32 | 1,386 | R12AAEM506 | N14 | L14 | 64 | 693 | R12AAEM509 | N7 | L7 |
| 100.0 | 10 | 1,112 | 1/2 | 24 | 1,386 | R12AAEM506 | N14 | L14 | 48 | 693 | R12AAEM509 | N7 | L7 |
| 125.0 | 10 | 1,229 | 1/2 | 20 | 1,443 | R12AAEM506 | N15 | L15 | 40 | 722 | R12AAEM509 | N8 | L8 |
| 150.0 | 10 | 1,281 | 1/2 | 16 | 1,386 | R12AAEM506 | N14 | L14 | 32 | 693 | R12AAEM509 | N7 | L7 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR.** | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | | | | | | |
| 175.0 | 10 | 1,381 | 1/2 | 28 | 1,415 | R12AAEM506 | N15 | L15 | | | | | |
| 200.0 | 10 | 1,482 | 5/8 | 25 | 1,443 | R58AAEM506 | N15 | L15 | | | | | |
| 225.0 | 10 | 1,558 | 5/8 | 22 | 1,429 | R58AAEM506 | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***Outboard***

## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B13.0) | | | | | 5-Way Transverse, Longitudinal Brace Pattern (B13.4) | | | | |
| 11.0 | 10 | 330 | 3/8 | 40 | 342 | R38AAEM406 | N4 | L4 | 80 | 171 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 751 | 1/2 | 40 | 778 | R12AAEM509 | N8 | L8 | 80 | 389 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 1,051 | 1/2 | 40 | 1,089 | R12AAEM506 | N11 | L11 | 80 | 545 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 1,501 | 5/8 | 40 | 1,556 | R58AAEM606 | N16 | L16 | 80 | 778 | R58AAEM509 | N8 | L8 |
| 65.0 | 10 | 1,952 | 3/4 | 40 | 2,022 | R34DGB2P09 | N21 | L21 | 80 | 1,011 | R34CFB1P06 | N11 | L11 |
| 75.0 | 10 | 2,152 | 3/4 | 38 | 2,217 | R34DGB2P09 | N23 | L23 | 76 | 1,108 | R34CFB1P06 | N12 | L12 |
| 100.0 | 10 | 2,203 | 3/4 | 28 | 2,178 | R34DGB2P09 | N22 | L22 | 56 | 1,089 | R34CFB1P06 | N11 | L11 |
| 125.0 | 10 | 2,254 | 3/4 | 22 | 2,139 | R34DGB2P09 | N22 | L22 | 44 | 1,070 | R34CFB1P06 | N11 | L11 |
| 150.0 | 10 | 2,305 | 3/4 | 18 | 2,100 | R34DGB2P09 | N22 | L22 | 36 | 1,050 | R34CFB1P06 | N11 | L11 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR. | | | | | | | | | |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B13.5) | | | | | | | | | |
| 175.0 | 10 | 2,514 | 3/4 | 33 | 2,246 | R34DGB2P09 | N23 | L23 | | | | | |
| 200.0 | 10 | 2,607 | 3/4 | 29 | 2,256 | R34DGB2P09 | N23 | L23 | | | | | |
| 225.0 | 10 | 2,708 | 3/4 | 26 | 2,275 | R34DGB2P09 | N23 | L23 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B13.0)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.4)** | | | | |
| 11.0 | 10 | 463 | 1/2 | 40 | 440 | R12AAEM406 | N5 | L5 | 80 | 220 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,053 | 1/2 | 40 | 1,000 | R12AAEM506 | N10 | L10 | 80 | 500 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 1,474 | 5/8 | 40 | 1,400 | R58AAEM506 | N14 | L14 | 80 | 700 | R58AAEM509 | N7 | L7 |
| 50.0 | 10 | 1,524 | 5/8 | 28 | 1,400 | R58AAEM506 | N14 | L14 | 56 | 700 | R58AAEM509 | N7 | L7 |
| 65.0 | 10 | 1,604 | 5/8 | 22 | 1,430 | R58AAEM506 | N15 | L15 | 44 | 715 | R58AAEM509 | N8 | L8 |
| 75.0 | 10 | 1,560 | 5/8 | 18 | 1,350 | R58AAEM506 | N14 | L14 | 36 | 675 | R58AAEM509 | N7 | L7 |
| 100.0 | 10 | 1,693 | 5/8 | 14 | 1,400 | R58AAEM506 | N14 | L14 | 28 | 700 | R58AAEM509 | N7 | L7 |
| 125.0 | 10 | 1,632 | 5/8 | 10 | 1,250 | R58AAEM506 | N13 | L13 | 20 | 625 | R58AAEM406 | N7 | L7 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR.** | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | | | | | | |
| 150.0 | 10 | 1,886 | 5/8 | 19 | 1,425 | R58AAEM506 | N15 | L15 | | | | | |
| 175.0 | 10 | 1,946 | 5/8 | 16 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 200.0 | 10 | 2,031 | 5/8 | 14 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 225.0 | 10 | 2,175 | 5/8 | 13 | 1,463 | R58AAEM606 | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** — **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B13.0) | | | | | 5-Way Transverse, Longitudinal Brace Pattern (B13.4) | | | | |
| 11.0 | 10 | 250 | 3/8 | 40 | 381 | R38AAEM406 | N4 | L4 | 80 | 191 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 568 | 1/2 | 40 | 866 | R12AAEM506 | N9 | L9 | 80 | 433 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 796 | 1/2 | 40 | 1,212 | R12AAEM506 | N13 | L13 | 80 | 606 | R12AAEM406 | N7 | L7 |
| 50.0 | 10 | 943 | 1/2 | 32 | 1,386 | R12AAEM506 | N14 | L14 | 64 | 693 | R12AAEM509 | N7 | L7 |
| 65.0 | 10 | 975 | 1/2 | 24 | 1,351 | R12AAEM506 | N14 | L14 | 48 | 675 | R12AAEM509 | N7 | L7 |
| 75.0 | 10 | 1,052 | 1/2 | 22 | 1,429 | R12AAEM506 | N15 | L15 | 44 | 714 | R12AAEM509 | N8 | L8 |
| 100.0 | 10 | 1,112 | 1/2 | 16 | 1,386 | R12AAEM506 | N14 | L14 | 32 | 693 | R12AAEM509 | N7 | L7 |
| 125.0 | 10 | 1,148 | 1/2 | 12 | 1,299 | R12AAEM506 | N13 | L13 | 24 | 650 | R12AAEM406 | N7 | L7 |
| 150.0 | 10 | 1,232 | 1/2 | 10 | 1,299 | R12AAEM506 | N13 | L13 | 20 | 650 | R12AAEM406 | N7 | L7 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR. | | | | | | | | | |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B13.5) | | | | | | | | | |
| 175.0 | 10 | 1,395 | 1/2 | 19 | 1,440 | R12AAEM506 | N15 | L15 | | | | | |
| 200.0 | 10 | 1,450 | 1/2 | 16 | 1,386 | R12AAEM506 | N14 | L14 | | | | | |
| 225.0 | 10 | 1,522 | 5/8 | 14 | 1,364 | R58AAEM506 | N14 | L14 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B13.0)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.4)** | | | | |
| 11.0 | 10 | 477 | 1/2 | 40 | 513 | R12AAEM406 | N6 | L6 | 80 | 257 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,084 | 5/8 | 40 | 1,167 | R58AAEM506 | N12 | L12 | 80 | 583 | R58AAEM406 | N6 | L6 |
| 35.0 | 10 | 1,517 | 3/4 | 40 | 1,634 | R34CFB2P12 | N17 | L17 | 80 | 817 | R34CFB1P09 | N9 | L9 |
| 50.0 | 10 | 2,067 | 3/4 | 38 | 2,217 | R34DGB2P09 | N23 | L23 | 76 | 1,108 | R34CFB1P06 | N12 | L12 |
| 65.0 | 10 | 2,038 | 3/4 | 28 | 2,124 | R34DGB2P09 | N22 | L22 | 56 | 1,062 | R34CFB1P06 | N11 | L11 |
| 75.0 | 10 | 2,052 | 3/4 | 24 | 2,100 | R34DGB2P09 | N22 | L22 | 48 | 1,050 | R34CFB1P06 | N11 | L11 |
| 100.0 | 10 | 2,136 | 3/4 | 18 | 2,100 | R34DGB2P09 | N22 | L22 | 36 | 1,050 | R34CFB1P06 | N11 | L11 |
| 125.0 | 10 | 2,171 | 3/4 | 14 | 2,042 | R34DGB2P09 | N21 | L21 | 28 | 1,021 | R34CFB1P06 | N11 | L11 |
| 150.0 | 10 | 2,305 | 3/4 | 12 | 2,100 | R34DGB2P09 | N22 | L22 | 24 | 1,050 | R34CFB1P06 | N11 | L11 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR.** | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | | | | | | |
| 175.0 | 10 | 2,514 | 3/4 | 22 | 2,246 | R34DGB2P09 | N23 | L23 | | | | | |
| 200.0 | 10 | 2,574 | 3/4 | 19 | 2,217 | R34DGB2P09 | N23 | L23 | | | | | |
| 225.0 | 10 | 2,671 | 3/4 | 17 | 2,231 | R34DGB2P09 | N23 | L23 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS[7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** — **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard[1] Rod Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B13.0) | | | | | 5-Way Transverse, Longitudinal Brace Pattern (B13.4) | | | | |
| 11.0 | 10 | 676 | 1/2 | 40 | 660 | R12AAEM406 | N7 | L7 | 80 | 330 | R12AAEM409 | N4 | L4 |
| 25.0 | 10 | 1,464 | 5/8 | 38 | 1,425 | R58AAEM506 | N15 | L15 | 76 | 713 | R58AAEM509 | N8 | L8 |
| 35.0 | 10 | 1,440 | 5/8 | 26 | 1,365 | R58AAEM506 | N14 | L14 | 52 | 683 | R58AAEM509 | N7 | L7 |
| 50.0 | 10 | 1,476 | 5/8 | 18 | 1,350 | R58AAEM506 | N14 | L14 | 36 | 675 | R58AAEM509 | N7 | L7 |
| 65.0 | 10 | 1,541 | 5/8 | 14 | 1,365 | R58AAEM506 | N14 | L14 | 28 | 683 | R58AAEM509 | N7 | L7 |
| 75.0 | 10 | 1,560 | 5/8 | 12 | 1,350 | R58AAEM506 | N14 | L14 | 24 | 675 | R58AAEM509 | N7 | L7 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR. | | | | | | | | | |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B13.5) | | | | | | | | | |
| 100.0 | 10 | 1,717 | 5/8 | 19 | 1,425 | R58AAEM506 | N15 | L15 | | | | | |
| 125.0 | 10 | 1,783 | 5/8 | 15 | 1,406 | R58AAEM506 | N15 | L15 | | | | | |
| 150.0 | 10 | 1,922 | 5/8 | 13 | 1,463 | R58AAEM606 | N15 | L15 | | | | | |
| 175.0 | 10 | 1,989 | 5/8 | 11 | 1,444 | R58AAEM506 | N15 | L15 | | | | | |
| 200.0 | 10 | 1,982 | 5/8 | 9 | 1,350 | R58AAEM506 | N14 | L14 | | | | | |
| 225.0 | 10 | 2,067 | 5/8 | 8 | 1,350 | R58AAEM506 | N14 | L14 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

ANTHONY A. POBLACAVA
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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B13.0)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.4)** | | | | |
| 11.0 | 10 | 321 | 3/8 | 40 | 508 | R38AAEM406 | N6 | L6 | 80 | 254 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 730 | 1/2 | 40 | 1,155 | R12AAEM506 | N12 | L12 | 80 | 577 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 886 | 1/2 | 34 | 1,374 | R12AAEM506 | N14 | L14 | 68 | 687 | R12AAEM509 | N7 | L7 |
| 50.0 | 10 | 943 | 1/2 | 24 | 1,386 | R12AAEM506 | N14 | L14 | 48 | 693 | R12AAEM509 | N7 | L7 |
| 65.0 | 10 | 975 | 1/2 | 18 | 1,351 | R12AAEM506 | N14 | L14 | 36 | 675 | R12AAEM509 | N7 | L7 |
| 75.0 | 10 | 1,028 | 1/2 | 16 | 1,386 | R12AAEM506 | N14 | L14 | 32 | 693 | R12AAEM509 | N7 | L7 |
| 100.0 | 10 | 1,112 | 1/2 | 12 | 1,386 | R12AAEM506 | N14 | L14 | 24 | 693 | R12AAEM509 | N7 | L7 |
| 125.0 | 10 | 1,229 | 1/2 | 10 | 1,443 | R12AAEM506 | N15 | L15 | 20 | 722 | R12AAEM509 | N8 | L8 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR.** | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | | | | | | |
| 150.0 | 10 | 1,281 | 1/2 | 16 | 1,386 | R12AAEM506 | N14 | L14 | | | | | |
| 175.0 | 10 | 1,381 | 1/2 | 14 | 1,415 | R12AAEM506 | N15 | L15 | | | | | |
| 200.0 | 10 | 1,450 | 1/2 | 12 | 1,386 | R12AAEM506 | N14 | L14 | | | | | |
| 225.0 | 10 | 1,558 | 5/8 | 11 | 1,429 | R58AAEM506 | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard [1] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B13.0)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B13.4)** | | | | |
| 11.0 | 10 | 623 | 1/2 | 40 | 685 | R12AAEM509 | N7 | L7 | 80 | 342 | R12AAEM406 | N4 | L4 |
| 25.0 | 10 | 1,417 | 5/8 | 40 | 1,556 | R58AAEM606 | N16 | L16 | 80 | 778 | R58AAEM509 | N8 | L8 |
| 35.0 | 10 | 1,984 | 3/4 | 40 | 2,178 | R34DGB2P09 | N22 | L22 | 80 | 1,089 | R34CFB1P06 | N11 | L11 |
| 50.0 | 10 | 2,034 | 3/4 | 28 | 2,178 | R34DGB2P09 | N22 | L22 | 56 | 1,089 | R34CFB1P06 | N11 | L11 |
| 65.0 | 10 | 2,125 | 3/4 | 22 | 2,225 | R34DGB2P09 | N23 | L23 | 44 | 1,112 | R34CFB1P06 | N12 | L12 |
| 75.0 | 10 | 2,052 | 3/4 | 18 | 2,100 | R34DGB2P09 | N22 | L22 | 36 | 1,050 | R34CFB1P06 | N11 | L11 |
| 100.0 | 10 | 2,203 | 3/4 | 14 | 2,178 | R34DGB2P09 | N22 | L22 | 28 | 1,089 | R34CFB1P06 | N11 | L11 |
| 125.0 | 10 | 2,087 | 3/4 | 10 | 1,945 | R34DGB2P09 | N20 | L20 | 20 | 972 | R34CFB1P06 | N10 | L10 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR.** | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B13.5)** | | | | | | | | | |
| 150.0 | 10 | 2,405 | 3/4 | 19 | 2,217 | R34DGB2P09 | N23 | L23 | | | | | |
| 175.0 | 10 | 2,456 | 3/4 | 16 | 2,178 | R34DGB2P09 | N22 | L22 | | | | | |
| 200.0 | 10 | 2,540 | 3/4 | 14 | 2,178 | R34DGB2P09 | N22 | L22 | | | | | |
| 225.0 | 10 | 2,708 | 3/4 | 13 | 2,275 | R34DGB2P09 | N23 | L23 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B13.0) | | | | | 5-Way Transverse, Longitudinal Brace Pattern (B13.4) | | | | |
| 11.0 | 10 | 889 | 1/2 | 40 | 880 | R12AAEM506 | N9 | L9 | 80 | 440 | R12AAEM406 | N5 | L5 |
| 25.0 | 10 | 1,440 | 5/8 | 28 | 1,400 | R58AAEM506 | N14 | L14 | 56 | 700 | R58AAEM509 | N7 | L7 |
| 35.0 | 10 | 1,474 | 5/8 | 20 | 1,400 | R58AAEM506 | N14 | L14 | 40 | 700 | R58AAEM509 | N7 | L7 |
| 50.0 | 10 | 1,524 | 5/8 | 14 | 1,400 | R58AAEM506 | N14 | L14 | 28 | 700 | R58AAEM509 | N7 | L7 |
| 65.0 | 10 | 1,478 | 5/8 | 10 | 1,300 | R58AAEM506 | N13 | L13 | 20 | 650 | R58AAEM406 | N7 | L7 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIR. | | | | | | | | | |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B13.5) | | | | | | | | | |
| 75.0 | 10 | 1,633 | 5/8 | 19 | 1,425 | R58AAEM506 | N15 | L15 | | | | | |
| 100.0 | 10 | 1,693 | 5/8 | 14 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 125.0 | 10 | 1,753 | 5/8 | 11 | 1,375 | R58AAEM506 | N14 | L14 | | | | | |
| 150.0 | 10 | 1,813 | 5/8 | 9 | 1,350 | R58AAEM506 | N14 | L14 | | | | | |
| 175.0 | 10 | 1,946 | 5/8 | 8 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 200.0 | 10 | 2,031 | 5/8 | 7 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 225.0 | 10 | 2,067 | 5/8 | 6 | 1,350 | R58AAEM506 | N14 | L14 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard[1, 8] Rod Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | |
| 11.0 | 10 | 126 | 3/8 | 80 | 216 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 80 | 491 | C12AA04WS | N5 | L5 |
| 35.0 | 10 | 402 | 1/2 | 80 | 687 | C12AA06WS | N7 | L7 |
| 50.0 | 10 | 574 | 1/2 | 80 | 981 | C12AA06WS | N10 | L10 |
| 65.0 | 10 | 746 | 1/2 | 80 | 1,276 | C12AA06WS | N13 | L13 |
| 75.0 | 10 | 861 | 1/2 | 78 | 1,435 | C12AA06WS | N15 | L15 |
| 100.0 | 10 | 1,148 | 1/2 | 59 | 1,448 | C12AA06WS | N15 | L15 |
| 125.0 | 10 | 1,434 | 1/2 | 47 | 1,442 | C12AA06WS | N15 | L15 |
| 150.0 | 10 | 1,721 | 1/2 | 39 | 1,435 | C12AA06WS | N15 | L15 |
| 175.0 | 10 | 2,008 | 1/2 | 33 | 1,417 | C12AA06WS | N15 | L15 |
| 200.0 | 10 | 2,295 | 1/2 | 29 | 1,423 | C12AA06WS | N15 | L15 |
| 225.0 | 10 | 2,582 | 5/8 | 26 | 1,435 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 80 | 291 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 80 | 661 | C12AA04WS | N7 | L7 |
| 35.0 | 10 | 402 | 1/2 | 80 | 926 | C12AA06WS | N10 | L10 |
| 50.0 | 10 | 574 | 1/2 | 80 | 1,322 | C12AA06WS | N14 | L14 |
| 65.0 | 10 | 746 | 5/8 | 80 | 1,719 | C58DG06TS | N18 | L18 |
| 75.0 | 10 | 861 | 5/8 | 72 | 1,785 | C58DG06TS | N18 | L18 |
| 100.0 | 10 | 1,148 | 5/8 | 54 | 1,785 | C58DG06TS | N18 | L18 |
| 125.0 | 10 | 1,434 | 5/8 | 44 | 1,818 | C58DG06TS | N19 | L19 |
| 150.0 | 10 | 1,721 | 5/8 | 36 | 1,785 | C58DG06TS | N18 | L18 |
| 175.0 | 10 | 2,008 | 5/8 | 30 | 1,736 | C58DG06TS | N18 | L18 |
| 200.0 | 10 | 2,295 | 5/8 | 26 | 1,719 | C58DG06TS | N18 | L18 |
| 225.0 | 10 | 2,582 | 5/8 | 24 | 1,785 | C58DG06TS | N18 | L18 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E-Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | |
| 11.0 | 10 | 126 | 3/8 | 80 | 374 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 287 | 1/2 | 80 | 850 | C12AA06WS | N9 | L9 |
| 35.0 | 10 | 402 | 5/8 | 80 | 1,190 | C58AA06WS | N12 | L12 |
| 50.0 | 10 | 574 | 5/8 | 69 | 1,466 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 746 | 5/8 | 53 | 1,464 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 861 | 5/8 | 46 | 1,466 | C58AA06WS | N15 | L15 |
| 100.0 | 10 | 1,148 | 5/8 | 34 | 1,445 | C58AA06WS | N15 | L15 |
| 125.0 | 10 | 1,434 | 5/8 | 27 | 1,434 | C58AA06WS | N15 | L15 |
| 150.0 | 10 | 1,721 | 5/8 | 23 | 1,466 | C58AA06WS | N15 | L15 |
| 175.0 | 10 | 2,008 | 5/8 | 19 | 1,413 | C58AA06WS | N15 | L15 |
| 200.0 | 10 | 2,295 | 5/8 | 17 | 1,445 | C58AA06WS | N15 | L15 |
| 225.0 | 10 | 2,582 | 5/8 | 15 | 1,434 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard** [1, 8] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 80 | 432 | C38AA04WS | N5 | L5 |
| 25.0 | 10 | 287 | 1/2 | 80 | 981 | C12AA06WS | N10 | L10 |
| 35.0 | 10 | 402 | 1/2 | 80 | 1,374 | C12AA06WS | N14 | L14 |
| 50.0 | 10 | 574 | 1/2 | 58 | 1,423 | C12AA06WS | N15 | L15 |
| 65.0 | 10 | 746 | 1/2 | 44 | 1,404 | C12AA06WS | N15 | L15 |
| 75.0 | 10 | 861 | 1/2 | 38 | 1,399 | C12AA06WS | N14 | L14 |
| 100.0 | 10 | 1,148 | 1/2 | 28 | 1,374 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 22 | 1,350 | C12AA06WS | N14 | L14 |
| 150.0 | 10 | 1,721 | 1/2 | 18 | 1,325 | C12AA06WS | N14 | L14 |
| 175.0 | 10 | 2,008 | 1/2 | 16 | 1,374 | C12AA06WS | N14 | L14 |
| 200.0 | 10 | 2,295 | 1/2 | 14 | 1,374 | C12AA06WS | N14 | L14 |
| 225.0 | 10 | 2,582 | 5/8 | 12 | 1,325 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = *0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard** [1, 8] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11.0 | 10 | 126 | 1/2 | 80 | 582 | C12AA04WS | N6 | L6 |
| 25.0 | 10 | 287 | 5/8 | 80 | 1,322 | C58AA06WS | N14 | L14 |
| 35.0 | 10 | 402 | 5/8 | 78 | 1,805 | C58DG06TS | N19 | L19 |
| 50.0 | 10 | 574 | 5/8 | 54 | 1,785 | C58DG06TS | N18 | L18 |
| 65.0 | 10 | 746 | 5/8 | 42 | 1,805 | C58DG06TS | N19 | L19 |
| 75.0 | 10 | 861 | 5/8 | 36 | 1,785 | C58DG06TS | N18 | L18 |
| 100.0 | 10 | 1,148 | 5/8 | 26 | 1,719 | C58DG06TS | N18 | L18 |
| 125.0 | 10 | 1,434 | 5/8 | 22 | 1,818 | C58DG06TS | N19 | L19 |
| 150.0 | 10 | 1,721 | 5/8 | 18 | 1,785 | C58DG06TS | N18 | L18 |
| 175.0 | 10 | 2,008 | 5/8 | 14 | 1,620 | C58DG06TS | N17 | L17 |
| 200.0 | 10 | 2,295 | 5/8 | 12 | 1,587 | C58DG06TS | N16 | L16 |
| 225.0 | 10 | 2,582 | 5/8 | 12 | 1,785 | C58DG06TS | N18 | L18 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E- Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | |
| 11.0 | 10 | 126 | 1/2 | 80 | 748 | C12AA06WS | N8 | L8 |
| 25.0 | 10 | 287 | 5/8 | 68 | 1,445 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 402 | 5/8 | 48 | 1,428 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 574 | 5/8 | 34 | 1,445 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 746 | 5/8 | 26 | 1,437 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 861 | 5/8 | 22 | 1,403 | C58AA06WS | N15 | L15 |
| 100.0 | 10 | 1,148 | 5/8 | 16 | 1,360 | C58AA06WS | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 12 | 1,275 | C12AA06WS | N13 | L13 |
| 150.0 | 10 | 1,721 | 1/2 | 10 | 1,275 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 80 | 648 | C38AA04WS | N7 | L7 |
| 25.0 | 10 | 287 | 1/2 | 78 | 1,435 | C12AA06WS | N15 | L15 |
| 35.0 | 10 | 402 | 1/2 | 56 | 1,443 | C12AA06WS | N15 | L15 |
| 50.0 | 10 | 574 | 1/2 | 38 | 1,399 | C12AA06WS | N14 | L14 |
| 65.0 | 10 | 746 | 1/2 | 30 | 1,435 | C12AA06WS | N15 | L15 |
| 75.0 | 10 | 861 | 1/2 | 26 | 1,435 | C12AA06WS | N15 | L15 |
| 100.0 | 10 | 1,148 | 1/2 | 18 | 1,325 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 14 | 1,288 | C12AA06WS | N13 | L13 |
| 150.0 | 10 | 1,721 | 1/2 | 12 | 1,325 | C12AA06WS | N14 | L14 |
| 175.0 | 10 | 2,008 | 1/2 | 10 | 1,288 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4$ x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11.0 | 10 | 126 | 1/2 | 80 | 873 | C12AA06WS | N9 | L9 |
| 25.0 | 10 | 287 | 5/8 | 72 | 1,785 | C58DG06TS | N18 | L18 |
| 35.0 | 10 | 402 | 5/8 | 52 | 1,805 | C58DG06TS | N19 | L19 |
| 50.0 | 10 | 574 | 5/8 | 36 | 1,785 | C58DG06TS | N18 | L18 |
| 65.0 | 10 | 746 | 5/8 | 28 | 1,805 | C58DG06TS | N19 | L19 |
| 75.0 | 10 | 861 | 5/8 | 24 | 1,785 | C58DG06TS | N18 | L18 |
| 100.0 | 10 | 1,148 | 5/8 | 18 | 1,785 | C58DG06TS | N18 | L18 |
| 125.0 | 10 | 1,434 | 5/8 | 14 | 1,736 | C58DG06TS | N18 | L18 |
| 150.0 | 10 | 1,721 | 5/8 | 12 | 1,785 | C58DG06TS | N18 | L18 |
| 175.0 | 10 | 2,008 | 5/8 | 10 | 1,736 | C58DG06TS | N18 | L18 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E-Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | |
| 11.0 | 10 | 126 | 1/2 | 80 | 1,122 | C12AA06WS | N12 | L12 |
| 25.0 | 10 | 287 | 5/8 | 46 | 1,466 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 402 | 5/8 | 32 | 1,428 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 574 | 5/8 | 22 | 1,403 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 746 | 5/8 | 16 | 1,326 | C58AA06WS | N14 | L14 |
| 75.0 | 10 | 861 | 5/8 | 14 | 1,339 | C58AA06WS | N14 | L14 |
| 100.0 | 10 | 1,148 | 5/8 | 10 | 1,275 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | |
| 11.0 | 10 | 126 | 1/2 | 80 | 864 | C12AA06WS | N9 | L9 |
| 25.0 | 10 | 287 | 1/2 | 58 | 1,423 | C12AA06WS | N15 | L15 |
| 35.0 | 10 | 402 | 1/2 | 42 | 1,443 | C12AA06WS | N15 | L15 |
| 50.0 | 10 | 574 | 1/2 | 28 | 1,374 | C12AA06WS | N14 | L14 |
| 65.0 | 10 | 746 | 1/2 | 22 | 1,404 | C12AA06WS | N15 | L15 |
| 75.0 | 10 | 861 | 1/2 | 18 | 1,325 | C12AA06WS | N14 | L14 |
| 100.0 | 10 | 1,148 | 1/2 | 14 | 1,374 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 10 | 1,227 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *CABLE BRACING REQUIREMENTS*[7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage**[6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard**[1, 8] **Rod Total Vertical Load (lbs)** | **Min.**[8] **Vertical Support Rod Dia. (in.)** | **Max.**[2] **Brace Spacing (ft.)** | **Brace**[3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour**[4] **Deck Page D1** | **Metal**[5] **Deck Page D2** |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11.0 | 10 | 126 | 1/2 | 80 | 1,164 | C12AA06WS | N12 | L12 |
| 25.0 | 10 | 287 | 5/8 | 54 | 1,785 | C58DG06TS | N18 | L18 |
| 35.0 | 10 | 402 | 5/8 | 38 | 1,759 | C58DG06TS | N18 | L18 |
| 50.0 | 10 | 574 | 5/8 | 26 | 1,719 | C58DG06TS | N18 | L18 |
| 65.0 | 10 | 746 | 5/8 | 20 | 1,719 | C58DG06TS | N18 | L18 |
| 75.0 | 10 | 861 | 5/8 | 18 | 1,785 | C58DG06TS | N18 | L18 |
| 100.0 | 10 | 1,148 | 5/8 | 12 | 1,587 | C58DG06TS | N16 | L16 |
| 125.0 | 10 | 1,434 | 5/8 | 10 | 1,653 | C58DG06TS | N17 | L17 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** — **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E-Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 126 | 5/8 | 78 | 1,459 | C58AA06WS | N15 | L15 |
| 25.0 | 10 | 287 | 5/8 | 34 | 1,445 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 402 | 5/8 | 24 | 1,428 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 574 | 5/8 | 16 | 1,360 | C58AA06WS | N14 | L14 |
| 65.0 | 10 | 746 | 5/8 | 12 | 1,326 | C58AA06WS | N14 | L14 |
| 75.0 | 10 | 861 | 5/8 | 10 | 1,275 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** — **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B17.0)** | | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11 | 10 | 37 | 3/8 | 40 | 127 | C38AA04WS | N2 | L2 | 80 | 64 | C38AA04WS | N1 | L1 |
| 25 | 10 | 84 | 1/2 | 40 | 289 | C12AA04WS | N3 | L3 | 80 | 144 | C12AA04WS | N2 | L2 |
| 35 | 10 | 118 | 1/2 | 40 | 404 | C12AA04WS | N5 | L5 | 80 | 202 | C12AA04WS | N3 | L3 |
| 50 | 10 | 169 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 289 | C12AA04WS | N3 | L3 |
| 65 | 10 | 219 | 1/2 | 40 | 751 | C12AA06WS | N8 | L8 | 80 | 375 | C12AA04WS | N4 | L4 |
| 75 | 10 | 253 | 1/2 | 40 | 866 | C12AA06WS | N9 | L9 | 80 | 433 | C12AA04WS | N5 | L5 |
| 100 | 10 | 338 | 1/2 | 40 | 1,155 | C12AA06WS | N12 | L12 | 80 | 577 | C12AA04WS | N6 | L6 |
| 125 | 10 | 422 | 1/2 | 40 | 1,443 | C12AA06WS | N15 | L15 | 80 | 722 | C12AA06WS | N8 | L8 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | | | | | | |
| 150 | 10 | 506 | 1/2 | 33 | 1,429 | C12AA06WS | N15 | L15 | | | | | |
| 175 | 10 | 591 | 1/2 | 28 | 1,415 | C12AA06WS | N15 | L15 | | | | | |
| 200 | 10 | 675 | 1/2 | 25 | 1,443 | C12AA06WS | N15 | L15 | | | | | |
| 225 | 10 | 759 | 1/2 | 22 | 1,429 | C12AA06WS | N15 | L15 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**Outboard**

## *CABLE BRACING REQUIREMENTS*[7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard[1] Rod Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS: Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6]: Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6]: Metal[5] Deck Page D2 | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS: Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6]: Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6]: Metal[5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2-Way Transverse Brace Pattern (B17.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | |
| 11 | 10 | 37 | 3/8 | 40 | 171 | C38AA04WS | N2 | L2 | 80 | 86 | C38AA04WS | N1 | L1 |
| 25 | 10 | 84 | 1/2 | 40 | 389 | C12AA04WS | N4 | L4 | 80 | 194 | C12AA04WS | N2 | L2 |
| 35 | 10 | 118 | 1/2 | 40 | 545 | C12AA04WS | N6 | L6 | 80 | 272 | C12AA04WS | N3 | L3 |
| 50 | 10 | 169 | 1/2 | 40 | 778 | C12AA06WS | N8 | L8 | 80 | 389 | C12AA04WS | N4 | L4 |
| 65 | 10 | 219 | 1/2 | 40 | 1,011 | C12AA06WS | N11 | L11 | 80 | 506 | C12AA04WS | N6 | L6 |
| 75 | 10 | 253 | 1/2 | 40 | 1,167 | C12AA06WS | N12 | L12 | 80 | 583 | C12AA04WS | N6 | L6 |
| 100 | 10 | 338 | 5/8 | 40 | 1,556 | C58DG06TS | N16 | L16 | 80 | 778 | C58AA06WS | N8 | L8 |
| 125 | 10 | 422 | 5/8 | 34 | 1,653 | C58DG06TS | N17 | L17 | 68 | 826 | C58AA06WC | N9 | L9 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | | | | | | |
| 150 | 10 | 506 | 5/8 | 30 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 175 | 10 | 591 | 5/8 | 26 | 1,770 | C58DG06TS | N18 | L18 | | | | | |
| 200 | 10 | 675 | 5/8 | 23 | 1,789 | C58DG06TS | N18 | L18 | | | | | |
| 225 | 10 | 759 | 5/8 | 20 | 1,750 | C58DG06TS | N18 | L18 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***C20-0.25-45***

***Outboard***

## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E- Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E- Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B17.0)** | | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11 | 10 | 37 | 3/8 | 40 | 220 | C38AA04WS | N3 | L3 | 80 | 110 | C38AA04WS | N2 | L2 |
| 25 | 10 | 84 | 1/2 | 40 | 500 | C12AA04WS | N5 | L5 | 80 | 250 | C12AA04WS | N3 | L3 |
| 35 | 10 | 118 | 1/2 | 40 | 700 | C12AA06WS | N7 | L7 | 80 | 350 | C12AA04WS | N4 | L4 |
| 50 | 10 | 169 | 1/2 | 40 | 1,000 | C12AA06WS | N10 | L10 | 80 | 500 | C12AA04WS | N5 | L5 |
| 65 | 10 | 219 | 5/8 | 40 | 1,300 | C58AA06WS | N13 | L13 | 80 | 650 | C58AA04WS | N7 | L7 |
| 75 | 10 | 253 | 3/4 | 39 | 1,463 | C34DG06WS | N15 | L15 | 78 | 731 | C34DG06WS | N8 | L8 |
| 100 | 10 | 338 | 5/8 | 29 | 1,450 | C58AA06WS | N15 | L15 | 58 | 725 | C58AA06WS | N8 | L8 |
| 125 | 10 | 422 | 5/8 | 23 | 1,438 | C58AA06WS | N15 | L15 | 46 | 719 | C58AA06WS | N8 | L8 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | | | | | | |
| 150 | 10 | 506 | 5/8 | 19 | 1,425 | C58AA06WS | N15 | L15 | | | | | |
| 175 | 10 | 591 | 5/8 | 16 | 1,400 | C58AA06WS | N14 | L14 | | | | | |
| 200 | 10 | 675 | 5/8 | 14 | 1,400 | C58AA06WS | N14 | L14 | | | | | |
| 225 | 10 | 759 | 5/8 | 13 | 1,463 | C58AA06WS | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***Outboard***

2013 CBC OSHPD

### CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B17.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | |
| 11 | 10 | 37 | 3/8 | 40 | 254 | C38AA04WS | N3 | L3 | 80 | 127 | C38AA04WS | N2 | L2 |
| 25 | 10 | 84 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 289 | C12AA04WS | N3 | L3 |
| 35 | 10 | 118 | 1/2 | 40 | 808 | C12AA06WS | N9 | L9 | 80 | 404 | C12AA04WS | N5 | L5 |
| 50 | 10 | 169 | 1/2 | 40 | 1,155 | C12AA06WS | N12 | L12 | 80 | 577 | C12AA04WS | N6 | L6 |
| 65 | 10 | 219 | 1/2 | 38 | 1,426 | C12AA06WS | N15 | L15 | 76 | 713 | C12AA06WS | N8 | L8 |
| 75 | 10 | 253 | 1/2 | 32 | 1,386 | C12AA06WS | N14 | L14 | 64 | 693 | C12AA06WS | N7 | L7 |
| 100 | 10 | 338 | 1/2 | 24 | 1,386 | C12AA06WS | N14 | L14 | 48 | 693 | C12AA06WS | N7 | L7 |
| 125 | 10 | 422 | 1/2 | 20 | 1,443 | C12AA06WS | N15 | L15 | 40 | 722 | C12AA06WS | N8 | L8 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | | | | | | |
| 150 | 10 | 506 | 1/2 | 16 | 1,386 | C12AA06WS | N14 | L14 | | | | | |
| 175 | 10 | 591 | 1/2 | 14 | 1,415 | C12AA06WS | N15 | L15 | | | | | |
| 200 | 10 | 675 | 1/2 | 12 | 1,386 | C12AA06WS | N14 | L14 | | | | | |
| 225 | 10 | 759 | 1/2 | 11 | 1,429 | C12AA06WS | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***Outboard***

## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard** [1] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B17.0)** | | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11 | 10 | 37 | 3/8 | 40 | 342 | C38AA04WS | N4 | L4 | 80 | 171 | C38AA04WS | N2 | L2 |
| 25 | 10 | 84 | 1/2 | 40 | 778 | C12AA06WS | N8 | L8 | 80 | 389 | C12AA04WS | N4 | L4 |
| 35 | 10 | 118 | 1/2 | 40 | 1,089 | C12AA06WS | N11 | L11 | 80 | 545 | C12AA04WS | N6 | L6 |
| 50 | 10 | 169 | 5/8 | 40 | 1,556 | C58DG06TS | N16 | L16 | 80 | 778 | C58AA06WS | N8 | L8 |
| 65 | 10 | 219 | 5/8 | 32 | 1,618 | C58DG06TS | N17 | L17 | 64 | 809 | C58AA06WS | N9 | L9 |
| 75 | 10 | 253 | 5/8 | 28 | 1,634 | C58DG06TS | N17 | L17 | 56 | 817 | C58AA06WS | N9 | L9 |
| 100 | 10 | 338 | 5/8 | 20 | 1,556 | C58DG06TS | N16 | L16 | 40 | 778 | C58AA06WS | N8 | L8 |
| 125 | 10 | 422 | 5/8 | 16 | 1,556 | C58DG06TS | N16 | L16 | 32 | 778 | C58AA06WC | N8 | L8 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | | | | | | |
| 150 | 10 | 506 | 5/8 | 15 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 175 | 10 | 591 | 5/8 | 13 | 1,770 | C58DG06TS | N18 | L18 | | | | | |
| 200 | 10 | 675 | 5/8 | 11 | 1,711 | C58DG06TS | N18 | L18 | | | | | |
| 225 | 10 | 759 | 5/8 | 10 | 1,750 | C58DG06TS | N18 | L18 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***Outboard***

## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** — **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard [1] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E- Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E- Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B17.0)** | | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11 | 10 | 37 | 1/2 | 40 | 440 | C12AA04WS | N5 | L5 | 80 | 220 | C12AA04WS | N3 | L3 |
| 25 | 10 | 84 | 1/2 | 40 | 1,000 | C12AA06WS | N10 | L10 | 80 | 500 | C12AA04WS | N5 | L5 |
| 35 | 10 | 118 | 5/8 | 40 | 1,400 | C58AA06WS | N14 | L14 | 80 | 700 | C58AA06WS | N7 | L7 |
| 50 | 10 | 169 | 3/4 | 29 | 1,450 | C34DG06WS | N15 | L15 | 58 | 725 | C34DG06WS | N8 | L8 |
| 65 | 10 | 219 | 5/8 | 22 | 1,430 | C58AA06WS | N15 | L15 | 44 | 715 | C58AA06WS | N8 | L8 |
| 75 | 10 | 253 | 5/8 | 19 | 1,425 | C58AA06WS | N15 | L15 | 38 | 713 | C58AA06WS | N8 | L8 |
| 100 | 10 | 338 | 5/8 | 14 | 1,400 | C58AA06WS | N14 | L14 | 28 | 700 | C58AA06WS | N7 | L7 |
| 125 | 10 | 422 | 5/8 | 11 | 1,375 | C58AA06WS | N14 | L14 | 22 | 688 | C58AA06WS | N7 | L7 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | | | | | | |
| 150 | 10 | 506 | 5/8 | 9 | 1,350 | C58AA06WS | N14 | L14 | | | | | |
| 175 | 10 | 591 | 5/8 | 8 | 1,400 | C58AA06WS | N14 | L14 | | | | | |
| 200 | 10 | 675 | 5/8 | 7 | 1,400 | C58AA06WS | N14 | L14 | | | | | |
| 225 | 10 | 759 | 5/8 | 6 | 1,350 | C58AA06WS | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times W_p$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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2013 CBC OSHPD

## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard [1] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B17.0)** | | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11 | 10 | 37 | 3/8 | 40 | 381 | C38AA04WS | N4 | L4 | 80 | 191 | C38AA04WS | N2 | L2 |
| 25 | 10 | 84 | 1/2 | 40 | 866 | C12AA06WS | N9 | L9 | 80 | 433 | C12AA04WS | N5 | L5 |
| 35 | 10 | 118 | 1/2 | 40 | 1,212 | C12AA06WS | N13 | L13 | 80 | 606 | C12AA04WS | N7 | L7 |
| 50 | 10 | 169 | 1/2 | 32 | 1,386 | C12AA06WS | N14 | L14 | 64 | 693 | C12AA06WS | N7 | L7 |
| 65 | 10 | 219 | 1/2 | 24 | 1,351 | C12AA06WS | N14 | L14 | 48 | 675 | C12AA06WS | N7 | L7 |
| 75 | 10 | 253 | 1/2 | 22 | 1,429 | C12AA06WS | N15 | L15 | 44 | 714 | C12AA06WS | N8 | L8 |
| 100 | 10 | 338 | 1/2 | 16 | 1,386 | C12AA06WS | N14 | L14 | 32 | 693 | C12AA06WS | N7 | L7 |
| 125 | 10 | 422 | 1/2 | 12 | 1,299 | C12AA06WS | N13 | L13 | 24 | 650 | C12AA04WS | N7 | L7 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | | | | | | |
| 150 | 10 | 506 | 1/2 | 11 | 1,429 | C12AA06WS | N15 | L15 | | | | | |
| 175 | 10 | 591 | 1/2 | 9 | 1,364 | C12AA06WS | N14 | L14 | | | | | |
| 200 | 10 | 675 | 1/2 | 8 | 1,386 | C12AA06WS | N14 | L14 | | | | | |
| 225 | 10 | 759 | 1/2 | 7 | 1,364 | C12AA06WS | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***C20-0.75-30***

***Outboard***

## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard [1] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B17.0)** | | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11 | 10 | 37 | 1/2 | 40 | 513 | C12AA04WS | N6 | L6 | 80 | 257 | C12AA04WS | N3 | L3 |
| 25 | 10 | 84 | 5/8 | 40 | 1,167 | C58AA06WS | N12 | L12 | 80 | 583 | C58AA04WS | N6 | L6 |
| 35 | 10 | 118 | 5/8 | 38 | 1,552 | C58DG06TS | N16 | L16 | 76 | 776 | C58AA06WS | N8 | L8 |
| 50 | 10 | 169 | 5/8 | 26 | 1,517 | C58DG06TS | N16 | L16 | 52 | 758 | C58AA06WS | N8 | L8 |
| 65 | 10 | 219 | 5/8 | 20 | 1,517 | C58DG06TS | N16 | L16 | 40 | 758 | C58AA06WS | N8 | L8 |
| 75 | 10 | 253 | 5/8 | 18 | 1,575 | C58DG06TS | N16 | L16 | 36 | 788 | C58AA06WS | N8 | L8 |
| 100 | 10 | 338 | 5/8 | 14 | 1,634 | C58DG06TS | N17 | L17 | 28 | 817 | C58AA06WS | N9 | L9 |
| 125 | 10 | 422 | 5/8 | 10 | 1,458 | C58AA06WS | N15 | L15 | 20 | 729 | C58AA06WC | N8 | L8 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | | | | | | |
| 150 | 10 | 506 | 5/8 | 10 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 175 | 10 | 591 | 5/8 | 8 | 1,634 | C58DG06TS | N17 | L17 | | | | | |
| 200 | 10 | 675 | 5/8 | 7 | 1,634 | C58DG06TS | N17 | L17 | | | | | |
| 225 | 10 | 759 | 5/8 | 6 | 1,575 | C58DG06TS | N16 | L16 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***C20-0.75-45***

***Outboard***

## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard** [1] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E- Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E- Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B17.0)** | | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11 | 10 | 37 | 1/2 | 40 | 660 | C12AA04WS | N7 | L7 | 80 | 330 | C12AA04WS | N4 | L4 |
| 25 | 10 | 84 | 3/4 | 39 | 1,463 | C34DG06WS | N15 | L15 | 78 | 731 | C34DG06WS | N8 | L8 |
| 35 | 10 | 118 | 3/4 | 28 | 1,470 | C34DG06WS | N15 | L15 | 56 | 735 | C34DG06WS | N8 | L8 |
| 50 | 10 | 169 | 5/8 | 19 | 1,425 | C58AA06WS | N15 | L15 | 38 | 713 | C58AA06WS | N8 | L8 |
| 65 | 10 | 219 | 3/4 | 15 | 1,463 | C34DG06WS | N15 | L15 | 30 | 731 | C34DG06WS | N8 | L8 |
| 75 | 10 | 253 | 5/8 | 12 | 1,350 | C58AA06WS | N14 | L14 | 24 | 675 | C58AA06WS | N7 | L7 |
| 100 | 10 | 338 | 5/8 | 9 | 1,350 | C58AA06WS | N14 | L14 | 18 | 675 | C58AA06WS | N7 | L7 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | | | | | | |
| 125 | 10 | 422 | 5/8 | 7 | 1,313 | C58AA06WS | N14 | L14 | | | | | |
| 150 | 10 | 506 | 5/8 | 6 | 1,350 | C58AA06WS | N14 | L14 | | | | | |
| 175 | 10 | 591 | 5/8 | 5 | 1,313 | C58AA06WS | N14 | L14 | | | | | |
| 200 | 10 | 675 | 5/8 | 4 | 1,200 | C58AA06WS | N12 | L12 | | | | | |
| 225 | 10 | 759 | 5/8 | 4 | 1,350 | C58AA06WS | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard** [1] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B17.0)** | | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | |
| 11 | 10 | 37 | 3/8 | 40 | 508 | C38AA04WS | N6 | L6 | 80 | 254 | C38AA04WS | N3 | L3 |
| 25 | 10 | 84 | 1/2 | 40 | 1,155 | C12AA06WS | N12 | L12 | 80 | 577 | C12AA04WS | N6 | L6 |
| 35 | 10 | 118 | 1/2 | 34 | 1,374 | C12AA06WS | N14 | L14 | 68 | 687 | C12AA06WS | N7 | L7 |
| 50 | 10 | 169 | 1/2 | 24 | 1,386 | C12AA06WS | N14 | L14 | 48 | 693 | C12AA06WS | N7 | L7 |
| 65 | 10 | 219 | 1/2 | 18 | 1,351 | C12AA06WS | N14 | L14 | 36 | 675 | C12AA06WS | N7 | L7 |
| 75 | 10 | 253 | 1/2 | 16 | 1,386 | C12AA06WS | N14 | L14 | 32 | 693 | C12AA06WS | N7 | L7 |
| 100 | 10 | 338 | 1/2 | 12 | 1,386 | C12AA06WS | N14 | L14 | 24 | 693 | C12AA06WS | N7 | L7 |
| 125 | 10 | 422 | 1/2 | 10 | 1,443 | C12AA06WS | N15 | L15 | 20 | 722 | C12AA06WS | N8 | L8 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B17.1)** | | | | | | | | | |
| 150 | 10 | 506 | 1/2 | 8 | 1,386 | C12AA06WS | N14 | L14 | | | | | |
| 175 | 10 | 591 | 1/2 | 7 | 1,415 | C12AA06WS | N15 | L15 | | | | | |
| 200 | 10 | 675 | 1/2 | 6 | 1,386 | C12AA06WS | N14 | L14 | | | | | |
| 225 | 10 | 759 | 1/2 | 5 | 1,299 | C12AA06WS | N13 | L13 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)*** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B17.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | |
| 11 | 10 | 37 | 1/2 | 40 | 685 | C12AA06WS | N7 | L7 | 80 | 342 | C12AA04WS | N4 | L4 |
| 25 | 10 | 84 | 5/8 | 40 | 1,556 | C58DG06TS | N16 | L16 | 80 | 778 | C58AA06WS | N8 | L8 |
| 35 | 10 | 118 | 5/8 | 28 | 1,525 | C58DG06TS | N16 | L16 | 56 | 762 | C58AA06WS | N8 | L8 |
| 50 | 10 | 169 | 5/8 | 20 | 1,556 | C58DG06TS | N16 | L16 | 40 | 778 | C58AA06WS | N8 | L8 |
| 65 | 10 | 219 | 5/8 | 16 | 1,618 | C58DG06TS | N17 | L17 | 32 | 809 | C58AA06WS | N9 | L9 |
| 75 | 10 | 253 | 5/8 | 14 | 1,634 | C58DG06TS | N17 | L17 | 28 | 817 | C58AA06WS | N9 | L9 |
| 100 | 10 | 338 | 5/8 | 10 | 1,556 | C58DG06TS | N16 | L16 | 20 | 778 | C58AA06WS | N8 | L8 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | | | | | | |
| 125 | 10 | 422 | 5/8 | 9 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 150 | 10 | 506 | 5/8 | 7 | 1,634 | C58DG06TS | N17 | L17 | | | | | |
| 175 | 10 | 591 | 5/8 | 6 | 1,634 | C58DG06TS | N17 | L17 | | | | | |
| 200 | 10 | 675 | 5/8 | 5 | 1,556 | C58DG06TS | N16 | L16 | | | | | |
| 225 | 10 | 759 | 5/8 | 5 | 1,750 | C58DG06TS | N18 | L18 | | | | | |

1. TVL = DL + Fv + $(0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZE MOUNTED PIPING (Plumbing, Mechanical, Process, Medical Gas)** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E- Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E- Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B17.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | |
| 11 | 10 | 37 | 1/2 | 40 | 880 | C12AA06WS | N9 | L9 | 80 | 440 | C12AA04WS | N5 | L5 |
| 25 | 10 | 84 | 3/4 | 29 | 1,450 | C34DG06WS | N15 | L15 | 58 | 725 | C34DG06WS | N8 | L8 |
| 35 | 10 | 118 | 3/4 | 21 | 1,470 | C34DG06WS | N15 | L15 | 42 | 735 | C34DG06WS | N8 | L8 |
| 50 | 10 | 169 | 5/8 | 14 | 1,400 | C58AA06WS | N14 | L14 | 28 | 700 | C58AA06WS | N7 | L7 |
| 65 | 10 | 219 | 5/8 | 11 | 1,430 | C58AA06WS | N15 | L15 | 22 | 715 | C58AA06WS | N8 | L8 |
| 75 | 10 | 253 | 5/8 | 9 | 1,350 | C58AA06WS | N14 | L14 | 18 | 675 | C58AA06WS | N7 | L7 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B17.1) | | | | | | | | | |
| 100 | 10 | 338 | 5/8 | 7 | 1,400 | C58AA06WS | N14 | L14 | | | | | |
| 125 | 10 | 422 | 5/8 | 5 | 1,250 | C58AA06WS | N13 | L13 | | | | | |
| 150 | 10 | 506 | 5/8 | 4 | 1,200 | C58AA06WS | N12 | L12 | | | | | |
| 175 | 10 | 591 | 5/8 | 4 | 1,400 | C58AA06WS | N14 | L14 | | | | | |
| 200 | 10 | 675 | 5/8 | 3 | 1,200 | C58AA06WS | N12 | L12 | | | | | |
| 225 | 10 | 759 | 5/8 | 3 | 1,350 | C58AA06WS | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 35% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 8.1 or 10.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B30.0 & B33.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2) | | | | |
| 11.0 | 10 | 175 | 3/8 | 30 | 95 | R38AAEM306 | N1 | L1 | 60 | 124 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 397 | 1/2 | 30 | 217 | R12AAEM306 | N3 | L3 | 60 | 281 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 556 | 1/2 | 30 | 303 | R12AAEM409 | N4 | L4 | 60 | 394 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 794 | 1/2 | 30 | 433 | R12AAEM406 | N5 | L5 | 60 | 563 | R12AAEM406 | N6 | L6 |
| 65.0 | 10 | 1,032 | 1/2 | 30 | 563 | R12AAEM406 | N6 | L6 | 60 | 732 | R12AAEM509 | N8 | L8 |
| 75.0 | 10 | 1,191 | 1/2 | 30 | 650 | R12AAEM406 | N7 | L7 | 60 | 844 | R12AAEM506 | N9 | L9 |
| 100.0 | 10 | 1,588 | 5/8 | 30 | 866 | R58AAEM506 | N9 | L9 | 60 | 1,126 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 1,985 | 5/8 | 30 | 1,083 | R58AAEM506 | N11 | L11 | 60 | 1,407 | R58AAEM506 | N15 | L15 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3) | | | | | | | | | |
| 150.0 | 10 | 1,849 | 5/8 | 30 | 844 | R58AAEM506 | N9 | L9 | | | | | |
| 175.0 | 10 | 2,157 | 5/8 | 30 | 985 | R58AAEM506 | N10 | L10 | | | | | |
| 200.0 | 10 | 2,465 | 3/4 | 30 | 1,126 | R34DGB1P06 | N12 | L12 | | | | | |
| 225.0 | 10 | 2,720 | 3/4 | 28 | 1,182 | R34DGB1P06 | N12 | L12 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B30.0 & B33.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2) | | | | |
| 11.0 | 10 | 258 | 3/8 | 30 | 128 | R38AAEM306 | N2 | L2 | 60 | 167 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 586 | 1/2 | 30 | 292 | R12AAEM306 | N3 | L3 | 60 | 379 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 820 | 1/2 | 30 | 408 | R12AAEM406 | N5 | L5 | 60 | 531 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 1,172 | 1/2 | 30 | 583 | R12AAEM406 | N6 | L6 | 60 | 758 | R12AAEM509 | N8 | L8 |
| 65.0 | 10 | 1,523 | 5/8 | 30 | 758 | R58AAEM509 | N8 | L8 | 60 | 986 | R58AAEM506 | N10 | L10 |
| 75.0 | 10 | 1,758 | 5/8 | 30 | 875 | R58AAEM506 | N9 | L9 | 60 | 1,138 | R58AAEM506 | N12 | L12 |
| 100.0 | 10 | 2,343 | 3/4 | 30 | 1,167 | R34CFB1P06 | N12 | L12 | 60 | 1,517 | R34CFB2P12 | N16 | L16 |
| 125.0 | 10 | 2,929 | 3/4 | 30 | 1,458 | R34CFB2P12 | N15 | L15 | 60 | 1,896 | R34DGB2P09 | N19 | L19 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3) | | | | | | | | | |
| 150.0 | 10 | 2,416 | 3/4 | 30 | 1,138 | R34CFB1P06 | N12 | L12 | | | | | |
| 175.0 | 10 | 2,818 | 3/4 | 30 | 1,327 | R34CFB2P12 | N14 | L14 | | | | | |
| 200.0 | 10 | 3,221 | 3/4 | 30 | 1,517 | R34CFB2P12 | N16 | L16 | | | | | |
| 225.0 | 10 | 3,459 | 3/4 | 27 | 1,536 | R34CFB2P12 | N16 | L16 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B30.0 & B33.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2)** | | | | |
| 11.0 | 10 | 331 | 3/8 | 30 | 165 | R38AAEM306 | N2 | L2 | 60 | 215 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 752 | 1/2 | 30 | 375 | R12AAEM406 | N4 | L4 | 60 | 488 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 1,053 | 1/2 | 30 | 525 | R12AAEM406 | N6 | L6 | 60 | 683 | R12AAEM509 | N7 | L7 |
| 50.0 | 10 | 1,504 | 5/8 | 30 | 750 | R58AAEM509 | N8 | L8 | 60 | 975 | R58AAEM506 | N10 | L10 |
| 65.0 | 10 | 1,955 | 5/8 | 30 | 975 | R58AAEM506 | N10 | L10 | 60 | 1,268 | R58AAEM506 | N13 | L13 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3)** | | | | | | | | | |
| 75.0 | 10 | 1,457 | 1/2 | 30 | 731 | R12AAEM509 | N8 | L8 | | | | | |
| 100.0 | 10 | 1,943 | 5/8 | 30 | 975 | R58AAEM506 | N10 | L10 | | | | | |
| 100.0 | 10 | 1,943 | 5/8 | 30 | 975 | R58AAEM506 | N10 | L10 | | | | | |
| 125.0 | 10 | 2,428 | 3/4 | 30 | 1,219 | R34DGB1P06 | N13 | L13 | | | | | |
| 150.0 | 10 | 2,808 | 3/4 | 28 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 175.0 | 10 | 3,027 | 3/4 | 24 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 200.0 | 10 | 3,246 | 3/4 | 21 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 225.0 | 10 | 3,492 | 3/4 | 19 | 1,389 | R34DGB1S06 | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B30.0 & B33.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2)** | | | | |
| 11.0 | 10 | 253 | 3/8 | 30 | 191 | R38AAEM306 | N2 | L2 | 60 | 248 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 574 | 1/2 | 30 | 433 | R12AAEM406 | N5 | L5 | 60 | 563 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 804 | 1/2 | 30 | 606 | R12AAEM406 | N7 | L7 | 60 | 788 | R12AAEM509 | N8 | L8 |
| 50.0 | 10 | 1,149 | 1/2 | 30 | 866 | R12AAEM506 | N9 | L9 | 60 | 1,126 | R12AAEM506 | N12 | L12 |
| 65.0 | 10 | 1,432 | 1/2 | 28 | 1,051 | R12AAEM506 | N11 | L11 | 56 | 1,366 | R12AAEM506 | N14 | L14 |
| 75.0 | 10 | 1,510 | 5/8 | 24 | 1,039 | R58AAEM506 | N11 | L11 | 48 | 1,351 | R58AAEM506 | N14 | L14 |
| 100.0 | 10 | 1,730 | 5/8 | 18 | 1,039 | R58AAEM506 | N11 | L11 | 36 | 1,351 | R58AAEM506 | N14 | L14 |
| 125.0 | 10 | 1,925 | 5/8 | 14 | 1,010 | R58AAEM506 | N11 | L11 | 28 | 1,313 | R58AAEM506 | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3)** | | | | | | | | | |
| 150.0 | 10 | 2,204 | 5/8 | 25 | 1,407 | R58AAEM506 | N15 | L15 | | | | | |
| 175.0 | 10 | 2,323 | 5/8 | 19 | 1,248 | R58AAEM506 | N13 | L13 | | | | | |
| 200.0 | 10 | 2,465 | 3/4 | 15 | 1,126 | R34DGB1P06 | N12 | L12 | | | | | |
| 225.0 | 10 | 2,720 | 3/4 | 14 | 1,182 | R34DGB1P06 | N12 | L12 | | | | | |

1. TVL = DL + Fv + $(0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS*[7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B30.0 & B33.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2)** | | | | |
| 11.0 | 10 | 419 | 3/8 | 30 | 257 | R38AAEM306 | N3 | L3 | 60 | 334 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 952 | 1/2 | 30 | 583 | R12AAEM406 | N6 | L6 | 60 | 758 | R12AAEM509 | N8 | L8 |
| 35.0 | 10 | 1,333 | 5/8 | 30 | 817 | R58AAEM506 | N9 | L9 | 60 | 1,062 | R58AAEM506 | N11 | L11 |
| 50.0 | 10 | 1,905 | 3/4 | 30 | 1,167 | R34CFB1P06 | N12 | L12 | 60 | 1,517 | R34CFB2P12 | N16 | L16 |
| 65.0 | 10 | 2,476 | 3/4 | 30 | 1,517 | R34CFB2P12 | N16 | L16 | 60 | 1,972 | R34DGB2P09 | N20 | L20 |
| 75.0 | 10 | 2,564 | 3/4 | 26 | 1,517 | R34CFB2P12 | N16 | L16 | 52 | 1,972 | R34DGB2P09 | N20 | L20 |
| 100.0 | 10 | 2,832 | 3/4 | 20 | 1,556 | R34CFB2P12 | N16 | L16 | 40 | 2,022 | R34DGB2P09 | N21 | L21 |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 1,556 | R34CFB2P12 | N16 | L16 | 32 | 2,022 | R34DGB2P09 | N21 | L21 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3)** | | | | | | | | | |
| 150.0 | 10 | 3,295 | 3/4 | 27 | 2,048 | R34DEB2P09 | N21 | L21 | | | | | |
| 175.0 | 10 | 3,417 | 3/4 | 22 | 1,947 | R34DEB2P09 | N20 | L20 | | | | | |
| 200.0 | 10 | 3,416 | 3/4 | 17 | 1,719 | R34DEB2P09 | N18 | L18 | | | | | |
| 225.0 | 10 | 3,404 | 3/4 | 13 | 1,479 | R34CFB2P12 | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B30.0 & B33.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2) | | | | |
| 11.0 | 10 | 565 | 1/2 | 30 | 330 | R12AAEM409 | N4 | L4 | 60 | 429 | R12AAEM406 | N5 | L5 |
| 25.0 | 10 | 1,285 | 5/8 | 30 | 750 | R58AAEM509 | N8 | L8 | 60 | 975 | R58AAEM506 | N10 | L10 |
| 35.0 | 10 | 1,799 | 3/4 | 30 | 1,050 | R34DGB1P06 | N11 | L11 | 60 | 1,365 | R34DGB1S06 | N14 | L14 |
| 50.0 | 10 | 1,859 | 5/8 | 20 | 1,000 | R58AAEM506 | N10 | L10 | 40 | 1,300 | R58AAEM506 | N13 | L13 |
| 65.0 | 10 | 2,048 | 3/4 | 16 | 1,040 | R34DGB1P06 | N11 | L11 | 32 | 1,352 | R34DGB1S06 | N14 | L14 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3) | | | | | | | | | |
| 75.0 | 10 | 2,150 | 3/4 | 28 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,369 | 3/4 | 21 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,369 | 3/4 | 21 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 125.0 | 10 | 2,606 | 3/4 | 17 | 1,381 | R34DGB1S06 | N14 | L14 | | | | | |
| 150.0 | 10 | 2,808 | 3/4 | 14 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 175.0 | 10 | 3,027 | 3/4 | 12 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 200.0 | 10 | 3,175 | 3/4 | 10 | 1,300 | R34DGB1S06 | N13 | L13 | | | | | |
| 225.0 | 10 | 3,413 | 3/4 | 9 | 1,316 | R34DGB1S06 | N14 | L14 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B30.0 & B33.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2) | | | | |
| 11.0 | 10 | 331 | 3/8 | 30 | 286 | R38AAEM306 | N3 | L3 | 60 | 372 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 752 | 1/2 | 30 | 650 | R12AAEM406 | N7 | L7 | 60 | 844 | R12AAEM506 | N9 | L9 |
| 35.0 | 10 | 1,053 | 1/2 | 30 | 909 | R12AAEM506 | N10 | L10 | 60 | 1,182 | R12AAEM506 | N12 | L12 |
| 50.0 | 10 | 1,291 | 1/2 | 24 | 1,039 | R12AAEM506 | N11 | L11 | 48 | 1,351 | R12AAEM506 | N14 | L14 |
| 65.0 | 10 | 1,401 | 1/2 | 18 | 1,013 | R12AAEM506 | N11 | L11 | 36 | 1,317 | R12AAEM506 | N14 | L14 |
| 75.0 | 10 | 1,510 | 5/8 | 16 | 1,039 | R58AAEM506 | N11 | L11 | 32 | 1,351 | R58AAEM506 | N14 | L14 |
| 100.0 | 10 | 1,730 | 5/8 | 12 | 1,039 | R58AAEM506 | N11 | L11 | 24 | 1,351 | R58AAEM506 | N14 | L14 |
| 125.0 | 10 | 1,985 | 5/8 | 10 | 1,083 | R58AAEM506 | N11 | L11 | 20 | 1,407 | R58AAEM506 | N15 | L15 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3) | | | | | | | | | |
| 150.0 | 10 | 2,222 | 5/8 | 17 | 1,435 | R58AAEM506 | N15 | L15 | | | | | |
| 175.0 | 10 | 2,281 | 5/8 | 12 | 1,182 | R58AAEM506 | N12 | L12 | | | | | |
| 200.0 | 10 | 2,465 | 3/4 | 10 | 1,126 | R34DGB1P06 | N12 | L12 | | | | | |
| 225.0 | 10 | 2,693 | 3/4 | 9 | 1,140 | R34DGB1P06 | N12 | L12 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B30.0 & B33.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2)** | | | | |
| 11.0 | 10 | 580 | 1/2 | 30 | 385 | R12AAEM406 | N4 | L4 | 60 | 501 | R12AAEM406 | N6 | L6 |
| 25.0 | 10 | 1,319 | 5/8 | 30 | 875 | R58AAEM506 | N9 | L9 | 60 | 1,138 | R58AAEM506 | N12 | L12 |
| 35.0 | 10 | 1,846 | 3/4 | 30 | 1,225 | R34CFB1P06 | N13 | L13 | 60 | 1,593 | R34CFB2P12 | N16 | L16 |
| 50.0 | 10 | 2,345 | 3/4 | 26 | 1,517 | R34CFB2P12 | N16 | L16 | 52 | 1,972 | R34DGB2P09 | N20 | L20 |
| 65.0 | 10 | 2,476 | 3/4 | 20 | 1,517 | R34CFB2P12 | N16 | L16 | 40 | 1,972 | R34DGB2P09 | N20 | L20 |
| 75.0 | 10 | 2,417 | 3/4 | 16 | 1,400 | R34CFB1S06 | N15 | L15 | 32 | 1,820 | R34DGB2P09 | N19 | L19 |
| 100.0 | 10 | 2,637 | 3/4 | 12 | 1,400 | R34CFB1S06 | N15 | L15 | 24 | 1,820 | R34DGB2P09 | N19 | L19 |
| 125.0 | 10 | 2,929 | 3/4 | 10 | 1,458 | R34CFB2P12 | N15 | L15 | 20 | 1,896 | R34DGB2P09 | N19 | L19 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3)** | | | | | | | | | |
| 150.0 | 10 | 3,295 | 3/4 | 18 | 2,048 | R34DEB2P09 | N21 | L21 | | | | | |
| 175.0 | 10 | 3,460 | 3/4 | 15 | 1,991 | R34DEB2P09 | N20 | L20 | | | | | |
| 200.0 | 10 | 3,368 | 3/4 | 11 | 1,669 | R34DEB2P09 | N17 | L17 | | | | | |
| 225.0 | 10 | 3,459 | 3/4 | 9 | 1,536 | R34CFB2P12 | N16 | L16 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B30.0 & B33.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2) | | | | |
| 11.0 | 10 | 800 | 1/2 | 30 | 495 | R12AAEM406 | N5 | L5 | 60 | 644 | R12AAEM406 | N7 | L7 |
| 25.0 | 10 | 1,711 | 3/4 | 28 | 1,050 | R34DGB1P06 | N11 | L11 | 56 | 1,365 | R34DGB1S06 | N14 | L14 |
| 35.0 | 10 | 1,799 | 3/4 | 20 | 1,050 | R34DGB1P06 | N11 | L11 | 40 | 1,365 | R34DGB1S06 | N14 | L14 |
| 50.0 | 10 | 1,930 | 3/4 | 14 | 1,050 | R34DGB1P06 | N11 | L11 | 28 | 1,365 | R34DGB1S06 | N14 | L14 |
| 65.0 | 10 | 1,955 | 5/8 | 10 | 975 | R58AAEM506 | N10 | L10 | 20 | 1,268 | R58AAEM506 | N13 | L13 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3) | | | | | | | | | |
| 75.0 | 10 | 2,176 | 3/4 | 19 | 1,389 | R34DGB1S06 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,369 | 3/4 | 14 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,369 | 3/4 | 14 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 125.0 | 10 | 2,562 | 3/4 | 11 | 1,341 | R34DGB1S06 | N14 | L14 | | | | | |
| 150.0 | 10 | 2,754 | 3/4 | 9 | 1,316 | R34DGB1S06 | N14 | L14 | | | | | |
| 175.0 | 10 | 3,027 | 3/4 | 8 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 200.0 | 10 | 3,246 | 3/4 | 7 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 225.0 | 10 | 3,413 | 3/4 | 6 | 1,316 | R34DGB1S06 | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B30.0 & B33.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2)** | | | | |
| 11.0 | 10 | 409 | 3/8 | 30 | 381 | R38AAEM406 | N4 | L4 | 60 | 495 | R38AAEM406 | N5 | L5 |
| 25.0 | 10 | 930 | 1/2 | 30 | 866 | R12AAEM506 | N9 | L9 | 60 | 1,126 | R12AAEM506 | N12 | L12 |
| 35.0 | 10 | 1,169 | 1/2 | 26 | 1,051 | R12AAEM506 | N11 | L11 | 52 | 1,366 | R12AAEM506 | N14 | L14 |
| 50.0 | 10 | 1,291 | 1/2 | 18 | 1,039 | R12AAEM506 | N11 | L11 | 36 | 1,351 | R12AAEM506 | N14 | L14 |
| 65.0 | 10 | 1,432 | 1/2 | 14 | 1,051 | R12AAEM506 | N11 | L11 | 28 | 1,366 | R12AAEM506 | N14 | L14 |
| 75.0 | 10 | 1,510 | 5/8 | 12 | 1,039 | R58AAEM506 | N11 | L11 | 24 | 1,351 | R58AAEM506 | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3)** | | | | | | | | | |
| 100.0 | 10 | 1,777 | 5/8 | 19 | 1,426 | R58AAEM506 | N15 | L15 | | | | | |
| 125.0 | 10 | 1,985 | 5/8 | 15 | 1,407 | R58AAEM506 | N15 | L15 | | | | | |
| 150.0 | 10 | 2,168 | 5/8 | 12 | 1,351 | R58AAEM506 | N14 | L14 | | | | | |
| 175.0 | 10 | 2,281 | 5/8 | 9 | 1,182 | R58AAEM506 | N12 | L12 | | | | | |
| 200.0 | 10 | 2,418 | 3/4 | 7 | 1,051 | R34DGB1P06 | N11 | L11 | | | | | |
| 225.0 | 10 | 2,720 | 3/4 | 7 | 1,182 | R34DGB1P06 | N12 | L12 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B30.0 & B33.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2)** | | | | |
| 11.0 | 10 | 742 | 1/2 | 30 | 513 | R12AAEM406 | N6 | L6 | 60 | 667 | R12AAEM509 | N7 | L7 |
| 25.0 | 10 | 1,685 | 3/4 | 30 | 1,167 | R34CFB1P06 | N12 | L12 | 60 | 1,517 | R34CFB2P12 | N16 | L16 |
| 35.0 | 10 | 2,223 | 3/4 | 28 | 1,525 | R34CFB2P12 | N16 | L16 | 56 | 1,982 | R34DGB2P09 | N20 | L20 |
| 50.0 | 10 | 2,198 | 3/4 | 18 | 1,400 | R34CFB1S06 | N15 | L15 | 36 | 1,820 | R34DGB2P09 | N19 | L19 |
| 65.0 | 10 | 2,349 | 3/4 | 14 | 1,416 | R34CFB1S06 | N15 | L15 | 28 | 1,840 | R34DGB2P09 | N19 | L19 |
| 75.0 | 10 | 2,417 | 3/4 | 12 | 1,400 | R34CFB1S06 | N15 | L15 | 24 | 1,820 | R34DGB2P09 | N19 | L19 |
| 100.0 | 10 | 2,832 | 3/4 | 10 | 1,556 | R34CFB2P12 | N16 | L16 | 20 | 2,022 | R34DGB2P09 | N21 | L21 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3)** | | | | | | | | | |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 2,022 | R34DEB2P09 | N21 | L21 | | | | | |
| 150.0 | 10 | 3,222 | 3/4 | 13 | 1,972 | R34DEB2P09 | N20 | L20 | | | | | |
| 175.0 | 10 | 3,417 | 3/4 | 11 | 1,947 | R34DEB2P09 | N20 | L20 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

ANTHONY A. ROSALCAVA
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## *RIGID BRACING REQUIREMENTS* [7]

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B30.0 & B33.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B30.2 & B33.2)** | | | | |
| 11.0 | 10 | 1,034 | 1/2 | 30 | 660 | R12AAEM406 | N7 | L7 | 60 | 858 | R12AAEM506 | N9 | L9 |
| 25.0 | 10 | 1,640 | 3/4 | 20 | 1,000 | R34DGB1P06 | N10 | L10 | 40 | 1,300 | R34DGB1S06 | N13 | L13 |
| 35.0 | 10 | 1,699 | 5/8 | 14 | 980 | R58AAEM506 | N10 | L10 | 28 | 1,274 | R58AAEM506 | N13 | L13 |
| 50.0 | 10 | 1,859 | 5/8 | 10 | 1,000 | R58AAEM506 | N10 | L10 | 20 | 1,300 | R58AAEM506 | N13 | L13 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Transverse, Longitudinal Brace Pattern (B30.3 & B33.3)** | | | | | | | | | |
| 65.0 | 10 | 2,048 | 3/4 | 16 | 1,352 | R34DGB1S06 | N14 | L14 | | | | | |
| 75.0 | 10 | 2,150 | 3/4 | 14 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,298 | 5/8 | 10 | 1,300 | R58AAEM506 | N13 | L13 | | | | | |
| 100.0 | 10 | 2,298 | 5/8 | 10 | 1,300 | R58AAEM506 | N13 | L13 | | | | | |
| 125.0 | 10 | 2,517 | 3/4 | 8 | 1,300 | R34DGB1S06 | N13 | L13 | | | | | |
| 150.0 | 10 | 2,808 | 3/4 | 7 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 175.0 | 10 | 3,027 | 3/4 | 6 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 200.0 | 10 | 3,175 | 3/4 | 5 | 1,300 | R34DGB1S06 | N13 | L13 | | | | | |
| 225.0 | 10 | 3,253 | 3/4 | 4 | 1,170 | R34DGB1P06 | N12 | L12 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B31.0, B34.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 95 | C38AA04WS | N1 | L1 | 60 | 124 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 30 | 217 | C12AA04WS | N3 | L3 | 60 | 281 | C12AA04WS | N3 | L3 |
| 35.0 | 10 | 307 | 1/2 | 30 | 303 | C12AA04WS | N4 | L4 | 60 | 394 | C12AA04WS | N4 | L4 |
| 50.0 | 10 | 439 | 1/2 | 30 | 433 | C12AA04WS | N5 | L5 | 60 | 563 | C12AA04WS | N6 | L6 |
| 65.0 | 10 | 570 | 1/2 | 30 | 563 | C12AA04WS | N6 | L6 | 60 | 732 | C12AA06WS | N8 | L8 |
| 75.0 | 10 | 658 | 1/2 | 30 | 650 | C12AA04WS | N7 | L7 | 60 | 844 | C12AA06WS | N9 | L9 |
| 100.0 | 10 | 878 | 1/2 | 30 | 866 | C12AA06WS | N9 | L9 | 60 | 1,126 | C12AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 1/2 | 30 | 1,083 | C12AA06WS | N11 | L11 | 60 | 1,407 | C12AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 1/2 | 25 | 1,083 | C12AA06WS | N11 | L11 | 50 | 1,407 | C12AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]:

**ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)** — **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B31.0, B34.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1) | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 128 | C38AA04WS | N2 | L2 | 60 | 167 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 30 | 292 | C12AA04WS | N3 | L3 | 60 | 379 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 307 | 1/2 | 30 | 408 | C12AA04WS | N5 | L5 | 60 | 531 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 439 | 1/2 | 30 | 583 | C12AA04WS | N6 | L6 | 60 | 758 | C12AA06WS | N8 | L8 |
| 65.0 | 10 | 570 | 1/2 | 30 | 758 | C12AA06WS | N8 | L8 | 60 | 986 | C12AA06WS | N10 | L10 |
| 75.0 | 10 | 658 | 5/8 | 30 | 875 | C58AA06WS | N9 | L9 | 60 | 1,138 | C58AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 5/8 | 30 | 1,167 | C58AA06WS | N12 | L12 | 60 | 1,517 | C58DG06TS | N16 | L16 |
| 125.0 | 10 | 1,097 | 5/8 | 24 | 1,167 | C58AA06WS | N12 | L12 | 48 | 1,517 | C58DG06TS | N16 | L16 |
| 150.0 | 10 | 1,316 | 5/8 | 20 | 1,167 | C58AA06WS | N12 | L12 | 40 | 1,517 | C58DG06TS | N16 | L16 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7] :*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B31.0, B34.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 165 | C38AA04WS | N2 | L2 | 60 | 215 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 30 | 375 | C12AA04WS | N4 | L4 | 60 | 488 | C12AA04WS | N5 | L5 |
| 35.0 | 10 | 307 | 1/2 | 30 | 525 | C12AA04WS | N6 | L6 | 60 | 683 | C12AA06WS | N7 | L7 |
| 50.0 | 10 | 439 | 5/8 | 30 | 750 | C58AA06WS | N8 | L8 | 60 | 975 | C58AA06WS | N10 | L10 |
| 65.0 | 10 | 570 | 5/8 | 30 | 975 | C58AA06WS | N10 | L10 | 60 | 1,268 | C58AA06WS | N13 | L13 |
| 75.0 | 10 | 658 | 3/4 | 30 | 1,125 | C34DG06WS | N12 | L12 | 60 | 1,463 | C34DG06WS | N15 | L15 |
| 100.0 | 10 | 878 | 3/4 | 22 | 1,100 | C34DG06WS | N11 | L11 | 44 | 1,430 | C34DG06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 3/4 | 18 | 1,125 | C34DG06WS | N12 | L12 | 36 | 1,463 | C34DG06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 3/4 | 15 | 1,125 | C34DG06WS | N12 | L12 | 30 | 1,463 | C34DG06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4$ x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B31.0, B34.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1) | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 191 | C38AA04WS | N2 | L2 | 60 | 248 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 30 | 433 | C12AA04WS | N5 | L5 | 60 | 563 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 1/2 | 30 | 606 | C12AA04WS | N7 | L7 | 60 | 788 | C12AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 1/2 | 30 | 866 | C12AA06WS | N9 | L9 | 60 | 1,126 | C12AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 1/2 | 29 | 1,088 | C12AA06WS | N11 | L11 | 58 | 1,415 | C12AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 1/2 | 25 | 1,083 | C12AA06WS | N11 | L11 | 50 | 1,407 | C12AA06WS | N15 | L15 |
| 100.0 | 10 | 878 | 1/2 | 19 | 1,097 | C12AA06WS | N11 | L11 | 38 | 1,426 | C12AA06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 1/2 | 15 | 1,083 | C12AA06WS | N11 | L11 | 30 | 1,407 | C12AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 1/2 | 12 | 1,039 | C12AA06WS | N11 | L11 | 24 | 1,351 | C12AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7] :*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B31.0, B34.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1) | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 257 | C38AA04WS | N3 | L3 | 60 | 334 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 30 | 583 | C12AA04WS | N6 | L6 | 60 | 758 | C12AA06WS | N8 | L8 |
| 35.0 | 10 | 307 | 5/8 | 30 | 817 | C58AA06WS | N9 | L9 | 60 | 1,062 | C58AA06WS | N11 | L11 |
| 50.0 | 10 | 439 | 3/4 | 30 | 1,167 | C34DG06WS | N12 | L12 | 60 | 1,517 | C34DG06TS | N16 | L16 |
| 65.0 | 10 | 570 | 3/4 | 23 | 1,163 | C34DG06WS | N12 | L12 | 46 | 1,512 | C34DG06TS | N16 | L16 |
| 75.0 | 10 | 658 | 3/4 | 20 | 1,167 | C34DG06WS | N12 | L12 | 40 | 1,517 | C34DG06TS | N16 | L16 |
| 100.0 | 10 | 878 | 5/8 | 15 | 1,167 | C58AA06WS | N12 | L12 | 30 | 1,517 | C58DG06TS | N16 | L16 |
| 125.0 | 10 | 1,097 | 5/8 | 12 | 1,167 | C58AA06WS | N12 | L12 | 24 | 1,517 | C58DG06TS | N16 | L16 |
| 150.0 | 10 | 1,316 | 5/8 | 10 | 1,167 | C58AA06WS | N12 | L12 | 20 | 1,517 | C58DG06TS | N16 | L16 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7] :*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2-Way Transverse Brace Pattern (B31.0, B34.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 30 | 330 | C12AA04WS | N4 | L4 | 60 | 429 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 5/8 | 30 | 750 | C58AA06WS | N8 | L8 | 60 | 975 | C58AA06WS | N10 | L10 |
| 35.0 | 10 | 307 | 3/4 | 30 | 1,050 | C34DG06WS | N11 | L11 | 60 | 1,365 | C34DG06WS | N14 | L14 |
| 50.0 | 10 | 439 | 3/4 | 22 | 1,100 | C34DG06WS | N11 | L11 | 44 | 1,430 | C34DG06WS | N15 | L15 |
| 65.0 | 10 | 570 | 3/4 | 17 | 1,105 | C34DG06WS | N12 | L12 | 34 | 1,437 | C34DG06WS | N15 | L15 |
| 75.0 | 10 | 658 | 3/4 | 15 | 1,125 | C34DG06WS | N12 | L12 | 30 | 1,463 | C34DG06WS | N15 | L15 |
| 100.0 | 10 | 878 | 3/4 | 11 | 1,100 | C34DG06WS | N11 | L11 | 22 | 1,430 | C34DG06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B31.0, B34.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1) | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 286 | C38AA04WS | N3 | L3 | 60 | 372 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 30 | 650 | C12AA04WS | N7 | L7 | 60 | 844 | C12AA06WS | N9 | L9 |
| 35.0 | 10 | 307 | 1/2 | 30 | 909 | C12AA06WS | N10 | L10 | 60 | 1,182 | C12AA06WS | N12 | L12 |
| 50.0 | 10 | 439 | 1/2 | 25 | 1,083 | C12AA06WS | N11 | L11 | 50 | 1,407 | C12AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 1/2 | 19 | 1,070 | C12AA06WS | N11 | L11 | 38 | 1,390 | C12AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 1/2 | 17 | 1,104 | C12AA06WS | N12 | L12 | 34 | 1,435 | C12AA06WS | N15 | L15 |
| 100.0 | 10 | 878 | 1/2 | 12 | 1,039 | C12AA06WS | N11 | L11 | 24 | 1,351 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,097 | 1/2 | 10 | 1,083 | C12AA06WS | N11 | L11 | 20 | 1,407 | C12AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B31.0, B34.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 30 | 385 | C12AA04WS | N4 | L4 | 60 | 501 | C12AA04WS | N6 | L6 |
| 25.0 | 10 | 219 | 5/8 | 30 | 875 | C58AA06WS | N9 | L9 | 60 | 1,138 | C58AA06WS | N12 | L12 |
| 35.0 | 10 | 307 | 5/8 | 27 | 1,103 | C58AA06WS | N12 | L12 | 54 | 1,433 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 20 | 1,167 | C34DG06WS | N12 | L12 | 40 | 1,517 | C34DG06TS | N16 | L16 |
| 65.0 | 10 | 570 | 5/8 | 15 | 1,138 | C58AA06WS | N12 | L12 | 30 | 1,479 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 5/8 | 13 | 1,138 | C58AA06WS | N12 | L12 | 26 | 1,479 | C58AA06WS | N15 | L15 |
| 100.0 | 10 | 878 | 5/8 | 10 | 1,167 | C58AA06WS | N12 | L12 | 20 | 1,517 | C58DG06TS | N16 | L16 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B31.0, B34.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 30 | 495 | C12AA04WS | N5 | L5 | 60 | 644 | C12AA04WS | N7 | L7 |
| 25.0 | 10 | 219 | 3/4 | 30 | 1,125 | C34DG06WS | N12 | L12 | 60 | 1,463 | C34DG06WS | N15 | L15 |
| 35.0 | 10 | 307 | 3/4 | 21 | 1,103 | C34DG06WS | N12 | L12 | 42 | 1,433 | C34DG06WS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 15 | 1,125 | C34DG06WS | N12 | L12 | 30 | 1,463 | C34DG06WS | N15 | L15 |
| 65.0 | 10 | 570 | 3/4 | 11 | 1,073 | C34DG06WS | N11 | L11 | 22 | 1,394 | C34DG06WS | N14 | L14 |
| 75.0 | 10 | 658 | 3/4 | 10 | 1,125 | C34DG06WS | N12 | L12 | 20 | 1,463 | C34DG06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B31.0, B34.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1) | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 381 | C38AA04WS | N4 | L4 | 60 | 495 | C38AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 1/2 | 30 | 866 | C12AA06WS | N9 | L9 | 60 | 1,126 | C12AA06WS | N12 | L12 |
| 35.0 | 10 | 307 | 1/2 | 27 | 1,091 | C12AA06WS | N11 | L11 | 54 | 1,419 | C12AA06WS | N15 | L15 |
| 50.0 | 10 | 439 | 1/2 | 19 | 1,097 | C12AA06WS | N11 | L11 | 38 | 1,426 | C12AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 1/2 | 14 | 1,051 | C12AA06WS | N11 | L11 | 28 | 1,366 | C12AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 1/2 | 12 | 1,039 | C12AA06WS | N11 | L11 | 24 | 1,351 | C12AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *CABLE BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **TRANSVERSE BRACING REQUIREMENTS**<br>**Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]**<br>**Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **LONGITUDINAL BRACING REQUIREMENTS**<br>**Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]**<br>**Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B31.0, B34.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 30 | 513 | C12AA04WS | N6 | L6 | 60 | 667 | C12AA04WS | N7 | L7 |
| 25.0 | 10 | 219 | 3/4 | 30 | 1,167 | C34DG06WS | N12 | L12 | 60 | 1,517 | C34DG06TS | N16 | L16 |
| 35.0 | 10 | 307 | 3/4 | 22 | 1,198 | C34DG06WS | N12 | L12 | 44 | 1,557 | C34DG06TS | N16 | L16 |
| 50.0 | 10 | 439 | 3/4 | 15 | 1,167 | C34DG06WS | N12 | L12 | 30 | 1,517 | C34DG06TS | N16 | L16 |
| 65.0 | 10 | 570 | 5/8 | 11 | 1,112 | C58AA06WS | N12 | L12 | 22 | 1,446 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 3/4 | 10 | 1,167 | C34DG06WS | N12 | L12 | 20 | 1,517 | C34DG06TS | N16 | L16 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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*CABLE BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B31.0, B34.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B31.1, B34.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 30 | 660 | C12AA04WS | N7 | L7 | 60 | 858 | C12AA06WS | N9 | L9 |
| 25.0 | 10 | 219 | 3/4 | 22 | 1,100 | C34DG06WS | N11 | L11 | 44 | 1,430 | C34DG06WS | N15 | L15 |
| 35.0 | 10 | 307 | 3/4 | 16 | 1,120 | C34DG06WS | N12 | L12 | 32 | 1,456 | C34DG06WS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 11 | 1,100 | C34DG06WS | N11 | L11 | 22 | 1,430 | C34DG06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B30.4, B33.4) | | | | |
| 11.0 | 10 | 136 | 3/8 | 30 | 67 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 308 | 1/2 | 30 | 153 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 431 | 1/2 | 30 | 214 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 616 | 1/2 | 30 | 306 | R12AAEM409 | N4 | L4 |
| 65.0 | 10 | 801 | 1/2 | 30 | 398 | R12AAEM406 | N4 | L4 |
| 75.0 | 10 | 924 | 1/2 | 30 | 459 | R12AAEM406 | N5 | L5 |
| 100.0 | 10 | 1,233 | 1/2 | 30 | 612 | R12AAEM406 | N7 | L7 |
| 125.0 | 10 | 1,541 | 5/8 | 30 | 765 | R58AAEM509 | N8 | L8 |
| 150.0 | 10 | 1,849 | 5/8 | 30 | 919 | R58AAEM506 | N10 | L10 |
| 175.0 | 10 | 2,157 | 5/8 | 30 | 1,072 | R58AAEM506 | N11 | L11 |
| 200.0 | 10 | 2,323 | 5/8 | 24 | 980 | R58AAEM506 | N10 | L10 |
| 225.0 | 10 | 2,534 | 3/4 | 21 | 964 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B30.4, B33.4) | | | | |
| 11.0 | 10 | 177 | 3/8 | 30 | 91 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 403 | 1/2 | 30 | 206 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 564 | 1/2 | 30 | 289 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 805 | 1/2 | 30 | 413 | R12AAEM406 | N5 | L5 |
| 65.0 | 10 | 1,047 | 1/2 | 30 | 536 | R12AAEM406 | N6 | L6 |
| 75.0 | 10 | 1,208 | 1/2 | 30 | 619 | R12AAEM406 | N7 | L7 |
| 100.0 | 10 | 1,610 | 5/8 | 30 | 825 | R58AAEM506 | N9 | L9 |
| 125.0 | 10 | 2,013 | 5/8 | 30 | 1,031 | R58AAEM506 | N11 | L11 |
| 150.0 | 10 | 2,416 | 3/4 | 30 | 1,238 | R34CFB1P06 | N13 | L13 |
| 175.0 | 10 | 2,818 | 3/4 | 30 | 1,444 | R34CFB2P12 | N15 | L15 |
| 200.0 | 10 | 3,221 | 3/4 | 30 | 1,650 | R34CFB2P12 | N17 | L17 |
| 225.0 | 10 | 3,404 | 3/4 | 26 | 1,609 | R34CFB2P12 | N17 | L17 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B30.4, B33.4)** | | | | |
| 11.0 | 10 | 214 | 3/8 | 30 | 117 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 486 | 1/2 | 30 | 265 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 680 | 1/2 | 30 | 371 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 971 | 1/2 | 30 | 530 | R12AAEM406 | N6 | L6 |
| 65.0 | 10 | 1,263 | 1/2 | 30 | 689 | R12AAEM509 | N7 | L7 |
| 75.0 | 10 | 1,457 | 1/2 | 30 | 795 | R12AAEM506 | N8 | L8 |
| 100.0 | 10 | 1,943 | 5/8 | 30 | 1,061 | R58AAEM506 | N11 | L11 |
| 125.0 | 10 | 2,428 | 3/4 | 30 | 1,326 | R34DGB1S06 | N14 | L14 |
| 150.0 | 10 | 2,701 | 3/4 | 26 | 1,379 | R34DGB1S06 | N14 | L14 |
| 175.0 | 10 | 2,903 | 3/4 | 22 | 1,361 | R34DGB1S06 | N14 | L14 |
| 200.0 | 10 | 3,104 | 3/4 | 19 | 1,344 | R34DGB1S06 | N14 | L14 |
| 225.0 | 10 | 3,333 | 3/4 | 17 | 1,352 | R34DGB1S06 | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B30.4, B33.4) | | | | |
| 11.0 | 10 | 175 | 3/8 | 30 | 135 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 397 | 1/2 | 30 | 306 | R12AAEM409 | N4 | L4 |
| 35.0 | 10 | 556 | 1/2 | 30 | 429 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 794 | 1/2 | 30 | 612 | R12AAEM406 | N7 | L7 |
| 65.0 | 10 | 1,032 | 1/2 | 30 | 796 | R12AAEM506 | N8 | L8 |
| 75.0 | 10 | 1,191 | 1/2 | 30 | 919 | R12AAEM506 | N10 | L10 |
| 100.0 | 10 | 1,564 | 5/8 | 29 | 1,184 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 1,777 | 5/8 | 23 | 1,174 | R58AAEM506 | N12 | L12 |
| 150.0 | 10 | 1,991 | 5/8 | 19 | 1,164 | R58AAEM506 | N12 | L12 |
| 175.0 | 10 | 2,198 | 5/8 | 16 | 1,143 | R58AAEM506 | N12 | L12 |
| 200.0 | 10 | 2,323 | 5/8 | 12 | 980 | R58AAEM506 | N10 | L10 |
| 225.0 | 10 | 2,507 | 3/4 | 10 | 919 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times W_p$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B30.4, B33.4) | | | | |
| 11.0 | 10 | 258 | 3/8 | 30 | 182 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 586 | 1/2 | 30 | 413 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 820 | 1/2 | 30 | 578 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 1,172 | 1/2 | 30 | 825 | R12AAEM506 | N9 | L9 |
| 65.0 | 10 | 1,523 | 5/8 | 30 | 1,073 | R58AAEM506 | N11 | L11 |
| 75.0 | 10 | 1,758 | 5/8 | 30 | 1,238 | R58AAEM506 | N13 | L13 |
| 100.0 | 10 | 2,343 | 3/4 | 30 | 1,650 | R34CFB2P12 | N17 | L17 |
| 125.0 | 10 | 2,929 | 3/4 | 30 | 2,063 | R34DGB2P09 | N21 | L21 |
| 150.0 | 10 | 3,295 | 3/4 | 27 | 2,228 | R34DGB2P09 | N23 | L23 |
| 175.0 | 10 | 3,417 | 3/4 | 22 | 2,118 | R34DGB2P09 | N22 | L22 |
| 200.0 | 10 | 3,416 | 3/4 | 17 | 1,870 | R34DGB2P09 | N19 | L19 |
| 225.0 | 10 | 3,404 | 3/4 | 13 | 1,609 | R34CFB2P12 | N17 | L17 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | **4-Way Splayed Brace Pattern (B30.4, B33.4)** | | | | |
| 11.0 | 10 | 331 | 3/8 | 30 | 233 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 752 | 1/2 | 30 | 530 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 1,053 | 1/2 | 30 | 742 | R12AAEM509 | N8 | L8 |
| 50.0 | 10 | 1,504 | 5/8 | 30 | 1,061 | R58AAEM506 | N11 | L11 |
| 65.0 | 10 | 1,955 | 5/8 | 30 | 1,379 | R58AAEM506 | N14 | L14 |
| 75.0 | 10 | 2,043 | 5/8 | 26 | 1,379 | R58AAEM506 | N14 | L14 |
| 100.0 | 10 | 2,298 | 5/8 | 20 | 1,414 | R58AAEM506 | N15 | L15 |
| 125.0 | 10 | 2,428 | 3/4 | 15 | 1,326 | R34DGB1S06 | N14 | L14 |
| 150.0 | 10 | 2,701 | 3/4 | 13 | 1,379 | R34DGB1S06 | N14 | L14 |
| 175.0 | 10 | 2,903 | 3/4 | 11 | 1,361 | R34DGB1S06 | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B30.4, B33.4)** | | | | |
| 11.0 | 10 | 214 | 3/8 | 30 | 202 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 486 | 1/2 | 30 | 459 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 680 | 1/2 | 30 | 643 | R12AAEM406 | N7 | L7 |
| 50.0 | 10 | 971 | 1/2 | 30 | 919 | R12AAEM506 | N10 | L10 |
| 65.0 | 10 | 1,240 | 1/2 | 29 | 1,154 | R12AAEM506 | N12 | L12 |
| 75.0 | 10 | 1,324 | 1/2 | 25 | 1,148 | R12AAEM506 | N12 | L12 |
| 100.0 | 10 | 1,552 | 5/8 | 19 | 1,164 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 1,763 | 5/8 | 15 | 1,148 | R58AAEM506 | N12 | L12 |
| 150.0 | 10 | 1,955 | 5/8 | 12 | 1,102 | R58AAEM506 | N12 | L12 |
| 175.0 | 10 | 2,219 | 5/8 | 11 | 1,179 | R58AAEM506 | N12 | L12 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B30.4, B33.4) | | | | |
| 11.0 | 10 | 338 | 3/8 | 30 | 272 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 769 | 1/2 | 30 | 619 | R12AAEM406 | N7 | L7 |
| 35.0 | 10 | 1,077 | 1/2 | 30 | 866 | R12AAEM506 | N9 | L9 |
| 50.0 | 10 | 1,538 | 5/8 | 30 | 1,238 | R58AAEM506 | N13 | L13 |
| 65.0 | 10 | 2,000 | 5/8 | 30 | 1,609 | R58AAEM606 | N17 | L17 |
| 75.0 | 10 | 2,307 | 3/4 | 30 | 1,856 | R34DGB2P09 | N19 | L19 |
| 100.0 | 10 | 2,857 | 3/4 | 27 | 2,228 | R34DGB2P09 | N23 | L23 |
| 125.0 | 10 | 3,021 | 3/4 | 21 | 2,166 | R34DGB2P09 | N22 | L22 |
| 150.0 | 10 | 3,295 | 3/4 | 18 | 2,228 | R34DGB2P09 | N23 | L23 |
| 175.0 | 10 | 3,460 | 3/4 | 15 | 2,166 | R34DGB2P09 | N22 | L22 |
| 200.0 | 10 | 3,368 | 3/4 | 11 | 1,815 | R34DGB2P09 | N19 | L19 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B30.4, B33.4)** | | | | |
| 11.0 | 10 | 448 | 3/8 | 30 | 350 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 1,018 | 1/2 | 30 | 795 | R12AAEM506 | N8 | L8 |
| 35.0 | 10 | 1,426 | 5/8 | 30 | 1,114 | R58AAEM506 | N12 | L12 |
| 50.0 | 10 | 1,824 | 5/8 | 26 | 1,379 | R58AAEM506 | N14 | L14 |
| 65.0 | 10 | 1,955 | 5/8 | 20 | 1,379 | R58AAEM506 | N14 | L14 |
| 75.0 | 10 | 2,096 | 5/8 | 18 | 1,432 | R58AAEM506 | N15 | L15 |
| 100.0 | 10 | 2,262 | 5/8 | 13 | 1,379 | R58AAEM506 | N14 | L14 |
| 125.0 | 10 | 2,428 | 3/4 | 10 | 1,326 | R34DGB1S06 | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** Form Pour [4] Deck Page D1 | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B30.4, B33.4)** | | | | |
| 11.0 | 10 | 253 | 3/8 | 30 | 269 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 574 | 1/2 | 30 | 612 | R12AAEM406 | N7 | L7 |
| 35.0 | 10 | 804 | 1/2 | 30 | 857 | R12AAEM506 | N9 | L9 |
| 50.0 | 10 | 1,125 | 1/2 | 29 | 1,184 | R12AAEM506 | N12 | L12 |
| 65.0 | 10 | 1,247 | 1/2 | 22 | 1,168 | R12AAEM506 | N12 | L12 |
| 75.0 | 10 | 1,333 | 1/2 | 19 | 1,164 | R12AAEM506 | N12 | L12 |
| 100.0 | 10 | 1,540 | 5/8 | 14 | 1,143 | R58AAEM506 | N12 | L12 |
| 125.0 | 10 | 1,748 | 5/8 | 11 | 1,123 | R58AAEM506 | N12 | L12 |
| 150.0 | 10 | 2,026 | 5/8 | 10 | 1,225 | R58AAEM506 | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B30.4, B33.4) | | | | |
| 11.0 | 10 | 419 | 3/8 | 30 | 363 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 952 | 1/2 | 30 | 825 | R12AAEM506 | N9 | L9 |
| 35.0 | 10 | 1,333 | 5/8 | 30 | 1,155 | R58AAEM506 | N12 | L12 |
| 50.0 | 10 | 1,905 | 3/4 | 30 | 1,650 | R34CFB2P12 | N17 | L17 |
| 65.0 | 10 | 2,476 | 3/4 | 30 | 2,145 | R34DGB2P09 | N22 | L22 |
| 75.0 | 10 | 2,564 | 3/4 | 26 | 2,145 | R34DGB2P09 | N22 | L22 |
| 100.0 | 10 | 2,832 | 3/4 | 20 | 2,200 | R34DGB2P09 | N23 | L23 |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 2,200 | R34DGB2P09 | N23 | L23 |
| 150.0 | 10 | 3,222 | 3/4 | 13 | 2,145 | R34DGB2P09 | N22 | L22 |
| 175.0 | 10 | 3,417 | 3/4 | 11 | 2,118 | R34DGB2P09 | N22 | L22 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7]:

***ROD HUNG HVAC DUCT (Rectangular and 2-Rod Round)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B30.4, B33.4)** | | | | |
| 11.0 | 10 | 565 | 1/2 | 30 | 467 | R12AAEM406 | N5 | L5 |
| 25.0 | 10 | 1,285 | 5/8 | 30 | 1,061 | R58AAEM506 | N11 | L11 |
| 35.0 | 10 | 1,699 | 5/8 | 28 | 1,386 | R58AAEM506 | N14 | L14 |
| 50.0 | 10 | 1,859 | 5/8 | 20 | 1,414 | R58AAEM506 | N15 | L15 |
| 65.0 | 10 | 1,955 | 5/8 | 15 | 1,379 | R58AAEM506 | N14 | L14 |
| 75.0 | 10 | 2,043 | 5/8 | 13 | 1,379 | R58AAEM506 | N14 | L14 |
| 100.0 | 10 | 2,298 | 5/8 | 10 | 1,414 | R58AAEM506 | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:

**ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B31.2, B34.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 135 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 30 | 306 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 307 | 1/2 | 30 | 429 | C12AA04WS | N5 | L5 |
| 50.0 | 10 | 439 | 1/2 | 30 | 612 | C12AA04WS | N7 | L7 |
| 65.0 | 10 | 570 | 1/2 | 30 | 796 | C12AA06WS | N8 | L8 |
| 75.0 | 10 | 658 | 1/2 | 30 | 919 | C12AA06WS | N10 | L10 |
| 100.0 | 10 | 878 | 1/2 | 29 | 1,184 | C12AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 1/2 | 23 | 1,174 | C12AA06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 1/2 | 19 | 1,164 | C12AA06WS | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *4-WAY SPLAYED CABLE BRACING REQUIREMENTS* [7] *:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS**<br>**Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]**<br>**Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
|---|---|---|---|---|---|---|---|---|
| | | | | **4-Way Splayed Brace Pattern (B31.2, B34.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 182 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 30 | 413 | C12AA04WS | N5 | L5 |
| 35.0 | 10 | 307 | 1/2 | 30 | 578 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 439 | 1/2 | 30 | 825 | C12AA06WS | N9 | L9 |
| 65.0 | 10 | 570 | 1/2 | 30 | 1,073 | C12AA06WS | N11 | L11 |
| 75.0 | 10 | 658 | 1/2 | 30 | 1,238 | C12AA06WS | N13 | L13 |
| 100.0 | 10 | 878 | 5/8 | 30 | 1,650 | C58DG06TS | N17 | L17 |
| 125.0 | 10 | 1,097 | 5/8 | 26 | 1,788 | C58DG06TS | N18 | L18 |
| 150.0 | 10 | 1,316 | 5/8 | 22 | 1,815 | C58DG06TS | N19 | L19 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | 4-Way Splayed Brace Pattern (B31.2, B34.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 233 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 30 | 530 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 1/2 | 30 | 742 | C12AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 1/2 | 30 | 1,061 | C12AA06WS | N11 | L11 |
| 65.0 | 10 | 570 | 5/8 | 30 | 1,379 | C58AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 5/8 | 26 | 1,379 | C58AA06WS | N14 | L14 |
| 100.0 | 10 | 878 | 5/8 | 20 | 1,414 | C58AA06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 5/8 | 16 | 1,414 | C58AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 5/8 | 13 | 1,379 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS* [7] *:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B31.2, B34.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 269 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 30 | 612 | C12AA04WS | N7 | L7 |
| 35.0 | 10 | 307 | 1/2 | 30 | 857 | C12AA06WS | N9 | L9 |
| 50.0 | 10 | 439 | 1/2 | 29 | 1,184 | C12AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 1/2 | 22 | 1,168 | C12AA06WS | N12 | L12 |
| 75.0 | 10 | 658 | 1/2 | 19 | 1,164 | C12AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 1/2 | 14 | 1,143 | C12AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 1/2 | 11 | 1,123 | C12AA06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 1/2 | 10 | 1,225 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B31.2, B34.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 363 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 30 | 825 | C12AA06WS | N9 | L9 |
| 35.0 | 10 | 307 | 1/2 | 30 | 1,155 | C12AA06WS | N12 | L12 |
| 50.0 | 10 | 439 | 5/8 | 30 | 1,650 | C58DG06TS | N17 | L17 |
| 65.0 | 10 | 570 | 5/8 | 24 | 1,716 | C58DG06TS | N18 | L18 |
| 75.0 | 10 | 658 | 5/8 | 22 | 1,815 | C58DG06TS | N19 | L19 |
| 100.0 | 10 | 878 | 5/8 | 16 | 1,760 | C58DG06TS | N18 | L18 |
| 125.0 | 10 | 1,097 | 5/8 | 13 | 1,788 | C58DG06TS | N18 | L18 |
| 150.0 | 10 | 1,316 | 5/8 | 11 | 1,815 | C58DG06TS | N19 | L19 |

1. TVL = DL + Fv + $(0.2S_{DS}/1.4 \times W_p)$. All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly Page E3** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B31.2, B34.2)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 30 | 467 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 1/2 | 30 | 1,061 | C12AA06WS | N11 | L11 |
| 35.0 | 10 | 307 | 5/8 | 29 | 1,435 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 439 | 5/8 | 20 | 1,414 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 5/8 | 16 | 1,471 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 5/8 | 13 | 1,379 | C58AA06WS | N14 | L14 |
| 100.0 | 10 | 878 | 5/8 | 10 | 1,414 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + $(0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B31.2, B34.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 404 | C38AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 1/2 | 30 | 919 | C12AA06WS | N10 | L10 |
| 35.0 | 10 | 307 | 1/2 | 27 | 1,157 | C12AA06WS | N12 | L12 |
| 50.0 | 10 | 439 | 1/2 | 19 | 1,164 | C12AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 1/2 | 14 | 1,115 | C12AA06WS | N12 | L12 |
| 75.0 | 10 | 658 | 1/2 | 12 | 1,102 | C12AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 1/2 | 10 | 1,225 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B31.2, B34.2)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 30 | 545 | C12AA04WS | N6 | L6 |
| 25.0 | 10 | 219 | 1/2 | 30 | 1,238 | C12AA06WS | N13 | L13 |
| 35.0 | 10 | 307 | 5/8 | 30 | 1,733 | C58DG06TS | N18 | L18 |
| 50.0 | 10 | 439 | 5/8 | 22 | 1,815 | C58DG06TS | N19 | L19 |
| 65.0 | 10 | 570 | 5/8 | 17 | 1,823 | C58DG06TS | N19 | L19 |
| 75.0 | 10 | 658 | 5/8 | 14 | 1,733 | C58DG06TS | N18 | L18 |
| 100.0 | 10 | 878 | 5/8 | 11 | 1,815 | C58DG06TS | N19 | L19 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly Page E3** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B31.2, B34.2)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 30 | 700 | C12AA06WS | N8 | L8 |
| 25.0 | 10 | 219 | 5/8 | 27 | 1,432 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 307 | 5/8 | 19 | 1,411 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 439 | 5/8 | 13 | 1,379 | C58AA06WS | N14 | L14 |
| 65.0 | 10 | 570 | 5/8 | 10 | 1,379 | C58AA06WS | N14 | L14 |

1. $TVL = DL + Fv + (0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS* [7] *:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B31.2, B34.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 30 | 539 | C38AA04WS | N6 | L6 |
| 25.0 | 10 | 219 | 1/2 | 29 | 1,184 | C12AA06WS | N12 | L12 |
| 35.0 | 10 | 307 | 1/2 | 20 | 1,143 | C12AA06WS | N12 | L12 |
| 50.0 | 10 | 439 | 1/2 | 14 | 1,143 | C12AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 1/2 | 11 | 1,168 | C12AA06WS | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:

**ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | 4-Way Splayed Brace Pattern (B31.2, B34.2) | | | | |
| 11.0 | 10 | 97 | 1/2 | 30 | 726 | C12AA06WS | N8 | L8 |
| 25.0 | 10 | 219 | 5/8 | 30 | 1,650 | C58DG06TS | N17 | L17 |
| 35.0 | 10 | 307 | 5/8 | 23 | 1,771 | C58DG06TS | N18 | L18 |
| 50.0 | 10 | 439 | 5/8 | 16 | 1,760 | C58DG06TS | N18 | L18 |
| 65.0 | 10 | 570 | 5/8 | 12 | 1,716 | C58DG06TS | N18 | L18 |
| 75.0 | 10 | 658 | 5/8 | 11 | 1,815 | C58DG06TS | N19 | L19 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***ROD HUNG HVAC DUCT (RECTANGULAR and 2-ROD ROUND)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **4-Way Splayed Brace Pattern (B31.2, B34.2)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 30 | 933 | C12AA06WS | N10 | L10 |
| 25.0 | 10 | 219 | 5/8 | 20 | 1,414 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 307 | 5/8 | 14 | 1,386 | C58AA06WS | N14 | L14 |
| 50.0 | 10 | 439 | 5/8 | 10 | 1,414 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading. 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Support Rod Total Vertical Load [1, 8] (lbs) | Minimum Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 33 | 3/8 | 7 | R38AAEM306 | N1 | L1 | 5 | R38AAEM306 | N1 | L1 |
| 50 | 66 | 3/8 | 14 | R38AAEM306 | N1 | L1 | 9 | R38AAEM306 | N1 | L1 |
| 75 | 99 | 3/8 | 22 | R38AAEM306 | N1 | L1 | 14 | R38AAEM306 | N1 | L1 |
| 100 | 132 | 3/8 | 29 | R38AAEM306 | N1 | L1 | 19 | R38AAEM306 | N1 | L1 |
| 200 | 264 | 3/8 | 58 | R38AAEM306 | N1 | L1 | 38 | R38AAEM306 | N1 | L1 |
| 300 | 396 | 3/8 | 87 | R38AAEM306 | N1 | L1 | 56 | R38AAEM306 | N1 | L1 |
| **4-ROD SUPPORT** | | | **4-WAY SPLAY BRACING REQUIREMENTS**<br>**4-Way Splay Brace Pattern (B38.1, B38.4, B50.1)** | | | | | | | |
| 500 | 407 | 3/8 | 72 | R38AAEM306 | N1 | L1 | | | | |
| 750 | 611 | 3/8 | 108 | R38AAEM306 | N2 | L2 | | | | |
| 1,000 | 815 | 1/2 | 144 | R12AAEM306 | N2 | L2 | | | | |
| 2,000 | 1,629 | 5/8 | 289 | R58AAEM306 | N3 | L3 | | | | |
| 4,000 | 3,259 | 3/4 | 577 | R34CFB1P12 | N6 | L6 | | | | |
| **6-ROD SUPPORT** | | | **8-WAY SPLAY BRACING REQUIREMENTS**<br>**8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 850 | 777 | 3/8 | 61 | R38AAEM306 | N1 | L1 | | | | |
| 1,500 | 1,370 | 1/2 | 108 | R12AAEM306 | N2 | L2 | | | | |
| 2,500 | 2,284 | 5/8 | 180 | R58AAEM306 | N2 | L2 | | | | |
| 3,800 | 3,472 | 3/4 | 274 | R34CFA1P06 | N3 | L3 | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp).
2. Not Used.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *RIGID BRACING REQUIREMENTS*[7]

***MECHANICAL EQUIPMENT, ROD HUNG*** | ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| **Equipment Maximum Operating Weight (lbs)** | **Support Rod Total Vertical Load[1, 8] (lbs)** | **Minimum Vertical Support Rod Dia. (in.)** | **TRANSVERSE BRACING REQUIREMENTS** | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage[6]** | | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage[6]** | |
| | | | | | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** | | | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** |
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 38 | 3/8 | 10 | R38AAEM306 | N1 | L1 | 6 | R38AAEM306 | N1 | L1 |
| 50 | 75 | 3/8 | 19 | R38AAEM306 | N1 | L1 | 13 | R38AAEM306 | N1 | L1 |
| 75 | 113 | 3/8 | 29 | R38AAEM306 | N1 | L1 | 19 | R38AAEM306 | N1 | L1 |
| 100 | 151 | 3/8 | 39 | R38AAEM306 | N1 | L1 | 25 | R38AAEM306 | N1 | L1 |
| 200 | 301 | 3/8 | 78 | R38AAEM306 | N1 | L1 | 51 | R38AAEM306 | N1 | L1 |
| 300 | 452 | 3/8 | 117 | R38AAEM306 | N2 | L2 | 76 | R38AAEM306 | N1 | L1 |
| **4-ROD SUPPORT** | | | **4-WAY SPLAY BRACING REQUIREMENTS**<br>**4-Way Splay Brace Pattern (B38.1, B38.4, )** | | | | | | | |
| 500 | 446 | 3/8 | 97 | R38AAEM306 | N1 | L1 | | | | |
| 750 | 669 | 3/8 | 146 | R38AAEM306 | N2 | L2 | | | | |
| 1,000 | 891 | 1/2 | 194 | R12AAEM306 | N2 | L2 | | | | |
| 2,000 | 1,783 | 5/8 | 389 | R58AAEM406 | N4 | L4 | | | | |
| 3,000 | 2,674 | 3/4 | 583 | R34CFB1P12 | N6 | L6 | | | | |
| **6-ROD SUPPORT** | | | **8-WAY SPLAY BRACING REQUIREMENTS**<br>**8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 800 | 762 | 3/8 | 78 | R38AAEM306 | N1 | L1 | | | | |
| 1,500 | 1,428 | 1/2 | 146 | R12AAEM306 | N2 | L2 | | | | |
| 2,400 | 2,285 | 5/8 | 233 | R58AAEM306 | N3 | L3 | | | | |
| 3,600 | 3,427 | 3/4 | 350 | R34CFA1P06 | N4 | L4 | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp).
2. Not Used.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *RIGID BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Support Rod Total Vertical Load [1, 8] (lbs) | Minimum Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 42 | 3/8 | 13 | R38AAEM306 | N1 | L1 | 8 | R38AAEM306 | N1 | L1 |
| 50 | 83 | 3/8 | 25 | R38AAEM306 | N1 | L1 | 16 | R38AAEM306 | N1 | L1 |
| 75 | 125 | 3/8 | 38 | R38AAEM306 | N1 | L1 | 24 | R38AAEM306 | N1 | L1 |
| 100 | 167 | 3/8 | 50 | R38AAEM306 | N1 | L1 | 33 | R38AAEM306 | N1 | L1 |
| 200 | 333 | 3/8 | 100 | R38AAEM306 | N1 | L1 | 65 | R38AAEM306 | N1 | L1 |
| 300 | 500 | 3/8 | 150 | R38AAEM306 | N2 | L2 | 98 | R38AAEM306 | N1 | L1 |
| | | | **4-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **4-ROD SUPPORT** | | | **4-Way Splay Brace Pattern (B38.1, B38.4, B50.1)** | | | | | | | |
| 500 | 480 | 3/8 | 125 | R38AAEM306 | N2 | L2 | | | | |
| 750 | 719 | 3/8 | 188 | R38AAEM306 | N2 | L2 | | | | |
| 1,000 | 959 | 1/2 | 250 | R12AAEM306 | N3 | L3 | | | | |
| 2,000 | 1,918 | 5/8 | 500 | R58AAEM406 | N5 | L5 | | | | |
| 3,000 | 2,877 | 3/4 | 750 | R34CFB1P09 | N8 | L8 | | | | |
| | | | **8-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **6-ROD SUPPORT** | | | **8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 800 | 789 | 3/8 | 100 | R38AAEM306 | N1 | L1 | | | | |
| 1,400 | 1,380 | 1/2 | 175 | R12AAEM306 | N2 | L2 | | | | |
| 2,300 | 2,267 | 5/8 | 288 | R58AAEM306 | N3 | L3 | | | | |
| 3,500 | 3,450 | 3/4 | 438 | R34CFA1P06 | N5 | L5 | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp).
2. Not Used.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *RIGID BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Support Rod Total Vertical Load [1, 8] (lbs) | Minimum Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 37 | 3/8 | 14 | R38AAEM306 | N1 | L1 | 9 | R38AAEM306 | N1 | L1 |
| 50 | 75 | 3/8 | 29 | R38AAEM306 | N1 | L1 | 19 | R38AAEM306 | N1 | L1 |
| 75 | 112 | 3/8 | 43 | R38AAEM306 | N1 | L1 | 28 | R38AAEM306 | N1 | L1 |
| 100 | 149 | 3/8 | 58 | R38AAEM306 | N1 | L1 | 38 | R38AAEM306 | N1 | L1 |
| 200 | 299 | 3/8 | 115 | R38AAEM306 | N2 | L2 | 75 | R38AAEM306 | N1 | L1 |
| 300 | 448 | 3/8 | 173 | R38AAEM306 | N2 | L2 | 113 | R38AAEM306 | N2 | L2 |
| | | | **4-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **4-ROD SUPPORT** | | | **4-Way Splay Brace Pattern (B38.1, B38.4, B50.1)** | | | | | | | |
| 500 | 443 | 3/8 | 144 | R38AAEM306 | N2 | L2 | | | | |
| 750 | 665 | 3/8 | 217 | R38AAEM306 | N3 | L3 | | | | |
| 1,000 | 887 | 1/2 | 289 | R12AAEM306 | N3 | L3 | | | | |
| 2,000 | 1,774 | 5/8 | 577 | R58AAEM406 | N6 | L6 | | | | |
| 3,000 | 2,661 | 3/4 | 866 | R34DGB1P09 | N9 | L9 | | | | |
| | | | **8-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **6-ROD SUPPORT** | | | **8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 800 | 760 | 3/8 | 115 | R38AAEM306 | N2 | L2 | | | | |
| 1,500 | 1,425 | 1/2 | 217 | R12AAEM306 | N3 | L3 | | | | |
| 2,450 | 2,327 | 5/8 | 354 | R58AAEM406 | N4 | L4 | | | | |
| 3,600 | 3,419 | 3/4 | 520 | R34CFA1P06 | N6 | L6 | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp).
2. Not Used.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *RIGID BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Support Rod Total Vertical Load [1, 8] (lbs) | Minimum Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Brace [3] Reaction P (lbs) | TRANSVERSE: Min. Brace Assembly E - Pages | TRANSVERSE: Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | TRANSVERSE: Min. Brace Anchorage [6] Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Brace [3] Reaction P (lbs) | LONGITUDINAL: Min. Brace Assembly E - Pages | LONGITUDINAL: Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | LONGITUDINAL: Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 47 | 3/8 | 19 | R38AAEM306 | N1 | L1 | 13 | R38AAEM306 | N1 | L1 |
| 50 | 93 | 3/8 | 39 | R38AAEM306 | N1 | L1 | 25 | R38AAEM306 | N1 | L1 |
| 75 | 140 | 3/8 | 58 | R38AAEM306 | N1 | L1 | 38 | R38AAEM306 | N1 | L1 |
| 100 | 186 | 3/8 | 78 | R38AAEM306 | N1 | L1 | 51 | R38AAEM306 | N1 | L1 |
| 200 | 373 | 3/8 | 156 | R38AAEM306 | N2 | L2 | 101 | R38AAEM306 | N2 | L2 |
| 300 | 559 | 3/8 | 233 | R38AAEM306 | N3 | L3 | 152 | R38AAEM306 | N2 | L2 |
| **4-ROD SUPPORT** | | | **4-WAY SPLAY BRACING REQUIREMENTS**<br>**4-Way Splay Brace Pattern (B38.1, B38.4, )** | | | | | | | |
| 500 | 520 | 3/8 | 194 | R38AAEM306 | N2 | L2 | | | | |
| 750 | 780 | 3/8 | 292 | R38AAEM306 | N3 | L3 | | | | |
| 1,000 | 1,040 | 1/2 | 389 | R12AAEM406 | N4 | L4 | | | | |
| 2,000 | 2,081 | 5/8 | 778 | R58AAEM509 | N8 | L8 | | | | |
| 3,000 | 3,121 | 3/4 | 1,167 | R34CFB1P06 | N12 | L12 | | | | |
| **6-ROD SUPPORT** | | | **8-WAY SPLAY BRACING REQUIREMENTS**<br>**8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 750 | 770 | 3/8 | 146 | R38AAEM306 | N2 | L2 | | | | |
| 1,400 | 1,437 | 1/2 | 272 | R12AAEM306 | N3 | L3 | | | | |
| 2,250 | 2,310 | 5/8 | 438 | R58AAEM406 | N5 | L5 | | | | |
| 3,400 | 3,490 | 3/4 | 661 | R34CFB1P12 | N7 | L7 | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp).
2. Not Used.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *RIGID BRACING REQUIREMENTS*[7]

***MECHANICAL EQUIPMENT, ROD HUNG*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Support Rod Total Vertical Load[1, 8] (lbs) | Minimum Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 |
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 55 | 3/8 | 25 | R38AAEM306 | N1 | L1 | 16 | R38AAEM306 | N1 | L1 |
| 50 | 109 | 3/8 | 50 | R38AAEM306 | N1 | L1 | 33 | R38AAEM306 | N1 | L1 |
| 75 | 164 | 3/8 | 75 | R38AAEM306 | N1 | L1 | 49 | R38AAEM306 | N1 | L1 |
| 100 | 219 | 3/8 | 100 | R38AAEM306 | N1 | L1 | 65 | R38AAEM306 | N1 | L1 |
| 200 | 437 | 3/8 | 200 | R38AAEM306 | N2 | L2 | 130 | R38AAEM306 | N2 | L2 |
| 300 | 656 | 3/8 | 300 | R38AAEM306 | N3 | L3 | 195 | R38AAEM306 | N2 | L2 |
| **4-ROD SUPPORT** | | | **4-WAY SPLAY BRACING REQUIREMENTS**<br>**4-Way Splay Brace Pattern (B38.1, B38.4, B50.1)** | | | | | | | |
| 500 | 588 | 3/8 | 250 | R38AAEM306 | N3 | L3 | | | | |
| 750 | 882 | 1/2 | 375 | R12AAEM406 | N4 | L4 | | | | |
| 1,000 | 1,176 | 1/2 | 500 | R12AAEM406 | N5 | L5 | | | | |
| 2,000 | 2,351 | 3/4 | 1,000 | R34DGB1P06 | N10 | L10 | | | | |
| 2,500 | 2,939 | 3/4 | 1,250 | R34DGB1P06 | N13 | L13 | | | | |
| **6-ROD SUPPORT** | | | **8-WAY SPLAY BRACING REQUIREMENTS**<br>**8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 700 | 766 | 3/8 | 175 | R38AAEM306 | N2 | L2 | | | | |
| 1,300 | 1,422 | 1/2 | 325 | R12AAEM409 | N4 | L4 | | | | |
| 2,100 | 2,297 | 5/8 | 525 | R58AAEM406 | N6 | L6 | | | | |
| 3,150 | 3,446 | 3/4 | 788 | R34CFB1P09 | N8 | L8 | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$).
2. Not Used.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

S 4710

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## *RIGID BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Support Rod Total Vertical Load [1, 8] (lbs) | Minimum Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | LONGITUDINAL BRACING REQUIREMENTS | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 42 | 3/8 | 22 | R38AAEM306 | N1 | L1 | 14 | R38AAEM306 | N1 | L1 |
| 50 | 83 | 3/8 | 43 | R38AAEM306 | N1 | L1 | 28 | R38AAEM306 | N1 | L1 |
| 75 | 125 | 3/8 | 65 | R38AAEM306 | N1 | L1 | 42 | R38AAEM306 | N1 | L1 |
| 100 | 167 | 3/8 | 87 | R38AAEM306 | N1 | L1 | 56 | R38AAEM306 | N1 | L1 |
| 200 | 333 | 3/8 | 173 | R38AAEM306 | N2 | L2 | 113 | R38AAEM306 | N2 | L2 |
| 300 | 500 | 3/8 | 260 | R38AAEM306 | N3 | L3 | 169 | R38AAEM306 | N2 | L2 |
| | | | **4-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **4-ROD SUPPORT** | | | **4-Way Splay Brace Pattern (B38.1, B38.4, B50.1)** | | | | | | | |
| 500 | 480 | 3/8 | 217 | R38AAEM306 | N3 | L3 | | | | |
| 750 | 719 | 3/8 | 325 | R38AAEM409 | N4 | L4 | | | | |
| 1,000 | 959 | 1/2 | 433 | R12AAEM406 | N5 | L5 | | | | |
| 2,000 | 1,918 | 5/8 | 866 | R58AAEM506 | N9 | L9 | | | | |
| 3,000 | 2,877 | 3/4 | 1,299 | #N/A | N13 | L13 | | | | |
| | | | **8-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **6-ROD SUPPORT** | | | **8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 800 | 789 | 3/8 | 173 | R38AAEM306 | N2 | L2 | | | | |
| 1,450 | 1,429 | 1/2 | 314 | R12AAEM409 | N4 | L4 | | | | |
| 2,350 | 2,317 | 5/8 | 509 | R58AAEM406 | N6 | L6 | | | | |
| 3,500 | 3,450 | 3/4 | 758 | R34CFB1P09 | N8 | L8 | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp).
2. Not Used.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *RIGID BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Support Rod Total Vertical Load [1, 8] (lbs) | Minimum Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS<br>Brace [3] Reaction P (lbs) | <br>Min. Brace Assembly E - Pages | <br>Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | <br><br>Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS<br>Brace [3] Reaction P (lbs) | <br>Min. Brace Assembly E - Pages | <br>Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | <br><br>Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 56 | 3/8 | 29 | R38AAEM306 | N1 | L1 | 19 | R38AAEM306 | N1 | L1 |
| 50 | 111 | 3/8 | 58 | R38AAEM306 | N1 | L1 | 38 | R38AAEM306 | N1 | L1 |
| 75 | 167 | 3/8 | 88 | R38AAEM306 | N1 | L1 | 57 | R38AAEM306 | N1 | L1 |
| 100 | 222 | 3/8 | 117 | R38AAEM306 | N2 | L2 | 76 | R38AAEM306 | N1 | L1 |
| 200 | 444 | 3/8 | 233 | R38AAEM306 | N3 | L3 | 152 | R38AAEM306 | N2 | L2 |
| 300 | 666 | 3/8 | 350 | R38AAEM406 | N4 | L4 | 228 | R38AAEM306 | N3 | L3 |
| **4-ROD SUPPORT** | | | **4-WAY SPLAY BRACING REQUIREMENTS**<br>**4-Way Splay Brace Pattern (B38.1, B38.4, )** | | | | | | | |
| 500 | 595 | 3/8 | 292 | R38AAEM306 | N3 | L3 | | | | |
| 750 | 892 | 1/2 | 438 | R12AAEM406 | N5 | L5 | | | | |
| 1,000 | 1,189 | 1/2 | 583 | R12AAEM406 | N6 | L6 | | | | |
| 2,000 | 2,379 | 3/4 | 1,167 | R34CFB1P06 | N12 | L12 | | | | |
| **6-ROD SUPPORT** | | | **8-WAY SPLAY BRACING REQUIREMENTS**<br>**8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 700 | 771 | 3/8 | 204 | R38AAEM306 | N3 | L3 | | | | |
| 1,300 | 1,431 | 1/2 | 379 | R12AAEM406 | N4 | L4 | | | | |
| 2,100 | 2,312 | 5/8 | 613 | R58AAEM406 | N7 | L7 | | | | |
| 3,150 | 3,468 | 3/4 | 919 | R34CFB1P06 | N10 | L10 | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp).
2. Not Used.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *RIGID BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Support Rod Total Vertical Load [1, 8] (lbs) | Minimum Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 68 | 3/8 | 38 | R38AAEM306 | N1 | L1 | 24 | R38AAEM306 | N1 | L1 |
| 50 | 135 | 3/8 | 75 | R38AAEM306 | N1 | L1 | 49 | R38AAEM306 | N1 | L1 |
| 75 | 203 | 3/8 | 113 | R38AAEM306 | N2 | L2 | 73 | R38AAEM306 | N1 | L1 |
| 100 | 271 | 3/8 | 150 | R38AAEM306 | N2 | L2 | 98 | R38AAEM306 | N1 | L1 |
| 200 | 541 | 3/8 | 300 | R38AAEM306 | N3 | L3 | 195 | R38AAEM306 | N2 | L2 |
| 300 | 812 | 1/2 | 450 | R12AAEM406 | N5 | L5 | 293 | R12AAEM306 | N3 | L3 |
| | | | **4-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **4-ROD SUPPORT** | | | **4-Way Splay Brace Pattern (B38.1, B38.4, B50.1)** | | | | | | | |
| 500 | 696 | 3/8 | 375 | R38AAEM406 | N4 | L4 | | | | |
| 750 | 1,044 | 1/2 | 563 | R12AAEM406 | N6 | L6 | | | | |
| 1,000 | 1,392 | 1/2 | 750 | R12AAEM509 | N8 | L8 | | | | |
| | | | **8-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **6-ROD SUPPORT** | | | **8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 650 | 781 | 3/8 | 244 | R38AAEM306 | N3 | L3 | | | | |
| 1,200 | 1,443 | 1/2 | 450 | R12AAEM406 | N5 | L5 | | | | |
| 1,850 | 2,224 | 5/8 | 694 | R58AAEM509 | N7 | L7 | | | | |
| 2,900 | 3,487 | 3/4 | 1,088 | R34DGB1P06 | N11 | L11 | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$).
2. Not Used.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *RIGID BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Support Rod Total Vertical Load [1, 8] (lbs) | Minimum Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 46 | 3/8 | 29 | R38AAEM306 | N1 | L1 | 19 | R38AAEM306 | N1 | L1 |
| 50 | 92 | 3/8 | 58 | R38AAEM306 | N1 | L1 | 38 | R38AAEM306 | N1 | L1 |
| 75 | 138 | 3/8 | 87 | R38AAEM306 | N1 | L1 | 56 | R38AAEM306 | N1 | L1 |
| 100 | 184 | 3/8 | 115 | R38AAEM306 | N2 | L2 | 75 | R38AAEM306 | N1 | L1 |
| 200 | 368 | 3/8 | 231 | R38AAEM306 | N3 | L3 | 150 | R38AAEM306 | N2 | L2 |
| 300 | 552 | 3/8 | 346 | R38AAEM406 | N4 | L4 | 225 | R38AAEM306 | N3 | L3 |
| | | | **4-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **4-ROD SUPPORT** | | | **4-Way Splay Brace Pattern (B38.1, B38.4, B50.1)** | | | | | | | |
| 500 | 516 | 3/8 | 289 | R38AAEM306 | N3 | L3 | | | | |
| 750 | 773 | 3/8 | 433 | R38AAEM406 | N5 | L5 | | | | |
| 1,000 | 1,031 | 1/2 | 577 | R12AAEM406 | N6 | L6 | | | | |
| 2,000 | 2,062 | 5/8 | 1,155 | R58AAEM506 | N12 | L12 | | | | |
| 4,000 | 4,125 | 7/8 | 2,309 | #N/A | N24 | L24 | | | | |
| | | | **8-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **6-ROD SUPPORT** | | | **8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 750 | 766 | 3/8 | 217 | R38AAEM306 | N3 | L3 | | | | |
| 1,400 | 1,431 | 1/2 | 404 | R12AAEM406 | N5 | L5 | | | | |
| 2,250 | 2,299 | 5/8 | 650 | R58AAEM406 | N7 | L7 | | | | |
| 3,400 | 3,474 | 3/4 | 981 | R34DGB1P06 | N10 | L10 | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp).
2. Not Used.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *RIGID BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Support Rod Total Vertical Load [1, 8] (lbs) | Minimum Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | LONGITUDINAL BRACING REQUIREMENTS | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 64 | 3/8 | 39 | R38AAEM306 | N1 | L1 | 25 | R38AAEM306 | N1 | L1 |
| 50 | 129 | 3/8 | 78 | R38AAEM306 | N1 | L1 | 51 | R38AAEM306 | N1 | L1 |
| 75 | 193 | 3/8 | 117 | R38AAEM306 | N2 | L2 | 76 | R38AAEM306 | N1 | L1 |
| 100 | 258 | 3/8 | 156 | R38AAEM306 | N2 | L2 | 101 | R38AAEM306 | N2 | L2 |
| 200 | 516 | 3/8 | 311 | R38AAEM409 | N4 | L4 | 202 | R38AAEM306 | N3 | L3 |
| 300 | 773 | 1/2 | 467 | R12AAEM406 | N5 | L5 | 303 | R12AAEM409 | N4 | L4 |
| | | | **4-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **4-ROD SUPPORT** | | | **4-Way Splay Brace Pattern (B38.1, B38.4, )** | | | | | | | |
| 500 | 669 | 3/8 | 389 | R38AAEM406 | N4 | L4 | | | | |
| 750 | 1,004 | 1/2 | 583 | R12AAEM406 | N6 | L6 | | | | |
| 1,000 | 1,338 | 1/2 | 778 | R12AAEM509 | N8 | L8 | | | | |
| 2,000 | 2,677 | 3/4 | 1,556 | R34CFB2P12 | N16 | L16 | | | | |
| 4,000 | 5,354 | 1 | 3,111 | #N/A | #N/A | #N/A | | | | |
| | | | **8-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **6-ROD SUPPORT** | | | **8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 650 | 764 | 3/8 | 253 | R38AAEM306 | N3 | L3 | | | | |
| 1,200 | 1,411 | 1/2 | 467 | R12AAEM406 | N5 | L5 | | | | |
| 1,950 | 2,292 | 5/8 | 758 | R58AAEM509 | N8 | L8 | | | | |
| 2,950 | 3,468 | 3/4 | 1,147 | R34CFB1P06 | N12 | L12 | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp).
2. Not Used.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## RIGID BRACING REQUIREMENTS[7]

***MECHANICAL EQUIPMENT, ROD HUNG*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Support Rod Total Vertical Load[1, 8] (lbs) | Minimum Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | LONGITUDINAL BRACING REQUIREMENTS | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] Form Pour[4] Deck Page D1 | Min. Brace Anchorage[6] Metal[5] Deck Page D2 |
| **2-ROD SUPPORT** | | | **1-Way Transverse Brace Pattern (B38.0, B38.3)** | | | | **3-Way Trans., Longitudinal Brace Pattern (B38.0, B38.3)** | | | |
| 25 | 81 | 3/8 | 50 | R38AAEM306 | N1 | L1 | 33 | R38AAEM306 | N1 | L1 |
| 50 | 161 | 3/8 | 100 | R38AAEM306 | N1 | L1 | 65 | R38AAEM306 | N1 | L1 |
| 75 | 242 | 3/8 | 150 | R38AAEM306 | N2 | L2 | 98 | R38AAEM306 | N1 | L1 |
| 100 | 323 | 3/8 | 200 | R38AAEM306 | N2 | L2 | 130 | R38AAEM306 | N2 | L2 |
| 200 | 645 | 1/2 | 400 | R12AAEM406 | N4 | L4 | 260 | R12AAEM306 | N3 | L3 |
| 300 | 968 | 1/2 | 600 | R12AAEM406 | N6 | L6 | 390 | R12AAEM406 | N4 | L4 |
| | | | **4-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **4-ROD SUPPORT** | | | **4-Way Splay Brace Pattern (B38.1, B38.4, B50.1)** | | | | | | | |
| 500 | 804 | 1/2 | 500 | R12AAEM406 | N5 | L5 | | | | |
| 750 | 1,206 | 1/2 | 750 | R12AAEM509 | N8 | L8 | | | | |
| 1,000 | 1,609 | 5/8 | 1,000 | R58AAEM506 | N10 | L10 | | | | |
| | | | **8-WAY SPLAY BRACING REQUIREMENTS** | | | | | | | |
| **6-ROD SUPPORT** | | | **8-Way Splay Brace Pattern (B38.2, B38.5)** | | | | | | | |
| 600 | 786 | 3/8 | 300 | R38AAEM306 | N3 | L3 | | | | |
| 1,100 | 1,442 | 1/2 | 550 | R12AAEM406 | N6 | L6 | | | | |
| 1,750 | 2,293 | 5/8 | 875 | R58AAEM506 | N9 | L9 | | | | |
| 2,650 | 3,473 | 3/4 | 1,325 | R34DGB1S06 | N14 | L14 | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times W_p$).
2. Not Used.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *CABLE BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Equipment Maximum Operating Weight (lbs)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED BRACING REQUIREMENTS** | | | |
|---|---|---|---|---|---|---|
| | | | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| **2-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.0, B39.5)** | | | |
| 25 | 29 | 3/8 | 7 | C38AA04WS | N1 | L1 |
| 50 | 57 | 3/8 | 14 | C38AA04WS | N1 | L1 |
| 75 | 86 | 3/8 | 22 | C38AA04WS | N1 | L1 |
| 100 | 115 | 3/8 | 29 | C38AA04WS | N1 | L1 |
| 200 | 230 | 3/8 | 58 | C38AA04WS | N1 | L1 |
| 300 | 344 | 3/8 | 87 | C38AA04WS | N1 | L1 |
| **4-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.1, B39.6)** | | | |
| 500 | 371 | 3/8 | 144 | C38AA04WS | N2 | L2 |
| 750 | 557 | 3/8 | 217 | C38AA04WS | N3 | L3 |
| 1,000 | 743 | 3/8 | 289 | C38AA04WS | N3 | L3 |
| 2,000 | 1,485 | 5/8 | 577 | C58AA04WS | N6 | L6 |
| 4,000 | 2,970 | 3/4 | 1,155 | C34DG06WS | N12 | L12 |
| | | | **8-WAY SPLAYED BRACING REQUIREMENTS** | | | |
| **6-ROD SUPPORT** | | | **8-Way Splayed Brace Pattern (B39.2, B39.7)** | | | |
| 900 | 790 | 3/8 | 169 | C38AA04WS | N2 | L2 |
| 1,650 | 1,448 | 1/2 | 310 | C12AA04WS | N4 | L4 |
| 2,650 | 2,325 | 5/8 | 497 | C58AA04WS | N5 | L5 |
| 3,950 | 3,466 | 3/4 | 741 | C34DG06WS | N8 | L8 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Not Used.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *CABLE BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED BRACING REQUIREMENTS | | | |
|---|---|---|---|---|---|---|
| | | | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| 2-ROD SUPPORT | | | 4-Way Splayed Brace Pattern (B39.0, B39.5) | | | |
| 25 | 29 | 3/8 | 10 | C38AA04WS | N1 | L1 |
| 50 | 57 | 3/8 | 19 | C38AA04WS | N1 | L1 |
| 75 | 86 | 3/8 | 29 | C38AA04WS | N1 | L1 |
| 100 | 115 | 3/8 | 39 | C38AA04WS | N1 | L1 |
| 200 | 230 | 3/8 | 78 | C38AA04WS | N1 | L1 |
| 300 | 344 | 3/8 | 117 | C38AA04WS | N2 | L2 |
| 4-ROD SUPPORT | | | 4-Way Splayed Brace Pattern (B39.1, B39.6) | | | |
| 500 | 371 | 3/8 | 194 | C38AA04WS | N2 | L2 |
| 750 | 557 | 3/8 | 292 | C38AA04WS | N3 | L3 |
| 1,000 | 743 | 3/8 | 389 | C38AA04WS | N4 | L4 |
| 2,000 | 1,485 | 5/8 | 778 | C58AA06WS | N8 | L8 |
| 4,000 | 2,970 | 3/4 | 1,556 | C34DG06TS | N16 | L16 |
| | | | 8-WAY SPLAYED BRACING REQUIREMENTS | | | |
| 6-ROD SUPPORT | | | 8-Way Splayed Brace Pattern (B39.2, B39.7) | | | |
| 900 | 790 | 3/8 | 228 | C38AA04WS | N3 | L3 |
| 1,650 | 1,448 | 1/2 | 417 | C12AA04WS | N5 | L5 |
| 2,650 | 2,325 | 5/8 | 670 | C58AA04WS | N7 | L7 |
| 3,950 | 3,466 | 3/4 | 999 | C34DG06WS | N10 | L10 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Not Used.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## CABLE BRACING REQUIREMENTS [7]

**MECHANICAL EQUIPMENT, ROD HUNG** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED BRACING REQUIREMENTS | | | |
|---|---|---|---|---|---|---|
| | | | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| 2-ROD SUPPORT | | | 4-Way Splayed Brace Pattern (B39.0, B39.3, B39.5) | | | |
| 25 | 29 | 3/8 | 13 | C38AA04WS | N1 | L1 |
| 50 | 57 | 3/8 | 25 | C38AA04WS | N1 | L1 |
| 75 | 86 | 3/8 | 38 | C38AA04WS | N1 | L1 |
| 100 | 115 | 3/8 | 50 | C38AA04WS | N1 | L1 |
| 200 | 230 | 3/8 | 100 | C38AA04WS | N1 | L1 |
| 300 | 344 | 3/8 | 150 | C38AA04WS | N2 | L2 |
| 4-ROD SUPPORT | | | 4-Way Splayed Brace Pattern (B39.1, B39.4, B39.6, B50.2) | | | |
| 500 | 371 | 3/8 | 250 | C38AA04WS | N3 | L3 |
| 750 | 557 | 3/8 | 375 | C38AA04WS | N4 | L4 |
| 1,000 | 743 | 1/2 | 500 | C12AA04WS | N5 | L5 |
| 2,000 | 1,485 | 5/8 | 1,000 | C58AA06WS | N10 | L10 |
| | | | 8-WAY SPLAYED BRACING REQUIREMENTS | | | |
| 6-ROD SUPPORT | | | 8-Way Splayed Brace Pattern (B39.2, B39.7) | | | |
| 900 | 790 | 3/8 | 293 | C38AA04WS | N3 | L3 |
| 1,650 | 1,448 | 1/2 | 536 | C12AA04WS | N6 | L6 |
| 2,650 | 2,325 | 5/8 | 861 | C58AA06WS | N9 | L9 |
| 3,950 | 3,466 | 3/4 | 1,284 | C34DG06WS | N13 | L13 |

1. $TVL = DL + Fv + (0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads.
2. Not Used.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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### *CABLE BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED BRACING REQUIREMENTS<br>Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6]<br>Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
|---|---|---|---|---|---|---|
| **2-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.0, B39.5)** | | | |
| 25 | 29 | 3/8 | 14 | C38AA04WS | N1 | L1 |
| 50 | 57 | 3/8 | 29 | C38AA04WS | N1 | L1 |
| 75 | 86 | 3/8 | 43 | C38AA04WS | N1 | L1 |
| 100 | 115 | 3/8 | 58 | C38AA04WS | N1 | L1 |
| 200 | 230 | 3/8 | 115 | C38AA04WS | N2 | L2 |
| 300 | 344 | 3/8 | 173 | C38AA04WS | N2 | L2 |
| **4-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.1, B39.6)** | | | |
| 500 | 371 | 3/8 | 289 | C38AA04WS | N3 | L3 |
| 750 | 557 | 3/8 | 433 | C38AA04WS | N5 | L5 |
| 1,000 | 743 | 3/8 | 577 | C38AA04WS | N6 | L6 |
| 2,000 | 1,485 | 5/8 | 1,155 | C58AA06WS | N12 | L12 |
| 2,500 | 1,856 | 5/8 | 1,443 | C58AA06WS | N15 | L15 |
| | | | **8-WAY SPLAYED BRACING REQUIREMENTS** | | | |
| **6-ROD SUPPORT** | | | **8-Way Splayed Brace Pattern (B39.2, B39.7)** | | | |
| 900 | 790 | 3/8 | 338 | C38AA04WS | N4 | L4 |
| 1,650 | 1,448 | 1/2 | 619 | C12AA04WS | N7 | L7 |
| 2,650 | 2,325 | 5/8 | 994 | C58AA06WS | N10 | L10 |
| 3,150 | 2,764 | 3/4 | 1,182 | C34DG06WS | N12 | L12 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Not Used.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *CABLE BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED BRACING REQUIREMENTS** | | | |
|---|---|---|---|---|---|---|
| | | | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| **2-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.0, B39.5)** | | | |
| 25 | 25 | 3/8 | 19 | C38AA04WS | N1 | L1 |
| 50 | 51 | 3/8 | 39 | C38AA04WS | N1 | L1 |
| 75 | 76 | 3/8 | 58 | C38AA04WS | N1 | L1 |
| 100 | 102 | 3/8 | 78 | C38AA04WS | N1 | L1 |
| 200 | 203 | 3/8 | 156 | C38AA04WS | N2 | L2 |
| 300 | 305 | 3/8 | 233 | C38AA04WS | N3 | L3 |
| **4-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.1, B39.6)** | | | |
| 1,000 | 658 | 1/2 | 778 | C12AA06WS | N8 | L8 |
| 2,000 | 1,316 | 5/8 | 1,556 | C58DG06TS | N16 | L16 |
| | | | **8-WAY SPLAYED BRACING REQUIREMENTS** | | | |
| **6-ROD SUPPORT** | | | **8-Way Splayed Brace Pattern (B39.2, B39.7)** | | | |
| 1,000 | 777 | 3/8 | 506 | C38AA04WS | N6 | L6 |
| 1,850 | 1,438 | 1/2 | 935 | C12AA06WS | N10 | L10 |
| 3,000 | 2,332 | 5/8 | 1,517 | C58DG06TS | N16 | L16 |
| 3,100 | 2,410 | 3/4 | 1,567 | C34DG06TS | N16 | L16 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Not Used.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *CABLE BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Equipment Maximum Operating Weight (lbs)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED BRACING REQUIREMENTS**<br>**Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]**<br>**Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
|---|---|---|---|---|---|---|
| **2-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.0, B39.3, B39.5)** | | | |
| 25 | 29 | 3/8 | 25 | C38AA04WS | N1 | L1 |
| 50 | 57 | 3/8 | 50 | C38AA04WS | N1 | L1 |
| 75 | 86 | 3/8 | 75 | C38AA04WS | N1 | L1 |
| 100 | 115 | 3/8 | 100 | C38AA04WS | N1 | L1 |
| 200 | 230 | 3/8 | 200 | C38AA04WS | N2 | L2 |
| 300 | 344 | 3/8 | 300 | C38AA04WS | N3 | L3 |
| **4-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.1, B39.4, B39.6, B50.2)** | | | |
| 500 | 371 | 1/2 | 500 | C12AA04WS | N5 | L5 |
| 750 | 557 | 1/2 | 750 | C12AA06WS | N8 | L8 |
| 1,000 | 743 | 1/2 | 1,000 | C12AA06WS | N10 | L10 |
| 1,400 | 1,040 | 5/8 | 1,400 | C58AA06WS | N14 | L14 |
| | | | **8-WAY SPLAYED BRACING REQUIREMENTS** | | | |
| **6-ROD SUPPORT** | | | **8-Way Splayed Brace Pattern (B39.2, B39.7)** | | | |
| 900 | 790 | 3/8 | 585 | C38AA04WS | N6 | L6 |
| 1,650 | 1,448 | 1/2 | 1,073 | C12AA06WS | N11 | L11 |
| 2,250 | 1,974 | 5/8 | 1,463 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Not Used.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## CABLE BRACING REQUIREMENTS [7]

**MECHANICAL EQUIPMENT, ROD HUNG** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED BRACING REQUIREMENTS | | | |
|---|---|---|---|---|---|---|
| | | | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| 2-ROD SUPPORT | | | 4-Way Splayed Brace Pattern (B39.0, B39.5) | | | |
| 25 | 29 | 3/8 | 22 | C38AA04WS | N1 | L1 |
| 50 | 57 | 3/8 | 43 | C38AA04WS | N1 | L1 |
| 75 | 86 | 3/8 | 65 | C38AA04WS | N1 | L1 |
| 100 | 115 | 3/8 | 87 | C38AA04WS | N1 | L1 |
| 200 | 230 | 3/8 | 173 | C38AA04WS | N2 | L2 |
| 300 | 344 | 3/8 | 260 | C38AA04WS | N3 | L3 |
| 4-ROD SUPPORT | | | 4-Way Splayed Brace Pattern (B39.1, B39.6) | | | |
| 500 | 371 | 3/8 | 433 | C38AA04WS | N5 | L5 |
| 750 | 557 | 3/8 | 650 | C38AA04WS | N7 | L7 |
| 1,000 | 743 | 1/2 | 866 | C12AA06WS | N9 | L9 |
| 1,600 | 1,188 | 1/2 | 1,386 | C12AA06WS | N14 | L14 |
| | | | 8-WAY SPLAYED BRACING REQUIREMENTS | | | |
| 6-ROD SUPPORT | | | 8-Way Splayed Brace Pattern (B39.2, B39.7) | | | |
| 900 | 790 | 3/8 | 507 | C38AA04WS | N6 | L6 |
| 1,650 | 1,448 | 1/2 | 929 | C12AA06WS | N10 | L10 |
| 2,550 | 2,238 | 5/8 | 1,435 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Not Used.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *CABLE BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED BRACING REQUIREMENTS | | | |
|---|---|---|---|---|---|---|
| | | | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| **2-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.0, B39.5)** | | | |
| 25 | 29 | 3/8 | 29 | C38AA04WS | N1 | L1 |
| 50 | 57 | 3/8 | 58 | C38AA04WS | N1 | L1 |
| 75 | 86 | 3/8 | 88 | C38AA04WS | N1 | L1 |
| 100 | 115 | 3/8 | 117 | C38AA04WS | N2 | L2 |
| 200 | 230 | 3/8 | 233 | C38AA04WS | N3 | L3 |
| 300 | 344 | 3/8 | 350 | C38AA04WS | N4 | L4 |
| **4-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.1, B39.6)** | | | |
| 500 | 371 | 1/2 | 583 | C12AA04WS | N6 | L6 |
| 750 | 557 | 1/2 | 875 | C12AA06WS | N9 | L9 |
| 1,000 | 743 | 1/2 | 1,167 | C12AA06WS | N12 | L12 |
| 1,500 | 1,114 | 5/8 | 1,750 | C58DG06TS | N18 | L18 |
| | | | **8-WAY SPLAYED BRACING REQUIREMENTS** | | | |
| **6-ROD SUPPORT** | | | **8-Way Splayed Brace Pattern (B39.2, B39.7)** | | | |
| 850 | 746 | 3/8 | 645 | C38AA04WS | N7 | L7 |
| 1,650 | 1,448 | 1/2 | 1,251 | C12AA06WS | N13 | L13 |
| 2,400 | 2,106 | 5/8 | 1,820 | C58DG06TS | N19 | L19 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Not Used.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *CABLE BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED BRACING REQUIREMENTS: Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|
| **2-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.0, B39.3, B39.5)** | | | |
| 25 | 29 | 3/8 | 38 | C38AA04WS | N1 | L1 |
| 50 | 57 | 3/8 | 75 | C38AA04WS | N1 | L1 |
| 75 | 86 | 3/8 | 113 | C38AA04WS | N2 | L2 |
| 100 | 115 | 3/8 | 150 | C38AA04WS | N2 | L2 |
| 200 | 230 | 3/8 | 300 | C38AA04WS | N3 | L3 |
| 300 | 344 | 1/2 | 450 | C12AA04WS | N5 | L5 |
| **4-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.1, B39.4, B39.6, B50.2)** | | | |
| 500 | 371 | 1/2 | 750 | C12AA06WS | N8 | L8 |
| 750 | 557 | 1/2 | 1,125 | C12AA06WS | N12 | L12 |
| 900 | 668 | 5/8 | 1,350 | C58AA06WS | N14 | L14 |
| | | | **8-WAY SPLAYED BRACING REQUIREMENTS** | | | |
| **6-ROD SUPPORT** | | | **8-Way Splayed Brace Pattern (B39.2, B39.7)** | | | |
| 550 | 483 | 3/8 | 536 | C38AA04WS | N6 | L6 |
| 1,500 | 1,316 | 1/2 | 1,463 | C12AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Not Used.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *CABLE BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED BRACING REQUIREMENTS | | | |
|---|---|---|---|---|---|---|
| | | | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| **2-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.0, B39.5)** | | | |
| 25 | 29 | 3/8 | 29 | C38AA04WS | N1 | L1 |
| 50 | 57 | 3/8 | 58 | C38AA04WS | N1 | L1 |
| 75 | 86 | 3/8 | 87 | C38AA04WS | N1 | L1 |
| 100 | 115 | 3/8 | 115 | C38AA04WS | N2 | L2 |
| 200 | 230 | 3/8 | 231 | C38AA04WS | N3 | L3 |
| 300 | 344 | 3/8 | 346 | C38AA04WS | N4 | L4 |
| **4-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.1, B39.6)** | | | |
| 500 | 371 | 3/8 | 577 | C38AA04WS | N6 | L6 |
| 750 | 557 | 1/2 | 866 | C12AA06WS | N9 | L9 |
| 1,000 | 743 | 1/2 | 1,155 | C12AA06WS | N12 | L12 |
| 1,200 | 891 | 1/2 | 1,386 | C12AA06WS | N14 | L14 |
| 1,250 | 928 | 1/2 | 1,443 | C12AA06WS | N15 | L15 |
| | | | **8-WAY SPLAYED BRACING REQUIREMENTS** | | | |
| **6-ROD SUPPORT** | | | **8-Way Splayed Brace Pattern (B39.2, B39.7)** | | | |
| 900 | 790 | 3/8 | 675 | C38AA06WS | N7 | L7 |
| 1,650 | 1,448 | 1/2 | 1,238 | C12AA06WS | N13 | L13 |
| 1,900 | 1,667 | 5/8 | 1,426 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Not Used.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *CABLE BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Equipment Maximum Operating Weight (lbs)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED BRACING REQUIREMENTS** | | | |
|---|---|---|---|---|---|---|
| | | | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| **2-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.0, B39.5)** | | | |
| 25 | 29 | 3/8 | 39 | C38AA04WS | N1 | L1 |
| 50 | 57 | 3/8 | 78 | C38AA04WS | N1 | L1 |
| 75 | 86 | 3/8 | 117 | C38AA04WS | N2 | L2 |
| 100 | 115 | 3/8 | 156 | C38AA04WS | N2 | L2 |
| 200 | 230 | 3/8 | 311 | C38AA04WS | N4 | L4 |
| 300 | 344 | 1/2 | 467 | C12AA04WS | N5 | L5 |
| **4-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.1, B39.6)** | | | |
| 500 | 371 | 1/2 | 778 | C12AA06WS | N8 | L8 |
| 750 | 557 | 1/2 | 1,167 | C12AA06WS | N12 | L12 |
| 1,000 | 743 | 5/8 | 1,556 | C58DG06TS | N16 | L16 |
| 1,100 | 817 | 5/8 | 1,711 | C58DG06TS | N18 | L18 |
| | | | **8-WAY SPLAYED BRACING REQUIREMENTS** | | | |
| **6-ROD SUPPORT** | | | **8-Way Splayed Brace Pattern (B39.2, B39.7)** | | | |
| 650 | 570 | 3/8 | 657 | C38AA04WS | N7 | L7 |
| 1,650 | 1,448 | 1/2 | 1,669 | C12GG06CC | N17 | L17 |
| 1,800 | 1,580 | 5/8 | 1,820 | C58DG06TS | N19 | L19 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Not Used.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *CABLE BRACING REQUIREMENTS* [7]

***MECHANICAL EQUIPMENT, ROD HUNG*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Equipment Maximum Operating Weight (lbs) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED BRACING REQUIREMENTS** | | | |
|---|---|---|---|---|---|---|
| | | | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| **2-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.0, B39.3, B39.5)** | | | |
| 25 | 29 | 3/8 | 50 | C38AA04WS | N1 | L1 |
| 50 | 57 | 3/8 | 100 | C38AA04WS | N1 | L1 |
| 75 | 86 | 3/8 | 150 | C38AA04WS | N2 | L2 |
| 100 | 115 | 3/8 | 200 | C38AA04WS | N2 | L2 |
| 200 | 230 | 1/2 | 400 | C12AA04WS | N4 | L4 |
| 300 | 344 | 1/2 | 600 | C12AA04WS | N6 | L6 |
| **4-ROD SUPPORT** | | | **4-Way Splayed Brace Pattern (B39.1, B39.4, B39.6, B50.2)** | | | |
| 500 | 371 | 1/2 | 1,000 | C12AA06WS | N10 | L10 |
| 700 | 520 | 5/8 | 1,400 | C58AA06WS | N14 | L14 |
| | | | **8-WAY SPLAYED BRACING REQUIREMENTS** | | | |
| **6-ROD SUPPORT** | | | **8-Way Splayed Brace Pattern (B39.2, B39.7)** | | | |
| 400 | 351 | 3/8 | 520 | C38AA04WS | N6 | L6 |
| 1,100 | 965 | 1/2 | 1,430 | C12AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Not Used.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 9.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Rod Loads Include A Force Increase of +/- 25% Of The Equipment Weight Due To Eccentricity Between Applied Lateral Force and Brace Arm Resistance.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG EMT CONDUIT*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 323 | 1/2 | 44 | 122 | R12AAEM306 | N2 | L2 | 132 | 367 | R12AAEM406 | N4 | L4 |
| 4 | 10 | 482 | 5/8 | 51 | 193 | R58AAEM306 | N2 | L2 | 154 | 580 | R58AAEM406 | N6 | L6 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 61 | R12AAEM306 | N1 | L1 | 132 | 184 | R12AAEM306 | N2 | L2 |
| 4 | 10 | 176 | 5/8 | 51 | 97 | R58AAEM306 | N1 | L1 | 154 | 290 | R58AAEM306 | N3 | L3 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 87 | R12AAEM306 | N1 | L1 | | | | | |
| 4 | 10 | 176 | 5/8 | 51 | 137 | R58AAEM306 | N2 | L2 | | | | | |
| ***SINGLE HUNG RIGID METAL CONDUIT (RMC)*** [9] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 520 | 1/2 | 50 | 208 | R12AAEM306 | N3 | L3 | 151 | 623 | R12AAEM406 | N7 | L7 |
| 4 | 10 | 778 | 5/8 | 58 | 326 | R58AAEM409 | N4 | L4 | 174 | 978 | R58AAEM506 | N10 | L10 |
| 5 | 10 | 1,073 | 5/8 | 63 | 559 | R58AAEM406 | N6 | L6 | 133 | 1,185 | R58AAEM506 | N12 | L12 |
| 6 | 10 | 1,635 | 5/8 | 62 | 1,032 | R58AAEM506 | N11 | L11 | 82 | 1,365 | R58AAEM506 | N14 | L14 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 104 | R12AAEM306 | N2 | L2 | 151 | 311 | R12AAEM409 | N4 | L4 |
| 4 | 10 | 262 | 5/8 | 58 | 163 | R58AAEM306 | N2 | L2 | 174 | 489 | R58AAEM406 | N5 | L5 |
| 5 | 10 | 418 | 5/8 | 63 | 279 | R58AAEM306 | N3 | L3 | 133 | 593 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 779 | 5/8 | 62 | 516 | R58AAEM406 | N6 | L6 | 82 | 683 | R58AAEM509 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 147 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 262 | 5/8 | 58 | 231 | R58AAEM306 | N3 | L3 | | | | | |
| 5 | 10 | 418 | 5/8 | 63 | 395 | R58AAEM406 | N4 | L4 | | | | | |
| 6 | 10 | 779 | 5/8 | 62 | 730 | R58AAEM509 | N8 | L8 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## RIGID BRACING REQUIREMENTS [7]

**SINGLE HUNG EMT CONDUIT [9]** MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B19.0) | | | | | 2-Way Trans., Longit. Brace Pattern (B19.4) | | | | |
| 3 | 10 | 529 | 1/2 | 44 | 165 | R12AAEM306 | N2 | L2 | 132 | 494 | R12AAEM406 | N5 | L5 |
| 4 | 10 | 807 | 5/8 | 51 | 260 | R58AAEM306 | N3 | L3 | 154 | 781 | R58AAEM509 | N8 | L8 |
| | | | | 2-Way Transverse Brace Pattern (B19.2) | | | | | 4-Way Transverse, Longit. Brace Pattern (B19.6) | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 82 | R12AAEM306 | N1 | L1 | 132 | 247 | R12AAEM306 | N3 | L3 |
| 4 | 10 | 176 | 5/8 | 51 | 130 | R58AAEM306 | N2 | L2 | 154 | 390 | R58AAEM406 | N4 | L4 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Splayed Brace Pattern (B19.8) | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 117 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 176 | 5/8 | 51 | 184 | R58AAEM306 | N2 | L2 | | | | | |

**SINGLE HUNG RIGID METAL CONDUIT (RMC) [9]** MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1-Way Transverse Brace Pattern (B19.0) | | | | | 2-Way Trans., Longit. Brace Pattern (B19.4) | | | | |
| 3 | 10 | 870 | 1/2 | 50 | 280 | R12AAEM306 | N3 | L3 | 151 | 839 | R12AAEM506 | N9 | L9 |
| 4 | 10 | 1,326 | 5/8 | 58 | 439 | R58AAEM406 | N5 | L5 | 174 | 1,318 | R58AAEM506 | N14 | L14 |
| 5 | 10 | 1,769 | 5/8 | 63 | 753 | R58AAEM509 | N8 | L8 | 133 | 1,595 | R58AAEM606 | N16 | L16 |
| 6 | 10 | 2,308 | 5/8 | 35 | 785 | R58AAEM509 | N8 | L8 | 82 | 1,835 | R58AAEM606 | N19 | L19 |
| | | | | 2-Way Transverse Brace Pattern (B19.2) | | | | | 4-Way Transverse, Longit. Brace Pattern (B19.6) | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 140 | R12AAEM306 | N2 | L2 | 151 | 419 | R12AAEM406 | N5 | L5 |
| 4 | 10 | 262 | 5/8 | 58 | 220 | R58AAEM306 | N3 | L3 | 174 | 659 | R58AAEM406 | N7 | L7 |
| 5 | 10 | 418 | 5/8 | 63 | 376 | R58AAEM406 | N4 | L4 | 133 | 798 | R58AAEM506 | N8 | L8 |
| 6 | 10 | 779 | 5/8 | 62 | 695 | R58AAEM509 | N7 | L7 | 82 | 918 | R58AAEM506 | N10 | L10 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 4-Way Splayed Brace Pattern (B19.8) | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 198 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 262 | 5/8 | 58 | 311 | R58AAEM409 | N4 | L4 | | | | | |
| 5 | 10 | 418 | 5/8 | 63 | 532 | R58AAEM406 | N6 | L6 | | | | | |
| 6 | 10 | 779 | 5/8 | 62 | 983 | R58AAEM506 | N10 | L10 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## RIGID BRACING REQUIREMENTS[7]

**SINGLE HUNG EMT CONDUIT[9]** — **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage[6] | | | | | Min. Brace Anchorage[6] | |
| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 710 | 1/2 | 44 | 212 | R12AAEM306 | N3 | L3 | 132 | 636 | R12AAEM406 | N7 | L7 |
| 4 | 10 | 1,093 | 5/8 | 51 | 335 | R58AAEM406 | N4 | L4 | 154 | 1,004 | R58AAEM506 | N11 | L11 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 106 | R12AAEM306 | N2 | L2 | 132 | 318 | R12AAEM409 | N4 | L4 |
| 4 | 10 | 176 | 5/8 | 51 | 167 | R58AAEM306 | N2 | L2 | 154 | 502 | R58AAEM406 | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 150 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 176 | 5/8 | 51 | 237 | R58AAEM306 | N3 | L3 | | | | | |
| **SINGLE HUNG RIGID METAL CONDUIT (RMC)[9]** | | | | | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 1,177 | 1/2 | 50 | 359 | R12AAEM406 | N4 | L4 | 151 | 1,078 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 1,356 | 5/8 | 58 | 565 | R58AAEM406 | N6 | L6 | 116 | 1,129 | R58AAEM506 | N12 | L12 |
| 5 | 10 | 1,856 | 5/8 | 48 | 743 | R58AAEM509 | N8 | L8 | 96 | 1,486 | R58AAEM606 | N15 | L15 |
| 6 | 10 | 2,287 | 5/8 | 27 | 779 | R58AAEM509 | N8 | L8 | 54 | 1,558 | R58AAEM606 | N16 | L16 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 180 | R12AAEM306 | N2 | L2 | 151 | 539 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 262 | 5/8 | 58 | 282 | R58AAEM306 | N3 | L3 | 174 | 847 | R58AAEM506 | N9 | L9 |
| 5 | 10 | 418 | 5/8 | 63 | 484 | R58AAEM406 | N5 | L5 | 117 | 903 | R58AAEM506 | N10 | L10 |
| 6 | 10 | 779 | 5/8 | 62 | 894 | R58AAEM506 | N9 | L9 | 72 | 1,040 | R58AAEM506 | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 254 | R12AAEM306 | N3 | L3 | | | | | |
| 4 | 10 | 262 | 5/8 | 58 | 399 | R58AAEM406 | N4 | L4 | | | | | |
| 5 | 10 | 418 | 5/8 | 63 | 684 | R58AAEM509 | N7 | L7 | | | | | |
| 6 | 10 | 779 | 5/8 | 62 | 1,264 | R58AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG EMT CONDUIT*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 455 | 1/2 | 37 | 206 | R12AAEM306 | N3 | L3 | 111 | 617 | R12AAEM406 | N7 | L7 |
| 4 | 10 | 681 | 5/8 | 43 | 325 | R58AAEM409 | N4 | L4 | 127 | 955 | R58AAEM506 | N10 | L10 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 103 | R12AAEM306 | N2 | L2 | 111 | 309 | R12AAEM409 | N4 | L4 |
| 4 | 10 | 176 | 5/8 | 43 | 162 | R58AAEM306 | N2 | L2 | 127 | 478 | R58AAEM406 | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 145 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 176 | 5/8 | 43 | 230 | R58AAEM306 | N3 | L3 | | | | | |
| ***SINGLE HUNG RIGID METAL CONDUIT (RMC)*** [9] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 744 | 1/2 | 42 | 349 | R12AAEM406 | N4 | L4 | 127 | 1,047 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 947 | 5/8 | 49 | 548 | R58AAEM406 | N6 | L6 | 112 | 1,255 | R58AAEM506 | N13 | L13 |
| 5 | 10 | 1,174 | 5/8 | 53 | 940 | R58AAEM506 | N10 | L10 | 66 | 1,185 | R58AAEM506 | N12 | L12 |
| 6 | 10 | 1,693 | 5/8 | 36 | 1,215 | R58AAEM506 | N13 | L13 | 41 | 1,365 | R58AAEM506 | N14 | L14 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 192 | 1/2 | 42 | 175 | R12AAEM306 | N2 | L2 | 127 | 524 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 262 | 5/8 | 49 | 274 | R58AAEM306 | N3 | L3 | 112 | 628 | R58AAEM406 | N7 | L7 |
| 5 | 10 | 418 | 5/8 | 53 | 470 | R58AAEM406 | N5 | L5 | 66 | 593 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 779 | 5/8 | 36 | 608 | R58AAEM406 | N7 | L7 | 41 | 683 | R58AAEM509 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 42 | 247 | R12AAEM306 | N3 | L3 | | | | | |
| 4 | 10 | 262 | 5/8 | 49 | 388 | R58AAEM406 | N4 | L4 | | | | | |
| 5 | 10 | 418 | 5/8 | 53 | 665 | R58AAEM509 | N7 | L7 | | | | | |
| 6 | 10 | 779 | 5/8 | 36 | 859 | R58AAEM506 | N9 | L9 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG EMT CONDUIT*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 801 | 1/2 | 37 | 277 | R12AAEM306 | N3 | L3 | 111 | 832 | R12AAEM506 | N9 | L9 |
| 4 | 10 | 1,161 | 5/8 | 40 | 407 | R58AAEM406 | N5 | L5 | 120 | 1,220 | R58AAEM506 | N13 | L13 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 139 | R12AAEM306 | N2 | L2 | 111 | 416 | R12AAEM406 | N5 | L5 |
| 4 | 10 | 176 | 5/8 | 43 | 219 | R58AAEM306 | N3 | L3 | 126 | 643 | R58AAEM406 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 196 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 176 | 5/8 | 40 | 288 | R58AAEM306 | N3 | L3 | | | | | |

***SINGLE HUNG RIGID METAL CONDUIT (RMC)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 998 | 1/2 | 42 | 470 | R12AAEM406 | N5 | L5 | 85 | 941 | R12AAEM506 | N10 | L10 |
| 4 | 10 | 1,675 | 5/8 | 49 | 739 | R58AAEM509 | N8 | L8 | 112 | 1,690 | R58AAEM606 | N17 | L17 |
| 5 | 10 | 1,874 | 5/8 | 43 | 1,035 | R58AAEM506 | N11 | L11 | 66 | 1,595 | R58AAEM606 | N16 | L16 |
| 6 | 10 | 2,240 | 5/8 | 19 | 853 | R58AAEM506 | N9 | L9 | 38 | 1,706 | R58AAEM606 | N18 | L18 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 192 | 1/2 | 40 | 222 | R12AAEM306 | N3 | L3 | 120 | 665 | R12AAEM509 | N7 | L7 |
| 4 | 10 | 262 | 5/8 | 40 | 302 | R58AAEM409 | N4 | L4 | 112 | 845 | R58AAEM506 | N9 | L9 |
| 5 | 10 | 418 | 5/8 | 40 | 481 | R58AAEM406 | N5 | L5 | 66 | 798 | R58AAEM506 | N8 | L8 |
| 6 | 10 | 779 | 5/8 | 36 | 818 | R58AAEM506 | N9 | L9 | 41 | 918 | R58AAEM506 | N10 | L10 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 40 | 313 | R12AAEM409 | N4 | L4 | | | | | |
| 4 | 10 | 262 | 5/8 | 40 | 428 | R58AAEM406 | N5 | L5 | | | | | |
| 5 | 10 | 418 | 5/8 | 40 | 681 | R58AAEM509 | N7 | L7 | | | | | |
| 6 | 10 | 779 | 5/8 | 36 | 1,156 | R58AAEM506 | N12 | L12 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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2013 CBC OSHPD

## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG EMT CONDUIT*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 1,106 | 1/2 | 37 | 356 | R12AAEM406 | N4 | L4 | 111 | 1,069 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 1,527 | 5/8 | 43 | 563 | R58AAEM406 | N6 | L6 | 111 | 1,455 | R58AAEM506 | N15 | L15 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 178 | R12AAEM306 | N2 | L2 | 111 | 535 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 176 | 5/8 | 43 | 281 | R58AAEM306 | N3 | L3 | 111 | 728 | R58AAEM509 | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 252 | R12AAEM306 | N3 | L3 | | | | | |
| 4 | 10 | 176 | 5/8 | 43 | 398 | R58AAEM406 | N4 | L4 | | | | | |

***SINGLE HUNG RIGID METAL CONDUIT (RMC)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 1,213 | 1/2 | 37 | 527 | R12AAEM406 | N6 | L6 | 74 | 1,054 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 1,693 | 5/8 | 38 | 739 | R58AAEM509 | N8 | L8 | 76 | 1,477 | R58AAEM606 | N15 | L15 |
| 5 | 10 | 1,856 | 5/8 | 24 | 743 | R58AAEM509 | N8 | L8 | 48 | 1,486 | R58AAEM606 | N15 | L15 |
| 6 | 10 | 2,232 | 5/8 | 13 | 750 | R58AAEM509 | N8 | L8 | 26 | 1,500 | R58AAEM606 | N16 | L16 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 192 | 1/2 | 40 | 285 | R12AAEM306 | N3 | L3 | 114 | 815 | R12AAEM506 | N9 | L9 |
| 4 | 10 | 262 | 5/8 | 40 | 389 | R58AAEM406 | N4 | L4 | 99 | 958 | R58AAEM506 | N10 | L10 |
| 5 | 10 | 418 | 5/8 | 40 | 619 | R58AAEM406 | N7 | L7 | 58 | 903 | R58AAEM506 | N10 | L10 |
| 6 | 10 | 779 | 5/8 | 32 | 925 | R58AAEM506 | N10 | L10 | 36 | 1,040 | R58AAEM506 | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 40 | 403 | R12AAEM406 | N5 | L5 | | | | | |
| 4 | 10 | 262 | 5/8 | 40 | 550 | R58AAEM406 | N6 | L6 | | | | | |
| 5 | 10 | 418 | 5/8 | 40 | 875 | R58AAEM506 | N9 | L9 | | | | | |
| 6 | 10 | 779 | 5/8 | 32 | 1,308 | R58AAEM506 | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG EMT CONDUIT*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 571 | 1/2 | 34 | 279 | R12AAEM306 | N3 | L3 | 101 | 837 | R12AAEM506 | N9 | L9 |
| 3 | 10 | 571 | 1/2 | 34 | 279 | R12AAEM306 | N3 | L3 | 101 | 837 | R12AAEM506 | N9 | L9 |
| 4 | 10 | 702 | 5/8 | 39 | 440 | R58AAEM406 | N5 | L5 | 84 | 955 | R58AAEM506 | N10 | L10 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 139 | R12AAEM306 | N2 | L2 | 101 | 418 | R12AAEM406 | N5 | L5 |
| 3 | 10 | 130 | 1/2 | 34 | 139 | R12AAEM306 | N2 | L2 | 101 | 418 | R12AAEM406 | N5 | L5 |
| 4 | 10 | 176 | 5/8 | 39 | 220 | R58AAEM306 | N3 | L3 | 84 | 478 | R58AAEM406 | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS**<br>**4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 197 | R12AAEM306 | N2 | L2 | | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 197 | R12AAEM306 | N2 | L2 | | | | | |
| 4 | 10 | 176 | 5/8 | 39 | 311 | R58AAEM409 | N4 | L4 | | | | | |
| ***SINGLE HUNG RIGID METAL CONDUIT (RMC)*** [9] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*** | | | | |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 777 | 1/2 | 38 | 473 | R12AAEM406 | N5 | L5 | 87 | 1,070 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 992 | 5/8 | 44 | 743 | R58AAEM509 | N8 | L8 | 75 | 1,255 | R58AAEM506 | N13 | L13 |
| 5 | 10 | 1,205 | 5/8 | 39 | 1,035 | R58AAEM506 | N11 | L11 | 44 | 1,185 | R58AAEM506 | N12 | L12 |
| 6 | 10 | 1,693 | 5/8 | 24 | 1,215 | R58AAEM506 | N13 | L13 | 27 | 1,365 | R58AAEM506 | N14 | L14 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 192 | 1/2 | 38 | 237 | R12AAEM306 | N3 | L3 | 87 | 535 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 262 | 5/8 | 44 | 372 | R58AAEM406 | N4 | L4 | 75 | 628 | R58AAEM406 | N7 | L7 |
| 5 | 10 | 418 | 5/8 | 39 | 518 | R58AAEM406 | N6 | L6 | 44 | 593 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 779 | 5/8 | 24 | 608 | R58AAEM406 | N7 | L7 | 27 | 683 | R58AAEM509 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS**<br>**4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 38 | 335 | R12AAEM406 | N4 | L4 | | | | | |
| 4 | 10 | 262 | 5/8 | 44 | 526 | R58AAEM406 | N6 | L6 | | | | | |
| 5 | 10 | 418 | 5/8 | 39 | 732 | R58AAEM509 | N8 | L8 | | | | | |
| 6 | 10 | 779 | 5/8 | 24 | 859 | R58AAEM506 | N9 | L9 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG EMT CONDUIT*** [9] — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 1,040 | 1/2 | 34 | 376 | R12AAEM406 | N4 | L4 | 101 | 1,127 | R12AAEM506 | N12 | L12 |
| 4 | 10 | 1,261 | 5/8 | 39 | 593 | R58AAEM406 | N6 | L6 | 84 | 1,285 | R58AAEM506 | N13 | L13 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 188 | R12AAEM306 | N2 | L2 | 101 | 564 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 176 | 5/8 | 39 | 297 | R58AAEM306 | N3 | L3 | 84 | 643 | R58AAEM406 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 266 | R12AAEM306 | N3 | L3 | | | | | |
| 4 | 10 | 176 | 5/8 | 39 | 420 | R58AAEM406 | N5 | L5 | | | | | |

***SINGLE HUNG RIGID METAL CONDUIT (RMC)*** [9] — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod Total Vertical Load (lbs)** | **Min. Vertical Support Rod Dia. (in.)** | **Max. Brace Spacing (ft.)** | **Brace Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour Deck Page D1** | **Metal Deck Page D2** | **Max. Brace Spacing (ft.)** | **Brace Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour Deck Page D1** | **Metal Deck Page D2** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 1,188 | 1/2 | 35 | 582 | R12AAEM406 | N6 | L6 | 70 | 1,163 | R12AAEM506 | N12 | L12 |
| 4 | 10 | 1,661 | 5/8 | 36 | 816 | R58AAEM506 | N9 | L9 | 72 | 1,633 | R58AAEM606 | N17 | L17 |
| 5 | 10 | 1,879 | 5/8 | 29 | 1,047 | R58AAEM506 | N11 | L11 | 44 | 1,595 | R58AAEM606 | N16 | L16 |
| 6 | 10 | 2,278 | 5/8 | 13 | 875 | R58AAEM506 | N9 | L9 | 26 | 1,750 | R58AAEM606 | N18 | L18 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 192 | 1/2 | 38 | 319 | R12AAEM409 | N4 | L4 | 87 | 720 | R12AAEM509 | N8 | L8 |
| 4 | 10 | 262 | 5/8 | 44 | 501 | R58AAEM406 | N6 | L6 | 75 | 845 | R58AAEM506 | N9 | L9 |
| 5 | 10 | 418 | 5/8 | 48 | 858 | R58AAEM506 | N9 | L9 | 44 | 798 | R58AAEM506 | N8 | L8 |
| 6 | 10 | 779 | 5/8 | 47 | 1,585 | R58AAEM606 | N16 | L16 | 27 | 918 | R58AAEM506 | N10 | L10 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 38 | 451 | R12AAEM406 | N5 | L5 | | | | | |
| 4 | 10 | 262 | 5/8 | 44 | 708 | R58AAEM509 | N8 | L8 | | | | | |
| 5 | 10 | 418 | 5/8 | 37 | 951 | R58AAEM506 | N10 | L10 | | | | | |
| 6 | 10 | 779 | 5/8 | 24 | 1,156 | R58AAEM506 | N12 | L12 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG EMT CONDUIT*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 1,065 | 1/2 | 34 | 483 | R12AAEM406 | N5 | L5 | 67 | 966 | R12AAEM506 | N10 | L10 |
| 4 | 10 | 1,592 | 5/8 | 38 | 745 | R58AAEM509 | N8 | L8 | 74 | 1,455 | R58AAEM506 | N15 | L15 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 242 | R12AAEM306 | N3 | L3 | 96 | 693 | R12AAEM509 | N7 | L7 |
| 4 | 10 | 176 | 5/8 | 39 | 381 | R58AAEM406 | N4 | L4 | 74 | 728 | R58AAEM509 | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 342 | R12AAEM406 | N4 | L4 | | | | | |
| 4 | 10 | 176 | 5/8 | 39 | 539 | R58AAEM406 | N6 | L6 | | | | | |

***SINGLE HUNG RIGID METAL CONDUIT (RMC)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 1,185 | 1/2 | 24 | 513 | R12AAEM406 | N6 | L6 | 48 | 1,025 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 1,674 | 5/8 | 25 | 729 | R58AAEM509 | N8 | L8 | 50 | 1,458 | R58AAEM506 | N15 | L15 |
| 5 | 10 | 1,856 | 5/8 | 16 | 743 | R58AAEM509 | N8 | L8 | 32 | 1,486 | R58AAEM606 | N15 | L15 |
| 6 | 10 | 2,287 | 5/8 | 9 | 779 | R58AAEM509 | N8 | L8 | 18 | 1,558 | R58AAEM606 | N16 | L16 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 192 | 1/2 | 38 | 410 | R12AAEM406 | N5 | L5 | 76 | 815 | R12AAEM506 | N9 | L9 |
| 4 | 10 | 262 | 5/8 | 44 | 644 | R58AAEM406 | N7 | L7 | 66 | 958 | R58AAEM506 | N10 | L10 |
| 5 | 10 | 418 | 5/8 | 34 | 790 | R58AAEM509 | N8 | L8 | 39 | 903 | R58AAEM506 | N10 | L10 |
| 6 | 10 | 779 | 5/8 | 21 | 925 | R58AAEM506 | N10 | L10 | 24 | 1,040 | R58AAEM506 | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 38 | 579 | R12AAEM406 | N6 | L6 | | | | | |
| 4 | 10 | 262 | 5/8 | 44 | 910 | R58AAEM506 | N10 | L10 | | | | | |
| 5 | 10 | 418 | 5/8 | 34 | 1,117 | R58AAEM506 | N12 | L12 | | | | | |
| 6 | 10 | 779 | 5/8 | 21 | 1,308 | R58AAEM506 | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG EMT CONDUIT*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 616 | 1/2 | 31 | 346 | R12AAEM406 | N4 | L4 | 82 | 910 | R12AAEM506 | N10 | L10 |
| 4 | 10 | 727 | 5/8 | 36 | 546 | R58AAEM406 | N6 | L6 | 63 | 955 | R58AAEM506 | N10 | L10 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 130 | 1/2 | 31 | 173 | R12AAEM306 | N2 | L2 | 82 | 455 | R12AAEM406 | N5 | L5 |
| 4 | 10 | 176 | 5/8 | 36 | 273 | R58AAEM306 | N3 | L3 | 63 | 478 | R58AAEM406 | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 31 | 245 | R12AAEM306 | N3 | L3 | | | | | |
| 4 | 10 | 176 | 5/8 | 36 | 386 | R58AAEM406 | N4 | L4 | | | | | |

***SINGLE HUNG RIGID METAL CONDUIT (RMC)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 802 | 1/2 | 36 | 587 | R12AAEM406 | N6 | L6 | 65 | 1,070 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 1,023 | 5/8 | 38 | 860 | R58AAEM506 | N9 | L9 | 56 | 1,255 | R58AAEM506 | N13 | L13 |
| 5 | 10 | 1,205 | 5/8 | 29 | 1,035 | R58AAEM506 | N11 | L11 | 33 | 1,185 | R58AAEM506 | N12 | L12 |
| 6 | 10 | 1,693 | 5/8 | 18 | 1,215 | R58AAEM506 | N13 | L13 | 20 | 1,365 | R58AAEM506 | N14 | L14 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 192 | 1/2 | 36 | 294 | R12AAEM306 | N3 | L3 | 65 | 535 | R12AAEM406 | N6 | L6 |
| 4 | 10 | 262 | 5/8 | 38 | 430 | R58AAEM406 | N5 | L5 | 56 | 628 | R58AAEM406 | N7 | L7 |
| 5 | 10 | 418 | 5/8 | 29 | 518 | R58AAEM406 | N6 | L6 | 33 | 593 | R58AAEM406 | N6 | L6 |
| 6 | 10 | 779 | 5/8 | 18 | 608 | R58AAEM406 | N7 | L7 | 20 | 683 | R58AAEM509 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 36 | 415 | R12AAEM406 | N5 | L5 | | | | | |
| 4 | 10 | 262 | 5/8 | 38 | 608 | R58AAEM406 | N7 | L7 | | | | | |
| 5 | 10 | 418 | 5/8 | 29 | 732 | R58AAEM509 | N8 | L8 | | | | | |
| 6 | 10 | 779 | 5/8 | 18 | 859 | R58AAEM506 | N9 | L9 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***SINGLE HUNG EMT CONDUIT*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** Form Pour [4] Deck Page D1 | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** Form Pour [4] Deck Page D1 | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 1,134 | 1/2 | 31 | 466 | R12AAEM406 | N5 | L5 | 82 | 1,225 | R12AAEM506 | N13 | L13 |
| 4 | 10 | 1,311 | 5/8 | 36 | 736 | R58AAEM509 | N8 | L8 | 63 | 1,285 | R58AAEM506 | N13 | L13 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 130 | 1/2 | 31 | 233 | R12AAEM306 | N3 | L3 | 82 | 613 | R12AAEM406 | N7 | L7 |
| 4 | 10 | 176 | 5/8 | 36 | 368 | R58AAEM406 | N4 | L4 | 63 | 643 | R58AAEM406 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 31 | 330 | R12AAEM409 | N4 | L4 | | | | | |
| 4 | 10 | 176 | 5/8 | 36 | 521 | R58AAEM406 | N6 | L6 | | | | | |
| ***SINGLE HUNG RIGID METAL CONDUIT (RMC)*** [9] | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*** | | | | | | | | |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 1,179 | 1/2 | 26 | 576 | R12AAEM406 | N6 | L6 | 52 | 1,152 | R12AAEM506 | N12 | L12 |
| 4 | 10 | 1,661 | 5/8 | 27 | 816 | R58AAEM506 | N9 | L9 | 54 | 1,633 | R58AAEM606 | N17 | L17 |
| 5 | 10 | 1,865 | 5/8 | 21 | 1,011 | R58AAEM506 | N11 | L11 | 33 | 1,595 | R58AAEM606 | N16 | L16 |
| 6 | 10 | 2,163 | 5/8 | 9 | 808 | R58AAEM506 | N9 | L9 | 18 | 1,616 | R58AAEM606 | N17 | L17 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 192 | 1/2 | 36 | 395 | R12AAEM406 | N4 | L4 | 65 | 720 | R12AAEM509 | N8 | L8 |
| 4 | 10 | 262 | 5/8 | 38 | 578 | R58AAEM406 | N6 | L6 | 56 | 845 | R58AAEM506 | N9 | L9 |
| 5 | 10 | 418 | 5/8 | 28 | 673 | R58AAEM509 | N7 | L7 | 33 | 798 | R58AAEM506 | N8 | L8 |
| 6 | 10 | 779 | 5/8 | 18 | 818 | R58AAEM506 | N9 | L9 | 20 | 918 | R58AAEM506 | N10 | L10 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 36 | 559 | R12AAEM406 | N6 | L6 | | | | | |
| 4 | 10 | 262 | 5/8 | 38 | 817 | R58AAEM506 | N9 | L9 | | | | | |
| 5 | 10 | 418 | 5/8 | 28 | 951 | R58AAEM506 | N10 | L10 | | | | | |
| 6 | 10 | 779 | 5/8 | 18 | 1,156 | R58AAEM506 | N12 | L12 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

### *SINGLE HUNG EMT CONDUIT* [9] *MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 1,133 | 1/2 | 27 | 518 | R12AAEM406 | N6 | L6 | 54 | 1,037 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 1,587 | 5/8 | 28 | 732 | R58AAEM509 | N8 | L8 | 56 | 1,455 | R58AAEM506 | N15 | L15 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 130 | 1/2 | 31 | 300 | R12AAEM306 | N3 | L3 | 72 | 693 | R12AAEM509 | N7 | L7 |
| 4 | 10 | 176 | 5/8 | 36 | 473 | R58AAEM406 | N5 | L5 | 56 | 728 | R58AAEM509 | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 130 | 1/2 | 31 | 424 | R12AAEM406 | N5 | L5 | | | | | |
| 4 | 10 | 176 | 5/8 | 36 | 669 | R58AAEM509 | N7 | L7 | | | | | |

### *SINGLE HUNG RIGID METAL CONDUIT (RMC)* [9] *MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*

| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod Total Vertical Load (lbs)** | **Min. Vertical Support Rod Dia. (in.)** | **Max. Brace Spacing (ft.)** | **Brace Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour Deck Page D1** | **Metal Deck Page D2** | **Max. Brace Spacing (ft.)** | **Brace Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour Deck Page D1** | **Metal Deck Page D2** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B19.0)** | | | | | **2-Way Trans., Longit. Brace Pattern (B19.4)** | | | | |
| 3 | 10 | 1,185 | 1/2 | 18 | 513 | R12AAEM406 | N6 | L6 | 36 | 1,025 | R12AAEM506 | N11 | L11 |
| 4 | 10 | 1,693 | 5/8 | 19 | 739 | R58AAEM509 | N8 | L8 | 38 | 1,477 | R58AAEM606 | N15 | L15 |
| 5 | 10 | 1,856 | 5/8 | 12 | 743 | R58AAEM509 | N8 | L8 | 24 | 1,486 | R58AAEM606 | N15 | L15 |
| 6 | 10 | 2,120 | 5/8 | 6 | 692 | R58AAEM509 | N7 | L7 | 12 | 1,385 | R58AAEM506 | N14 | L14 |
| | | | | **2-Way Transverse Brace Pattern (B19.2)** | | | | | **4-Way Transverse, Longit. Brace Pattern (B19.6)** | | | | |
| 3 | 10 | 192 | 1/2 | 35 | 495 | R12AAEM406 | N5 | L5 | 57 | 815 | R12AAEM506 | N9 | L9 |
| 4 | 10 | 262 | 5/8 | 34 | 655 | R58AAEM406 | N7 | L7 | 49 | 958 | R58AAEM506 | N10 | L10 |
| 5 | 10 | 418 | 5/8 | 26 | 790 | R58AAEM509 | N8 | L8 | 29 | 903 | R58AAEM506 | N10 | L10 |
| 6 | 10 | 779 | 5/8 | 16 | 925 | R58AAEM506 | N10 | L10 | 18 | 1,040 | R58AAEM506 | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **4-Way Splayed Brace Pattern (B19.8)** | | | | | | | | | |
| 3 | 10 | 192 | 1/2 | 35 | 700 | R12AAEM509 | N8 | L8 | | | | | |
| 4 | 10 | 262 | 5/8 | 34 | 926 | R58AAEM506 | N10 | L10 | | | | | |
| 5 | 10 | 418 | 5/8 | 26 | 1,117 | R58AAEM506 | N12 | L12 | | | | | |
| 6 | 10 | 779 | 5/8 | 16 | 1,308 | R58AAEM506 | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG EMT CONDUIT [9]*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 122 | C12AA04WS | N2 | L2 | 132 | 367 | C12AA04WS | N4 | L4 |
| 4 | 10 | 176 | 5/8 | 51 | 193 | C58AA04WS | N2 | L2 | 154 | 580 | C58AA04WS | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 122 | C12AA04WS | N2 | L2 | 44 | 122 | C12AA04WS | N2 | L2 |
| 4 | 10 | 176 | 5/8 | 51 | 193 | C58AA04WS | N2 | L2 | 51 | 193 | C58AA04WS | N2 | L2 |
| ***SINGLE HUNG RIGID METAL CONDUIT (RMC) [9]*** | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's*** | | | | | | | | |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 208 | C12AA04WS | N3 | L3 | 151 | 623 | C12AA04WS | N7 | L7 |
| 4 | 10 | 262 | 5/8 | 58 | 326 | C58AA04WS | N4 | L4 | 174 | 978 | C58AA06WS | N10 | L10 |
| 5 | 10 | 418 | 5/8 | 63 | 559 | C58AA04WS | N6 | L6 | 133 | 1,185 | C58AA06WS | N12 | L12 |
| 6 | 10 | 779 | 5/8 | 62 | 1,032 | C58AA06WS | N11 | L11 | 82 | 1,365 | C58AA06WS | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 208 | C12AA04WS | N3 | L3 | 50 | 208 | C12AA04WS | N3 | L3 |
| 4 | 10 | 262 | 5/8 | 58 | 326 | C58AA04WS | N4 | L4 | 58 | 326 | C58AA04WS | N4 | L4 |
| 5 | 10 | 418 | 5/8 | 63 | 559 | C58AA04WS | N6 | L6 | 63 | 559 | C58AA04WS | N6 | L6 |
| 6 | 10 | 779 | 5/8 | 62 | 1,032 | C58AA06WS | N11 | L11 | 62 | 1,032 | C58AA06WS | N11 | L11 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## CABLE BRACING REQUIREMENTS [7] :

***SINGLE HUNG EMT CONDUIT*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B19.20) | | | | | 4-Way T/L Details (B19.22) | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 165 | C12AA04WS | N2 | L2 | 132 | 494 | C12AA04WS | N5 | L5 |
| 4 | 10 | 176 | 5/8 | 51 | 260 | C58AA04WS | N3 | L3 | 154 | 781 | C58AA06WS | N8 | L8 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY) | | | | | | | | | |
| | | | | 4-Way T/L Details (B19.22) | | | | | 4-Way Splay Details (B19.23) | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 165 | C12AA04WS | N2 | L2 | 44 | 165 | C12AA04WS | N2 | L2 |
| 4 | 10 | 176 | 5/8 | 51 | 260 | C58AA04WS | N3 | L3 | 51 | 260 | C58AA04WS | N3 | L3 |

***SINGLE HUNG RIGID METAL CONDUIT (RMC)*** [9] ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2-Way Transverse Brace Pattern (B19.20) | | | | | 4-Way T/L Details (B19.22) | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 280 | C12AA04WS | N3 | L3 | 151 | 839 | C12AA06WS | N9 | L9 |
| 4 | 10 | 262 | 5/8 | 58 | 439 | C58AA04WS | N5 | L5 | 174 | 1,318 | C58AA06WS | N14 | L14 |
| 5 | 10 | 418 | 5/8 | 56 | 674 | C58AA06WS | N7 | L7 | 112 | 1,348 | C58AA06WS | N14 | L14 |
| 6 | 10 | 779 | 5/8 | 31 | 696 | C58AA06WS | N7 | L7 | 62 | 1,391 | C58AA06WS | N14 | L14 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY) | | | | | | | | | |
| | | | | 4-Way T/L Details (B19.22) | | | | | 4-Way Splay Details (B19.23) | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 280 | C12AA04WS | N3 | L3 | 50 | 280 | C12AA04WS | N3 | L3 |
| 4 | 10 | 262 | 5/8 | 58 | 439 | C58AA04WS | N5 | L5 | 58 | 589 | C58AA04WS | N6 | L6 |
| 5 | 10 | 418 | 5/8 | 63 | 753 | C58AA06WS | N8 | L8 | 63 | 1,010 | C58AA06WS | N11 | L11 |
| 6 | 10 | 779 | 5/8 | 60 | 1,346 | C58AA06WS | N14 | L14 | 60 | 1,807 | C58DG06TS | N19 | L19 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## CABLE BRACING REQUIREMENTS [7:]

**SINGLE HUNG EMT CONDUIT [9]**　　**MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B19.20) | | | | | 4-Way T/L Details (B19.22) | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 212 | C12AA04WS | N3 | L3 | 132 | 636 | C12AA04WS | N7 | L7 |
| 4 | 10 | 176 | 5/8 | 51 | 335 | C58AA04WS | N4 | L4 | 154 | 1,004 | C58AA06WS | N11 | L11 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY) | | | | | | | | | |
| | | | | 4-Way T/L Details (B19.22) | | | | | 4-Way Splay Details (B19.23) | | | | |
| 3 | 10 | 130 | 1/2 | 44 | 212 | C12AA04WS | N3 | L3 | 44 | 212 | C12AA04WS | N3 | L3 |
| 4 | 10 | 176 | 5/8 | 51 | 335 | C58AA04WS | N4 | L4 | 51 | 335 | C58AA04WS | N4 | L4 |
| **SINGLE HUNG RIGID METAL CONDUIT (RMC) [9]** | | | | | | | | | **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's** | | | | |
| | | | | 2-Way Transverse Brace Pattern (B19.20) | | | | | 4-Way T/L Details (B19.22) | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 359 | C12AA04WS | N4 | L4 | 101 | 719 | C12AA06WS | N8 | L8 |
| 4 | 10 | 262 | 5/8 | 58 | 565 | C58AA04WS | N6 | L6 | 116 | 1,129 | C58AA06WS | N12 | L12 |
| 5 | 10 | 418 | 5/8 | 38 | 588 | C58AA04WS | N6 | L6 | 76 | 1,176 | C58AA06WS | N12 | L12 |
| 6 | 10 | 779 | 5/8 | 21 | 606 | C58AA04WS | N7 | L7 | 42 | 1,212 | C58AA06WS | N13 | L13 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY) | | | | | | | | | |
| | | | | 4-Way T/L Details (B19.22) | | | | | 4-Way Splay Details (B19.23) | | | | |
| 3 | 10 | 192 | 1/2 | 50 | 359 | C12AA04WS | N4 | L4 | 50 | 359 | C12AA04WS | N4 | L4 |
| 4 | 10 | 262 | 5/8 | 58 | 565 | C58AA04WS | N6 | L6 | 58 | 565 | C58AA04WS | N6 | L6 |
| 5 | 10 | 418 | 5/8 | 63 | 968 | C58AA06WS | N10 | L10 | 63 | 968 | C58AA06WS | N10 | L10 |
| 6 | 10 | 779 | 5/8 | 43 | 1,241 | C58AA06WS | N13 | L13 | 43 | 1,241 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## CABLE BRACING REQUIREMENTS [7] :

**SINGLE HUNG EMT CONDUIT [9]** — *MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 206 | C12AA04WS | N3 | L3 | 111 | 617 | C12AA04WS | N7 | L7 |
| 4 | 10 | 176 | 5/8 | 43 | 325 | C58AA04WS | N4 | L4 | 127 | 955 | C58AA06WS | N10 | L10 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 206 | C12AA04WS | N3 | L3 | 37 | 206 | C12AA04WS | N3 | L3 |
| 4 | 10 | 176 | 5/8 | 43 | 325 | C58AA04WS | N4 | L4 | 43 | 325 | C58AA04WS | N4 | L4 |
| **SINGLE HUNG RIGID METAL CONDUIT (RMC) [9]** | | | | | | | | | *MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's* | | | | |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 192 | 1/2 | 42 | 349 | C12AA04WS | N4 | L4 | 127 | 1,047 | C12AA06WS | N11 | L11 |
| 4 | 10 | 262 | 5/8 | 49 | 548 | C58AA04WS | N6 | L6 | 112 | 1,255 | C58AA06WS | N13 | L13 |
| 5 | 10 | 418 | 5/8 | 53 | 940 | C58AA06WS | N10 | L10 | 66 | 1,185 | C58AA06WS | N12 | L12 |
| 6 | 10 | 779 | 5/8 | 36 | 1,215 | C58AA06WS | N13 | L13 | 41 | 1,365 | C58AA06WS | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 192 | 1/2 | 42 | 349 | C12AA04WS | N4 | L4 | 42 | 349 | C12AA04WS | N4 | L4 |
| 4 | 10 | 262 | 5/8 | 49 | 548 | C58AA04WS | N6 | L6 | 49 | 548 | C58AA04WS | N6 | L6 |
| 5 | 10 | 418 | 5/8 | 53 | 940 | C58AA06WS | N10 | L10 | 53 | 940 | C58AA06WS | N10 | L10 |
| 6 | 10 | 779 | 5/8 | 36 | 1,215 | C58AA06WS | N13 | L13 | 36 | 1,215 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG EMT CONDUIT [9]*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 277 | C12AA04WS | N3 | L3 | 111 | 832 | C12AA06WS | N9 | L9 |
| 4 | 10 | 176 | 5/8 | 43 | 438 | C58AA04WS | N5 | L5 | 126 | 1,285 | C58AA06WS | N13 | L13 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 277 | C12AA04WS | N3 | L3 | 37 | 277 | C12AA04WS | N3 | L3 |
| 4 | 10 | 176 | 5/8 | 43 | 438 | C58AA04WS | N5 | L5 | 43 | 438 | C58AA04WS | N5 | L5 |
| ***SINGLE HUNG RIGID METAL CONDUIT (RMC) [9]*** | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*** | | | | | | | | |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 192 | 1/2 | 42 | 470 | C12AA04WS | N5 | L5 | 85 | 941 | C12AA06WS | N10 | L10 |
| 4 | 10 | 262 | 5/8 | 43 | 650 | C58AA04WS | N7 | L7 | 86 | 1,300 | C58AA06WS | N14 | L14 |
| 5 | 10 | 418 | 5/8 | 28 | 674 | C58AA06WS | N7 | L7 | 56 | 1,348 | C58AA06WS | N14 | L14 |
| 6 | 10 | 779 | 5/8 | 15 | 673 | C58AA06WS | N7 | L7 | 30 | 1,346 | C58AA06WS | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 192 | 1/2 | 42 | 470 | C12AA04WS | N5 | L5 | 42 | 470 | C12AA04WS | N5 | L5 |
| 4 | 10 | 262 | 5/8 | 49 | 739 | C58AA06WS | N8 | L8 | 49 | 739 | C58AA06WS | N8 | L8 |
| 5 | 10 | 418 | 5/8 | 53 | 1,266 | C58AA06WS | N13 | L13 | 53 | 1,266 | C58AA06WS | N13 | L13 |
| 6 | 10 | 779 | 5/8 | 31 | 1,391 | C58AA06WS | N14 | L14 | 31 | 1,391 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## CABLE BRACING REQUIREMENTS [7:]

*SINGLE HUNG EMT CONDUIT* [9] — *MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's*

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 356 | C12AA04WS | N4 | L4 | 74 | 713 | C12AA06WS | N8 | L8 |
| 4 | 10 | 176 | 5/8 | 43 | 563 | C58AA04WS | N6 | L6 | 86 | 1,126 | C58AA06WS | N12 | L12 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 130 | 1/2 | 37 | 356 | C12AA04WS | N4 | L4 | 37 | 356 | C12AA04WS | N4 | L4 |
| 4 | 10 | 176 | 5/8 | 43 | 563 | C58AA04WS | N6 | L6 | 43 | 563 | C58AA04WS | N6 | L6 |
| *SINGLE HUNG RIGID METAL CONDUIT (RMC)* [9] | | | | | | | | | *MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's* | | | | |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 192 | 1/2 | 29 | 413 | C12AA04WS | N5 | L5 | 58 | 826 | C12AA06WS | N9 | L9 |
| 4 | 10 | 262 | 5/8 | 30 | 583 | C58AA04WS | N6 | L6 | 60 | 1,166 | C58AA06WS | N12 | L12 |
| 5 | 10 | 418 | 5/8 | 18 | 557 | C58AA04WS | N6 | L6 | 36 | 1,114 | C58AA06WS | N12 | L12 |
| 6 | 10 | 779 | 5/8 | 10 | 577 | C58AA04WS | N6 | L6 | 20 | 1,154 | C58AA06WS | N12 | L12 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 192 | 1/2 | 42 | 605 | C12AA04WS | N7 | L7 | 42 | 605 | C12AA04WS | N7 | L7 |
| 4 | 10 | 262 | 5/8 | 49 | 950 | C58AA06WS | N10 | L10 | 49 | 950 | C58AA06WS | N10 | L10 |
| 5 | 10 | 418 | 5/8 | 38 | 1,176 | C58AA06WS | N12 | L12 | 38 | 1,176 | C58AA06WS | N12 | L12 |
| 6 | 10 | 779 | 5/8 | 21 | 1,212 | C58AA06WS | N13 | L13 | 21 | 1,212 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG EMT CONDUIT [9]*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 279 | C12AA04WS | N3 | L3 | 101 | 837 | C12AA06WS | N9 | L9 |
| 4 | 10 | 176 | 5/8 | 39 | 440 | C58AA04WS | N5 | L5 | 84 | 955 | C58AA06WS | N10 | L10 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 279 | C12AA04WS | N3 | L3 | 34 | 279 | C12AA04WS | N3 | L3 |
| 4 | 10 | 176 | 5/8 | 39 | 440 | C58AA04WS | N5 | L5 | 39 | 591 | C58AA04WS | N6 | L6 |
| ***SINGLE HUNG RIGID METAL CONDUIT (RMC) [9]*** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 192 | 1/2 | 38 | 473 | C12AA04WS | N5 | L5 | 87 | 1,070 | C12AA06WS | N11 | L11 |
| 4 | 10 | 262 | 5/8 | 44 | 743 | C58AA06WS | N8 | L8 | 75 | 1,255 | C58AA06WS | N13 | L13 |
| 5 | 10 | 418 | 5/8 | 39 | 1,035 | C58AA06WS | N11 | L11 | 44 | 1,185 | C58AA06WS | N12 | L12 |
| 6 | 10 | 779 | 5/8 | 24 | 1,215 | C58AA06WS | N13 | L13 | 27 | 1,365 | C58AA06WS | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 192 | 1/2 | 38 | 473 | C12AA04WS | N5 | L5 | 38 | 473 | C12AA04WS | N5 | L5 |
| 4 | 10 | 262 | 5/8 | 44 | 743 | C58AA06WS | N8 | L8 | 44 | 743 | C58AA06WS | N8 | L8 |
| 5 | 10 | 418 | 5/8 | 39 | 1,035 | C58AA06WS | N11 | L11 | 39 | 1,035 | C58AA06WS | N11 | L11 |
| 6 | 10 | 779 | 5/8 | 24 | 1,215 | C58AA06WS | N13 | L13 | 24 | 1,215 | C58AA06WS | N13 | L13 |

1. $\text{TVL} = \text{DL} + \text{Fv} + (0.2\text{S}_{DS}/1.4 \times \text{Wp})$. All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS* [7] *:*

***SINGLE HUNG EMT CONDUIT*** [9] — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 376 | C12AA04WS | N4 | L4 | 67 | 751 | C12AA06WS | N8 | L8 |
| 4 | 10 | 176 | 5/8 | 39 | 593 | C58AA04WS | N6 | L6 | 84 | 1,285 | C58AA06WS | N13 | L13 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 376 | C12AA04WS | N4 | L4 | 34 | 376 | C12AA04WS | N4 | L4 |
| 4 | 10 | 176 | 5/8 | 39 | 593 | C58AA04WS | N6 | L6 | 39 | 593 | C58AA04WS | N6 | L6 |
| ***SINGLE HUNG RIGID METAL CONDUIT (RMC)*** [9] | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 192 | 1/2 | 28 | 465 | C12AA04WS | N5 | L5 | 56 | 930 | C12AA06WS | N10 | L10 |
| 4 | 10 | 262 | 5/8 | 28 | 635 | C58AA04WS | N7 | L7 | 56 | 1,270 | C58AA06WS | N13 | L13 |
| 5 | 10 | 418 | 5/8 | 18 | 650 | C58AA04WS | N7 | L7 | 36 | 1,300 | C58AA06WS | N14 | L14 |
| 6 | 10 | 779 | 5/8 | 10 | 673 | C58AA06WS | N7 | L7 | 20 | 1,346 | C58AA06WS | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 192 | 1/2 | 38 | 637 | C12AA04WS | N7 | L7 | 38 | 637 | C12AA04WS | N7 | L7 |
| 4 | 10 | 262 | 5/8 | 44 | 1,001 | C58AA06WS | N11 | L11 | 44 | 1,001 | C58AA06WS | N11 | L11 |
| 5 | 10 | 418 | 5/8 | 37 | 1,345 | C58AA06WS | N14 | L14 | 37 | 1,345 | C58AA06WS | N14 | L14 |
| 6 | 10 | 779 | 5/8 | 20 | 1,346 | C58AA06WS | N14 | L14 | 20 | 1,346 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## CABLE BRACING REQUIREMENTS [7:]

**SINGLE HUNG EMT CONDUIT [9]** — *MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's*

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 130 | 1/2 | 28 | 403 | C12AA04WS | N5 | L5 | 56 | 806 | C12AA06WS | N9 | L9 |
| 4 | 10 | 176 | 5/8 | 28 | 549 | C58AA04WS | N6 | L6 | 56 | 1,098 | C58AA06WS | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 130 | 1/2 | 34 | 483 | C12AA04WS | N5 | L5 | 34 | 483 | C12AA04WS | N5 | L5 |
| 4 | 10 | 176 | 5/8 | 39 | 763 | C58AA06WS | N8 | L8 | 39 | 763 | C58AA06WS | N8 | L8 |
| **SINGLE HUNG RIGID METAL CONDUIT (RMC) [9]** | | | | | | | | | *MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's* | | | | |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 192 | 1/2 | 18 | 384 | C12AA04WS | N4 | L4 | 36 | 769 | C12AA06WS | N8 | L8 |
| 4 | 10 | 262 | 5/8 | 18 | 525 | C58AA04WS | N6 | L6 | 36 | 1,050 | C58AA06WS | N11 | L11 |
| 5 | 10 | 418 | 5/8 | 12 | 557 | C58AA04WS | N6 | L6 | 24 | 1,114 | C58AA06WS | N12 | L12 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 192 | 1/2 | 38 | 819 | C12AA06WS | N9 | L9 | 38 | 819 | C12AA06WS | N9 | L9 |
| 4 | 10 | 262 | 5/8 | 36 | 1,050 | C58AA06WS | N11 | L11 | 36 | 1,050 | C58AA06WS | N11 | L11 |
| 5 | 10 | 418 | 5/8 | 22 | 1,021 | C58AA06WS | N11 | L11 | 22 | 1,021 | C58AA06WS | N11 | L11 |
| 6 | 10 | 779 | 5/8 | 12 | 1,039 | C58AA06WS | N11 | L11 | 12 | 1,039 | C58AA06WS | N11 | L11 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

*SINGLE HUNG EMT CONDUIT [9]* — *MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Pipe Diameter (in.) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 130 | 1/2 | 31 | 346 | C12AA04WS | N4 | L4 | 82 | 910 | C12AA06WS | N10 | L10 |
| 4 | 10 | 176 | 5/8 | 36 | 546 | C58AA04WS | N6 | L6 | 63 | 955 | C58AA06WS | N10 | L10 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 130 | 1/2 | 31 | 346 | C12AA04WS | N4 | L4 | 31 | 346 | C12AA04WS | N4 | L4 |
| 4 | 10 | 176 | 5/8 | 36 | 546 | C58AA04WS | N6 | L6 | 36 | 546 | C58AA04WS | N6 | L6 |
| *SINGLE HUNG RIGID METAL CONDUIT (RMC) [9]* | | | | | | | | | *MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's* | | | | |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 192 | 1/2 | 36 | 587 | C12AA04WS | N6 | L6 | 65 | 1,070 | C12AA06WS | N11 | L11 |
| 4 | 10 | 262 | 5/8 | 38 | 860 | C58AA06WS | N9 | L9 | 56 | 1,255 | C58AA06WS | N13 | L13 |
| 5 | 10 | 418 | 5/8 | 29 | 1,035 | C58AA06WS | N11 | L11 | 33 | 1,185 | C58AA06WS | N12 | L12 |
| 6 | 10 | 779 | 5/8 | 18 | 1,215 | C58AA06WS | N13 | L13 | 20 | 1,365 | C58AA06WS | N14 | L14 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 192 | 1/2 | 36 | 587 | C12AA04WS | N6 | L6 | 36 | 587 | C12AA04WS | N6 | L6 |
| 4 | 10 | 262 | 5/8 | 38 | 860 | C58AA06WS | N9 | L9 | 38 | 860 | C58AA06WS | N9 | L9 |
| 5 | 10 | 418 | 5/8 | 29 | 1,035 | C58AA06WS | N11 | L11 | 29 | 1,035 | C58AA06WS | N11 | L11 |
| 6 | 10 | 779 | 5/8 | 16 | 1,066 | C58AA06WS | N11 | L11 | 16 | 1,066 | C58AA06WS | N11 | L11 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *CABLE BRACING REQUIREMENTS [7] :*

***SINGLE HUNG EMT CONDUIT [9]*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 130 | 1/2 | 30 | 448 | C12AA04WS | N5 | L5 | 60 | 896 | C12AA06WS | N9 | L9 |
| 4 | 10 | 176 | 5/8 | 36 | 736 | C58AA06WS | N8 | L8 | 63 | 1,285 | C58AA06WS | N13 | L13 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 130 | 1/2 | 31 | 466 | C12AA04WS | N5 | L5 | 31 | 466 | C12AA04WS | N5 | L5 |
| 4 | 10 | 176 | 5/8 | 36 | 736 | C58AA06WS | N8 | L8 | 36 | 736 | C58AA06WS | N8 | L8 |
| ***SINGLE HUNG RIGID METAL CONDUIT (RMC) [9]*** | | | | | | | | | ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*** | | | | |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 192 | 1/2 | 20 | 443 | C12AA04WS | N5 | L5 | 40 | 886 | C12AA06WS | N9 | L9 |
| 4 | 10 | 262 | 5/8 | 20 | 605 | C58AA04WS | N7 | L7 | 40 | 1,210 | C58AA06WS | N13 | L13 |
| 5 | 10 | 418 | 5/8 | 14 | 674 | C58AA06WS | N7 | L7 | 28 | 1,348 | C58AA06WS | N14 | L14 |
| 6 | 10 | 779 | 5/8 | 10 | 898 | C58AA06WS | N9 | L9 | 20 | 1,795 | C58DG06TS | N18 | L18 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 192 | 1/2 | 36 | 791 | C12AA06WS | N8 | L8 | 36 | 791 | C12AA06WS | N8 | L8 |
| 4 | 10 | 262 | 5/8 | 38 | 1,155 | C58AA06WS | N12 | L12 | 38 | 1,155 | C58AA06WS | N12 | L12 |
| 5 | 10 | 418 | 5/8 | 28 | 1,345 | C58AA06WS | N14 | L14 | 28 | 1,345 | C58AA06WS | N14 | L14 |
| 6 | 10 | 779 | 5/8 | 15 | 1,346 | C58AA06WS | N14 | L14 | 15 | 1,346 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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***C32-1-45***

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## *CABLE BRACING REQUIREMENTS* [7:]

*SINGLE HUNG EMT CONDUIT* [9] — *MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's*

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| **Maximum Pipe Diameter (in.)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 130 | 1/2 | 20 | 384 | C12AA04WS | N4 | L4 | 40 | 768 | C12AA06WS | N8 | L8 |
| 4 | 10 | 176 | 5/8 | 22 | 575 | C58AA04WS | N6 | L6 | 44 | 1,150 | C58AA06WS | N12 | L12 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 130 | 1/2 | 31 | 599 | C12AA04WS | N6 | L6 | 31 | 599 | C12AA04WS | N6 | L6 |
| 4 | 10 | 176 | 5/8 | 36 | 947 | C58AA06WS | N10 | L10 | 36 | 947 | C58AA06WS | N10 | L10 |
| *SINGLE HUNG RIGID METAL CONDUIT (RMC)* [9] | | | | | | | | | *MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's* | | | | |
| | | | | **2-Way Transverse Brace Pattern (B19.20)** | | | | | **4-Way T/L Details (B19.22)** | | | | |
| 3 | 10 | 192 | 1/2 | 14 | 399 | C12AA04WS | N4 | L4 | 28 | 797 | C12AA06WS | N8 | L8 |
| 4 | 10 | 262 | 5/8 | 14 | 544 | C58AA04WS | N6 | L6 | 28 | 1,089 | C58AA06WS | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS (SELECT EITHER T/L OR SPLAY)** | | | | | | | | | |
| | | | | **4-Way T/L Details (B19.22)** | | | | | **4-Way Splay Details (B19.23)** | | | | |
| 3 | 10 | 192 | 1/2 | 29 | 826 | C12AA06WS | N9 | L9 | 29 | 826 | C12AA06WS | N9 | L9 |
| 4 | 10 | 262 | 5/8 | 30 | 1,166 | C58AA06WS | N12 | L12 | 30 | 1,166 | C58AA06WS | N12 | L12 |
| 5 | 10 | 418 | 5/8 | 18 | 1,114 | C58AA06WS | N12 | L12 | 18 | 1,114 | C58AA06WS | N12 | L12 |
| 6 | 10 | 779 | 5/8 | 10 | 1,154 | C58AA06WS | N12 | L12 | 10 | 1,154 | C58AA06WS | N12 | L12 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page7.1
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Based on Conductor Filled Conduit Weight. Refer to X-Series Weight Charts.

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 201 | 3/8 | 40 | 127 | R38AAEM306 | N2 | L2 | 80 | 165 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 456 | 1/2 | 40 | 289 | R12AAEM306 | N3 | L3 | 80 | 375 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 639 | 1/2 | 40 | 404 | R12AAEM406 | N5 | L5 | 80 | 525 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 912 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 751 | R12AAEM509 | N8 | L8 |
| 65.0 | 10 | 1,186 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | 80 | 976 | R12AAEM506 | N10 | L10 |
| 75.0 | 10 | 1,368 | 1/2 | 40 | 866 | R12AAEM506 | N9 | L9 | 80 | 1,126 | R12AAEM506 | N12 | L12 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 100.0 | 10 | 1,351 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | | | | | |
| 125.0 | 10 | 1,689 | 1/2 | 40 | 938 | R12AAEM506 | N10 | L10 | | | | | |
| 150.0 | 10 | 2,026 | 1/2 | 40 | 1,126 | R12AAEM506 | N12 | L12 | | | | | |
| 175.0 | 10 | 2,364 | 1/2 | 40 | 1,313 | R12AAEM506 | N14 | L14 | | | | | |
| 200.0 | 10 | 2,655 | 5/8 | 38 | 1,426 | R58AAEM506 | N15 | L15 | | | | | |
| 225.0 | 10 | 2,880 | 5/8 | 34 | 1,435 | R58AAEM506 | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 312 | 3/8 | 40 | 171 | R38AAEM306 | N2 | L2 | 80 | 222 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 708 | 1/2 | 40 | 389 | R12AAEM406 | N4 | L4 | 80 | 506 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 991 | 1/2 | 40 | 545 | R12AAEM406 | N6 | L6 | 80 | 708 | R12AAEM509 | N8 | L8 |
| 50.0 | 10 | 1,416 | 1/2 | 40 | 778 | R12AAEM509 | N8 | L8 | 80 | 1,011 | R12AAEM506 | N11 | L11 |
| 65.0 | 10 | 1,841 | 5/8 | 40 | 1,011 | R58AAEM506 | N11 | L11 | 80 | 1,315 | R58AAEM506 | N14 | L14 |
| 75.0 | 10 | 2,124 | 3/4 | 40 | 1,167 | R34CFB1P06 | N12 | L12 | 80 | 1,517 | R34CFB2P12 | N16 | L16 |
| 100.0 | 10 | 2,832 | 3/4 | 40 | 1,556 | R34CFB2P12 | N16 | L16 | 80 | 2,022 | R34DGB2P09 | N21 | L21 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 125.0 | 10 | 2,319 | 5/8 | 40 | 1,264 | R58AAEM506 | N13 | L13 | | | | | |
| 150.0 | 10 | 2,782 | 5/8 | 40 | 1,517 | R58AAEM606 | N16 | L16 | | | | | |
| 175.0 | 10 | 3,246 | 3/4 | 40 | 1,770 | R34DGB2P09 | N18 | L18 | | | | | |
| 200.0 | 10 | 3,710 | 3/4 | 40 | 2,022 | R34DGB2P09 | N21 | L21 | | | | | |
| 225.0 | 10 | 4,063 | 3/4 | 38 | 2,161 | R34DGB2P09 | N22 | L22 | | | | | |

1. TVL = DL + Fv + (0.2$S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 220 | R38AAEM306 | N3 | L3 | 80 | 286 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 930 | 1/2 | 40 | 500 | R12AAEM406 | N5 | L5 | 80 | 650 | R12AAEM406 | N7 | L7 |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 700 | R12AAEM509 | N7 | L7 | 80 | 910 | R12AAEM506 | N10 | L10 |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 1,000 | R58AAEM506 | N10 | L10 | 80 | 1,300 | R58AAEM506 | N13 | L13 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 65.0 | 10 | 1,494 | 1/2 | 40 | 845 | R12AAEM506 | N9 | L9 | | | | | |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 975 | R58AAEM506 | N10 | L10 | | | | | |
| 100.0 | 10 | 2,298 | 5/8 | 40 | 1,300 | R58AAEM506 | N13 | L13 | | | | | |
| 125.0 | 10 | 2,606 | 3/4 | 34 | 1,381 | R34DGB1S06 | N14 | L14 | | | | | |
| 150.0 | 10 | 2,808 | 5/8 | 28 | 1,365 | R58AAEM506 | N14 | L14 | | | | | |
| 175.0 | 10 | 3,027 | 5/8 | 24 | 1,365 | R58AAEM506 | N14 | L14 | | | | | |
| 200.0 | 10 | 3,246 | 5/8 | 21 | 1,365 | R58AAEM506 | N14 | L14 | | | | | |
| 225.0 | 10 | 3,492 | 5/8 | 19 | 1,389 | R58AAEM506 | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 305 | 3/8 | 40 | 254 | R38AAEM306 | N3 | L3 | 80 | 330 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 693 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 751 | R12AAEM509 | N8 | L8 |
| 35.0 | 10 | 970 | 1/2 | 40 | 808 | R12AAEM506 | N9 | L9 | 80 | 1,051 | R12AAEM506 | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 50.0 | 10 | 912 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | | | | | |
| 65.0 | 10 | 1,186 | 1/2 | 40 | 976 | R12AAEM506 | N10 | L10 | | | | | |
| 75.0 | 10 | 1,368 | 1/2 | 40 | 1,126 | R12AAEM506 | N12 | L12 | | | | | |
| 100.0 | 10 | 1,777 | 1/2 | 38 | 1,426 | R12AAEM506 | N15 | L15 | | | | | |
| 125.0 | 10 | 1,985 | 1/2 | 30 | 1,407 | R12AAEM506 | N15 | L15 | | | | | |
| 150.0 | 10 | 2,204 | 1/2 | 25 | 1,407 | R12AAEM506 | N15 | L15 | | | | | |
| 175.0 | 10 | 2,447 | 1/2 | 22 | 1,445 | R12AAEM506 | N15 | L15 | | | | | |
| 200.0 | 10 | 2,655 | 5/8 | 19 | 1,426 | R58AAEM506 | N15 | L15 | | | | | |
| 225.0 | 10 | 2,880 | 5/8 | 17 | 1,435 | R58AAEM506 | N15 | L15 | | | | | |

1. TVL = DL + Fv + (0.2$S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 527 | 1/2 | 40 | 342 | R12AAEM406 | N4 | L4 | 80 | 445 | R12AAEM406 | N5 | L5 |
| 25.0 | 10 | 1,197 | 1/2 | 40 | 778 | R12AAEM509 | N8 | L8 | 80 | 1,011 | R12AAEM506 | N11 | L11 |
| 35.0 | 10 | 1,675 | 5/8 | 40 | 1,089 | R58AAEM506 | N11 | L11 | 80 | 1,416 | R58AAEM506 | N15 | L15 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 50.0 | 10 | 1,416 | 1/2 | 40 | 1,011 | R12AAEM506 | N11 | L11 | | | | | |
| 65.0 | 10 | 1,841 | 5/8 | 40 | 1,315 | R58AAEM506 | N14 | L14 | | | | | |
| 75.0 | 10 | 2,124 | 3/4 | 40 | 1,517 | R34CFB2P12 | N16 | L16 | | | | | |
| 100.0 | 10 | 2,832 | 3/4 | 40 | 2,022 | R34DGB2P09 | N21 | L21 | | | | | |
| 125.0 | 10 | 3,051 | 3/4 | 32 | 2,022 | R34DGB2P09 | N21 | L21 | | | | | |
| 150.0 | 10 | 3,295 | 3/4 | 27 | 2,048 | R34DGB2P09 | N21 | L21 | | | | | |
| 175.0 | 10 | 3,502 | 3/4 | 23 | 2,035 | R34DGB2P09 | N21 | L21 | | | | | |
| 200.0 | 10 | 3,807 | 3/4 | 21 | 2,124 | R34DGB2P09 | N22 | L22 | | | | | |
| 225.0 | 10 | 4,063 | 3/4 | 19 | 2,161 | R34DGB2P09 | N22 | L22 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 721 | 1/2 | 40 | 440 | R12AAEM406 | N5 | L5 | 80 | 572 | R12AAEM406 | N6 | L6 |
| 25.0 | 10 | 1,640 | 3/4 | 40 | 1,000 | R34DGB1P06 | N10 | L10 | 80 | 1,300 | R34DGB1S06 | N13 | L13 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 910 | R12AAEM506 | N10 | L10 | | | | | |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 1,300 | R58AAEM506 | N13 | L13 | | | | | |
| 65.0 | 10 | 2,048 | 3/4 | 32 | 1,352 | R34DGB1S06 | N14 | L14 | | | | | |
| 75.0 | 10 | 2,150 | 3/4 | 28 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,369 | 3/4 | 21 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 125.0 | 10 | 2,606 | 3/4 | 17 | 1,381 | R34DGB1S06 | N14 | L14 | | | | | |
| 150.0 | 10 | 2,808 | 5/8 | 14 | 1,365 | R58AAEM506 | N14 | L14 | | | | | |
| 175.0 | 10 | 3,027 | 5/8 | 12 | 1,365 | R58AAEM506 | N14 | L14 | | | | | |
| 200.0 | 10 | 3,175 | 5/8 | 10 | 1,300 | R58AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 381 | R38AAEM406 | N4 | L4 | 80 | 495 | R38AAEM406 | N5 | L5 |
| 25.0 | 10 | 930 | 1/2 | 40 | 866 | R12AAEM506 | N9 | L9 | 80 | 1,126 | R12AAEM506 | N12 | L12 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 35.0 | 10 | 804 | 1/2 | 40 | 788 | R12AAEM509 | N8 | L8 | | | | | |
| 50.0 | 10 | 1,149 | 1/2 | 40 | 1,126 | R12AAEM506 | N12 | L12 | | | | | |
| 65.0 | 10 | 1,471 | 1/2 | 39 | 1,427 | R12AAEM506 | N15 | L15 | | | | | |
| 75.0 | 10 | 1,564 | 1/2 | 34 | 1,435 | R12AAEM506 | N15 | L15 | | | | | |
| 100.0 | 10 | 1,765 | 1/2 | 25 | 1,407 | R12AAEM506 | N15 | L15 | | | | | |
| 125.0 | 10 | 1,985 | 1/2 | 20 | 1,407 | R12AAEM506 | N15 | L15 | | | | | |
| 150.0 | 10 | 2,222 | 1/2 | 17 | 1,435 | R12AAEM506 | N15 | L15 | | | | | |
| 175.0 | 10 | 2,406 | 1/2 | 14 | 1,379 | R12AAEM506 | N14 | L14 | | | | | |
| 200.0 | 10 | 2,607 | 5/8 | 12 | 1,351 | R58AAEM506 | N14 | L14 | | | | | |

1. TVL = DL + Fv + (0.2S$_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 742 | 1/2 | 40 | 513 | R12AAEM406 | N6 | L6 | 80 | 667 | R12AAEM509 | N7 | L7 |
| 25.0 | 10 | 1,685 | 3/4 | 40 | 1,167 | R34CFB1P06 | N12 | L12 | 80 | 1,517 | R34CFB2P12 | N16 | L16 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 35.0 | 10 | 1,333 | 5/8 | 40 | 1,062 | R58AAEM506 | N11 | L11 | | | | | |
| 50.0 | 10 | 1,905 | 3/4 | 40 | 1,517 | R34CFB2P12 | N16 | L16 | | | | | |
| 65.0 | 10 | 2,476 | 3/4 | 40 | 1,972 | R34DGB2P09 | N20 | L20 | | | | | |
| 75.0 | 10 | 2,582 | 3/4 | 35 | 1,991 | R34DGB2P09 | N20 | L20 | | | | | |
| 100.0 | 10 | 2,857 | 3/4 | 27 | 2,048 | R34DGB2P09 | N21 | L21 | | | | | |
| 125.0 | 10 | 3,021 | 3/4 | 21 | 1,991 | R34DGB2P09 | N20 | L20 | | | | | |
| 150.0 | 10 | 3,295 | 3/4 | 18 | 2,048 | R34DGB2P09 | N21 | L21 | | | | | |
| 175.0 | 10 | 3,460 | 3/4 | 15 | 1,991 | R34DGB2P09 | N20 | L20 | | | | | |
| 200.0 | 10 | 3,807 | 3/4 | 14 | 2,124 | R34DGB2P09 | N22 | L22 | | | | | |
| 225.0 | 10 | 3,953 | 3/4 | 12 | 2,048 | R34DGB2P09 | N21 | L21 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 1,034 | 1/2 | 40 | 660 | R12AAEM406 | N7 | L7 | 80 | 858 | R12AAEM506 | N9 | L9 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 25.0 | 10 | 1,285 | 5/8 | 40 | 975 | R58AAEM506 | N10 | L10 | | | | | |
| 35.0 | 10 | 1,799 | 3/4 | 40 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 50.0 | 10 | 1,930 | 3/4 | 28 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 65.0 | 10 | 2,024 | 3/4 | 21 | 1,331 | R34DGB1S06 | N14 | L14 | | | | | |
| 75.0 | 10 | 2,176 | 3/4 | 19 | 1,389 | R34DGB1S06 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,369 | 3/4 | 14 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 125.0 | 10 | 2,562 | 5/8 | 11 | 1,341 | R58AAEM506 | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 513 | 1/2 | 40 | 508 | R12AAEM406 | N6 | L6 | 80 | 660 | R12AAEM509 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 25.0 | 10 | 693 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | | | | | |
| 35.0 | 10 | 970 | 1/2 | 40 | 1,051 | R12AAEM506 | N11 | L11 | | | | | |
| 50.0 | 10 | 1,338 | 1/2 | 38 | 1,426 | R12AAEM506 | N15 | L15 | | | | | |
| 65.0 | 10 | 1,463 | 1/2 | 29 | 1,415 | R12AAEM506 | N15 | L15 | | | | | |
| 75.0 | 10 | 1,546 | 1/2 | 25 | 1,407 | R12AAEM506 | N15 | L15 | | | | | |
| 100.0 | 10 | 1,777 | 1/2 | 19 | 1,426 | R12AAEM506 | N15 | L15 | | | | | |
| 125.0 | 10 | 1,985 | 1/2 | 15 | 1,407 | R12AAEM506 | N15 | L15 | | | | | |
| 150.0 | 10 | 2,168 | 1/2 | 12 | 1,351 | R12AAEM506 | N14 | L14 | | | | | |
| 175.0 | 10 | 2,447 | 1/2 | 11 | 1,445 | R12AAEM506 | N15 | L15 | | | | | |

1. TVL = DL + Fv + (0.2$S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6]: Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6]: Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 957 | 1/2 | 40 | 685 | R12AAEM509 | N7 | L7 | 80 | 890 | R12AAEM506 | N9 | L9 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 25.0 | 10 | 1,197 | 1/2 | 40 | 1,011 | R12AAEM506 | N11 | L11 | | | | | |
| 35.0 | 10 | 1,675 | 5/8 | 40 | 1,416 | R58AAEM506 | N15 | L15 | | | | | |
| 50.0 | 10 | 2,345 | 3/4 | 39 | 1,972 | R34DGB2P09 | N20 | L20 | | | | | |
| 65.0 | 10 | 2,476 | 3/4 | 30 | 1,972 | R34DGB2P09 | N20 | L20 | | | | | |
| 75.0 | 10 | 2,564 | 3/4 | 26 | 1,972 | R34DGB2P09 | N20 | L20 | | | | | |
| 100.0 | 10 | 2,832 | 3/4 | 20 | 2,022 | R34DGB2P09 | N21 | L21 | | | | | |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 2,022 | R34DGB2P09 | N21 | L21 | | | | | |
| 150.0 | 10 | 3,222 | 3/4 | 13 | 1,972 | R34DGB2P09 | N20 | L20 | | | | | |
| 175.0 | 10 | 3,417 | 3/4 | 11 | 1,947 | R34DGB2P09 | N20 | L20 | | | | | |
| 200.0 | 10 | 3,710 | 3/4 | 10 | 2,022 | R34DGB2P09 | N21 | L21 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B20.0, B41.0, B45.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B20.2, B41.2, B45.2)** | | | | |
| 11.0 | 10 | 1,346 | 5/8 | 40 | 880 | R58AAEM506 | N9 | L9 | 80 | 1,144 | R58AAEM506 | N12 | L12 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B20.1, B20.3, B41.1, B41.3, B45.1 B45.3)** | | | | | | | | | |
| 25.0 | 10 | 1,640 | 3/4 | 40 | 1,300 | R34DGB1S06 | N13 | L13 | | | | | |
| 35.0 | 10 | 1,799 | 3/4 | 30 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 50.0 | 10 | 1,930 | 3/4 | 21 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 65.0 | 10 | 2,048 | 3/4 | 16 | 1,352 | R34DGB1S06 | N14 | L14 | | | | | |
| 75.0 | 10 | 2,150 | 3/4 | 14 | 1,365 | R34DGB1S06 | N14 | L14 | | | | | |
| 100.0 | 10 | 2,298 | 5/8 | 10 | 1,300 | R58AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS*[7]

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod[1] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max.[2] Brace Spacing (ft.)** | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage[6]** | | **Max.[2] Brace Spacing (ft.)** | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage[6]** | |
| | | | | | | | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** | | | | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B21.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B21.2)** | | | | |
| 11.0 | 10 | 201 | 3/8 | 40 | 64 | R38AAEM306 | N1 | L1 | 80 | 83 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 456 | 1/2 | 40 | 144 | R12AAEM306 | N2 | L2 | 80 | 188 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 639 | 1/2 | 40 | 202 | R12AAEM306 | N3 | L3 | 80 | 263 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 912 | 1/2 | 40 | 289 | R12AAEM306 | N3 | L3 | 80 | 375 | R12AAEM406 | N4 | L4 |
| 65.0 | 10 | 1,186 | 1/2 | 40 | 375 | R12AAEM406 | N4 | L4 | 80 | 488 | R12AAEM406 | N5 | L5 |
| 75.0 | 10 | 1,368 | 1/2 | 40 | 433 | R12AAEM406 | N5 | L5 | 80 | 563 | R12AAEM406 | N6 | L6 |
| 100.0 | 10 | 1,824 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 751 | R12AAEM509 | N8 | L8 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1, B21.3)** | | | | | | | | | |
| 125.0 | 10 | 1,689 | 1/2 | 40 | 469 | R12AAEM406 | N5 | L5 | | | | | |
| 150.0 | 10 | 2,026 | 1/2 | 40 | 563 | R12AAEM406 | N6 | L6 | | | | | |
| 175.0 | 10 | 2,364 | 1/2 | 40 | 657 | R12AAEM406 | N7 | L7 | | | | | |
| 200.0 | 10 | 2,702 | 5/8 | 40 | 751 | R58AAEM509 | N8 | L8 | | | | | |
| 225.0 | 10 | 3,040 | 5/8 | 40 | 844 | R58AAEM506 | N9 | L9 | | | | | |

1. TVL = DL + Fv + (0.2$S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## *RIGID BRACING REQUIREMENTS* [7]

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B20.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B21.2) | | | | |
| 11.0 | 10 | 312 | 3/8 | 40 | 86 | R38AAEM306 | N1 | L1 | 80 | 111 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 708 | 1/2 | 40 | 194 | R12AAEM306 | N2 | L2 | 80 | 253 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 991 | 1/2 | 40 | 272 | R12AAEM306 | N3 | L3 | 80 | 354 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 1,416 | 1/2 | 40 | 389 | R12AAEM406 | N4 | L4 | 80 | 506 | R12AAEM406 | N6 | L6 |
| 65.0 | 10 | 1,841 | 5/8 | 40 | 506 | R58AAEM406 | N6 | L6 | 80 | 657 | R58AAEM406 | N7 | L7 |
| 75.0 | 10 | 2,124 | 3/4 | 40 | 583 | R34CFB1P12 | N6 | L6 | 80 | 758 | R34CFB1P09 | N8 | L8 |
| 100.0 | 10 | 2,832 | 3/4 | 40 | 778 | R34CFB1P09 | N8 | L8 | 80 | 1,011 | R34CFB1P06 | N11 | L11 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1) | | | | | | | | | |
| 125.0 | 10 | 2,319 | 5/8 | 40 | 632 | R58AAEM406 | N7 | L7 | | | | | |
| 150.0 | 10 | 2,782 | 5/8 | 40 | 758 | R58AAEM509 | N8 | L8 | | | | | |
| 175.0 | 10 | 3,246 | 3/4 | 40 | 885 | R34CFB1P09 | N9 | L9 | | | | | |
| 200.0 | 10 | 3,710 | 3/4 | 40 | 1,011 | R34CFB1P06 | N11 | L11 | | | | | |
| 225.0 | 10 | 4,063 | 3/4 | 38 | 1,081 | R34CFB1P06 | N11 | L11 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## *RIGID BRACING REQUIREMENTS* [7]

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B21.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B21.2)** | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 110 | R38AAEM306 | N2 | L2 | 80 | 143 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 930 | 1/2 | 40 | 250 | R12AAEM306 | N3 | L3 | 80 | 325 | R12AAEM409 | N4 | L4 |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 350 | R12AAEM406 | N4 | L4 | 80 | 455 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 500 | R58AAEM406 | N5 | L5 | 80 | 650 | R58AAEM406 | N7 | L7 |
| 65.0 | 10 | 2,417 | 3/4 | 40 | 650 | R34CFB1P12 | N7 | L7 | 80 | 845 | R34CFB1P09 | N9 | L9 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1, B21.3)** | | | | | | | | | |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 488 | R58AAEM406 | N5 | L5 | | | | | |
| 100.0 | 10 | 2,298 | 5/8 | 40 | 650 | R58AAEM406 | N7 | L7 | | | | | |
| 125.0 | 10 | 2,872 | 3/4 | 40 | 813 | R34CFB1P09 | N9 | L9 | | | | | |
| 150.0 | 10 | 3,340 | 3/4 | 38 | 926 | R34DGB1P06 | N10 | L10 | | | | | |
| 175.0 | 10 | 3,524 | 3/4 | 32 | 910 | R34DGB1P09 | N10 | L10 | | | | | |
| 200.0 | 10 | 3,815 | 3/4 | 29 | 943 | R34DGB1P06 | N10 | L10 | | | | | |
| 225.0 | 10 | 4,052 | 3/4 | 26 | 951 | R34DGB1P06 | N10 | L10 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

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## *RIGID BRACING REQUIREMENTS [7]*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B21.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B21.2)** | | | | |
| 11.0 | 10 | 305 | 3/8 | 40 | 127 | R38AAEM306 | N2 | L2 | 80 | 165 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 693 | 1/2 | 40 | 289 | R12AAEM306 | N3 | L3 | 80 | 375 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 970 | 1/2 | 40 | 404 | R12AAEM406 | N5 | L5 | 80 | 525 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 1,386 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 751 | R12AAEM509 | N8 | L8 |
| 65.0 | 10 | 1,801 | 5/8 | 40 | 751 | R58AAEM509 | N8 | L8 | 80 | 976 | R58AAEM506 | N10 | L10 |
| 75.0 | 10 | 2,079 | 5/8 | 40 | 866 | R58AAEM506 | N9 | L9 | 80 | 1,126 | R58AAEM506 | N12 | L12 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1, B21.3)** | | | | | | | | | |
| 100.0 | 10 | 1,824 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | | | | | |
| 125.0 | 10 | 2,281 | 5/8 | 40 | 938 | R58AAEM506 | N10 | L10 | | | | | |
| 150.0 | 10 | 2,737 | 5/8 | 40 | 1,126 | R58AAEM506 | N12 | L12 | | | | | |
| 175.0 | 10 | 3,068 | 5/8 | 37 | 1,215 | R58AAEM506 | N13 | L13 | | | | | |
| 200.0 | 10 | 3,270 | 5/8 | 32 | 1,201 | R58AAEM506 | N13 | L13 | | | | | |
| 225.0 | 10 | 3,519 | 5/8 | 29 | 1,224 | R58AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

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## RIGID BRACING REQUIREMENTS [7]

**2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1-Way Transverse Brace Pattern (B20.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B21.2) | | | | |
| 11.0 | 10 | 527 | 1/2 | 40 | 171 | R12AAEM306 | N2 | L2 | 80 | 222 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,197 | 1/2 | 40 | 389 | R12AAEM406 | N4 | L4 | 80 | 506 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 1,675 | 5/8 | 40 | 545 | R58AAEM406 | N6 | L6 | 80 | 708 | R58AAEM509 | N8 | L8 |
| 50.0 | 10 | 2,345 | 3/4 | 39 | 758 | R34CFB1P09 | N8 | L8 | 78 | 986 | R34CFB1P06 | N10 | L10 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1) | | | | | | | | | |
| 65.0 | 10 | 1,841 | 5/8 | 40 | 657 | R58AAEM406 | N7 | L7 | | | | | |
| 75.0 | 10 | 2,124 | 3/4 | 40 | 758 | R34CFB1P09 | N8 | L8 | | | | | |
| 100.0 | 10 | 2,832 | 3/4 | 40 | 1,011 | R34CFB1P06 | N11 | L11 | | | | | |
| 125.0 | 10 | 3,051 | 3/4 | 32 | 1,011 | R34CFB1P06 | N11 | L11 | | | | | |
| 150.0 | 10 | 3,295 | 3/4 | 27 | 1,024 | R34CFB1P06 | N11 | L11 | | | | | |
| 175.0 | 10 | 3,502 | 3/4 | 23 | 1,018 | R34CFB1P06 | N11 | L11 | | | | | |
| 200.0 | 10 | 3,807 | 3/4 | 21 | 1,062 | R34CFB1P06 | N11 | L11 | | | | | |
| 225.0 | 10 | 4,063 | 3/4 | 19 | 1,081 | R34CFB1P06 | N11 | L11 | | | | | |

1. TVL = DL + Fv + (0.2$S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)***

***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B21.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B21.2)** | | | | |
| 11.0 | 10 | 721 | 1/2 | 40 | 220 | R12AAEM306 | N3 | L3 | 80 | 286 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,640 | 3/4 | 40 | 500 | R34CFA1P06 | N5 | L5 | 80 | 650 | R34CFB1P12 | N7 | L7 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1, B21.3)** | | | | | | | | | |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 455 | R12AAEM406 | N5 | L5 | | | | | |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 650 | R58AAEM406 | N7 | L7 | | | | | |
| 65.0 | 10 | 2,417 | 3/4 | 40 | 845 | R34CFB1P09 | N9 | L9 | | | | | |
| 75.0 | 10 | 2,576 | 3/4 | 36 | 878 | R34DGB1P09 | N9 | L9 | | | | | |
| 100.0 | 10 | 2,795 | 3/4 | 27 | 878 | R34DGB1P09 | N9 | L9 | | | | | |
| 125.0 | 10 | 3,050 | 3/4 | 22 | 894 | R34DGB1P09 | N9 | L9 | | | | | |
| 150.0 | 10 | 3,340 | 3/4 | 19 | 926 | R34DGB1P06 | N10 | L10 | | | | | |
| 175.0 | 10 | 3,524 | 3/4 | 16 | 910 | R34DGB1P09 | N10 | L10 | | | | | |
| 200.0 | 10 | 3,744 | 3/4 | 14 | 910 | R34DGB1P09 | N10 | L10 | | | | | |
| 225.0 | 10 | 4,052 | 3/4 | 13 | 951 | R34DGB1P06 | N10 | L10 | | | | | |

1. TVL = DL + Fv + (0.2$S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B21.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B21.2) | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 191 | R38AAEM306 | N2 | L2 | 80 | 248 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 930 | 1/2 | 40 | 433 | R12AAEM406 | N5 | L5 | 80 | 563 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 606 | R12AAEM406 | N7 | L7 | 80 | 788 | R12AAEM509 | N8 | L8 |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 866 | R58AAEM506 | N9 | L9 | 80 | 1,126 | R58AAEM506 | N12 | L12 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1, B21.3) | | | | | | | | | |
| 65.0 | 10 | 1,494 | 1/2 | 40 | 732 | R12AAEM509 | N8 | L8 | | | | | |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 844 | R58AAEM506 | N9 | L9 | | | | | |
| 100.0 | 10 | 2,298 | 5/8 | 40 | 1,126 | R58AAEM506 | N12 | L12 | | | | | |
| 125.0 | 10 | 2,606 | 3/4 | 34 | 1,196 | R34DGB1P06 | N12 | L12 | | | | | |
| 150.0 | 10 | 2,808 | 5/8 | 28 | 1,182 | R58AAEM506 | N12 | L12 | | | | | |
| 175.0 | 10 | 3,027 | 5/8 | 24 | 1,182 | R58AAEM506 | N12 | L12 | | | | | |
| 200.0 | 10 | 3,246 | 5/8 | 21 | 1,182 | R58AAEM506 | N12 | L12 | | | | | |
| 225.0 | 10 | 3,492 | 5/8 | 19 | 1,203 | R58AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + (0.2$S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

**2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B20.0) | | | | | 3-Way Transverse, Longitudinal Brace Pattern (B21.2) | | | | |
| 11.0 | 10 | 742 | 1/2 | 40 | 257 | R12AAEM306 | N3 | L3 | 80 | 334 | R12AAEM406 | N4 | L4 |
| 25.0 | 10 | 1,685 | 3/4 | 40 | 583 | R34CFB1P12 | N6 | L6 | 80 | 758 | R34CFB1P09 | N8 | L8 |
| | | | | TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS | | | | | | | | | |
| | | | | 2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1) | | | | | | | | | |
| 35.0 | 10 | 1,333 | 5/8 | 40 | 531 | R58AAEM406 | N6 | L6 | | | | | |
| 50.0 | 10 | 1,905 | 3/4 | 40 | 758 | R34CFB1P09 | N8 | L8 | | | | | |
| 65.0 | 10 | 2,476 | 3/4 | 40 | 986 | R34CFB1P06 | N10 | L10 | | | | | |
| 75.0 | 10 | 2,582 | 3/4 | 35 | 995 | R34CFB1P06 | N10 | L10 | | | | | |
| 100.0 | 10 | 2,857 | 3/4 | 27 | 1,024 | R34CFB1P06 | N11 | L11 | | | | | |
| 125.0 | 10 | 3,021 | 3/4 | 21 | 995 | R34CFB1P06 | N10 | L10 | | | | | |
| 150.0 | 10 | 3,295 | 3/4 | 18 | 1,024 | R34CFB1P06 | N11 | L11 | | | | | |
| 175.0 | 10 | 3,460 | 3/4 | 15 | 995 | R34CFB1P06 | N10 | L10 | | | | | |
| 200.0 | 10 | 3,807 | 3/4 | 14 | 1,062 | R34CFB1P06 | N11 | L11 | | | | | |
| 225.0 | 10 | 3,953 | 3/4 | 12 | 1,024 | R34CFB1P06 | N11 | L11 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**C33-0.75-45**
**2-Tier**

2013 CBC OSHPD

## *RIGID BRACING REQUIREMENTS* [7]

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B21.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B21.2)** | | | | |
| 11.0 | 10 | 1,034 | 1/2 | 40 | 330 | R12AAEM409 | N4 | L4 | 80 | 429 | R12AAEM406 | N5 | L5 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1, B21.3)** | | | | | | | | | |
| 25.0 | 10 | 1,285 | 5/8 | 40 | 488 | R58AAEM406 | N5 | L5 | | | | | |
| 35.0 | 10 | 1,799 | 3/4 | 40 | 683 | R34CFB1P09 | N7 | L7 | | | | | |
| 50.0 | 10 | 2,356 | 3/4 | 36 | 878 | R34DGB1P09 | N9 | L9 | | | | | |
| 65.0 | 10 | 2,509 | 3/4 | 28 | 887 | R34DGB1P09 | N9 | L9 | | | | | |
| 75.0 | 10 | 2,576 | 3/4 | 24 | 878 | R34DGB1P09 | N9 | L9 | | | | | |
| 100.0 | 10 | 2,795 | 3/4 | 18 | 878 | R34DGB1P09 | N9 | L9 | | | | | |
| 125.0 | 10 | 3,094 | 3/4 | 15 | 914 | R34DGB1P06 | N10 | L10 | | | | | |
| 150.0 | 10 | 3,234 | 3/4 | 12 | 878 | R34DGB1P09 | N9 | L9 | | | | | |
| 175.0 | 10 | 3,400 | 3/4 | 10 | 853 | R34CFB1P09 | N9 | L9 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

2013 CBC OSHPD

## *RIGID BRACING REQUIREMENTS* [7]

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B21.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B21.2)** | | | | |
| 11.0 | 10 | 513 | 1/2 | 40 | 254 | R12AAEM306 | N3 | L3 | 80 | 330 | R12AAEM406 | N4 | L4 |
| 25.0 | 10 | 1,166 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 751 | R12AAEM509 | N8 | L8 |
| 35.0 | 10 | 1,633 | 5/8 | 40 | 808 | R58AAEM506 | N9 | L9 | 80 | 1,051 | R58AAEM506 | N11 | L11 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1, B21.3)** | | | | | | | | | |
| 50.0 | 10 | 1,386 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | | | | | |
| 65.0 | 10 | 1,801 | 5/8 | 40 | 976 | R58AAEM506 | N10 | L10 | | | | | |
| 75.0 | 10 | 2,079 | 5/8 | 40 | 1,126 | R58AAEM506 | N12 | L12 | | | | | |
| 100.0 | 10 | 2,345 | 5/8 | 31 | 1,163 | R58AAEM506 | N12 | L12 | | | | | |
| 125.0 | 10 | 2,576 | 5/8 | 25 | 1,173 | R58AAEM506 | N12 | L12 | | | | | |
| 150.0 | 10 | 2,808 | 5/8 | 21 | 1,182 | R58AAEM506 | N12 | L12 | | | | | |
| 175.0 | 10 | 3,027 | 5/8 | 18 | 1,182 | R58AAEM506 | N12 | L12 | | | | | |
| 200.0 | 10 | 3,270 | 5/8 | 16 | 1,201 | R58AAEM506 | N13 | L13 | | | | | |
| 225.0 | 10 | 3,466 | 5/8 | 14 | 1,182 | R58AAEM506 | N12 | L12 | | | | | |

1. TVL = DL + Fv + (0.2$S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## *RIGID BRACING REQUIREMENTS* [7]

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B20.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B21.2)** | | | | |
| 11.0 | 10 | 957 | 1/2 | 40 | 342 | R12AAEM406 | N4 | L4 | 80 | 445 | R12AAEM406 | N5 | L5 |
| 25.0 | 10 | 2,125 | 3/4 | 39 | 758 | R34CFB1P09 | N8 | L8 | 78 | 986 | R34CFB1P06 | N10 | L10 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1)** | | | | | | | | | |
| 35.0 | 10 | 1,675 | 5/8 | 40 | 708 | R58AAEM509 | N8 | L8 | | | | | |
| 50.0 | 10 | 2,345 | 3/4 | 39 | 986 | R34CFB1P06 | N10 | L10 | | | | | |
| 65.0 | 10 | 2,476 | 3/4 | 30 | 986 | R34CFB1P06 | N10 | L10 | | | | | |
| 75.0 | 10 | 2,564 | 3/4 | 26 | 986 | R34CFB1P06 | N10 | L10 | | | | | |
| 100.0 | 10 | 2,832 | 3/4 | 20 | 1,011 | R34CFB1P06 | N11 | L11 | | | | | |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 1,011 | R34CFB1P06 | N11 | L11 | | | | | |
| 150.0 | 10 | 3,222 | 3/4 | 13 | 986 | R34CFB1P06 | N10 | L10 | | | | | |
| 175.0 | 10 | 3,417 | 3/4 | 11 | 973 | R34CFB1P06 | N10 | L10 | | | | | |
| 200.0 | 10 | 3,710 | 3/4 | 10 | 1,011 | R34CFB1P06 | N11 | L11 | | | | | |

1. TVL = DL + Fv + (0.2$S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B21.0)** | | | | | **3-Way Transverse, Longitudinal Brace Pattern (B21.2)** | | | | |
| 11.0 | 10 | 1,346 | 5/8 | 40 | 440 | R58AAEM406 | N5 | L5 | 80 | 572 | R58AAEM406 | N6 | L6 |
| | | | | **TRANSVERSE, LONGITUDINAL BRACING REQUIREMENTS** | | | | | | | | | |
| | | | | **2-Way, 4-Way Transverse, Longitudinal Brace Pattern (B21.1, B21.3)** | | | | | | | | | |
| 25.0 | 10 | 1,640 | 3/4 | 40 | 650 | R34CFB1P12 | N7 | L7 | | | | | |
| 35.0 | 10 | 2,196 | 3/4 | 38 | 865 | R34CFB1P09 | N9 | L9 | | | | | |
| 50.0 | 10 | 2,356 | 3/4 | 27 | 878 | R34DGB1P09 | N9 | L9 | | | | | |
| 65.0 | 10 | 2,509 | 3/4 | 21 | 887 | R34DGB1P09 | N9 | L9 | | | | | |
| 75.0 | 10 | 2,576 | 3/4 | 18 | 878 | R34DGB1P09 | N9 | L9 | | | | | |
| 100.0 | 10 | 2,724 | 3/4 | 13 | 845 | R34CFB1P09 | N9 | L9 | | | | | |
| 125.0 | 10 | 3,050 | 3/4 | 11 | 894 | R34DGB1P09 | N9 | L9 | | | | | |

1. TVL = DL + Fv + ($0.2S_D$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## *CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 127 | C38AA04WS | N2 | L2 | 80 | 165 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 289 | C12AA04WS | N3 | L3 | 80 | 375 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 307 | 1/2 | 40 | 404 | C12AA04WS | N5 | L5 | 80 | 525 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 439 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 751 | C12AA06WS | N8 | L8 |
| 65.0 | 10 | 570 | 1/2 | 40 | 751 | C12AA06WS | N8 | L8 | 80 | 976 | C12AA06WS | N10 | L10 |
| 75.0 | 10 | 658 | 1/2 | 40 | 866 | C12AA06WS | N9 | L9 | 80 | 1,126 | C12AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 1/2 | 38 | 1,097 | C12AA06WS | N11 | L11 | 76 | 1,426 | C12AA06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 1/2 | 30 | 1,083 | C12AA06WS | N11 | L11 | 60 | 1,407 | C12AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 1/2 | 24 | 1,039 | C12AA06WS | N11 | L11 | 48 | 1,351 | C12AA06WS | N14 | L14 |
| 175.0 | 10 | 1,536 | 1/2 | 22 | 1,111 | C12AA06WS | N12 | L12 | 44 | 1,445 | C12AA06WS | N15 | L15 |
| 200.0 | 10 | 1,755 | 1/2 | 18 | 1,039 | C12AA06WS | N11 | L11 | 36 | 1,351 | C12AA06WS | N14 | L14 |
| 225.0 | 10 | 1,974 | 1/2 | 16 | 1,039 | C12AA06WS | N11 | L11 | 32 | 1,351 | C12AA06WS | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *CABLE BRACING REQUIREMENTS*[7]*:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

|  |  |  |  | **TRANSVERSE BRACING REQUIREMENTS** |  |  |  |  | **LONGITUDINAL BRACING REQUIREMENTS** |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  | **Min. Brace Anchorage**[6] |  |  |  |  | **Min. Brace Anchorage**[6] |  |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod**[1, 8] **Total Vertical Load (lbs)** | **Min.**[8] **Vertical Support Rod Dia. (in.)** | **Max.**[2] **Brace Spacing (ft.)** | **Brace**[3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour**[4] **Deck Page D1** | **Metal**[5] **Deck Page D2** | **Max.**[2] **Brace Spacing (ft.)** | **Brace**[3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour**[4] **Deck Page D1** | **Metal**[5] **Deck Page D2** |
|  |  |  |  | **2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0)** |  |  |  |  | **6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1)** |  |  |  |  |
| 11.0 | 10 | 97 | 3/8 | 40 | 171 | C38AA04WS | N2 | L2 | 80 | 222 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 389 | C12AA04WS | N4 | L4 | 80 | 506 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 1/2 | 40 | 545 | C12AA04WS | N6 | L6 | 80 | 708 | C12AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 1/2 | 40 | 778 | C12AA06WS | N8 | L8 | 80 | 1,011 | C12AA06WS | N11 | L11 |
| 65.0 | 10 | 570 | 5/8 | 40 | 1,011 | C58AA06WS | N11 | L11 | 80 | 1,315 | C58AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 3/4 | 40 | 1,167 | C34DG06WS | N12 | L12 | 80 | 1,517 | C34DG06TS | N16 | L16 |
| 100.0 | 10 | 878 | 5/8 | 30 | 1,167 | C58AA06WS | N12 | L12 | 60 | 1,517 | C58DG06TS | N16 | L16 |
| 125.0 | 10 | 1,097 | 5/8 | 24 | 1,167 | C58AA06WS | N12 | L12 | 48 | 1,517 | C58DG06TS | N16 | L16 |
| 150.0 | 10 | 1,316 | 5/8 | 20 | 1,167 | C58AA06WS | N12 | L12 | 40 | 1,517 | C58DG06TS | N16 | L16 |
| 175.0 | 10 | 1,536 | 5/8 | 16 | 1,089 | C58AA06WS | N11 | L11 | 32 | 1,416 | C58AA06WS | N15 | L15 |
| 200.0 | 10 | 1,755 | 5/8 | 14 | 1,089 | C58AA06WS | N11 | L11 | 28 | 1,416 | C58AA06WS | N15 | L15 |
| 225.0 | 10 | 1,974 | 5/8 | 14 | 1,225 | C58AA06WS | N13 | L13 | 28 | 1,593 | C58DG06TS | N16 | L16 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 220 | C38AA04WS | N3 | L3 | 80 | 286 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 500 | C12AA04WS | N5 | L5 | 80 | 650 | C12AA04WS | N7 | L7 |
| 35.0 | 10 | 307 | 1/2 | 40 | 700 | C12AA06WS | N7 | L7 | 80 | 910 | C12AA06WS | N10 | L10 |
| 50.0 | 10 | 439 | 5/8 | 40 | 1,000 | C58AA06WS | N10 | L10 | 80 | 1,300 | C58AA06WS | N13 | L13 |
| 65.0 | 10 | 570 | 3/4 | 35 | 1,138 | C34DG06WS | N12 | L12 | 70 | 1,479 | C34DG06WS | N15 | L15 |
| 75.0 | 10 | 658 | 3/4 | 30 | 1,125 | C34DG06WS | N12 | L12 | 60 | 1,463 | C34DG06WS | N15 | L15 |
| 100.0 | 10 | 878 | 3/4 | 22 | 1,100 | C34DG06WS | N11 | L11 | 44 | 1,430 | C34DG06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 3/4 | 18 | 1,125 | C34DG06WS | N12 | L12 | 36 | 1,463 | C34DG06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 3/4 | 15 | 1,125 | C34DG06WS | N12 | L12 | 30 | 1,463 | C34DG06WS | N15 | L15 |
| 175.0 | 10 | 1,536 | 5/8 | 12 | 1,050 | C58AA06WS | N11 | L11 | 24 | 1,365 | C58AA06WS | N14 | L14 |
| 200.0 | 10 | 1,755 | 5/8 | 10 | 1,000 | C58AA06WS | N10 | L10 | 20 | 1,300 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS*[7]*:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage[6] | | | | | Min. Brace Anchorage[6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod[1, 8] Total Vertical Load (lbs)** | **Min.[8] Vertical Support Rod Dia. (in.)** | **Max.[2] Brace Spacing (ft.)** | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** | **Max.[2] Brace Spacing (ft.)** | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 254 | C38AA04WS | N3 | L3 | 80 | 330 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 751 | C12AA06WS | N8 | L8 |
| 35.0 | 10 | 307 | 1/2 | 40 | 808 | C12AA06WS | N9 | L9 | 80 | 1,051 | C12AA06WS | N11 | L11 |
| 50.0 | 10 | 439 | 1/2 | 38 | 1,097 | C12AA06WS | N11 | L11 | 76 | 1,426 | C12AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 1/2 | 28 | 1,051 | C12AA06WS | N11 | L11 | 56 | 1,366 | C12AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 1/2 | 24 | 1,039 | C12AA06WS | N11 | L11 | 48 | 1,351 | C12AA06WS | N14 | L14 |
| 100.0 | 10 | 878 | 1/2 | 18 | 1,039 | C12AA06WS | N11 | L11 | 36 | 1,351 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,097 | 1/2 | 14 | 1,010 | C12AA06WS | N11 | L11 | 28 | 1,313 | C12AA06WS | N14 | L14 |
| 150.0 | 10 | 1,316 | 1/2 | 12 | 1,039 | C12AA06WS | N11 | L11 | 24 | 1,351 | C12AA06WS | N14 | L14 |
| 175.0 | 10 | 1,536 | 1/2 | 10 | 1,010 | C12AA06WS | N11 | L11 | 20 | 1,313 | C12AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 342 | C12AA04WS | N4 | L4 | 80 | 445 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 1/2 | 40 | 778 | C12AA06WS | N8 | L8 | 80 | 1,011 | C12AA06WS | N11 | L11 |
| 35.0 | 10 | 307 | 5/8 | 40 | 1,089 | C58AA06WS | N11 | L11 | 80 | 1,416 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 30 | 1,167 | C34DG06WS | N12 | L12 | 60 | 1,517 | C34DG06TS | N16 | L16 |
| 65.0 | 10 | 570 | 5/8 | 22 | 1,112 | C58AA06WS | N12 | L12 | 44 | 1,446 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 3/4 | 20 | 1,167 | C34DG06WS | N12 | L12 | 40 | 1,517 | C34DG06TS | N16 | L16 |
| 100.0 | 10 | 878 | 5/8 | 14 | 1,089 | C58AA06WS | N11 | L11 | 28 | 1,416 | C58AA06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 5/8 | 12 | 1,167 | C58AA06WS | N12 | L12 | 24 | 1,517 | C58DG06TS | N16 | L16 |
| 150.0 | 10 | 1,316 | 5/8 | 10 | 1,167 | C58AA06WS | N12 | L12 | 20 | 1,517 | C58DG06TS | N16 | L16 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**C34-0.5-45**

## *CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 440 | C12AA04WS | N5 | L5 | 80 | 572 | C12AA04WS | N6 | L6 |
| 25.0 | 10 | 219 | 3/4 | 40 | 1,000 | C34DG06WS | N10 | L10 | 80 | 1,300 | C34DG06WS | N13 | L13 |
| 35.0 | 10 | 307 | 3/4 | 32 | 1,120 | C34DG06WS | N12 | L12 | 64 | 1,456 | C34DG06WS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 22 | 1,100 | C34DG06WS | N11 | L11 | 44 | 1,430 | C34DG06WS | N15 | L15 |
| 65.0 | 10 | 570 | 3/4 | 17 | 1,105 | C34DG06WS | N12 | L12 | 34 | 1,437 | C34DG06WS | N15 | L15 |
| 75.0 | 10 | 658 | 3/4 | 15 | 1,125 | C34DG06WS | N12 | L12 | 30 | 1,463 | C34DG06WS | N15 | L15 |
| 100.0 | 10 | 878 | 3/4 | 11 | 1,100 | C34DG06WS | N11 | L11 | 22 | 1,430 | C34DG06WS | N15 | L15 |

1. $TVL = DL + Fv + (0.2S_{DS} \times 0.70 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 381 | C38AA04WS | N4 | L4 | 80 | 495 | C38AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 1/2 | 40 | 866 | C12AA06WS | N9 | L9 | 80 | 1,126 | C12AA06WS | N12 | L12 |
| 35.0 | 10 | 307 | 1/2 | 36 | 1,091 | C12AA06WS | N11 | L11 | 72 | 1,419 | C12AA06WS | N15 | L15 |
| 50.0 | 10 | 439 | 1/2 | 24 | 1,039 | C12AA06WS | N11 | L11 | 48 | 1,351 | C12AA06WS | N14 | L14 |
| 65.0 | 10 | 570 | 1/2 | 18 | 1,013 | C12AA06WS | N11 | L11 | 36 | 1,317 | C12AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 1/2 | 16 | 1,039 | C12AA06WS | N11 | L11 | 32 | 1,351 | C12AA06WS | N14 | L14 |
| 100.0 | 10 | 878 | 1/2 | 12 | 1,039 | C12AA06WS | N11 | L11 | 24 | 1,351 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,097 | 1/2 | 10 | 1,083 | C12AA06WS | N11 | L11 | 20 | 1,407 | C12AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 513 | C12AA04WS | N6 | L6 | 80 | 667 | C12AA04WS | N7 | L7 |
| 25.0 | 10 | 219 | 3/4 | 40 | 1,167 | C34DG06WS | N12 | L12 | 80 | 1,517 | C34DG06TS | N16 | L16 |
| 35.0 | 10 | 307 | 3/4 | 28 | 1,143 | C34DG06WS | N12 | L12 | 56 | 1,486 | C34DG06TS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 20 | 1,167 | C34DG06WS | N12 | L12 | 40 | 1,517 | C34DG06TS | N16 | L16 |
| 65.0 | 10 | 570 | 5/8 | 14 | 1,062 | C58AA06WS | N11 | L11 | 28 | 1,380 | C58AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 5/8 | 12 | 1,050 | C58AA06WS | N11 | L11 | 24 | 1,365 | C58AA06WS | N14 | L14 |
| 100.0 | 10 | 878 | 5/8 | 10 | 1,167 | C58AA06WS | N12 | L12 | 20 | 1,517 | C58DG06TS | N16 | L16 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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2013 CBC OSHPD

*CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 660 | C12AA04WS | N7 | L7 | 80 | 858 | C12AA06WS | N9 | L9 |
| 25.0 | 10 | 219 | 3/4 | 30 | 1,125 | C34DG06WS | N12 | L12 | 60 | 1,463 | C34DG06WS | N15 | L15 |
| 35.0 | 10 | 307 | 3/4 | 21 | 1,103 | C34DG06WS | N12 | L12 | 42 | 1,433 | C34DG06WS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 15 | 1,125 | C34DG06WS | N12 | L12 | 30 | 1,463 | C34DG06WS | N15 | L15 |
| 65.0 | 10 | 570 | 3/4 | 11 | 1,073 | C34DG06WS | N11 | L11 | 22 | 1,394 | C34DG06WS | N14 | L14 |
| 75.0 | 10 | 658 | 3/4 | 10 | 1,125 | C34DG06WS | N12 | L12 | 20 | 1,463 | C34DG06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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*CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 508 | C12AA04WS | N6 | L6 | 80 | 660 | C12AA04WS | N7 | L7 |
| 25.0 | 10 | 219 | 1/2 | 38 | 1,097 | C12AA06WS | N11 | L11 | 76 | 1,426 | C12AA06WS | N15 | L15 |
| 35.0 | 10 | 307 | 1/2 | 26 | 1,051 | C12AA06WS | N11 | L11 | 52 | 1,366 | C12AA06WS | N14 | L14 |
| 50.0 | 10 | 439 | 1/2 | 18 | 1,039 | C12AA06WS | N11 | L11 | 36 | 1,351 | C12AA06WS | N14 | L14 |
| 65.0 | 10 | 570 | 1/2 | 14 | 1,051 | C12AA06WS | N11 | L11 | 28 | 1,366 | C12AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 1/2 | 12 | 1,039 | C12AA06WS | N11 | L11 | 24 | 1,351 | C12AA06WS | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *CABLE BRACING REQUIREMENTS [7]:*

***<u>TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)</u>*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 685 | C12AA06WS | N7 | L7 | 80 | 890 | C12AA06WS | N9 | L9 |
| 25.0 | 10 | 219 | 3/4 | 30 | 1,167 | C34DG06WS | N12 | L12 | 60 | 1,517 | C34DG06TS | N16 | L16 |
| 35.0 | 10 | 307 | 3/4 | 22 | 1,198 | C34DG06WS | N12 | L12 | 44 | 1,557 | C34DG06TS | N16 | L16 |
| 50.0 | 10 | 439 | 5/8 | 14 | 1,089 | C58AA06WS | N11 | L11 | 28 | 1,416 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 5/8 | 10 | 1,011 | C58AA06WS | N11 | L11 | 20 | 1,315 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B24.0, B43.0, B46.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B24.1, B43.1, B46.1)** | | | | |
| 11.0 | 10 | 97 | 5/8 | 40 | 880 | C58AA06WS | N9 | L9 | 80 | 1,144 | C58AA06WS | N12 | L12 |
| 25.0 | 10 | 219 | 3/4 | 22 | 1,100 | C34DG06WS | N11 | L11 | 44 | 1,430 | C34DG06WS | N15 | L15 |
| 35.0 | 10 | 307 | 3/4 | 16 | 1,120 | C34DG06WS | N12 | L12 | 32 | 1,456 | C34DG06WS | N15 | L15 |
| 50.0 | 10 | 439 | 3/4 | 11 | 1,100 | C34DG06WS | N11 | L11 | 22 | 1,430 | C34DG06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***C34-1-60***

## *CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B25.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B25.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 64 | C38AA04WS | N1 | L1 | 80 | 83 | C38AA04WS | N1 | L1 |
| 25.0 | 10 | 219 | 1/2 | 40 | 144 | C12AA04WS | N2 | L2 | 80 | 188 | C12AA04WS | N2 | L2 |
| 35.0 | 10 | 307 | 1/2 | 40 | 202 | C12AA04WS | N3 | L3 | 80 | 263 | C12AA04WS | N3 | L3 |
| 50.0 | 10 | 439 | 1/2 | 40 | 289 | C12AA04WS | N3 | L3 | 80 | 375 | C12AA04WS | N4 | L4 |
| 65.0 | 10 | 570 | 1/2 | 40 | 375 | C12AA04WS | N4 | L4 | 80 | 488 | C12AA04WS | N5 | L5 |
| 75.0 | 10 | 658 | 1/2 | 40 | 433 | C12AA04WS | N5 | L5 | 80 | 563 | C12AA04WS | N6 | L6 |
| 100.0 | 10 | 878 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 751 | C12AA06WS | N8 | L8 |
| 125.0 | 10 | 1,097 | 5/8 | 40 | 722 | C58AA06WS | N8 | L8 | 80 | 938 | C58AA06WS | N10 | L10 |
| 150.0 | 10 | 1,316 | 5/8 | 40 | 866 | C58AA06WS | N9 | L9 | 80 | 1,126 | C58AA06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 5/8 | 37 | 935 | C58AA06WS | N10 | L10 | 74 | 1,215 | C58AA06WS | N13 | L13 |
| 200.0 | 10 | 1,755 | 5/8 | 32 | 924 | C58AA06WS | N10 | L10 | 64 | 1,201 | C58AA06WS | N13 | L13 |
| 225.0 | 10 | 1,974 | 5/8 | 29 | 942 | C58AA06WS | N10 | L10 | 58 | 1,224 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## *CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B25.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B25.1) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 86 | C38AA04WS | N1 | L1 | 80 | 111 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 194 | C12AA04WS | N2 | L2 | 80 | 253 | C12AA04WS | N3 | L3 |
| 35.0 | 10 | 307 | 1/2 | 40 | 272 | C12AA04WS | N3 | L3 | 80 | 354 | C12AA04WS | N4 | L4 |
| 50.0 | 10 | 439 | 1/2 | 40 | 389 | C12AA04WS | N4 | L4 | 80 | 506 | C12AA04WS | N6 | L6 |
| 65.0 | 10 | 570 | 5/8 | 40 | 506 | C58AA04WS | N6 | L6 | 80 | 657 | C58AA04WS | N7 | L7 |
| 75.0 | 10 | 658 | 3/4 | 40 | 583 | C34CF04WS | N6 | L6 | 80 | 758 | C34DG06WS | N8 | L8 |
| 100.0 | 10 | 878 | 3/4 | 40 | 778 | C34DG06WS | N8 | L8 | 80 | 1,011 | C34DG06WS | N11 | L11 |
| 125.0 | 10 | 1,097 | 3/4 | 32 | 778 | C34DG06WS | N8 | L8 | 64 | 1,011 | C34DG06WS | N11 | L11 |
| 150.0 | 10 | 1,316 | 3/4 | 27 | 788 | C34DG06WS | N8 | L8 | 54 | 1,024 | C34DG06WS | N11 | L11 |
| 175.0 | 10 | 1,536 | 3/4 | 23 | 783 | C34DG06WS | N8 | L8 | 46 | 1,018 | C34DG06WS | N11 | L11 |
| 200.0 | 10 | 1,755 | 3/4 | 21 | 817 | C34DG06WS | N9 | L9 | 42 | 1,062 | C34DG06WS | N11 | L11 |
| 225.0 | 10 | 1,974 | 3/4 | 19 | 831 | C34DG06WS | N9 | L9 | 38 | 1,081 | C34DG06WS | N11 | L11 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## *CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B25.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B25.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 110 | C38AA04WS | N2 | L2 | 80 | 143 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 250 | C12AA04WS | N3 | L3 | 80 | 325 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 307 | 1/2 | 40 | 350 | C12AA04WS | N4 | L4 | 80 | 455 | C12AA04WS | N5 | L5 |
| 50.0 | 10 | 439 | 5/8 | 40 | 500 | C58AA04WS | N5 | L5 | 80 | 650 | C58AA04WS | N7 | L7 |
| 65.0 | 10 | 570 | 3/4 | 40 | 650 | C34CF04WS | N7 | L7 | 80 | 845 | C34DG06WS | N9 | L9 |
| 75.0 | 10 | 658 | 3/4 | 36 | 675 | C34DG06WS | N7 | L7 | 72 | 878 | C34DG06WS | N9 | L9 |
| 100.0 | 10 | 878 | 3/4 | 26 | 650 | C34CF04WS | N7 | L7 | 52 | 845 | C34DG06WS | N9 | L9 |
| 125.0 | 10 | 1,097 | 3/4 | 22 | 688 | C34DG06WS | N7 | L7 | 44 | 894 | C34DG06WS | N9 | L9 |
| 150.0 | 10 | 1,316 | 3/4 | 18 | 675 | C34DG06WS | N7 | L7 | 36 | 878 | C34DG06WS | N9 | L9 |
| 175.0 | 10 | 1,536 | 3/4 | 16 | 700 | C34DG06WS | N7 | L7 | 32 | 910 | C34DG06WS | N10 | L10 |
| 200.0 | 10 | 1,755 | 3/4 | 14 | 700 | C34DG06WS | N7 | L7 | 28 | 910 | C34DG06WS | N10 | L10 |
| 225.0 | 10 | 1,974 | 3/4 | 12 | 675 | C34DG06WS | N7 | L7 | 24 | 878 | C34DG06WS | N9 | L9 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## *CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | | | | | **Min. Brace Anchorage [6]** | |
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B25.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B25.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 127 | C38AA04WS | N2 | L2 | 80 | 165 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 289 | C12AA04WS | N3 | L3 | 80 | 375 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 307 | 1/2 | 40 | 404 | C12AA04WS | N5 | L5 | 80 | 525 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 439 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 751 | C12AA06WS | N8 | L8 |
| 65.0 | 10 | 570 | 5/8 | 40 | 751 | C58AA06WS | N8 | L8 | 80 | 976 | C58AA06WS | N10 | L10 |
| 75.0 | 10 | 658 | 5/8 | 40 | 866 | C58AA06WS | N9 | L9 | 80 | 1,126 | C58AA06WS | N12 | L12 |
| 100.0 | 10 | 878 | 5/8 | 31 | 895 | C58AA06WS | N9 | L9 | 62 | 1,163 | C58AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 5/8 | 25 | 902 | C58AA06WS | N10 | L10 | 50 | 1,173 | C58AA06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 5/8 | 21 | 909 | C58AA06WS | N10 | L10 | 42 | 1,182 | C58AA06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 5/8 | 18 | 909 | C58AA06WS | N10 | L10 | 36 | 1,182 | C58AA06WS | N12 | L12 |
| 200.0 | 10 | 1,755 | 5/8 | 16 | 924 | C58AA06WS | N10 | L10 | 32 | 1,201 | C58AA06WS | N13 | L13 |
| 225.0 | 10 | 1,974 | 5/8 | 14 | 909 | C58AA06WS | N10 | L10 | 28 | 1,182 | C58AA06WS | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

Anthony A. Rubalcava
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**2-Tier**

2013 CBC OSHPD

## *CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B25.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B25.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 171 | C12AA04WS | N2 | L2 | 80 | 222 | C12AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 389 | C12AA04WS | N4 | L4 | 80 | 506 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 5/8 | 40 | 545 | C58AA04WS | N6 | L6 | 80 | 708 | C58AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 3/4 | 39 | 758 | C34DG06WS | N8 | L8 | 78 | 986 | C34DG06WS | N10 | L10 |
| 65.0 | 10 | 570 | 3/4 | 30 | 758 | C34DG06WS | N8 | L8 | 60 | 986 | C34DG06WS | N10 | L10 |
| 75.0 | 10 | 658 | 3/4 | 26 | 758 | C34DG06WS | N8 | L8 | 52 | 986 | C34DG06WS | N10 | L10 |
| 100.0 | 10 | 878 | 3/4 | 20 | 778 | C34DG06WS | N8 | L8 | 40 | 1,011 | C34DG06WS | N11 | L11 |
| 125.0 | 10 | 1,097 | 3/4 | 16 | 778 | C34DG06WS | N8 | L8 | 32 | 1,011 | C34DG06WS | N11 | L11 |
| 150.0 | 10 | 1,316 | 3/4 | 13 | 758 | C34DG06WS | N8 | L8 | 26 | 986 | C34DG06WS | N10 | L10 |
| 175.0 | 10 | 1,536 | 3/4 | 11 | 749 | C34DG06WS | N8 | L8 | 22 | 973 | C34DG06WS | N10 | L10 |
| 200.0 | 10 | 1,755 | 3/4 | 10 | 778 | C34DG06WS | N8 | L8 | 20<br>0 | 1,011 | C34DG06WS | N11 | L11 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## *CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B25.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B25.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 220 | C12AA04WS | N3 | L3 | 80 | 286 | C12AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 3/4 | 40 | 500 | C34CF04WS | N5 | L5 | 80 | 650 | C34CF04WS | N7 | L7 |
| 35.0 | 10 | 307 | 3/4 | 38 | 665 | C34CF04WS | N7 | L7 | 76 | 865 | C34DG06WS | N9 | L9 |
| 50.0 | 10 | 439 | 3/4 | 26 | 650 | C34CF04WS | N7 | L7 | 52 | 845 | C34DG06WS | N9 | L9 |
| 65.0 | 10 | 570 | 3/4 | 20 | 650 | C34CF04WS | N7 | L7 | 40 | 845 | C34DG06WS | N9 | L9 |
| 75.0 | 10 | 658 | 3/4 | 18 | 675 | C34DG06WS | N7 | L7 | 36 | 878 | C34DG06WS | N9 | L9 |
| 100.0 | 10 | 878 | 3/4 | 12 | 600 | C34CF04WS | N6 | L6 | 24 | 780 | C34DG06WS | N8 | L8 |
| 125.0 | 10 | 1,097 | 3/4 | 10 | 625 | C34CF04WS | N7 | L7 | 20 | 813 | C34DG06WS | N9 | L9 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## *CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B25.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B25.1)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 191 | C38AA04WS | N2 | L2 | 80 | 248 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 433 | C12AA04WS | N5 | L5 | 80 | 563 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 1/2 | 40 | 606 | C12AA04WS | N7 | L7 | 80 | 788 | C12AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 5/8 | 40 | 866 | C58AA06WS | N9 | L9 | 80 | 1,126 | C58AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 3/4 | 32 | 901 | C34DG06WS | N10 | L10 | 64 | 1,171 | C34DG06WS | N12 | L12 |
| 75.0 | 10 | 658 | 3/4 | 28 | 909 | C34DG06WS | N10 | L10 | 56 | 1,182 | C34DG06WS | N12 | L12 |
| 100.0 | 10 | 878 | 3/4 | 21 | 909 | C34DG06WS | N10 | L10 | 42 | 1,182 | C34DG06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 3/4 | 17 | 920 | C34DG06WS | N10 | L10 | 34 | 1,196 | C34DG06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 5/8 | 14 | 909 | C58AA06WS | N10 | L10 | 28 | 1,182 | C58AA06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 5/8 | 12 | 909 | C58AA06WS | N10 | L10 | 24 | 1,182 | C58AA06WS | N12 | L12 |
| 200.0 | 10 | 1,755 | 5/8 | 10 | 866 | C58AA06WS | N9 | L9 | 20 | 1,126 | C58AA06WS | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

**CABLE BRACING REQUIREMENTS [7]:**

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B25.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B25.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 257 | C12AA04WS | N3 | L3 | 80 | 334 | C12AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 3/4 | 40 | 583 | C34CF04WS | N6 | L6 | 80 | 758 | C34DG06WS | N8 | L8 |
| 35.0 | 10 | 307 | 3/4 | 37 | 755 | C34DG06WS | N8 | L8 | 74 | 982 | C34DG06WS | N10 | L10 |
| 50.0 | 10 | 439 | 3/4 | 26 | 758 | C34DG06WS | N8 | L8 | 52 | 986 | C34DG06WS | N10 | L10 |
| 65.0 | 10 | 570 | 3/4 | 20 | 758 | C34DG06WS | N8 | L8 | 40 | 986 | C34DG06WS | N10 | L10 |
| 75.0 | 10 | 658 | 3/4 | 17 | 744 | C34DG06WS | N8 | L8 | 34 | 967 | C34DG06WS | N10 | L10 |
| 100.0 | 10 | 878 | 3/4 | 13 | 758 | C34DG06WS | N8 | L8 | 26 | 986 | C34DG06WS | N10 | L10 |
| 125.0 | 10 | 1,097 | 3/4 | 10 | 729 | C34DG06WS | N8 | L8 | 20 | 948 | C34DG06WS | N10 | L10 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**C34-0.75-45**
**2-Tier**

## *CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly Page E3** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly Page E3** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B25.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B25.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 330 | C12AA04WS | N4 | L4 | 80 | 429 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 3/4 | 34 | 638 | C34CF04WS | N7 | L7 | 68 | 829 | C34DG06WS | N9 | L9 |
| 35.0 | 10 | 307 | 3/4 | 24 | 630 | C34CF04WS | N7 | L7 | 48 | 819 | C34DG06WS | N9 | L9 |
| 50.0 | 10 | 439 | 3/4 | 18 | 675 | C34DG06WS | N7 | L7 | 36 | 878 | C34DG06WS | N9 | L9 |
| 65.0 | 10 | 570 | 3/4 | 14 | 683 | C34DG06WS | N7 | L7 | 28 | 887 | C34DG06WS | N9 | L9 |
| 75.0 | 10 | 658 | 3/4 | 12 | 675 | C34DG06WS | N7 | L7 | 24 | 878 | C34DG06WS | N9 | L9 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

### *CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **TRANSVERSE BRACING REQUIREMENTS** | | | | | **LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6]: Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6]: Metal [5] Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B25.0)** | | | | | **6-Way Transverse, Longitudinal Brace Pattern (B25.1)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 254 | C12AA04WS | N3 | L3 | 80 | 330 | C12AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 751 | C12AA06WS | N8 | L8 |
| 35.0 | 10 | 307 | 5/8 | 40 | 808 | C58AA06WS | N9 | L9 | 80 | 1,051 | C58AA06WS | N11 | L11 |
| 50.0 | 10 | 439 | 3/4 | 31 | 895 | C34DG06WS | N9 | L9 | 62 | 1,163 | C34DG06WS | N12 | L12 |
| 65.0 | 10 | 570 | 3/4 | 24 | 901 | C34DG06WS | N10 | L10 | 48 | 1,171 | C34DG06WS | N12 | L12 |
| 75.0 | 10 | 658 | 3/4 | 21 | 909 | C34DG06WS | N10 | L10 | 42 | 1,182 | C34DG06WS | N12 | L12 |
| 100.0 | 10 | 878 | 5/8 | 15 | 866 | C58AA06WS | N9 | L9 | 30 | 1,126 | C58AA06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 5/8 | 12 | 866 | C58AA06WS | N9 | L9 | 24 | 1,126 | C58AA06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 5/8 | 10 | 866 | C58AA06WS | N9 | L9 | 20 | 1,126 | C58AA06WS | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## *CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B25.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B25.1) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 342 | C12AA04WS | N4 | L4 | 80 | 445 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 3/4 | 39 | 758 | C34DG06WS | N8 | L8 | 78 | 986 | C34DG06WS | N10 | L10 |
| 35.0 | 10 | 307 | 3/4 | 28 | 762 | C34DG06WS | N8 | L8 | 56 | 991 | C34DG06WS | N10 | L10 |
| 50.0 | 10 | 439 | 3/4 | 19 | 739 | C34DG06WS | N8 | L8 | 38 | 961 | C34DG06WS | N10 | L10 |
| 65.0 | 10 | 570 | 3/4 | 15 | 758 | C34DG06WS | N8 | L8 | 30 | 986 | C34DG06WS | N10 | L10 |
| 75.0 | 10 | 658 | 3/4 | 13 | 758 | C34DG06WS | N8 | L8 | 26 | 986 | C34DG06WS | N10 | L10 |
| 100.0 | 10 | 878 | 3/4 | 10 | 778 | C34DG06WS | N8 | L8 | 20 | 1,011 | C34DG06WS | N11 | L11 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

## *CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | TRANSVERSE BRACING REQUIREMENTS | | | | | LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B25.0) | | | | | 6-Way Transverse, Longitudinal Brace Pattern (B25.1) | | | | |
| 11.0 | 10 | 97 | 5/8 | 40 | 440 | C58AA04WS | N5 | L5 | 80 | 572 | C58AA04WS | N6 | L6 |
| 25.0 | 10 | 219 | 3/4 | 26 | 650 | C34CF04WS | N7 | L7 | 52 | 845 | C34DG06WS | N9 | L9 |
| 35.0 | 10 | 307 | 3/4 | 18 | 630 | C34CF04WS | N7 | L7 | 36 | 819 | C34DG06WS | N9 | L9 |
| 50.0 | 10 | 439 | 3/4 | 12 | 600 | C34CF04WS | N6 | L6 | 24 | 780 | C34DG06WS | N8 | L8 |
| 65.0 | 10 | 570 | 3/4 | 10 | 650 | C34CF04WS | N7 | L7 | 20 | 845 | C34DG06WS | N9 | L9 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4) | | | | |
| 11.0 | 10 | 149 | 3/8 | 40 | 90 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 338 | 1/2 | 40 | 204 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 473 | 1/2 | 40 | 286 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 675 | 1/2 | 40 | 408 | R12AAEM406 | N5 | L5 |
| 65.0 | 10 | 878 | 1/2 | 40 | 531 | R12AAEM406 | N6 | L6 |
| 75.0 | 10 | 1,013 | 1/2 | 40 | 612 | R12AAEM406 | N7 | L7 |
| 100.0 | 10 | 1,351 | 1/2 | 40 | 816 | R12AAEM506 | N9 | L9 |
| 125.0 | 10 | 1,689 | 1/2 | 40 | 1,021 | R12AAEM506 | N11 | L11 |
| 150.0 | 10 | 2,026 | 1/2 | 40 | 1,225 | R12AAEM506 | N13 | L13 |
| 175.0 | 10 | 2,364 | 1/2 | 40 | 1,429 | R12AAEM506 | N15 | L15 |
| 200.0 | 10 | 2,560 | 5/8 | 34 | 1,388 | R58AAEM506 | N14 | L14 |
| 225.0 | 10 | 2,773 | 5/8 | 30 | 1,378 | R58AAEM506 | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4)** | | | | |
| 11.0 | 10 | 204 | 3/8 | 40 | 121 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 464 | 1/2 | 40 | 275 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 649 | 1/2 | 40 | 385 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 927 | 1/2 | 40 | 550 | R12AAEM406 | N6 | L6 |
| 65.0 | 10 | 1,206 | 1/2 | 40 | 715 | R12AAEM509 | N8 | L8 |
| 75.0 | 10 | 1,391 | 1/2 | 40 | 825 | R12AAEM506 | N9 | L9 |
| 100.0 | 10 | 1,855 | 1/2 | 40 | 1,100 | R12AAEM506 | N12 | L12 |
| 125.0 | 10 | 2,319 | 5/8 | 40 | 1,375 | R58AAEM506 | N14 | L14 |
| 150.0 | 10 | 2,782 | 5/8 | 40 | 1,650 | R58AAEM606 | N17 | L17 |
| 175.0 | 10 | 3,246 | 3/4 | 40 | 1,925 | R34DGB2P09 | N20 | L20 |
| 200.0 | 10 | 3,710 | 3/4 | 40 | 2,200 | R34DGB2P09 | N23 | L23 |
| 225.0 | 10 | 4,063 | 3/4 | 38 | 2,351 | R34DGB2P09 | N24 | L24 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS* [7] *:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1, 8] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage** [6] | |
| | | | | | | | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4)** | | | | |
| 11.0 | 10 | 253 | 3/8 | 40 | 156 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 574 | 1/2 | 40 | 354 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 804 | 1/2 | 40 | 495 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 1,149 | 1/2 | 40 | 707 | R12AAEM509 | N8 | L8 |
| 65.0 | 10 | 1,494 | 1/2 | 40 | 919 | R12AAEM506 | N10 | L10 |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 1,061 | R58AAEM506 | N11 | L11 |
| 100.0 | 10 | 2,298 | 5/8 | 40 | 1,414 | R58AAEM506 | N15 | L15 |
| 125.0 | 10 | 2,517 | 5/8 | 32 | 1,414 | R58AAEM506 | N15 | L15 |
| 150.0 | 10 | 2,808 | 5/8 | 28 | 1,485 | R58AAEM606 | N15 | L15 |
| 175.0 | 10 | 3,027 | 5/8 | 24 | 1,485 | R58AAEM606 | N15 | L15 |
| 200.0 | 10 | 3,175 | 5/8 | 20 | 1,414 | R58AAEM506 | N15 | L15 |
| 225.0 | 10 | 3,413 | 5/8 | 18 | 1,432 | R58AAEM506 | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4)** | | | | |
| 11.0 | 10 | 201 | 3/8 | 40 | 180 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 456 | 1/2 | 40 | 408 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 639 | 1/2 | 40 | 572 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 912 | 1/2 | 40 | 816 | R12AAEM506 | N9 | L9 |
| 65.0 | 10 | 1,186 | 1/2 | 40 | 1,061 | R12AAEM506 | N11 | L11 |
| 75.0 | 10 | 1,368 | 1/2 | 40 | 1,225 | R12AAEM506 | N13 | L13 |
| 100.0 | 10 | 1,682 | 1/2 | 34 | 1,388 | R12AAEM506 | N14 | L14 |
| 125.0 | 10 | 1,925 | 1/2 | 28 | 1,429 | R12AAEM506 | N15 | L15 |
| 150.0 | 10 | 2,097 | 1/2 | 22 | 1,347 | R12AAEM506 | N14 | L14 |
| 175.0 | 10 | 2,364 | 1/2 | 20 | 1,429 | R12AAEM506 | N15 | L15 |
| 200.0 | 10 | 2,513 | 5/8 | 16 | 1,306 | R58AAEM506 | N14 | L14 |
| 225.0 | 10 | 2,720 | 5/8 | 14 | 1,286 | R58AAEM506 | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS* [7] *:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod** [1, 8] **Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4)** | | | | |
| 11.0 | 10 | 312 | 3/8 | 40 | 242 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 708 | 1/2 | 40 | 550 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 991 | 1/2 | 40 | 770 | R12AAEM509 | N8 | L8 |
| 50.0 | 10 | 1,416 | 1/2 | 40 | 1,100 | R12AAEM506 | N12 | L12 |
| 65.0 | 10 | 1,841 | 5/8 | 40 | 1,430 | R58AAEM506 | N15 | L15 |
| 75.0 | 10 | 2,124 | 3/4 | 40 | 1,650 | R34CFB2P12 | N17 | L17 |
| 100.0 | 10 | 2,832 | 3/4 | 40 | 2,200 | R34DGB2P09 | N23 | L23 |
| 125.0 | 10 | 3,051 | 3/4 | 32 | 2,200 | R34DGB2P09 | N23 | L23 |
| 150.0 | 10 | 3,222 | 3/4 | 26 | 2,145 | R34DGB2P09 | N22 | L22 |
| 175.0 | 10 | 3,417 | 3/4 | 22 | 2,118 | R34DGB2P09 | N22 | L22 |
| 200.0 | 10 | 3,710 | 3/4 | 20 | 2,200 | R34DGB2P09 | N23 | L23 |
| 225.0 | 10 | 3,953 | 3/4 | 18 | 2,228 | R34DGB2P09 | N23 | L23 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4)** | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 311 | R38AAEM409 | N4 | L4 |
| 25.0 | 10 | 930 | 1/2 | 40 | 707 | R12AAEM509 | N8 | L8 |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 990 | R12AAEM506 | N10 | L10 |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 1,414 | R58AAEM506 | N15 | L15 |
| 65.0 | 10 | 1,955 | 5/8 | 30 | 1,379 | R58AAEM506 | N14 | L14 |
| 75.0 | 10 | 2,043 | 5/8 | 26 | 1,379 | R58AAEM506 | N14 | L14 |
| 100.0 | 10 | 2,298 | 5/8 | 20 | 1,414 | R58AAEM506 | N15 | L15 |
| 125.0 | 10 | 2,517 | 5/8 | 16 | 1,414 | R58AAEM506 | N15 | L15 |
| 150.0 | 10 | 2,808 | 5/8 | 14 | 1,485 | R58AAEM606 | N15 | L15 |
| 175.0 | 10 | 3,027 | 5/8 | 12 | 1,485 | R58AAEM606 | N15 | L15 |
| 200.0 | 10 | 3,175 | 5/8 | 10 | 1,414 | R58AAEM506 | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS**<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | **4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4)** | | | | |
| 11.0 | 10 | 253 | 3/8 | 40 | 269 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 574 | 1/2 | 40 | 612 | R12AAEM406 | N7 | L7 |
| 35.0 | 10 | 804 | 1/2 | 40 | 857 | R12AAEM506 | N9 | L9 |
| 50.0 | 10 | 1,149 | 1/2 | 40 | 1,225 | R12AAEM506 | N13 | L13 |
| 65.0 | 10 | 1,401 | 1/2 | 36 | 1,433 | R12AAEM506 | N15 | L15 |
| 75.0 | 10 | 1,457 | 1/2 | 30 | 1,378 | R12AAEM506 | N14 | L14 |
| 100.0 | 10 | 1,659 | 1/2 | 22 | 1,347 | R12AAEM506 | N14 | L14 |
| 125.0 | 10 | 1,896 | 1/2 | 18 | 1,378 | R12AAEM506 | N14 | L14 |
| 150.0 | 10 | 2,062 | 1/2 | 14 | 1,286 | R12AAEM506 | N13 | L13 |
| 175.0 | 10 | 2,281 | 1/2 | 12 | 1,286 | R12AAEM506 | N13 | L13 |
| 200.0 | 10 | 2,465 | 1/2 | 10 | 1,225 | R12AAEM506 | N13 | L13 |
| 225.0 | 10 | 2,773 | 5/8 | 10 | 1,378 | R58AAEM506 | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | 4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4) | | | | |
| 11.0 | 10 | 419 | 3/8 | 40 | 363 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 952 | 1/2 | 40 | 825 | R12AAEM506 | N9 | L9 |
| 35.0 | 10 | 1,333 | 5/8 | 40 | 1,155 | R58AAEM506 | N12 | L12 |
| 50.0 | 10 | 1,905 | 3/4 | 40 | 1,650 | R34CFB2P12 | N17 | L17 |
| 65.0 | 10 | 2,476 | 3/4 | 40 | 2,145 | R34DGB2P09 | N22 | L22 |
| 75.0 | 10 | 2,527 | 3/4 | 34 | 2,104 | R34DGB2P09 | N22 | L22 |
| 100.0 | 10 | 2,783 | 3/4 | 26 | 2,145 | R34DGB2P09 | N22 | L22 |
| 125.0 | 10 | 2,929 | 3/4 | 20 | 2,063 | R34DGB2P09 | N21 | L21 |
| 150.0 | 10 | 3,295 | 3/4 | 18 | 2,228 | R34DGB2P09 | N23 | L23 |
| 175.0 | 10 | 3,331 | 3/4 | 14 | 2,021 | R34DGB2P09 | N21 | L21 |
| 200.0 | 10 | 3,807 | 3/4 | 14 | 2,310 | R34DGB2P09 | N24 | L24 |
| 225.0 | 10 | 3,953 | 3/4 | 12 | 2,228 | R34DGB2P09 | N23 | L23 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS[7]:

**TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage[6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod[1, 8] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4) | | | | |
| 11.0 | 10 | 565 | 1/2 | 40 | 467 | R12AAEM406 | N5 | L5 |
| 25.0 | 10 | 1,285 | 5/8 | 40 | 1,061 | R58AAEM506 | N11 | L11 |
| 35.0 | 10 | 1,649 | 5/8 | 36 | 1,336 | R58AAEM506 | N14 | L14 |
| 50.0 | 10 | 1,824 | 5/8 | 26 | 1,379 | R58AAEM506 | N14 | L14 |
| 65.0 | 10 | 1,955 | 5/8 | 20 | 1,379 | R58AAEM506 | N14 | L14 |
| 75.0 | 10 | 2,096 | 5/8 | 18 | 1,432 | R58AAEM506 | N15 | L15 |
| 100.0 | 10 | 2,156 | 5/8 | 12 | 1,273 | R58AAEM506 | N13 | L13 |
| 125.0 | 10 | 2,428 | 5/8 | 10 | 1,326 | R58AAEM506 | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

**TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | 4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4) | | | | |
| 11.0 | 10 | 305 | 3/8 | 40 | 359 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 693 | 1/2 | 40 | 816 | R12AAEM506 | N9 | L9 |
| 35.0 | 10 | 970 | 1/2 | 40 | 1,143 | R12AAEM506 | N12 | L12 |
| 50.0 | 10 | 1,244 | 1/2 | 34 | 1,388 | R12AAEM506 | N14 | L14 |
| 65.0 | 10 | 1,371 | 1/2 | 26 | 1,380 | R12AAEM506 | N14 | L14 |
| 75.0 | 10 | 1,439 | 1/2 | 22 | 1,347 | R12AAEM506 | N14 | L14 |
| 100.0 | 10 | 1,635 | 1/2 | 16 | 1,306 | R12AAEM506 | N14 | L14 |
| 125.0 | 10 | 1,925 | 1/2 | 14 | 1,429 | R12AAEM506 | N15 | L15 |
| 150.0 | 10 | 2,026 | 1/2 | 10 | 1,225 | R12AAEM506 | N13 | L13 |
| 175.0 | 10 | 2,364 | 1/2 | 10 | 1,429 | R12AAEM506 | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS**<br>**Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]**<br>**Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
|---|---|---|---|---|---|---|---|---|
| | | | | **4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4)** | | | | |
| 11.0 | 10 | 527 | 1/2 | 40 | 484 | R12AAEM406 | N5 | L5 |
| 25.0 | 10 | 1,197 | 1/2 | 40 | 1,100 | R12AAEM506 | N12 | L12 |
| 35.0 | 10 | 1,675 | 5/8 | 40 | 1,540 | R58AAEM606 | N16 | L16 |
| 50.0 | 10 | 2,198 | 3/4 | 36 | 1,980 | R34DGB2P09 | N20 | L20 |
| 65.0 | 10 | 2,476 | 3/4 | 30 | 2,145 | R34DGB2P09 | N22 | L22 |
| 75.0 | 10 | 2,564 | 3/4 | 26 | 2,145 | R34DGB2P09 | N22 | L22 |
| 100.0 | 10 | 2,832 | 3/4 | 20 | 2,200 | R34DGB2P09 | N23 | L23 |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 2,200 | R34DGB2P09 | N23 | L23 |
| 150.0 | 10 | 3,075 | 3/4 | 12 | 1,980 | R34DGB2P09 | N20 | L20 |
| 175.0 | 10 | 3,246 | 3/4 | 10 | 1,925 | R34DGB2P09 | N20 | L20 |
| 200.0 | 10 | 3,710 | 3/4 | 10 | 2,200 | R34DGB2P09 | N23 | L23 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7]:

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B20.4, B41.4, B45.4) | | | | |
| 11.0 | 10 | 721 | 1/2 | 40 | 622 | R12AAEM406 | N7 | L7 |
| 25.0 | 10 | 1,604 | 5/8 | 39 | 1,379 | R58AAEM506 | N14 | L14 |
| 35.0 | 10 | 1,699 | 5/8 | 28 | 1,386 | R58AAEM506 | N14 | L14 |
| 50.0 | 10 | 1,859 | 5/8 | 20 | 1,414 | R58AAEM506 | N15 | L15 |
| 65.0 | 10 | 1,863 | 5/8 | 14 | 1,287 | R58AAEM506 | N13 | L13 |
| 75.0 | 10 | 1,936 | 5/8 | 12 | 1,273 | R58AAEM506 | N13 | L13 |
| 100.0 | 10 | 2,298 | 5/8 | 10 | 1,414 | R58AAEM506 | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B21.4)** | | | | |
| 11.0 | 10 | 149 | 3/8 | 40 | 45 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 338 | 1/2 | 40 | 102 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 473 | 1/2 | 40 | 143 | R12AAEM306 | N2 | L2 |
| 50.0 | 10 | 675 | 1/2 | 40 | 204 | R12AAEM306 | N3 | L3 |
| 65.0 | 10 | 878 | 1/2 | 40 | 265 | R12AAEM306 | N3 | L3 |
| 75.0 | 10 | 1,013 | 1/2 | 40 | 306 | R12AAEM409 | N4 | L4 |
| 100.0 | 10 | 1,351 | 1/2 | 40 | 408 | R12AAEM406 | N5 | L5 |
| 125.0 | 10 | 1,689 | 1/2 | 40 | 510 | R12AAEM406 | N6 | L6 |
| 150.0 | 10 | 2,026 | 1/2 | 40 | 612 | R12AAEM406 | N7 | L7 |
| 175.0 | 10 | 2,364 | 1/2 | 40 | 714 | R12AAEM509 | N8 | L8 |
| 200.0 | 10 | 2,702 | 5/8 | 40 | 816 | R58AAEM506 | N9 | L9 |
| 225.0 | 10 | 3,040 | 5/8 | 40 | 919 | R58AAEM506 | N10 | L10 |

1. TVL = DL + Fv + $(0.2S_{DS} \times 0.70 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**2-Tier**

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B21.4) | | | | |
| 11.0 | 10 | 204 | 3/8 | 40 | 61 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 464 | 1/2 | 40 | 138 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 649 | 1/2 | 40 | 193 | R12AAEM306 | N2 | L2 |
| 50.0 | 10 | 927 | 1/2 | 40 | 275 | R12AAEM306 | N3 | L3 |
| 65.0 | 10 | 1,206 | 1/2 | 40 | 358 | R12AAEM406 | N4 | L4 |
| 75.0 | 10 | 1,391 | 1/2 | 40 | 413 | R12AAEM406 | N5 | L5 |
| 100.0 | 10 | 1,855 | 1/2 | 40 | 550 | R12AAEM406 | N6 | L6 |
| 125.0 | 10 | 2,319 | 5/8 | 40 | 688 | R58AAEM509 | N7 | L7 |
| 150.0 | 10 | 2,782 | 5/8 | 40 | 825 | R58AAEM506 | N9 | L9 |
| 175.0 | 10 | 3,246 | 3/4 | 40 | 963 | R34CFB1P06 | N10 | L10 |
| 200.0 | 10 | 3,710 | 3/4 | 40 | 1,100 | R34CFB1P06 | N12 | L12 |
| 225.0 | 10 | 4,063 | 3/4 | 38 | 1,176 | R34CFB1P06 | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS* [7] *:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **4-Way Splayed Brace Pattern (B21.4)** | | | | |
| 11.0 | 10 | 253 | 3/8 | 40 | 78 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 574 | 1/2 | 40 | 177 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 804 | 1/2 | 40 | 247 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 1,149 | 1/2 | 40 | 354 | R12AAEM406 | N4 | L4 |
| 65.0 | 10 | 1,494 | 1/2 | 40 | 460 | R12AAEM406 | N5 | L5 |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 530 | R58AAEM406 | N6 | L6 |
| 100.0 | 10 | 2,298 | 5/8 | 40 | 707 | R58AAEM509 | N8 | L8 |
| 125.0 | 10 | 2,872 | 3/4 | 40 | 884 | R34DGB1P09 | N9 | L9 |
| 150.0 | 10 | 3,340 | 3/4 | 38 | 1,008 | R34DGB1P06 | N11 | L11 |
| 175.0 | 10 | 3,524 | 3/4 | 32 | 990 | R34DGB1P06 | N10 | L10 |
| 200.0 | 10 | 3,744 | 3/4 | 28 | 990 | R34DGB1P06 | N10 | L10 |
| 225.0 | 10 | 4,052 | 3/4 | 26 | 1,034 | R34DGB1P06 | N11 | L11 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS[7]:

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod[1, 8] Total Vertical Load (lbs)** | **Min.[8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage[6]** | |
| | | | | **Max.[2] Brace Spacing (ft.)** | **Brace[3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour[4] Deck Page D1** | **Metal[5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B21.4)** | | | | |
| 11.0 | 10 | 201 | 3/8 | 40 | 90 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 456 | 1/2 | 40 | 204 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 639 | 1/2 | 40 | 286 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 912 | 1/2 | 40 | 408 | R12AAEM406 | N5 | L5 |
| 65.0 | 10 | 1,186 | 1/2 | 40 | 531 | R12AAEM406 | N6 | L6 |
| 75.0 | 10 | 1,368 | 1/2 | 40 | 612 | R12AAEM406 | N7 | L7 |
| 100.0 | 10 | 1,824 | 1/2 | 40 | 816 | R12AAEM506 | N9 | L9 |
| 125.0 | 10 | 2,281 | 5/8 | 40 | 1,021 | R58AAEM506 | N11 | L11 |
| 150.0 | 10 | 2,737 | 5/8 | 40 | 1,225 | R58AAEM506 | N13 | L13 |
| 175.0 | 10 | 3,027 | 5/8 | 36 | 1,286 | R58AAEM506 | N13 | L13 |
| 200.0 | 10 | 3,270 | 5/8 | 32 | 1,306 | R58AAEM506 | N14 | L14 |
| 225.0 | 10 | 3,466 | 5/8 | 28 | 1,286 | R58AAEM506 | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7]:

**2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | <br>Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B21.4) | | | | |
| 11.0 | 10 | 312 | 3/8 | 40 | 121 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 708 | 1/2 | 40 | 275 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 991 | 1/2 | 40 | 385 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 1,416 | 1/2 | 40 | 550 | R12AAEM406 | N6 | L6 |
| 65.0 | 10 | 1,841 | 5/8 | 40 | 715 | R58AAEM509 | N8 | L8 |
| 75.0 | 10 | 2,124 | 3/4 | 40 | 825 | R34CFB1P09 | N9 | L9 |
| 100.0 | 10 | 2,832 | 3/4 | 40 | 1,100 | R34CFB1P06 | N12 | L12 |
| 125.0 | 10 | 3,051 | 3/4 | 32 | 1,100 | R34CFB1P06 | N12 | L12 |
| 150.0 | 10 | 3,295 | 3/4 | 27 | 1,114 | R34CFB1P06 | N12 | L12 |
| 175.0 | 10 | 3,502 | 3/4 | 23 | 1,107 | R34CFB1P06 | N12 | L12 |
| 200.0 | 10 | 3,807 | 3/4 | 21 | 1,155 | R34CFB1P06 | N12 | L12 |
| 225.0 | 10 | 4,063 | 3/4 | 19 | 1,176 | R34CFB1P06 | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B21.4)** | | | | |
| 11.0 | 10 | 409 | 3/8 | 40 | 156 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 930 | 1/2 | 40 | 354 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 1,301 | 1/2 | 40 | 495 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 1,859 | 5/8 | 40 | 707 | R58AAEM509 | N8 | L8 |
| 65.0 | 10 | 2,417 | 3/4 | 40 | 919 | R34DGB1P06 | N10 | L10 |
| 75.0 | 10 | 2,576 | 3/4 | 36 | 955 | R34DGB1P06 | N10 | L10 |
| 100.0 | 10 | 2,724 | 3/4 | 26 | 919 | R34DGB1P06 | N10 | L10 |
| 125.0 | 10 | 3,050 | 3/4 | 22 | 972 | R34DGB1P06 | N10 | L10 |
| 150.0 | 10 | 3,234 | 3/4 | 18 | 955 | R34DGB1P06 | N10 | L10 |
| 175.0 | 10 | 3,524 | 3/4 | 16 | 990 | R34DGB1P06 | N10 | L10 |
| 200.0 | 10 | 3,744 | 3/4 | 14 | 990 | R34DGB1P06 | N10 | L10 |
| 225.0 | 10 | 3,892 | 3/4 | 12 | 955 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS*[7] *:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod[1, 8] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS**<br>Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6]<br>Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | **4-Way Splayed Brace Pattern (B21.4)** | | | | |
| 11.0 | 10 | 253 | 3/8 | 40 | 135 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 574 | 1/2 | 40 | 306 | R12AAEM409 | N4 | L4 |
| 35.0 | 10 | 804 | 1/2 | 40 | 429 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 1,149 | 1/2 | 40 | 612 | R12AAEM406 | N7 | L7 |
| 65.0 | 10 | 1,494 | 1/2 | 40 | 796 | R12AAEM506 | N8 | L8 |
| 75.0 | 10 | 1,723 | 5/8 | 40 | 919 | R58AAEM506 | N10 | L10 |
| 100.0 | 10 | 2,298 | 5/8 | 40 | 1,225 | R58AAEM506 | N13 | L13 |
| 125.0 | 10 | 2,517 | 5/8 | 32 | 1,225 | R58AAEM506 | N13 | L13 |
| 150.0 | 10 | 2,808 | 5/8 | 28 | 1,286 | R58AAEM506 | N13 | L13 |
| 175.0 | 10 | 3,027 | 5/8 | 24 | 1,286 | R58AAEM506 | N13 | L13 |
| 200.0 | 10 | 3,175 | 5/8 | 20 | 1,225 | R58AAEM506 | N13 | L13 |
| 225.0 | 10 | 3,413 | 5/8 | 18 | 1,240 | R58AAEM506 | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7]:

**2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | 4-Way Splayed Brace Pattern (B21.4) | | | | |
| 11.0 | 10 | 419 | 3/8 | 40 | 182 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 952 | 1/2 | 40 | 413 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 1,333 | 5/8 | 40 | 578 | R58AAEM406 | N6 | L6 |
| 50.0 | 10 | 1,905 | 3/4 | 40 | 825 | R34CFB1P09 | N9 | L9 |
| 65.0 | 10 | 2,476 | 3/4 | 40 | 1,073 | R34CFB1P06 | N11 | L11 |
| 75.0 | 10 | 2,582 | 3/4 | 35 | 1,083 | R34CFB1P06 | N11 | L11 |
| 100.0 | 10 | 2,857 | 3/4 | 27 | 1,114 | R34CFB1P06 | N12 | L12 |
| 125.0 | 10 | 3,021 | 3/4 | 21 | 1,083 | R34CFB1P06 | N11 | L11 |
| 150.0 | 10 | 3,295 | 3/4 | 18 | 1,114 | R34CFB1P06 | N12 | L12 |
| 175.0 | 10 | 3,460 | 3/4 | 15 | 1,083 | R34CFB1P06 | N11 | L11 |
| 200.0 | 10 | 3,807 | 3/4 | 14 | 1,155 | R34CFB1P06 | N12 | L12 |
| 225.0 | 10 | 3,953 | 3/4 | 12 | 1,114 | R34CFB1P06 | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **4-Way Splayed Brace Pattern (B21.4)** | | | | |
| 11.0 | 10 | 565 | 1/2 | 40 | 233 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,285 | 5/8 | 40 | 530 | R58AAEM406 | N6 | L6 |
| 35.0 | 10 | 1,799 | 3/4 | 40 | 742 | R34CFB1P09 | N8 | L8 |
| 50.0 | 10 | 2,356 | 3/4 | 36 | 955 | R34DGB1P06 | N10 | L10 |
| 65.0 | 10 | 2,509 | 3/4 | 28 | 965 | R34DGB1P06 | N10 | L10 |
| 75.0 | 10 | 2,576 | 3/4 | 24 | 955 | R34DGB1P06 | N10 | L10 |
| 100.0 | 10 | 2,795 | 3/4 | 18 | 955 | R34DGB1P06 | N10 | L10 |
| 125.0 | 10 | 2,961 | 3/4 | 14 | 928 | R34DGB1P06 | N10 | L10 |
| 150.0 | 10 | 3,234 | 3/4 | 12 | 955 | R34DGB1P06 | N10 | L10 |
| 175.0 | 10 | 3,400 | 3/4 | 10 | 928 | R34DGB1P06 | N10 | L10 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B21.4)** | | | | |
| 11.0 | 10 | 305 | 3/8 | 40 | 180 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 693 | 1/2 | 40 | 408 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 970 | 1/2 | 40 | 572 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 1,386 | 1/2 | 40 | 816 | R12AAEM506 | N9 | L9 |
| 65.0 | 10 | 1,801 | 5/8 | 40 | 1,061 | R58AAEM506 | N11 | L11 |
| 75.0 | 10 | 2,079 | 5/8 | 40 | 1,225 | R58AAEM506 | N13 | L13 |
| 100.0 | 10 | 2,298 | 5/8 | 30 | 1,225 | R58AAEM506 | N13 | L13 |
| 125.0 | 10 | 2,517 | 5/8 | 24 | 1,225 | R58AAEM506 | N13 | L13 |
| 150.0 | 10 | 2,737 | 5/8 | 20 | 1,225 | R58AAEM506 | N13 | L13 |
| 175.0 | 10 | 3,027 | 5/8 | 18 | 1,286 | R58AAEM506 | N13 | L13 |
| 200.0 | 10 | 3,270 | 5/8 | 16 | 1,306 | R58AAEM506 | N14 | L14 |
| 225.0 | 10 | 3,466 | 5/8 | 14 | 1,286 | R58AAEM506 | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED RIGID BRACING REQUIREMENTS* [7] *:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED RIGID BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **4-Way Splayed Brace Pattern (B21.4)** | | | | |
| 11.0 | 10 | 527 | 1/2 | 40 | 242 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,197 | 1/2 | 40 | 550 | R12AAEM406 | N6 | L6 |
| 35.0 | 10 | 1,675 | 5/8 | 40 | 770 | R58AAEM509 | N8 | L8 |
| 50.0 | 10 | 2,345 | 3/4 | 39 | 1,073 | R34CFB1P06 | N11 | L11 |
| 65.0 | 10 | 2,476 | 3/4 | 30 | 1,073 | R34CFB1P06 | N11 | L11 |
| 75.0 | 10 | 2,564 | 3/4 | 26 | 1,073 | R34CFB1P06 | N11 | L11 |
| 100.0 | 10 | 2,832 | 3/4 | 20 | 1,100 | R34CFB1P06 | N12 | L12 |
| 125.0 | 10 | 3,051 | 3/4 | 16 | 1,100 | R34CFB1P06 | N12 | L12 |
| 150.0 | 10 | 3,222 | 3/4 | 13 | 1,073 | R34CFB1P06 | N11 | L11 |
| 175.0 | 10 | 3,417 | 3/4 | 11 | 1,059 | R34CFB1P06 | N11 | L11 |
| 200.0 | 10 | 3,710 | 3/4 | 10 | 1,100 | R34CFB1P06 | N12 | L12 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED RIGID BRACING REQUIREMENTS [7] :

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED RIGID BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B21.4) | | | | |
| 11.0 | 10 | 721 | 1/2 | 40 | 311 | R12AAEM409 | N4 | L4 |
| 25.0 | 10 | 1,640 | 3/4 | 40 | 707 | R34CFB1P09 | N8 | L8 |
| 35.0 | 10 | 2,196 | 3/4 | 38 | 940 | R34DGB1P06 | N10 | L10 |
| 50.0 | 10 | 2,285 | 3/4 | 26 | 919 | R34DGB1P06 | N10 | L10 |
| 65.0 | 10 | 2,417 | 3/4 | 20 | 919 | R34DGB1P06 | N10 | L10 |
| 75.0 | 10 | 2,576 | 3/4 | 18 | 955 | R34DGB1P06 | N10 | L10 |
| 100.0 | 10 | 2,582 | 3/4 | 12 | 849 | R34CFB1P09 | N9 | L9 |
| 125.0 | 10 | 2,872 | 3/4 | 10 | 884 | R34DGB1P09 | N9 | L9 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 180 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 408 | C12AA04WS | N5 | L5 |
| 35.0 | 10 | 307 | 1/2 | 40 | 572 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 439 | 1/2 | 40 | 816 | C12AA06WS | N9 | L9 |
| 65.0 | 10 | 570 | 1/2 | 40 | 1,061 | C12AA06WS | N11 | L11 |
| 75.0 | 10 | 658 | 1/2 | 40 | 1,225 | C12AA06WS | N13 | L13 |
| 100.0 | 10 | 878 | 1/2 | 35 | 1,429 | C12AA06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 1/2 | 28 | 1,429 | C12AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 1/2 | 23 | 1,408 | C12AA06WS | N15 | L15 |
| 175.0 | 10 | 1,536 | 1/2 | 20 | 1,429 | C12AA06WS | N15 | L15 |
| 200.0 | 10 | 1,755 | 1/2 | 17 | 1,388 | C12AA06WS | N14 | L14 |
| 225.0 | 10 | 1,974 | 1/2 | 15 | 1,378 | C12AA06WS | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 242 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 550 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 1/2 | 40 | 770 | C12AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 1/2 | 40 | 1,100 | C12AA06WS | N12 | L12 |
| 65.0 | 10 | 570 | 5/8 | 40 | 1,430 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 5/8 | 40 | 1,650 | C58DG06TS | N17 | L17 |
| 100.0 | 10 | 878 | 5/8 | 32 | 1,760 | C58DG06TS | N18 | L18 |
| 125.0 | 10 | 1,097 | 5/8 | 26 | 1,788 | C58DG06TS | N18 | L18 |
| 150.0 | 10 | 1,316 | 5/8 | 22 | 1,815 | C58DG06TS | N19 | L19 |
| 175.0 | 10 | 1,536 | 5/8 | 18 | 1,733 | C58DG06TS | N18 | L18 |
| 200.0 | 10 | 1,755 | 5/8 | 16 | 1,760 | C58DG06TS | N18 | L18 |
| 225.0 | 10 | 1,974 | 5/8 | 14 | 1,733 | C58DG06TS | N18 | L18 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 311 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 40 | 707 | C12AA06WS | N8 | L8 |
| 35.0 | 10 | 307 | 1/2 | 40 | 990 | C12AA06WS | N10 | L10 |
| 50.0 | 10 | 439 | 5/8 | 40 | 1,414 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 5/8 | 32 | 1,471 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 5/8 | 27 | 1,432 | C58AA06WS | N15 | L15 |
| 100.0 | 10 | 878 | 5/8 | 20 | 1,414 | C58AA06WS | N15 | L15 |
| 125.0 | 10 | 1,097 | 5/8 | 16 | 1,414 | C58AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 5/8 | 13 | 1,379 | C58AA06WS | N14 | L14 |
| 175.0 | 10 | 1,536 | 5/8 | 11 | 1,361 | C58AA06WS | N14 | L14 |
| 200.0 | 10 | 1,755 | 5/8 | 10 | 1,414 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS*[7]*:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod**[1, 8] **Total Vertical Load (lbs)** | **Min.**[8] **Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** **Max.**[2] **Brace Spacing (ft.)** | **Brace**[3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage**[6] **Form Pour**[4] **Deck Page D1** | **Metal**[5] **Deck Page D2** |
|---|---|---|---|---|---|---|---|---|
| | | | | **4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 359 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 40 | 816 | C12AA06WS | N9 | L9 |
| 35.0 | 10 | 307 | 1/2 | 40 | 1,143 | C12AA06WS | N12 | L12 |
| 50.0 | 10 | 439 | 1/2 | 34 | 1,388 | C12AA06WS | N14 | L14 |
| 65.0 | 10 | 570 | 1/2 | 26 | 1,380 | C12AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 1/2 | 22 | 1,347 | C12AA06WS | N14 | L14 |
| 100.0 | 10 | 878 | 1/2 | 16 | 1,306 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,097 | 1/2 | 14 | 1,429 | C12AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 1/2 | 10 | 1,225 | C12AA06WS | N13 | L13 |
| 175.0 | 10 | 1,536 | 1/2 | 10 | 1,429 | C12AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 484 | C38AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 1/2 | 40 | 1,100 | C12AA06WS | N12 | L12 |
| 35.0 | 10 | 307 | 5/8 | 40 | 1,540 | C58DG06TS | N16 | L16 |
| 50.0 | 10 | 439 | 5/8 | 32 | 1,760 | C58DG06TS | N18 | L18 |
| 65.0 | 10 | 570 | 5/8 | 24 | 1,716 | C58DG06TS | N18 | L18 |
| 75.0 | 10 | 658 | 5/8 | 22 | 1,815 | C58DG06TS | N19 | L19 |
| 100.0 | 10 | 878 | 5/8 | 16 | 1,760 | C58DG06TS | N18 | L18 |
| 125.0 | 10 | 1,097 | 5/8 | 12 | 1,650 | C58DG06TS | N17 | L17 |
| 150.0 | 10 | 1,316 | 5/8 | 10 | 1,650 | C58DG06TS | N17 | L17 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | **4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 622 | C12AA04WS | N7 | L7 |
| 25.0 | 10 | 219 | 5/8 | 40 | 1,414 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 307 | 5/8 | 28 | 1,386 | C58AA06WS | N14 | L14 |
| 50.0 | 10 | 439 | 5/8 | 20 | 1,414 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 570 | 5/8 | 16 | 1,471 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 5/8 | 12 | 1,273 | C58AA06WS | N13 | L13 |
| 100.0 | 10 | 878 | 5/8 | 10 | 1,414 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 539 | C38AA04WS | N6 | L6 |
| 25.0 | 10 | 219 | 1/2 | 40 | 1,225 | C12AA06WS | N13 | L13 |
| 35.0 | 10 | 307 | 1/2 | 32 | 1,372 | C12AA06WS | N14 | L14 |
| 50.0 | 10 | 439 | 1/2 | 22 | 1,347 | C12AA06WS | N14 | L14 |
| 65.0 | 10 | 570 | 1/2 | 18 | 1,433 | C12AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 1/2 | 14 | 1,286 | C12AA06WS | N13 | L13 |
| 100.0 | 10 | 878 | 1/2 | 10 | 1,225 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod[1, 8] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 726 | C12AA06WS | N8 | L8 |
| 25.0 | 10 | 219 | 5/8 | 40 | 1,650 | C58DG06TS | N17 | L17 |
| 35.0 | 10 | 307 | 5/8 | 30 | 1,733 | C58DG06TS | N18 | L18 |
| 50.0 | 10 | 439 | 5/8 | 22 | 1,815 | C58DG06TS | N19 | L19 |
| 65.0 | 10 | 570 | 5/8 | 16 | 1,716 | C58DG06TS | N18 | L18 |
| 75.0 | 10 | 658 | 5/8 | 14 | 1,733 | C58DG06TS | N18 | L18 |
| 100.0 | 10 | 878 | 5/8 | 10 | 1,650 | C58DG06TS | N17 | L17 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2)** | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 933 | C12AA06WS | N10 | L10 |
| 25.0 | 10 | 219 | 5/8 | 26 | 1,379 | C58AA06WS | N14 | L14 |
| 35.0 | 10 | 307 | 5/8 | 18 | 1,336 | C58AA06WS | N14 | L14 |
| 50.0 | 10 | 439 | 5/8 | 12 | 1,273 | C58AA06WS | N13 | L13 |
| 65.0 | 10 | 570 | 5/8 | 10 | 1,379 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 719 | C38AA06WS | N8 | L8 |
| 25.0 | 10 | 219 | 1/2 | 34 | 1,388 | C12AA06WS | N14 | L14 |
| 35.0 | 10 | 307 | 1/2 | 24 | 1,372 | C12AA06WS | N14 | L14 |
| 50.0 | 10 | 439 | 1/2 | 16 | 1,306 | C12AA06WS | N14 | L14 |
| 65.0 | 10 | 570 | 1/2 | 12 | 1,274 | C12AA06WS | N13 | L13 |
| 75.0 | 10 | 658 | 1/2 | 10 | 1,225 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

**TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 968 | C12AA06WS | N10 | L10 |
| 25.0 | 10 | 219 | 5/8 | 32 | 1,760 | C58DG06TS | N18 | L18 |
| 35.0 | 10 | 307 | 5/8 | 22 | 1,694 | C58DG06TS | N17 | L17 |
| 50.0 | 10 | 439 | 5/8 | 16 | 1,760 | C58DG06TS | N18 | L18 |
| 65.0 | 10 | 570 | 5/8 | 12 | 1,716 | C58DG06TS | N18 | L18 |
| 75.0 | 10 | 658 | 5/8 | 10 | 1,650 | C58DG06TS | N17 | L17 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | **Min. Brace Anchorage [6]** | |
|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B24.2, B43.2, B46.2)** | | | | |
| 11.0 | 10 | 97 | 5/8 | 40 | 1,245 | C58AA06WS | N13 | L13 |
| 25.0 | 10 | 219 | 5/8 | 20 | 1,414 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 307 | 5/8 | 14 | 1,386 | C58AA06WS | N14 | L14 |
| 50.0 | 10 | 439 | 5/8 | 10 | 1,414 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B25.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 90 | C38AA04WS | N1 | L1 |
| 25.0 | 10 | 219 | 1/2 | 40 | 204 | C12AA04WS | N3 | L3 |
| 35.0 | 10 | 307 | 1/2 | 40 | 286 | C12AA04WS | N3 | L3 |
| 50.0 | 10 | 439 | 1/2 | 40 | 408 | C12AA04WS | N5 | L5 |
| 65.0 | 10 | 570 | 1/2 | 40 | 531 | C12AA04WS | N6 | L6 |
| 75.0 | 10 | 658 | 1/2 | 40 | 612 | C12AA04WS | N7 | L7 |
| 100.0 | 10 | 878 | 1/2 | 40 | 816 | C12AA06WS | N9 | L9 |
| 125.0 | 10 | 1,097 | 1/2 | 40 | 1,021 | C12AA06WS | N11 | L11 |
| 150.0 | 10 | 1,316 | 5/8 | 40 | 1,225 | C58AA06WS | N13 | L13 |
| 175.0 | 10 | 1,536 | 5/8 | 40 | 1,429 | C58AA06WS | N15 | L15 |
| 200.0 | 10 | 1,755 | 5/8 | 34 | 1,388 | C58AA06WS | N14 | L14 |
| 225.0 | 10 | 1,974 | 5/8 | 30 | 1,378 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B25.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 121 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 275 | C12AA04WS | N3 | L3 |
| 35.0 | 10 | 307 | 1/2 | 40 | 385 | C12AA04WS | N4 | L4 |
| 50.0 | 10 | 439 | 1/2 | 40 | 550 | C12AA04WS | N6 | L6 |
| 65.0 | 10 | 570 | 5/8 | 40 | 715 | C58AA06WS | N8 | L8 |
| 75.0 | 10 | 658 | 5/8 | 40 | 825 | C58AA06WS | N9 | L9 |
| 100.0 | 10 | 878 | 3/4 | 40 | 1,100 | C34DG06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 3/4 | 38 | 1,306 | C34DG06WS | N14 | L14 |
| 150.0 | 10 | 1,316 | 3/4 | 32 | 1,320 | C34DG06WS | N14 | L14 |
| 175.0 | 10 | 1,536 | 3/4 | 27 | 1,299 | C34DG06WS | N13 | L13 |
| 200.0 | 10 | 1,755 | 3/4 | 24 | 1,320 | C34DG06WS | N14 | L14 |
| 225.0 | 10 | 1,974 | 3/4 | 22 | 1,361 | C34DG06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly Page E3** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B25.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 156 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 354 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 307 | 1/2 | 40 | 495 | C12AA04WS | N5 | L5 |
| 50.0 | 10 | 439 | 5/8 | 40 | 707 | C58AA06WS | N8 | L8 |
| 65.0 | 10 | 570 | 3/4 | 40 | 919 | C34DG06WS | N10 | L10 |
| 75.0 | 10 | 658 | 3/4 | 40 | 1,061 | C34DG06WS | N11 | L11 |
| 100.0 | 10 | 878 | 3/4 | 32 | 1,131 | C34DG06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 3/4 | 26 | 1,149 | C34DG06WS | N12 | L12 |
| 150.0 | 10 | 1,316 | 3/4 | 22 | 1,167 | C34DG06WS | N12 | L12 |
| 175.0 | 10 | 1,536 | 3/4 | 18 | 1,114 | C34DG06WS | N12 | L12 |
| 200.0 | 10 | 1,755 | 3/4 | 16 | 1,131 | C34DG06WS | N12 | L12 |
| 225.0 | 10 | 1,974 | 3/4 | 14 | 1,114 | C34DG06WS | N12 | L12 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B25.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 180 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 219 | 1/2 | 40 | 408 | C12AA04WS | N5 | L5 |
| 35.0 | 10 | 307 | 1/2 | 40 | 572 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 439 | 1/2 | 40 | 816 | C12AA06WS | N9 | L9 |
| 65.0 | 10 | 570 | 5/8 | 40 | 1,061 | C58AA06WS | N11 | L11 |
| 75.0 | 10 | 658 | 5/8 | 40 | 1,225 | C58AA06WS | N13 | L13 |
| 100.0 | 10 | 878 | 5/8 | 34 | 1,388 | C58AA06WS | N14 | L14 |
| 125.0 | 10 | 1,097 | 5/8 | 28 | 1,429 | C58AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 5/8 | 22 | 1,347 | C58AA06WS | N14 | L14 |
| 175.0 | 10 | 1,536 | 5/8 | 20 | 1,429 | C58AA06WS | N15 | L15 |
| 200.0 | 10 | 1,755 | 5/8 | 16 | 1,306 | C58AA06WS | N14 | L14 |
| 225.0 | 10 | 1,974 | 5/8 | 14 | 1,286 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B25.2)** | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 242 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 550 | C12AA04WS | N6 | L6 |
| 35.0 | 10 | 307 | 5/8 | 40 | 770 | C58AA06WS | N8 | L8 |
| 50.0 | 10 | 439 | 3/4 | 40 | 1,100 | C34DG06WS | N12 | L12 |
| 65.0 | 10 | 570 | 3/4 | 35 | 1,251 | C34DG06WS | N13 | L13 |
| 75.0 | 10 | 658 | 3/4 | 31 | 1,279 | C34DG06WS | N13 | L13 |
| 100.0 | 10 | 878 | 3/4 | 23 | 1,265 | C34DG06WS | N13 | L13 |
| 125.0 | 10 | 1,097 | 3/4 | 19 | 1,306 | C34DG06WS | N14 | L14 |
| 150.0 | 10 | 1,316 | 3/4 | 16 | 1,320 | C34DG06WS | N14 | L14 |
| 175.0 | 10 | 1,536 | 3/4 | 13 | 1,251 | C34DG06WS | N13 | L13 |
| 200.0 | 10 | 1,755 | 3/4 | 12 | 1,320 | C34DG06WS | N14 | L14 |
| 225.0 | 10 | 1,974 | 3/4 | 10 | 1,238 | C34DG06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B25.2) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 311 | C12AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 5/8 | 40 | 707 | C58AA06WS | N8 | L8 |
| 35.0 | 10 | 307 | 3/4 | 40 | 990 | C34DG06WS | N10 | L10 |
| 50.0 | 10 | 439 | 3/4 | 30 | 1,061 | C34DG06WS | N11 | L11 |
| 65.0 | 10 | 570 | 3/4 | 24 | 1,103 | C34DG06WS | N12 | L12 |
| 75.0 | 10 | 658 | 3/4 | 20 | 1,061 | C34DG06WS | N11 | L11 |
| 100.0 | 10 | 878 | 3/4 | 16 | 1,131 | C34DG06WS | N12 | L12 |
| 125.0 | 10 | 1,097 | 3/4 | 12 | 1,061 | C34DG06WS | N11 | L11 |
| 150.0 | 10 | 1,316 | 3/4 | 10 | 1,061 | C34DG06WS | N11 | L11 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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### *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)***  ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets.*  *Use of Any Non-ISAT Bracket Voids Engineering.*  *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | 4-Way Splayed Brace Pattern (B25.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 269 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 219 | 1/2 | 40 | 612 | C12AA04WS | N7 | L7 |
| 35.0 | 10 | 307 | 1/2 | 40 | 857 | C12AA06WS | N9 | L9 |
| 50.0 | 10 | 439 | 5/8 | 40 | 1,225 | C58AA06WS | N13 | L13 |
| 65.0 | 10 | 570 | 5/8 | 36 | 1,433 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 658 | 5/8 | 30 | 1,378 | C58AA06WS | N14 | L14 |
| 100.0 | 10 | 878 | 5/8 | 22 | 1,347 | C58AA06WS | N14 | L14 |
| 125.0 | 10 | 1,097 | 5/8 | 18 | 1,378 | C58AA06WS | N14 | L14 |
| 150.0 | 10 | 1,316 | 5/8 | 14 | 1,286 | C58AA06WS | N13 | L13 |
| 175.0 | 10 | 1,536 | 5/8 | 12 | 1,286 | C58AA06WS | N13 | L13 |
| 200.0 | 10 | 1,755 | 5/8 | 10 | 1,225 | C58AA06WS | N13 | L13 |
| 225.0 | 10 | 1,974 | 5/8 | 10 | 1,378 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:

**2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS<br>Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | 4-Way Splayed Brace Pattern (B25.2) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 363 | C12AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 5/8 | 40 | 825 | C58AA06WS | N9 | L9 |
| 35.0 | 10 | 307 | 3/4 | 40 | 1,155 | C34DG06WS | N12 | L12 |
| 50.0 | 10 | 439 | 3/4 | 30 | 1,238 | C34DG06WS | N13 | L13 |
| 65.0 | 10 | 570 | 3/4 | 23 | 1,233 | C34DG06WS | N13 | L13 |
| 75.0 | 10 | 658 | 3/4 | 20 | 1,238 | C34DG06WS | N13 | L13 |
| 100.0 | 10 | 878 | 3/4 | 15 | 1,238 | C34DG06WS | N13 | L13 |
| 125.0 | 10 | 1,097 | 3/4 | 12 | 1,238 | C34DG06WS | N13 | L13 |
| 150.0 | 10 | 1,316 | 3/4 | 10 | 1,238 | C34DG06WS | N13 | L13 |

1. $TVL = DL + Fv + (0.2S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## 4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :

**2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B25.2) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 467 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 3/4 | 40 | 1,061 | C34DG06WS | N11 | L11 |
| 35.0 | 10 | 307 | 3/4 | 28 | 1,039 | C34DG06WS | N11 | L11 |
| 50.0 | 10 | 439 | 3/4 | 20 | 1,061 | C34DG06WS | N11 | L11 |
| 65.0 | 10 | 570 | 3/4 | 16 | 1,103 | C34DG06WS | N12 | L12 |
| 75.0 | 10 | 658 | 3/4 | 14 | 1,114 | C34DG06WS | N12 | L12 |
| 100.0 | 10 | 878 | 3/4 | 10 | 1,061 | C34DG06WS | N11 | L11 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS*[7]*:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering. 2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod[1, 8] Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B25.2) | | | | |
| 11.0 | 10 | 97 | 3/8 | 40 | 359 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 219 | 1/2 | 40 | 816 | C12AA06WS | N9 | L9 |
| 35.0 | 10 | 307 | 5/8 | 40 | 1,143 | C58AA06WS | N12 | L12 |
| 50.0 | 10 | 439 | 5/8 | 34 | 1,388 | C58AA06WS | N14 | L14 |
| 65.0 | 10 | 570 | 5/8 | 26 | 1,380 | C58AA06WS | N14 | L14 |
| 75.0 | 10 | 658 | 5/8 | 22 | 1,347 | C58AA06WS | N14 | L14 |
| 100.0 | 10 | 878 | 5/8 | 16 | 1,306 | C58AA06WS | N14 | L14 |
| 125.0 | 10 | 1,097 | 5/8 | 14 | 1,429 | C58AA06WS | N15 | L15 |
| 150.0 | 10 | 1,316 | 5/8 | 10 | 1,225 | C58AA06WS | N13 | L13 |
| 175.0 | 10 | 1,536 | 5/8 | 10 | 1,429 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7] :*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Combined 2-Tier Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Rod [1, 8] Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | 4-WAY SPLAYED CABLE BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 4-Way Splayed Brace Pattern (B25.2) | | | | |
| 11.0 | 10 | 97 | 1/2 | 40 | 484 | C12AA04WS | N5 | L5 |
| 25.0 | 10 | 219 | 3/4 | 40 | 1,100 | C34DG06WS | N12 | L12 |
| 35.0 | 10 | 307 | 3/4 | 32 | 1,232 | C34DG06WS | N13 | L13 |
| 50.0 | 10 | 439 | 3/4 | 23 | 1,265 | C34DG06WS | N13 | L13 |
| 65.0 | 10 | 570 | 3/4 | 17 | 1,216 | C34DG06WS | N13 | L13 |
| 75.0 | 10 | 658 | 3/4 | 15 | 1,238 | C34DG06WS | N13 | L13 |
| 100.0 | 10 | 878 | 3/4 | 11 | 1,210 | C34DG06WS | N13 | L13 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**C36-1-45**

**2- Tier**

## *4-WAY SPLAYED CABLE BRACING REQUIREMENTS [7]:*

***2-TIERED TRAPEZE MOUNTED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets.* *Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| **Combined 2-Tier Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Rod [1, 8] Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **4-WAY SPLAYED CABLE BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly Page E3** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **4-Way Splayed Brace Pattern (B25.2)** | | | | |
| 11.0 | 10 | 97 | 5/8 | 40 | 622 | C58AA04WS | N7 | L7 |
| 25.0 | 10 | 219 | 3/4 | 30 | 1,061 | C34DG06WS | N11 | L11 |
| 35.0 | 10 | 307 | 3/4 | 22 | 1,089 | C34DG06WS | N11 | L11 |
| 50.0 | 10 | 439 | 3/4 | 14 | 990 | C34DG06WS | N10 | L10 |
| 65.0 | 10 | 570 | 3/4 | 12 | 1,103 | C34DG06WS | N12 | L12 |
| 75.0 | 10 | 658 | 3/4 | 10 | 1,061 | C34DG06WS | N11 | L11 |

1. TVL = DL + Fv + (0.2$S_{DS}$ x 0.70 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 65% Of Total Load Allocated Per Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 5-Way Transverse, Longitudinal Brace Pattern (B22.4) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 54 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 287 | 1/2 | 40 | 123 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 402 | 1/2 | 40 | 172 | R12AAEM306 | N2 | L2 |
| 50.0 | 10 | 574 | 1/2 | 40 | 245 | R12AAEM306 | N3 | L3 |
| 65.0 | 10 | 746 | 1/2 | 40 | 319 | R12AAEM409 | N4 | L4 |
| 75.0 | 10 | 861 | 1/2 | 40 | 368 | R12AAEM406 | N4 | L4 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 491 | R12AAEM406 | N5 | L5 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 613 | R12AAEM406 | N7 | L7 |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B22.5) | | | | |
| 150.0 | 10 | 1,721 | 1/2 | 40 | 736 | R12AAEM509 | N8 | L8 |
| 175.0 | 10 | 2,008 | 1/2 | 40 | 859 | R12AAEM506 | N9 | L9 |
| 200.0 | 10 | 2,295 | 1/2 | 40 | 981 | R12AAEM506 | N10 | L10 |
| 225.0 | 10 | 2,582 | 5/8 | 40 | 1,104 | R58AAEM506 | N12 | L12 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS<br>Max. [2] Brace Spacing (ft.) | <br>Brace [3] Reaction P (lbs) | <br>Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | <br>Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 73 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 287 | 1/2 | 40 | 165 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 402 | 1/2 | 40 | 231 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 574 | 1/2 | 40 | 331 | R12AAEM406 | N4 | L4 |
| 65.0 | 10 | 746 | 1/2 | 40 | 430 | R12AAEM406 | N5 | L5 |
| 75.0 | 10 | 861 | 1/2 | 40 | 496 | R12AAEM406 | N5 | L5 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 661 | R12AAEM509 | N7 | L7 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 826 | R12AAEM506 | N9 | L9 |
| 150.0 | 10 | 1,721 | 1/2 | 40 | 992 | R12AAEM506 | N10 | L10 |
| 175.0 | 10 | 2,008 | 1/2 | 40 | 1,157 | R12AAEM506 | N12 | L12 |
| 200.0 | 10 | 2,295 | 1/2 | 40 | 1,322 | R12AAEM506 | N14 | L14 |
| 225.0 | 10 | 2,582 | 5/8 | 40 | 1,488 | R58AAEM606 | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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## RIGID BRACING REQUIREMENTS [7]

**3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard** [1, 8] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 94 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 287 | 1/2 | 40 | 213 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 402 | 1/2 | 40 | 298 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 574 | 1/2 | 40 | 425 | R12AAEM406 | N5 | L5 |
| 65.0 | 10 | 746 | 1/2 | 40 | 553 | R12AAEM406 | N6 | L6 |
| 75.0 | 10 | 861 | 1/2 | 40 | 638 | R12AAEM406 | N7 | L7 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 850 | R12AAEM506 | N9 | L9 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 1,063 | R12AAEM506 | N11 | L11 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | |
| 150.0 | 10 | 1,721 | 1/2 | 40 | 1,275 | R12AAEM506 | N13 | L13 |
| 175.0 | 10 | 2,008 | 1/2 | 40 | 1,488 | R12AAEM606 | N15 | L15 |
| 200.0 | 10 | 2,295 | 1/2 | 40 | 1,700 | R12AAEM606 | N17 | L17 |
| 225.0 | 10 | 2,582 | 5/8 | 40 | 1,913 | R58AAEM606 | N20 | L20 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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## RIGID BRACING REQUIREMENTS [7]

**3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 5-Way Transverse, Longitudinal Brace Pattern (B22.4) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 108 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 287 | 1/2 | 40 | 245 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 402 | 1/2 | 40 | 344 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 574 | 1/2 | 40 | 491 | R12AAEM406 | N5 | L5 |
| 65.0 | 10 | 746 | 1/2 | 40 | 638 | R12AAEM406 | N7 | L7 |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B22.5) | | | | |
| 75.0 | 10 | 861 | 1/2 | 40 | 736 | R12AAEM509 | N8 | L8 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 981 | R12AAEM506 | N10 | L10 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 1,227 | R12AAEM506 | N13 | L13 |
| 150.0 | 10 | 1,721 | 1/2 | 39 | 1,435 | R12AAEM506 | N15 | L15 |
| 175.0 | 10 | 2,008 | 1/2 | 33 | 1,417 | R12AAEM506 | N15 | L15 |
| 200.0 | 10 | 2,295 | 1/2 | 29 | 1,423 | R12AAEM506 | N15 | L15 |
| 225.0 | 10 | 2,582 | 5/8 | 26 | 1,435 | R58AAEM506 | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4$ x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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## *RIGID BRACING REQUIREMENTS* [7]

## *3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*

***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.***

***2013 California Building Code Compliant***

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 145 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 287 | 1/2 | 40 | 331 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 402 | 1/2 | 40 | 463 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 574 | 1/2 | 40 | 661 | R12AAEM509 | N7 | L7 |
| 65.0 | 10 | 746 | 1/2 | 40 | 860 | R12AAEM506 | N9 | L9 |
| 75.0 | 10 | 861 | 1/2 | 40 | 992 | R12AAEM506 | N10 | L10 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 1,322 | R12AAEM506 | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 1,653 | R12AAEM606 | N17 | L17 |
| 150.0 | 10 | 1,721 | 1/2 | 40 | 1,984 | R12AAEM606 | N20 | L20 |
| 175.0 | 10 | 2,008 | 1/2 | 39 | 2,256 | R12BGB2P09 | N23 | L23 |
| 200.0 | 10 | 2,295 | 1/2 | 34 | 2,248 | R12BGB2P09 | N23 | L23 |
| 225.0 | 10 | 2,582 | 5/8 | 33 | 2,455 | R58DGB2P06 | N25 | L25 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** **MAXIMUM SEISMIC DESIGN FORCE =** ***0.50 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 187 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 287 | 1/2 | 40 | 425 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 402 | 1/2 | 40 | 595 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 574 | 1/2 | 40 | 850 | R12AAEM506 | N9 | L9 |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,105 | R12AAEM506 | N12 | L12 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | |
| 75.0 | 10 | 861 | 1/2 | 40 | 1,275 | R12AAEM506 | N13 | L13 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 1,700 | R12AAEM606 | N17 | L17 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 2,125 | R12AAB2P09 | N22 | L22 |
| 150.0 | 10 | 1,721 | 1/2 | 38 | 2,423 | R12AAB2P06 | N25 | L25 |
| 175.0 | 10 | 2,008 | 1/2 | 33 | 2,454 | R12AAB2P06 | N25 | L25 |
| 200.0 | 10 | 2,295 | 1/2 | 29 | 2,465 | R12AAB2P06 | N25 | L25 |
| 225.0 | 10 | 2,582 | 5/8 | 25 | 2,391 | R58AAB2P06 | N24 | L24 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard [1, 8] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]**<br>**Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 162 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 287 | 1/2 | 40 | 368 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 402 | 1/2 | 40 | 515 | R12AAEM406 | N6 | L6 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | |
| 50.0 | 10 | 574 | 1/2 | 40 | 736 | R12AAEM509 | N8 | L8 |
| 65.0 | 10 | 746 | 1/2 | 40 | 957 | R12AAEM506 | N10 | L10 |
| 75.0 | 10 | 861 | 1/2 | 40 | 1,104 | R12AAEM506 | N12 | L12 |
| 100.0 | 10 | 1,148 | 1/2 | 39 | 1,435 | R12AAEM506 | N15 | L15 |
| 125.0 | 10 | 1,434 | 1/2 | 31 | 1,426 | R12AAEM506 | N15 | L15 |
| 150.0 | 10 | 1,721 | 1/2 | 26 | 1,435 | R12AAEM506 | N15 | L15 |
| 175.0 | 10 | 2,008 | 1/2 | 22 | 1,417 | R12AAEM506 | N15 | L15 |
| 200.0 | 10 | 2,295 | 1/2 | 19 | 1,399 | R12AAEM506 | N14 | L14 |
| 225.0 | 10 | 2,582 | 5/8 | 17 | 1,408 | R58AAEM506 | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard [1, 8] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 218 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 40 | 496 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 402 | 1/2 | 40 | 694 | R12AAEM509 | N7 | L7 |
| 50.0 | 10 | 574 | 1/2 | 40 | 992 | R12AAEM506 | N10 | L10 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,289 | R12AAEM506 | N13 | L13 |
| 75.0 | 10 | 861 | 1/2 | 40 | 1,488 | R12AAEM606 | N15 | L15 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 1,984 | R12AAEM606 | N20 | L20 |
| 125.0 | 10 | 1,434 | 1/2 | 36 | 2,231 | R12BGB2P09 | N23 | L23 |
| 150.0 | 10 | 1,721 | 1/2 | 30 | 2,231 | R12BGB2P09 | N23 | L23 |
| 175.0 | 10 | 2,008 | 1/2 | 26 | 2,256 | R12BGB2P09 | N23 | L23 |
| 200.0 | 10 | 2,295 | 1/2 | 23 | 2,281 | R12BGB2P09 | N23 | L23 |
| 225.0 | 10 | 2,582 | 5/8 | 22 | 2,455 | R58DGB2P06 | N25 | L25 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard [1, 8] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 281 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 40 | 638 | R12AAEM406 | N7 | L7 |
| 35.0 | 10 | 402 | 1/2 | 40 | 893 | R12AAEM506 | N9 | L9 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | |
| 50.0 | 10 | 574 | 1/2 | 40 | 1,275 | R12AAEM506 | N13 | L13 |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,658 | R12AAEM606 | N17 | L17 |
| 75.0 | 10 | 861 | 1/2 | 40 | 1,913 | R12AAEM606 | N20 | L20 |
| 100.0 | 10 | 1,148 | 1/2 | 38 | 2,423 | R12AAB2P06 | N25 | L25 |
| 125.0 | 10 | 1,434 | 1/2 | 31 | 2,470 | R12AAB2P06 | N25 | L25 |
| 150.0 | 10 | 1,721 | 1/2 | 25 | 2,391 | R12AAB2P06 | N24 | L24 |
| 175.0 | 10 | 2,008 | 1/2 | 22 | 2,454 | R12AAB2P06 | N25 | L25 |
| 200.0 | 10 | 2,295 | 1/2 | 19 | 2,423 | R12AAB2P06 | N25 | L25 |
| 225.0 | 10 | 2,582 | 5/8 | 17 | 2,438 | R58AAB2P06 | N25 | L25 |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Max.** | **Inboard [1, 8]** | **Min. [8]** | | | | **Min. Brace Anchorage [6]** | |
| **Maximum Trapeze Load (lbs/lf)** | **Vertical Support Spacing (ft.)** | **Rod Total Vertical Load (lbs)** | **Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 216 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 40 | 491 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 402 | 1/2 | 40 | 687 | R12AAEM509 | N7 | L7 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | |
| 50.0 | 10 | 574 | 1/2 | 40 | 981 | R12AAEM506 | N10 | L10 |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,276 | R12AAEM506 | N13 | L13 |
| 75.0 | 10 | 861 | 1/2 | 39 | 1,435 | R12AAEM506 | N15 | L15 |
| 100.0 | 10 | 1,148 | 1/2 | 29 | 1,423 | R12AAEM506 | N15 | L15 |
| 125.0 | 10 | 1,434 | 1/2 | 23 | 1,411 | R12AAEM506 | N15 | L15 |
| 150.0 | 10 | 1,721 | 1/2 | 19 | 1,399 | R12AAEM506 | N14 | L14 |
| 175.0 | 10 | 2,008 | 1/2 | 16 | 1,374 | R12AAEM506 | N14 | L14 |
| 200.0 | 10 | 2,295 | 1/2 | 14 | 1,374 | R12AAEM506 | N14 | L14 |
| 225.0 | 10 | 2,582 | 5/8 | 13 | 1,435 | R58AAEM506 | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard** [1, 8] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 291 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 40 | 661 | R12AAEM509 | N7 | L7 |
| 35.0 | 10 | 402 | 1/2 | 40 | 926 | R12AAEM506 | N10 | L10 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | |
| 50.0 | 10 | 574 | 1/2 | 40 | 1,322 | R12AAEM506 | N14 | L14 |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,719 | R12AAEM606 | N18 | L18 |
| 75.0 | 10 | 861 | 1/2 | 40 | 1,984 | R12AAEM606 | N20 | L20 |
| 100.0 | 10 | 1,148 | 1/2 | 34 | 2,248 | R12BGB2P09 | N23 | L23 |
| 125.0 | 10 | 1,434 | 1/2 | 27 | 2,231 | R12BGB2P09 | N23 | L23 |
| 150.0 | 10 | 1,721 | 1/2 | 23 | 2,281 | R12BGB2P09 | N23 | L23 |
| 175.0 | 10 | 2,008 | 1/2 | 19 | 2,198 | R12BGB2P09 | N22 | L22 |
| 200.0 | 10 | 2,295 | 1/2 | 17 | 2,248 | R12BGB2P09 | N23 | L23 |
| 225.0 | 10 | 2,582 | 5/8 | 16 | 2,380 | R58DGB2P09 | N24 | L24 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard** [1, 8] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 374 | R38AAEM406 | N4 | L4 |
| 25.0 | 10 | 287 | 1/2 | 40 | 850 | R12AAEM506 | N9 | L9 |
| 35.0 | 10 | 402 | 1/2 | 40 | 1,190 | R12AAEM506 | N12 | L12 |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | |
| 50.0 | 10 | 574 | 1/2 | 40 | 1,700 | R12AAEM606 | N17 | L17 |
| 65.0 | 10 | 746 | 1/2 | 40 | 2,210 | R12AAB2P09 | N23 | L23 |
| 75.0 | 10 | 861 | 1/2 | 38 | 2,423 | R12AAB2P06 | N25 | L25 |
| 100.0 | 10 | 1,148 | 1/2 | 29 | 2,465 | R12AAB2P06 | N25 | L25 |
| 125.0 | 10 | 1,434 | 1/2 | 23 | 2,444 | R12AAB2P06 | N25 | L25 |
| 150.0 | 10 | 1,721 | 1/2 | 19 | 2,423 | R12AAB2P06 | N25 | L25 |
| 175.0 | 10 | 2,008 | 1/2 | 16 | 2,380 | R12AAB2P09 | N24 | L24 |
| 200.0 | 10 | 2,295 | 1/2 | 14 | 2,380 | R12AAB2P09 | N24 | L24 |
| 225.0 | 10 | 2,582 | 5/8 | 12 | 2,295 | R58AAB2P09 | N23 | L23 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load". Center Rod Does Not Undergo Compression. Rod Stiffening of Center Rod Not Required.

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***RIGID BRACING REQUIREMENTS*** [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| | | | | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4) | | | | | 5-Way Transverse, Longitudinal Brace Pattern (B22.4) | | | | |
| 11.0 | 10 | 108 | 3/8 | 40 | 127 | R38AAEM306 | N2 | L2 | 80 | 64 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 246 | 1/2 | 40 | 289 | R12AAEM306 | N3 | L3 | 80 | 144 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 344 | 1/2 | 40 | 404 | R12AAEM406 | N5 | L5 | 80 | 202 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 491 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 289 | R12AAEM306 | N3 | L3 |
| 65.0 | 10 | 639 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | 80 | 375 | R12AAEM406 | N4 | L4 |
| 75.0 | 10 | 737 | 1/2 | 40 | 866 | R12AAEM506 | N9 | L9 | 80 | 433 | R12AAEM406 | N5 | L5 |
| 100.0 | 10 | 983 | 1/2 | 40 | 1,155 | R12AAEM506 | N12 | L12 | 80 | 577 | R12AAEM406 | N6 | L6 |
| 125.0 | 10 | 1,229 | 1/2 | 40 | 1,443 | R12AAEM506 | N15 | L15 | 80 | 722 | R12AAEM509 | N8 | L8 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9] | | | | | | | | | |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B22.5) | | | | | | | | | |
| 150.0 | 10 | 990 | 1/2 | 40 | 866 | R12AAEM506 | N9 | L9 | | | | | |
| 175.0 | 10 | 1,155 | 1/2 | 40 | 1,010 | R12AAEM506 | N11 | L11 | | | | | |
| 200.0 | 10 | 1,320 | 1/2 | 40 | 1,155 | R12AAEM506 | N12 | L12 | | | | | |
| 225.0 | 10 | 1,486 | 1/2 | 40 | 1,299 | R12AAEM506 | N13 | L13 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**Outboard**

## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.***

***2013 California Building Code Compliant***

| | | | | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard** [1] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 184 | 3/8 | 40 | 171 | R38AAEM306 | N2 | L2 | 80 | 86 | R38AAEM306 | N1 | L1 |
| 25.0 | 10 | 417 | 1/2 | 40 | 389 | R12AAEM406 | N4 | L4 | 80 | 194 | R12AAEM306 | N2 | L2 |
| 35.0 | 10 | 584 | 1/2 | 40 | 545 | R12AAEM406 | N6 | L6 | 80 | 272 | R12AAEM306 | N3 | L3 |
| 50.0 | 10 | 835 | 1/2 | 40 | 778 | R12AAEM509 | N8 | L8 | 80 | 389 | R12AAEM406 | N4 | L4 |
| 65.0 | 10 | 1,085 | 1/2 | 40 | 1,011 | R12AAEM506 | N11 | L11 | 80 | 506 | R12AAEM406 | N6 | L6 |
| 75.0 | 10 | 1,252 | 1/2 | 40 | 1,167 | R12AAEM506 | N12 | L12 | 80 | 583 | R12AAEM406 | N6 | L6 |
| 100.0 | 10 | 1,670 | 5/8 | 40 | 1,556 | R58AAEM606 | N16 | L16 | 80 | 778 | R58AAEM509 | N8 | L8 |
| 125.0 | 10 | 2,087 | 3/4 | 40 | 1,945 | R34DGB2P09 | N20 | L20 | 80 | 972 | R34CFB1P06 | N10 | L10 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS** [9] | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | | | | | | |
| 150.0 | 10 | 1,506 | 1/2 | 40 | 1,167 | R12AAEM506 | N12 | L12 | | | | | |
| 175.0 | 10 | 1,756 | 5/8 | 40 | 1,361 | R58AAEM506 | N14 | L14 | | | | | |
| 200.0 | 10 | 2,007 | 5/8 | 40 | 1,556 | R58AAEM606 | N16 | L16 | | | | | |
| 225.0 | 10 | 2,258 | 3/4 | 40 | 1,750 | R34DGB2P09 | N18 | L18 | | | | | |

1. TVL = DL + Fv + $(0.2S_{DS}/1.4 \times Wp)$. All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

### *3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*

***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 250 | 3/8 | 40 | 220 | R38AAEM306 | N3 | L3 | 80 | 110 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 568 | 1/2 | 40 | 500 | R12AAEM406 | N5 | L5 | 80 | 250 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 796 | 1/2 | 40 | 700 | R12AAEM509 | N7 | L7 | 80 | 350 | R12AAEM406 | N4 | L4 |
| 50.0 | 10 | 1,137 | 1/2 | 40 | 1,000 | R12AAEM506 | N10 | L10 | 80 | 500 | R12AAEM406 | N5 | L5 |
| 65.0 | 10 | 1,478 | 5/8 | 40 | 1,300 | R58AAEM506 | N13 | L13 | 80 | 650 | R58AAEM406 | N7 | L7 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS** [9] | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | | | | | | |
| 75.0 | 10 | 979 | 1/2 | 40 | 750 | R12AAEM509 | N8 | L8 | | | | | |
| 100.0 | 10 | 1,306 | 1/2 | 40 | 1,000 | R12AAEM506 | N10 | L10 | | | | | |
| 125.0 | 10 | 1,632 | 5/8 | 40 | 1,250 | R58AAEM506 | N13 | L13 | | | | | |
| 150.0 | 10 | 1,922 | 5/8 | 39 | 1,463 | R58AAEM606 | N15 | L15 | | | | | |
| 175.0 | 10 | 1,989 | 5/8 | 33 | 1,444 | R58AAEM506 | N15 | L15 | | | | | |
| 200.0 | 10 | 2,079 | 5/8 | 29 | 1,450 | R58AAEM506 | N15 | L15 | | | | | |
| 225.0 | 10 | 2,175 | 5/8 | 26 | 1,463 | R58AAEM606 | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

## 3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)

**MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4) | | | | | 5-Way Transverse, Longitudinal Brace Pattern (B22.4) | | | | |
| 11.0 | 10 | 179 | 3/8 | 40 | 254 | R38AAEM306 | N3 | L3 | 80 | 127 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 407 | 1/2 | 40 | 577 | R12AAEM406 | N6 | L6 | 80 | 289 | R12AAEM306 | N3 | L3 |
| 35.0 | 10 | 570 | 1/2 | 40 | 808 | R12AAEM506 | N9 | L9 | 80 | 404 | R12AAEM406 | N5 | L5 |
| 50.0 | 10 | 814 | 1/2 | 40 | 1,155 | R12AAEM506 | N12 | L12 | 80 | 577 | R12AAEM406 | N6 | L6 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9] | | | | | | | | | |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B22.5) | | | | | | | | | |
| 65.0 | 10 | 639 | 1/2 | 40 | 751 | R12AAEM509 | N8 | L8 | | | | | |
| 75.0 | 10 | 737 | 1/2 | 40 | 866 | R12AAEM506 | N9 | L9 | | | | | |
| 100.0 | 10 | 983 | 1/2 | 40 | 1,155 | R12AAEM506 | N12 | L12 | | | | | |
| 125.0 | 10 | 1,229 | 1/2 | 40 | 1,443 | R12AAEM506 | N15 | L15 | | | | | |
| 150.0 | 10 | 1,305 | 1/2 | 33 | 1,429 | R12AAEM506 | N15 | L15 | | | | | |
| 175.0 | 10 | 1,381 | 1/2 | 28 | 1,415 | R12AAEM506 | N15 | L15 | | | | | |
| 200.0 | 10 | 1,482 | 1/2 | 25 | 1,443 | R12AAEM506 | N15 | L15 | | | | | |
| 225.0 | 10 | 1,558 | 1/2 | 22 | 1,429 | R12AAEM506 | N15 | L15 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. [blank]

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## *RIGID BRACING REQUIREMENTS* [7]

## *3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*

***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.***

***2013 California Building Code Compliant***

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 330 | 3/8 | 40 | 342 | R38AAEM406 | N4 | L4 | 80 | 171 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 751 | 1/2 | 40 | 778 | R12AAEM509 | N8 | L8 | 80 | 389 | R12AAEM406 | N4 | L4 |
| 35.0 | 10 | 1,051 | 1/2 | 40 | 1,089 | R12AAEM506 | N11 | L11 | 80 | 545 | R12AAEM406 | N6 | L6 |
| 50.0 | 10 | 1,501 | 5/8 | 40 | 1,556 | R58AAEM606 | N16 | L16 | 80 | 778 | R58AAEM509 | N8 | L8 |
| 65.0 | 10 | 1,952 | 3/4 | 40 | 2,022 | R34DGB2P09 | N21 | L21 | 80 | 1,011 | R34CFB1P06 | N11 | L11 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS** [9] | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | | | | | | |
| 75.0 | 10 | 1,252 | 1/2 | 40 | 1,167 | R12AAEM506 | N12 | L12 | | | | | |
| 100.0 | 10 | 1,670 | 5/8 | 40 | 1,556 | R58AAEM606 | N16 | L16 | | | | | |
| 125.0 | 10 | 2,087 | 3/4 | 40 | 1,945 | R34DGB2P09 | N20 | L20 | | | | | |
| 150.0 | 10 | 2,405 | 3/4 | 38 | 2,217 | R34DGB2P09 | N23 | L23 | | | | | |
| 175.0 | 10 | 2,514 | 3/4 | 33 | 2,246 | R34DGB2P09 | N23 | L23 | | | | | |
| 200.0 | 10 | 2,607 | 3/4 | 29 | 2,256 | R34DGB2P09 | N23 | L23 | | | | | |
| 225.0 | 10 | 2,708 | 3/4 | 26 | 2,275 | R34DGB2P09 | N23 | L23 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## RIGID BRACING REQUIREMENTS [7]

### 3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)

**MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4) | | | | | 5-Way Transverse, Longitudinal Brace Pattern (B22.4) | | | | |
| 11.0 | 10 | 463 | 1/2 | 40 | 440 | R12AAEM406 | N5 | L5 | 80 | 220 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,053 | 1/2 | 40 | 1,000 | R12AAEM506 | N10 | L10 | 80 | 500 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 1,474 | 5/8 | 40 | 1,400 | R58AAEM506 | N14 | L14 | 80 | 700 | R58AAEM509 | N7 | L7 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9] | | | | | | | | | |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B22.5) | | | | | | | | | |
| 50.0 | 10 | 1,137 | 1/2 | 40 | 1,000 | R12AAEM506 | N10 | L10 | | | | | |
| 65.0 | 10 | 1,478 | 5/8 | 40 | 1,300 | R58AAEM506 | N13 | L13 | | | | | |
| 75.0 | 10 | 1,633 | 5/8 | 38 | 1,425 | R58AAEM506 | N15 | L15 | | | | | |
| 100.0 | 10 | 1,741 | 5/8 | 29 | 1,450 | R58AAEM506 | N15 | L15 | | | | | |
| 125.0 | 10 | 1,814 | 5/8 | 23 | 1,438 | R58AAEM506 | N15 | L15 | | | | | |
| 150.0 | 10 | 1,886 | 5/8 | 19 | 1,425 | R58AAEM506 | N15 | L15 | | | | | |
| 175.0 | 10 | 1,946 | 5/8 | 16 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 200.0 | 10 | 2,031 | 5/8 | 14 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 225.0 | 10 | 2,175 | 5/8 | 13 | 1,463 | R58AAEM606 | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**C37 -0.5-60**
**Outboard**

2013 CBC OSHPD

## *RIGID BRACING REQUIREMENTS* [7]

## ***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)***

***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.***

***2013 California Building Code Compliant***

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 250 | 3/8 | 40 | 381 | R38AAEM406 | N4 | L4 | 80 | 191 | R38AAEM306 | N2 | L2 |
| 25.0 | 10 | 568 | 1/2 | 40 | 866 | R12AAEM506 | N9 | L9 | 80 | 433 | R12AAEM406 | N5 | L5 |
| 35.0 | 10 | 796 | 1/2 | 40 | 1,212 | R12AAEM506 | N13 | L13 | 80 | 606 | R12AAEM406 | N7 | L7 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS** [9] | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | | | | | | |
| 50.0 | 10 | 653 | 1/2 | 40 | 866 | R12AAEM506 | N9 | L9 | | | | | |
| 65.0 | 10 | 849 | 1/2 | 40 | 1,126 | R12AAEM506 | N12 | L12 | | | | | |
| 75.0 | 10 | 979 | 1/2 | 40 | 1,299 | R12AAEM506 | N13 | L13 | | | | | |
| 100.0 | 10 | 1,136 | 1/2 | 33 | 1,429 | R12AAEM506 | N15 | L15 | | | | | |
| 125.0 | 10 | 1,209 | 1/2 | 26 | 1,407 | R12AAEM506 | N15 | L15 | | | | | |
| 150.0 | 10 | 1,305 | 1/2 | 22 | 1,429 | R12AAEM506 | N15 | L15 | | | | | |
| 175.0 | 10 | 1,395 | 1/2 | 19 | 1,440 | R12AAEM506 | N15 | L15 | | | | | |
| 200.0 | 10 | 1,450 | 1/2 | 16 | 1,386 | R12AAEM506 | N14 | L14 | | | | | |
| 225.0 | 10 | 1,522 | 1/2 | 14 | 1,364 | R12AAEM506 | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

**_3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)_** **_MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's_**

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| | | | | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4) | | | | | 5-Way Transverse, Longitudinal Brace Pattern (B22.4) | | | | |
| 11.0 | 10 | 477 | 1/2 | 40 | 513 | R12AAEM406 | N6 | L6 | 80 | 257 | R12AAEM306 | N3 | L3 |
| 25.0 | 10 | 1,084 | 5/8 | 40 | 1,167 | R58AAEM506 | N12 | L12 | 80 | 583 | R58AAEM406 | N6 | L6 |
| 35.0 | 10 | 1,517 | 3/4 | 40 | 1,634 | R34CFB2P12 | N17 | L17 | 80 | 817 | R34CFB1P09 | N9 | L9 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9] | | | | | | | | | |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B22.5) | | | | | | | | | |
| 50.0 | 10 | 1,168 | 5/8 | 40 | 1,167 | R58AAEM506 | N12 | L12 | | | | | |
| 65.0 | 10 | 1,518 | 5/8 | 40 | 1,517 | R58AAEM606 | N16 | L16 | | | | | |
| 75.0 | 10 | 1,752 | 3/4 | 40 | 1,750 | R34DGB2P09 | N18 | L18 | | | | | |
| 100.0 | 10 | 2,236 | 3/4 | 38 | 2,217 | R34DGB2P09 | N23 | L23 | | | | | |
| 125.0 | 10 | 2,296 | 3/4 | 30 | 2,188 | R34DGB2P09 | N22 | L22 | | | | | |
| 150.0 | 10 | 2,380 | 3/4 | 25 | 2,188 | R34DGB2P09 | N22 | L22 | | | | | |
| 175.0 | 10 | 2,514 | 3/4 | 22 | 2,246 | R34DGB2P09 | N23 | L23 | | | | | |
| 200.0 | 10 | 2,574 | 3/4 | 19 | 2,217 | R34DGB2P09 | N23 | L23 | | | | | |
| 225.0 | 10 | 2,671 | 3/4 | 17 | 2,231 | R34DGB2P09 | N23 | L23 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*** ***2013 California Building Code Compliant***

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4) | | | | | 5-Way Transverse, Longitudinal Brace Pattern (B22.4) | | | | |
| 11.0 | 10 | 676 | 1/2 | 40 | 660 | R12AAEM406 | N7 | L7 | 80 | 330 | R12AAEM409 | N4 | L4 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9] | | | | | | | | | |
| | | | | 6-Way Transverse, Longitudinal Brace Pattern (B22.5) | | | | | | | | | |
| 25.0 | 10 | 811 | 1/2 | 40 | 750 | R12AAEM509 | N8 | L8 | | | | | |
| 35.0 | 10 | 1,135 | 5/8 | 40 | 1,050 | R58AAEM506 | N11 | L11 | | | | | |
| 50.0 | 10 | 1,549 | 5/8 | 38 | 1,425 | R58AAEM506 | N15 | L15 | | | | | |
| 65.0 | 10 | 1,588 | 5/8 | 29 | 1,414 | R58AAEM506 | N15 | L15 | | | | | |
| 75.0 | 10 | 1,615 | 5/8 | 25 | 1,406 | R58AAEM506 | N15 | L15 | | | | | |
| 100.0 | 10 | 1,717 | 5/8 | 19 | 1,425 | R58AAEM506 | N15 | L15 | | | | | |
| 125.0 | 10 | 1,783 | 5/8 | 15 | 1,406 | R58AAEM506 | N15 | L15 | | | | | |
| 150.0 | 10 | 1,922 | 5/8 | 13 | 1,463 | R58AAEM606 | N15 | L15 | | | | | |
| 175.0 | 10 | 1,989 | 5/8 | 11 | 1,444 | R58AAEM506 | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

## *3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*

***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| | | | | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard [1] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6]** | |
| | | | | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** | | | | **Form Pour [4] Deck Page D1** | **Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 321 | 3/8 | 40 | 508 | R38AAEM406 | N6 | L6 | 80 | 254 | R38AAEM306 | N3 | L3 |
| 25.0 | 10 | 730 | 1/2 | 40 | 1,155 | R12AAEM506 | N12 | L12 | 80 | 577 | R12AAEM406 | N6 | L6 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9]** | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | | | | | | |
| 35.0 | 10 | 570 | 1/2 | 40 | 808 | R12AAEM506 | N9 | L9 | | | | | |
| 50.0 | 10 | 814 | 1/2 | 40 | 1,155 | R12AAEM506 | N12 | L12 | | | | | |
| 65.0 | 10 | 1,017 | 1/2 | 38 | 1,426 | R12AAEM506 | N15 | L15 | | | | | |
| 75.0 | 10 | 1,052 | 1/2 | 33 | 1,429 | R12AAEM506 | N15 | L15 | | | | | |
| 100.0 | 10 | 1,144 | 1/2 | 25 | 1,443 | R12AAEM506 | N15 | L15 | | | | | |
| 125.0 | 10 | 1,229 | 1/2 | 20 | 1,443 | R12AAEM506 | N15 | L15 | | | | | |
| 150.0 | 10 | 1,281 | 1/2 | 16 | 1,386 | R12AAEM506 | N14 | L14 | | | | | |
| 175.0 | 10 | 1,381 | 1/2 | 14 | 1,415 | R12AAEM506 | N15 | L15 | | | | | |
| 200.0 | 10 | 1,450 | 1/2 | 12 | 1,386 | R12AAEM506 | N14 | L14 | | | | | |
| 225.0 | 10 | 1,558 | 1/2 | 11 | 1,429 | R12AAEM506 | N15 | L15 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

## *3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*

***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.***

***2013 California Building Code Compliant***

| | | | | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard [1] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** | **Max. [2] Brace Spacing (ft.)** | **Brace [3] Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Min. Brace Anchorage [6] Form Pour [4] Deck Page D1** | **Min. Brace Anchorage [6] Metal [5] Deck Page D2** |
| | | | | **1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 623 | 1/2 | 40 | 685 | R12AAEM509 | N7 | L7 | 80 | 342 | R12AAEM406 | N4 | L4 |
| 25.0 | 10 | 1,417 | 5/8 | 40 | 1,556 | R58AAEM606 | N16 | L16 | 80 | 778 | R58AAEM509 | N8 | L8 |
| 35.0 | 10 | 1,984 | 3/4 | 40 | 2,178 | R34DGB2P09 | N22 | L22 | 80 | 1,089 | R34CFB1P06 | N11 | L11 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9]** | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | | | | | | |
| 50.0 | 10 | 1,501 | 5/8 | 40 | 1,556 | R58AAEM606 | N16 | L16 | | | | | |
| 65.0 | 10 | 1,952 | 3/4 | 40 | 2,022 | R34DGB2P09 | N21 | L21 | | | | | |
| 75.0 | 10 | 2,152 | 3/4 | 38 | 2,217 | R34DGB2P09 | N23 | L23 | | | | | |
| 100.0 | 10 | 2,203 | 3/4 | 28 | 2,178 | R34DGB2P09 | N22 | L22 | | | | | |
| 125.0 | 10 | 2,337 | 3/4 | 23 | 2,236 | R34DGB2P09 | N23 | L23 | | | | | |
| 150.0 | 10 | 2,405 | 3/4 | 19 | 2,217 | R34DGB2P09 | N23 | L23 | | | | | |
| 175.0 | 10 | 2,456 | 3/4 | 16 | 2,178 | R34DGB2P09 | N22 | L22 | | | | | |
| 200.0 | 10 | 2,540 | 3/4 | 14 | 2,178 | R34DGB2P09 | N22 | L22 | | | | | |
| 225.0 | 10 | 2,708 | 3/4 | 13 | 2,275 | R34DGB2P09 | N23 | L23 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *RIGID BRACING REQUIREMENTS* [7]

## ***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)***

***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

***Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.***

***2013 California Building Code Compliant***

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **1-Way Transverse Brace Pattern (B22.0, B22.2, B22.4)** | | | | | **5-Way Transverse, Longitudinal Brace Pattern (B22.4)** | | | | |
| 11.0 | 10 | 889 | 1/2 | 40 | 880 | R12AAEM506 | N9 | L9 | 80 | 440 | R12AAEM406 | N5 | L5 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS** [9] | | | | | | | | | |
| | | | | **6-Way Transverse, Longitudinal Brace Pattern (B22.5)** | | | | | | | | | |
| 25.0 | 10 | 1,053 | 1/2 | 40 | 1,000 | R12AAEM506 | N10 | L10 | | | | | |
| 35.0 | 10 | 1,474 | 5/8 | 40 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 50.0 | 10 | 1,524 | 5/8 | 28 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 65.0 | 10 | 1,604 | 5/8 | 22 | 1,430 | R58AAEM506 | N15 | L15 | | | | | |
| 75.0 | 10 | 1,633 | 5/8 | 19 | 1,425 | R58AAEM506 | N15 | L15 | | | | | |
| 100.0 | 10 | 1,693 | 5/8 | 14 | 1,400 | R58AAEM506 | N14 | L14 | | | | | |
| 125.0 | 10 | 1,753 | 5/8 | 11 | 1,375 | R58AAEM506 | N14 | L14 | | | | | |

1. TVL = DL + Fv + (0.2$S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 108 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 287 | 1/2 | 40 | 245 | C12AA04WS | N3 | L3 |
| 35.0 | 10 | 402 | 1/2 | 40 | 344 | C12AA04WS | N4 | L4 |
| 50.0 | 10 | 574 | 1/2 | 40 | 491 | C12AA04WS | N5 | L5 |
| 65.0 | 10 | 746 | 1/2 | 40 | 638 | C12AA04WS | N7 | L7 |
| 75.0 | 10 | 861 | 1/2 | 40 | 736 | C12AA06WS | N8 | L8 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 981 | C12AA06WS | N10 | L10 |
| 125.0 | 10 | 1,434 | 1/2 | 40 | 1,227 | C12AA06WS | N13 | L13 |
| 150.0 | 10 | 1,721 | 1/2 | 39 | 1,435 | C12AA06WS | N15 | L15 |
| 175.0 | 10 | 2,008 | 1/2 | 33 | 1,417 | C12AA06WS | N15 | L15 |
| 200.0 | 10 | 2,295 | 1/2 | 29 | 1,423 | C12AA06WS | N15 | L15 |
| 225.0 | 10 | 2,582 | 5/8 | 26 | 1,435 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard** [1, 8] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B26.1)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 145 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 287 | 1/2 | 40 | 331 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 402 | 1/2 | 40 | 463 | C12AA04WS | N5 | L5 |
| 50.0 | 10 | 574 | 1/2 | 40 | 661 | C12AA04WS | N7 | L7 |
| 65.0 | 10 | 746 | 1/2 | 40 | 860 | C12AA06WS | N9 | L9 |
| 75.0 | 10 | 861 | 1/2 | 40 | 992 | C12AA06WS | N10 | L10 |
| 100.0 | 10 | 1,148 | 1/2 | 40 | 1,322 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,434 | 5/8 | 40 | 1,653 | C58DG06TS | N17 | L17 |
| 150.0 | 10 | 1,721 | 5/8 | 36 | 1,785 | C58DG06TS | N18 | L18 |
| 175.0 | 10 | 2,008 | 5/8 | 30 | 1,736 | C58DG06TS | N18 | L18 |
| 200.0 | 10 | 2,295 | 5/8 | 26 | 1,719 | C58DG06TS | N18 | L18 |
| 225.0 | 10 | 2,582 | 5/8 | 24 | 1,785 | C58DG06TS | N18 | L18 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing Page D1 | Brace [3] Reaction P Page D2 | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1-03 | Min. Brace Anchorage [6] Metal [5] Deck Page D2-03 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 187 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 287 | 1/2 | 40 | 425 | C12AA04WS | N5 | L5 |
| 35.0 | 10 | 402 | 1/2 | 40 | 595 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 574 | 1/2 | 40 | 850 | C12AA06WS | N9 | L9 |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,105 | C12AA06WS | N12 | L12 |
| 75.0 | 10 | 861 | 5/8 | 40 | 1,275 | C58AA06WS | N13 | L13 |
| 100.0 | 10 | 1,148 | 5/8 | 34 | 1,445 | C58AA06WS | N15 | L15 |
| 125.0 | 10 | 1,434 | 5/8 | 27 | 1,434 | C58AA06WS | N15 | L15 |
| 150.0 | 10 | 1,721 | 5/8 | 23 | 1,466 | C58AA06WS | N15 | L15 |
| 175.0 | 10 | 2,008 | 5/8 | 19 | 1,413 | C58AA06WS | N15 | L15 |
| 200.0 | 10 | 2,295 | 5/8 | 17 | 1,445 | C58AA06WS | N15 | L15 |
| 225.0 | 10 | 2,582 | 5/8 | 15 | 1,434 | C58AA06WS | N15 | L15 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Refer To C48.7A For Outboard Rod Bracing Requirements.

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## CABLE BRACING REQUIREMENTS[7]

**3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard[1, 8] Rod Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 216 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 40 | 491 | C12AA04WS | N5 | L5 |
| 35.0 | 10 | 402 | 1/2 | 40 | 687 | C12AA06WS | N7 | L7 |
| 50.0 | 10 | 574 | 1/2 | 40 | 981 | C12AA06WS | N10 | L10 |
| 65.0 | 10 | 746 | 1/2 | 40 | 1,276 | C12AA06WS | N13 | L13 |
| 75.0 | 10 | 861 | 1/2 | 38 | 1,399 | C12AA06WS | N14 | L14 |
| 100.0 | 10 | 1,148 | 1/2 | 28 | 1,374 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 22 | 1,350 | C12AA06WS | N14 | L14 |
| 150.0 | 10 | 1,721 | 1/2 | 18 | 1,325 | C12AA06WS | N14 | L14 |
| 175.0 | 10 | 2,008 | 1/2 | 16 | 1,374 | C12AA06WS | N14 | L14 |
| 200.0 | 10 | 2,295 | 1/2 | 14 | 1,374 | C12AA06WS | N14 | L14 |
| 225.0 | 10 | 2,582 | 5/8 | 12 | 1,325 | C58AA06WS | N14 | L14 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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**CABLE BRACING REQUIREMENTS**[7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard[1, 8] Rod Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B26.1)** | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 291 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 287 | 1/2 | 40 | 661 | C12AA04WS | N7 | L7 |
| 35.0 | 10 | 402 | 1/2 | 40 | 926 | C12AA06WS | N10 | L10 |
| 50.0 | 10 | 574 | 1/2 | 40 | 1,322 | C12AA06WS | N14 | L14 |
| 65.0 | 10 | 746 | 5/8 | 40 | 1,719 | C58DG06TS | N18 | L18 |
| 75.0 | 10 | 861 | 5/8 | 36 | 1,785 | C58DG06TS | N18 | L18 |
| 100.0 | 10 | 1,148 | 5/8 | 26 | 1,719 | C58DG06TS | N18 | L18 |
| 125.0 | 10 | 1,434 | 5/8 | 22 | 1,818 | C58DG06TS | N19 | L19 |
| 150.0 | 10 | 1,721 | 5/8 | 18 | 1,785 | C58DG06TS | N18 | L18 |
| 175.0 | 10 | 2,008 | 5/8 | 14 | 1,620 | C58DG06TS | N17 | L17 |
| 200.0 | 10 | 2,295 | 5/8 | 12 | 1,587 | C58DG06TS | N16 | L16 |
| 225.0 | 10 | 2,582 | 5/8 | 12 | 1,785 | C58DG06TS | N18 | L18 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing Page D1 | Brace [3] Reaction P Page D2 | Min. Brace Assembly Page E3 | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1-03 | Metal [5] Deck Page D2-03 |
|---|---|---|---|---|---|---|---|---|
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 374 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 287 | 1/2 | 40 | 850 | C12AA06WS | N9 | L9 |
| 35.0 | 10 | 402 | 5/8 | 40 | 1,190 | C58AA06WS | N12 | L12 |
| 50.0 | 10 | 574 | 5/8 | 34 | 1,445 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 746 | 5/8 | 26 | 1,437 | C58AA06WS | N15 | L15 |
| 75.0 | 10 | 861 | 5/8 | 22 | 1,403 | C58AA06WS | N15 | L15 |
| 100.0 | 10 | 1,148 | 5/8 | 16 | 1,360 | C58AA06WS | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 12 | 1,275 | C12AA06WS | N13 | L13 |
| 150.0 | 10 | 1,721 | 1/2 | 10 | 1,275 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Refer To C48.7A For Outboard Rod Bracing Requirements.

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## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard[1, 8] Rod Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 324 | C38AA04WS | N4 | L4 |
| 25.0 | 10 | 287 | 1/2 | 40 | 736 | C12AA06WS | N8 | L8 |
| 35.0 | 10 | 402 | 1/2 | 40 | 1,031 | C12AA06WS | N11 | L11 |
| 50.0 | 10 | 574 | 1/2 | 38 | 1,399 | C12AA06WS | N14 | L14 |
| 65.0 | 10 | 746 | 1/2 | 30 | 1,435 | C12AA06WS | N15 | L15 |
| 75.0 | 10 | 861 | 1/2 | 26 | 1,435 | C12AA06WS | N15 | L15 |
| 100.0 | 10 | 1,148 | 1/2 | 18 | 1,325 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 14 | 1,288 | C12AA06WS | N13 | L13 |
| 150.0 | 10 | 1,721 | 1/2 | 12 | 1,325 | C12AA06WS | N14 | L14 |
| 175.0 | 10 | 2,008 | 1/2 | 10 | 1,288 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS[7]

**3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage[6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard[1, 8] Rod Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 436 | C38AA04WS | N5 | L5 |
| 25.0 | 10 | 287 | 1/2 | 40 | 992 | C12AA06WS | N10 | L10 |
| 35.0 | 10 | 402 | 5/8 | 40 | 1,388 | C58AA06WS | N14 | L14 |
| 50.0 | 10 | 574 | 5/8 | 36 | 1,785 | C58DG06TS | N18 | L18 |
| 65.0 | 10 | 746 | 5/8 | 28 | 1,805 | C58DG06TS | N19 | L19 |
| 75.0 | 10 | 861 | 5/8 | 24 | 1,785 | C58DG06TS | N18 | L18 |
| 100.0 | 10 | 1,148 | 5/8 | 18 | 1,785 | C58DG06TS | N18 | L18 |
| 125.0 | 10 | 1,434 | 5/8 | 14 | 1,736 | C58DG06TS | N18 | L18 |
| 150.0 | 10 | 1,721 | 5/8 | 12 | 1,785 | C58DG06TS | N18 | L18 |
| 175.0 | 10 | 2,008 | 5/8 | 10 | 1,736 | C58DG06TS | N18 | L18 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| | | | | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Inboard [1, 8] Rod Total Vertical Load (lbs)** | **Min. [8] Vertical Support Rod Dia. (in.)** | **Max. [2] Brace Spacing Page D1** | **Brace [3] Reaction P Page D2** | **Min. Brace Assembly Page E3** | **Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1-03** | **Metal [5] Deck Page D2-03** |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B26.1)** | | | | |
| 11.0 | 10 | 126 | 1/2 | 40 | 561 | C12AA04WS | N6 | L6 |
| 25.0 | 10 | 287 | 5/8 | 46 | 1,466 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 402 | 5/8 | 32 | 1,428 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 574 | 5/8 | 22 | 1,403 | C58AA06WS | N15 | L15 |
| 65.0 | 10 | 746 | 5/8 | 16 | 1,326 | C58AA06WS | N14 | L14 |
| 75.0 | 10 | 861 | 5/8 | 14 | 1,339 | C58AA06WS | N14 | L14 |
| 100.0 | 10 | 1,148 | 5/8 | 10 | 1,275 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Refer To C48.7A For Outboard Rod Bracing Requirements.

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### CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 126 | 3/8 | 40 | 432 | C38AA04WS | N5 | L5 |
| 25.0 | 10 | 287 | 1/2 | 40 | 981 | C12AA06WS | N10 | L10 |
| 35.0 | 10 | 402 | 1/2 | 40 | 1,374 | C12AA06WS | N14 | L14 |
| 50.0 | 10 | 574 | 1/2 | 28 | 1,374 | C12AA06WS | N14 | L14 |
| 65.0 | 10 | 746 | 1/2 | 22 | 1,404 | C12AA06WS | N15 | L15 |
| 75.0 | 10 | 861 | 1/2 | 18 | 1,325 | C12AA06WS | N14 | L14 |
| 100.0 | 10 | 1,148 | 1/2 | 14 | 1,374 | C12AA06WS | N14 | L14 |
| 125.0 | 10 | 1,434 | 1/2 | 10 | 1,227 | C12AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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*CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **INBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]<br>Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6]<br>Metal [5] Deck Page D2 |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B26.1)** | | | | |
| 11.0 | 10 | 126 | 1/2 | 40 | 582 | C12AA04WS | N6 | L6 |
| 25.0 | 10 | 287 | 5/8 | 40 | 1,322 | C58AA06WS | N14 | L14 |
| 35.0 | 10 | 402 | 5/8 | 38 | 1,759 | C58DG06TS | N18 | L18 |
| 50.0 | 10 | 574 | 5/8 | 26 | 1,719 | C58DG06TS | N18 | L18 |
| 65.0 | 10 | 746 | 5/8 | 20 | 1,719 | C58DG06TS | N18 | L18 |
| 75.0 | 10 | 861 | 5/8 | 18 | 1,785 | C58DG06TS | N18 | L18 |
| 100.0 | 10 | 1,148 | 5/8 | 12 | 1,587 | C58DG06TS | N16 | L16 |
| 125.0 | 10 | 1,434 | 5/8 | 10 | 1,653 | C58DG06TS | N17 | L17 |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS*[7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Inboard[1, 8] Rod Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | INBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing Page D1 | Brace[3] Reaction P Page D2 | Min. Brace Assembly Page E3 | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1-03 | Metal[5] Deck Page D2-03 |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 126 | 1/2 | 40 | 748 | C12AA06WS | N8 | L8 |
| 25.0 | 10 | 287 | 5/8 | 34 | 1,445 | C58AA06WS | N15 | L15 |
| 35.0 | 10 | 402 | 5/8 | 24 | 1,428 | C58AA06WS | N15 | L15 |
| 50.0 | 10 | 574 | 5/8 | 16 | 1,360 | C58AA06WS | N14 | L14 |
| 65.0 | 10 | 746 | 5/8 | 12 | 1,326 | C58AA06WS | N14 | L14 |
| 75.0 | 10 | 861 | 5/8 | 10 | 1,275 | C58AA06WS | N13 | L13 |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 85% Of Total Load Allocated Per Inboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Refer To C48.7A For Outboard Rod Bracing Requirements.

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B26.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 37 | 3/8 | 40 | 127 | C38AA04WS | N2 | L2 | 80 | 64 | C38AA04WS | N1 | L1 |
| 25.0 | 10 | 84 | 1/2 | 40 | 289 | C12AA04WS | N3 | L3 | 80 | 144 | C12AA04WS | N2 | L2 |
| 35.0 | 10 | 118 | 1/2 | 40 | 404 | C12AA04WS | N5 | L5 | 80 | 202 | C12AA04WS | N3 | L3 |
| 50.0 | 10 | 169 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 289 | C12AA04WS | N3 | L3 |
| 65.0 | 10 | 219 | 1/2 | 40 | 751 | C12AA06WS | N8 | L8 | 80 | 375 | C12AA04WS | N4 | L4 |
| 75.0 | 10 | 253 | 1/2 | 40 | 866 | C12AA06WS | N9 | L9 | 80 | 433 | C12AA04WS | N5 | L5 |
| 100.0 | 10 | 338 | 1/2 | 40 | 1,155 | C12AA06WS | N12 | L12 | 80 | 577 | C12AA04WS | N6 | L6 |
| 125.0 | 10 | 422 | 1/2 | 40 | 1,443 | C12AA06WS | N15 | L15 | 80 | 722 | C12AA06WS | N8 | L8 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9] | | | | | | | | | |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | | | | | | |
| 150.0 | 10 | 506 | 1/2 | 33 | 1,429 | C12AA06WS | N15 | L15 | | | | | |
| 175.0 | 10 | 591 | 1/2 | 28 | 1,415 | C12AA06WS | N15 | L15 | | | | | |
| 200.0 | 10 | 675 | 1/2 | 25 | 1,443 | C12AA06WS | N15 | L15 | | | | | |
| 225.0 | 10 | 759 | 1/2 | 22 | 1,429 | C12AA06WS | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1,8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2-Way Transverse Brace Pattern (B26.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 37 | 3/8 | 40 | 171 | C38AA04WS | N2 | L2 | 80 | 86 | C38AA04WS | N1 | L1 |
| 25.0 | 10 | 84 | 1/2 | 40 | 389 | C12AA04WS | N4 | L4 | 80 | 194 | C12AA04WS | N2 | L2 |
| 35.0 | 10 | 118 | 1/2 | 40 | 545 | C12AA04WS | N6 | L6 | 80 | 272 | C12AA04WS | N3 | L3 |
| 50.0 | 10 | 169 | 1/2 | 40 | 778 | C12AA06WS | N8 | L8 | 80 | 389 | C12AA04WS | N4 | L4 |
| 65.0 | 10 | 219 | 1/2 | 40 | 1,011 | C12AA06WS | N11 | L11 | 80 | 506 | C12AA04WS | N6 | L6 |
| 75.0 | 10 | 253 | 1/2 | 40 | 1,167 | C12AA06WS | N12 | L12 | 80 | 583 | C12AA04WS | N6 | L6 |
| 100.0 | 10 | 338 | 5/8 | 40 | 1,556 | C58DG06TS | N16 | L16 | 80 | 778 | C58AA06WS | N8 | L8 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9] | | | | | | | | | |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | | | | | | |
| 125.0 | 10 | 422 | 5/8 | 36 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 150.0 | 10 | 506 | 5/8 | 30 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 175.0 | 10 | 591 | 5/8 | 26 | 1,770 | C58DG06TS | N18 | L18 | | | | | |
| 200.0 | 10 | 675 | 5/8 | 23 | 1,789 | C58DG06TS | N18 | L18 | | | | | |
| 225.0 | 10 | 759 | 5/8 | 20 | 1,750 | C58DG06TS | N18 | L18 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]

**3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)** — **MAXIMUM SEISMIC DESIGN FORCE = 0.25 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS [9] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min. Brace Anchorage [6] | | | | | Min. Brace Anchorage [6] | |
| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B26.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 37 | 3/8 | 40 | 220 | C38AA04WS | N3 | L3 | 80 | 110 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 84 | 1/2 | 40 | 500 | C12AA04WS | N5 | L5 | 80 | 250 | C12AA04WS | N3 | L3 |
| 35.0 | 10 | 118 | 1/2 | 40 | 700 | C12AA06WS | N7 | L7 | 80 | 350 | C12AA04WS | N4 | L4 |
| 50.0 | 10 | 169 | 1/2 | 40 | 1,000 | C12AA06WS | N10 | L10 | 80 | 500 | C12AA04WS | N5 | L5 |
| 65.0 | 10 | 219 | 5/8 | 40 | 1,300 | C58AA06WS | N13 | L13 | 80 | 650 | C58AA04WS | N7 | L7 |
| 75.0 | 10 | 253 | 3/4 | 40 | 1,500 | C34DG06TS | N15 | L15 | 80 | 750 | C34DG06WS | N8 | L8 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9] | | | | | | | | | |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | | | | | | |
| 100.0 | 10 | 338 | 5/8 | 29 | 1,450 | C58AA06WS | N15 | L15 | | | | | |
| 125.0 | 10 | 422 | 5/8 | 23 | 1,438 | C58AA06WS | N15 | L15 | | | | | |
| 150.0 | 10 | 506 | 5/8 | 19 | 1,425 | C58AA06WS | N15 | L15 | | | | | |
| 175.0 | 10 | 591 | 5/8 | 16 | 1,400 | C58AA06WS | N14 | L14 | | | | | |
| 200.0 | 10 | 675 | 5/8 | 14 | 1,400 | C58AA06WS | N14 | L14 | | | | | |
| 225.0 | 10 | 759 | 5/8 | 13 | 1,463 | C58AA06WS | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Refer To C48.7B For Inboard Rod Bracing Requirements.

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **2-Way Transverse Brace Pattern (B26.0)** | | | | | **8-Way Transverse, Longitudinal Brace Pattern (B26.1)** | | | | |
| 11.0 | 10 | 37 | 3/8 | 40 | 254 | C38AA04WS | N3 | L3 | 80 | 127 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 84 | 1/2 | 40 | 577 | C12AA04WS | N6 | L6 | 80 | 289 | C12AA04WS | N3 | L3 |
| 35.0 | 10 | 118 | 1/2 | 40 | 808 | C12AA06WS | N9 | L9 | 80 | 404 | C12AA04WS | N5 | L5 |
| 50.0 | 10 | 169 | 1/2 | 40 | 1,155 | C12AA06WS | N12 | L12 | 80 | 577 | C12AA04WS | N6 | L6 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS** [9] | | | | | | | | | |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B26.1)** | | | | | | | | | |
| 65.0 | 10 | 219 | 1/2 | 38 | 1,426 | C12AA06WS | N15 | L15 | | | | | |
| 75.0 | 10 | 253 | 1/2 | 33 | 1,429 | C12AA06WS | N15 | L15 | | | | | |
| 100.0 | 10 | 338 | 1/2 | 25 | 1,443 | C12AA06WS | N15 | L15 | | | | | |
| 125.0 | 10 | 422 | 1/2 | 20 | 1,443 | C12AA06WS | N15 | L15 | | | | | |
| 150.0 | 10 | 506 | 1/2 | 16 | 1,386 | C12AA06WS | N14 | L14 | | | | | |
| 175.0 | 10 | 591 | 1/2 | 14 | 1,415 | C12AA06WS | N15 | L15 | | | | | |
| 200.0 | 10 | 675 | 1/2 | 12 | 1,386 | C12AA06WS | N14 | L14 | | | | | |
| 225.0 | 10 | 759 | 1/2 | 11 | 1,429 | C12AA06WS | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B26.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 37 | 3/8 | 40 | 342 | C38AA04WS | N4 | L4 | 80 | 171 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 84 | 1/2 | 40 | 778 | C12AA06WS | N8 | L8 | 80 | 389 | C12AA04WS | N4 | L4 |
| 35.0 | 10 | 118 | 1/2 | 40 | 1,089 | C12AA06WS | N11 | L11 | 80 | 545 | C12AA04WS | N6 | L6 |
| 50.0 | 10 | 169 | 5/8 | 40 | 1,556 | C58DG06TS | N16 | L16 | 80 | 778 | C58AA06WS | N8 | L8 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS** [9] | | | | | | | | | |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | | | | | | |
| 65.0 | 10 | 219 | 5/8 | 35 | 1,770 | C58DG06TS | N18 | L18 | | | | | |
| 75.0 | 10 | 253 | 5/8 | 30 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 100.0 | 10 | 338 | 5/8 | 22 | 1,711 | C58DG06TS | N18 | L18 | | | | | |
| 125.0 | 10 | 422 | 5/8 | 18 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 150.0 | 10 | 506 | 5/8 | 15 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 175.0 | 10 | 591 | 5/8 | 13 | 1,770 | C58DG06TS | N18 | L18 | | | | | |
| 200.0 | 10 | 675 | 5/8 | 11 | 1,711 | C58DG06TS | N18 | L18 | | | | | |
| 225.0 | 10 | 759 | 5/8 | 10 | 1,750 | C58DG06TS | N18 | L18 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times W_p$). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.50 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS [9] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B26.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 37 | 1/2 | 40 | 440 | C12AA04WS | N5 | L5 | 80 | 220 | C12AA04WS | N3 | L3 |
| 25.0 | 10 | 84 | 1/2 | 40 | 1,000 | C12AA06WS | N10 | L10 | 80 | 500 | C12AA04WS | N5 | L5 |
| 35.0 | 10 | 118 | 5/8 | 40 | 1,400 | C58AA06WS | N14 | L14 | 80 | 700 | C58AA06WS | N7 | L7 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9] | | | | | | | | | |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | | | | | | |
| 50.0 | 10 | 169 | 5/8 | 29 | 1,450 | C58AA06WS | N15 | L15 | | | | | |
| 65.0 | 10 | 219 | 5/8 | 22 | 1,430 | C58AA06WS | N15 | L15 | | | | | |
| 75.0 | 10 | 253 | 5/8 | 19 | 1,425 | C58AA06WS | N15 | L15 | | | | | |
| 100.0 | 10 | 338 | 5/8 | 14 | 1,400 | C58AA06WS | N14 | L14 | | | | | |
| 125.0 | 10 | 422 | 5/8 | 11 | 1,375 | C58AA06WS | N14 | L14 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}$/1.4 x Wp). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Refer To C48.7B For Inboard Rod Bracing Requirements.

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] Form Pour [4] Deck Page D1 | Min. Brace Anchorage [6] Metal [5] Deck Page D2 |
| | | | | **2-Way Transverse Brace Pattern (B26.0)** | | | | | **8-Way Transverse, Longitudinal Brace Pattern (B26.1)** | | | | |
| 11.0 | 10 | 37 | 3/8 | 40 | 381 | C38AA04WS | N4 | L4 | 80 | 191 | C38AA04WS | N2 | L2 |
| 25.0 | 10 | 84 | 1/2 | 40 | 866 | C12AA06WS | N9 | L9 | 80 | 433 | C12AA04WS | N5 | L5 |
| 35.0 | 10 | 118 | 1/2 | 40 | 1,212 | C12AA06WS | N13 | L13 | 80 | 606 | C12AA04WS | N7 | L7 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9]** | | | | | | | | | |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B26.1)** | | | | | | | | | |
| 50.0 | 10 | 169 | 1/2 | 33 | 1,429 | C12AA06WS | N15 | L15 | | | | | |
| 65.0 | 10 | 219 | 1/2 | 25 | 1,407 | C12AA06WS | N15 | L15 | | | | | |
| 75.0 | 10 | 253 | 1/2 | 22 | 1,429 | C12AA06WS | N15 | L15 | | | | | |
| 100.0 | 10 | 338 | 1/2 | 16 | 1,386 | C12AA06WS | N14 | L14 | | | | | |
| 125.0 | 10 | 422 | 1/2 | 13 | 1,407 | C12AA06WS | N15 | L15 | | | | | |
| 150.0 | 10 | 506 | 1/2 | 11 | 1,429 | C12AA06WS | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS*[7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard[1, 8] Rod Total Vertical Load (lbs) | Min.[8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | | Max.[2] Brace Spacing (ft.) | Brace[3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage[6] | |
| | | | | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 | | | | Form Pour[4] Deck Page D1 | Metal[5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B26.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 37 | 1/2 | 40 | 513 | C12AA04WS | N6 | L6 | 80 | 257 | C12AA04WS | N3 | L3 |
| 25.0 | 10 | 84 | 5/8 | 40 | 1,167 | C58AA06WS | N12 | L12 | 80 | 583 | C58AA04WS | N6 | L6 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS[9] | | | | | | | | | |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | | | | | | |
| 35.0 | 10 | 118 | 5/8 | 40 | 1,634 | C58DG06TS | N17 | L17 | | | | | |
| 50.0 | 10 | 169 | 5/8 | 30 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 65.0 | 10 | 219 | 5/8 | 23 | 1,744 | C58DG06TS | N18 | L18 | | | | | |
| 75.0 | 10 | 253 | 5/8 | 20 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 100.0 | 10 | 338 | 5/8 | 15 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 125.0 | 10 | 422 | 5/8 | 12 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 150.0 | 10 | 506 | 5/8 | 10 | 1,750 | C58DG06TS | N18 | L18 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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***Outboard***

## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 0.75 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS [9] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | | Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6] | |
| | | | | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | | | | Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B26.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 37 | 1/2 | 40 | 660 | C12AA04WS | N7 | L7 | 80 | 330 | C12AA04WS | N4 | L4 |
| 25.0 | 10 | 84 | 3/4 | 40 | 1,500 | C34DG06TS | N15 | L15 | 80 | 750 | C34DG06WS | N8 | L8 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9] | | | | | | | | | |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | | | | | | |
| 35.0 | 10 | 118 | 5/8 | 28 | 1,470 | C58AA06WS | N15 | L15 | | | | | |
| 50.0 | 10 | 169 | 5/8 | 19 | 1,425 | C58AA06WS | N15 | L15 | | | | | |
| 65.0 | 10 | 219 | 5/8 | 15 | 1,463 | C58AA06WS | N15 | L15 | | | | | |
| 75.0 | 10 | 253 | 5/8 | 13 | 1,463 | C58AA06WS | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Refer To C48.7B For Inboard Rod Bracing Requirements.

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## *CABLE BRACING REQUIREMENTS* $^{7}$

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** **MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* *2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard $^{1,8}$ Rod Total Vertical Load (lbs) | Min. $^{8}$ Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS | | | | | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Max. $^{2}$ Brace Spacing (ft.) | Brace $^{3}$ Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage $^{6}$ | | Max. $^{2}$ Brace Spacing (ft.) | Brace $^{3}$ Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage $^{6}$ | |
| | | | | | | | Form Pour $^{4}$ Deck Page D1 | Metal $^{5}$ Deck Page D2 | | | | Form Pour $^{4}$ Deck Page D1 | Metal $^{5}$ Deck Page D2 |
| | | | | 2-Way Transverse Brace Pattern (B26.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 37 | 3/8 | 40 | 508 | C38AA04WS | N6 | L6 | 80 | 254 | C38AA04WS | N3 | L3 |
| 25.0 | 10 | 84 | 1/2 | 40 | 1,155 | C12AA06WS | N12 | L12 | 80 | 577 | C12AA04WS | N6 | L6 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS $^{9}$ | | | | | | | | | |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | | | | | | |
| 35.0 | 10 | 118 | 1/2 | 35 | 1,415 | C12AA06WS | N15 | L15 | | | | | |
| 50.0 | 10 | 169 | 1/2 | 25 | 1,443 | C12AA06WS | N15 | L15 | | | | | |
| 65.0 | 10 | 219 | 1/2 | 19 | 1,426 | C12AA06WS | N15 | L15 | | | | | |
| 75.0 | 10 | 253 | 1/2 | 16 | 1,386 | C12AA06WS | N14 | L14 | | | | | |
| 100.0 | 10 | 338 | 1/2 | 12 | 1,386 | C12AA06WS | N14 | L14 | | | | | |
| 125.0 | 10 | 422 | 1/2 | 10 | 1,443 | C12AA06WS | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 30 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## *CABLE BRACING REQUIREMENTS* [7]

***3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)*** — ***MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's***

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.* — *2013 California Building Code Compliant*

| | | | | **OUTBOARD TRANSVERSE BRACING REQUIREMENTS** | | | | | **OUTBOARD LONGITUDINAL BRACING REQUIREMENTS** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Min. Brace Anchorage** [6] | | | | | **Min. Brace Anchorage** [6] | |
| **Maximum Trapeze Load (lbs/lf)** | **Max. Vertical Support Spacing (ft.)** | **Outboard** [1, 8] **Rod Total Vertical Load (lbs)** | **Min.** [8] **Vertical Support Rod Dia. (in.)** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** | **Max.** [2] **Brace Spacing (ft.)** | **Brace** [3] **Reaction P (lbs)** | **Min. Brace Assembly E - Pages** | **Form Pour** [4] **Deck Page D1** | **Metal** [5] **Deck Page D2** |
| | | | | **2-Way Transverse Brace Pattern (B26.0)** | | | | | **8-Way Transverse, Longitudinal Brace Pattern (B26.1)** | | | | |
| 11.0 | 10 | 37 | 1/2 | 40 | 685 | C12AA06WS | N7 | L7 | 80 | 342 | C12AA04WS | N4 | L4 |
| 25.0 | 10 | 84 | 5/8 | 40 | 1,556 | C58DG06TS | N16 | L16 | 80 | 778 | C58AA06WS | N8 | L8 |
| | | | | **OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS** [9] | | | | | | | | | |
| | | | | **8-Way Transverse, Longitudinal Brace Pattern (B26.1)** | | | | | | | | | |
| 35.0 | 10 | 118 | 5/8 | 32 | 1,742 | C58DG06TS | N18 | L18 | | | | | |
| 50.0 | 10 | 169 | 5/8 | 22 | 1,711 | C58DG06TS | N18 | L18 | | | | | |
| 65.0 | 10 | 219 | 5/8 | 17 | 1,719 | C58DG06TS | N18 | L18 | | | | | |
| 75.0 | 10 | 253 | 5/8 | 15 | 1,750 | C58DG06TS | N18 | L18 | | | | | |
| 100.0 | 10 | 338 | 5/8 | 11 | 1,711 | C58DG06TS | N18 | L18 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 50 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".

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## CABLE BRACING REQUIREMENTS [7]

### 3-ROD TRAPEZED ELECTRICAL SYSTEMS (Conduit, Cable Tray, Bus Duct, Bus Way)

**MAXIMUM SEISMIC DESIGN FORCE = 1.00 G's**

*Requires Use of ISAT Seismic Brackets. Use of Any Non-ISAT Bracket Voids Engineering.*

*2013 California Building Code Compliant*

| Maximum Trapeze Load (lbs/lf) | Max. Vertical Support Spacing (ft.) | Outboard [1, 8] Rod Total Vertical Load (lbs) | Min. [8] Vertical Support Rod Dia. (in.) | OUTBOARD TRANSVERSE BRACING REQUIREMENTS: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 | OUTBOARD LONGITUDINAL BRACING REQUIREMENTS [9]: Max. [2] Brace Spacing (ft.) | Brace [3] Reaction P (lbs) | Min. Brace Assembly E - Pages | Min. Brace Anchorage [6]: Form Pour [4] Deck Page D1 | Metal [5] Deck Page D2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2-Way Transverse Brace Pattern (B26.0) | | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | |
| 11.0 | 10 | 37 | 1/2 | 40 | 880 | C12AA06WS | N9 | L9 | 80 | 440 | C12AA04WS | N5 | L5 |
| | | | | OUTBOARD TRANS., LONGITUDINAL BRACING REQUIREMENTS [9] | | | | | | | | | |
| | | | | 8-Way Transverse, Longitudinal Brace Pattern (B26.1) | | | | | | | | | |
| 25.0 | 10 | 84 | 5/8 | 29 | 1,450 | C58AA06WS | N15 | L15 | | | | | |
| 35.0 | 10 | 118 | 5/8 | 21 | 1,470 | C58AA06WS | N15 | L15 | | | | | |
| 50.0 | 10 | 169 | 5/8 | 14 | 1,400 | C58AA06WS | N14 | L14 | | | | | |
| 65.0 | 10 | 219 | 5/8 | 11 | 1,430 | C58AA06WS | N15 | L15 | | | | | |

1. TVL = DL + Fv + ($0.2S_{DS}/1.4 \times Wp$). All Terms Are Working Loads. Based On Eccentric Loading, 25% Of Total Load Allocated Per Outboard Rod.
2. Reductions In Actual Installed Brace Spacing Will Result In An Equal Percentage Reduction In Brace Reaction. As An Option When This Occurs ISAT May Substitute An Alternate Anchorage From Tables D1 or D2 Which Meets or Exceeds The Lowered Brace Reaction.
3. At Max. 60 Degree Brace Inclination.
4. Min. 3,000 psi NWC. Any "N Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
5. Min. 3,000 psi NWC or LWC. Any "L Series" Connection May Be Utilized Having A Numeric Designation Equal To Or Higher Than That Shown.
6. As An Alternate, Brace Anchorage Connections To Structure May Be Employed Using Any Detail From Structural Connections Section "D" Series Details Where Assembly Design Value Meets Or Exceeds Brace Reaction.
7. For Trade Specific Bracing Installation Notes, Refer To Page 7.1.
8. Utilize Any "G" Series Vertical Support Connection Having A Design Value Equal To Or Greater Than The Corresponding "Rod Total Vertical Load".
9. Refer To C48.7B For Inboard Rod Bracing Requirements.

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***Outboard***

| STEEL PIPE SCHEDULE STD (WATER FILLED WITH INSULATION) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TRADE SIZE (in) | MAX GRAVITY SUPPORT SPACING (ft) | MAX WEIGHT (lbs/ft) | MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING (ft) | | | | | | | |
| | | | G FORCE (ASD) | | | | | | | |
| | | | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 |
| 1.25 | 10 | 3.58 | 36 | 30 | 25 | 21 | 19 | 17 | 16 | 15 |
| 1.5 | 10 | 4.24 | 39 | 33 | 27 | 23 | 21 | 19 | 18 | 17 |
| 2 | 10 | 5.89 | 43 | 37 | 30 | 26 | 24 | 22 | 20 | 19 |
| 2.5 | 11 | 8.84 | 48 | 41 | 35 | 30 | 27 | 24 | 23 | 21 |
| 3 | 12 | 11.86 | 53 | 45 | 38 | 33 | 29 | 27 | 25 | 23 |
| 4 | 14 | 19.49 | 58 | 48 | 39 | 34 | 30 | 27 | 25 | 24 |
| 5 | 16 | 26.89 | 65 | 52 | 42 | 37 | 33 | 30 | 28 | 26 |
| 6 | 17 | 35.72 | 71 | 56 | 45 | 39 | 35 | 32 | 30 | 28 |
| 8 | 19 | 55.24 | 80 | 62 | 51 | 44 | 39 | 36 | 33 | 31 |
| 10 | 22 | 80.95 | 89 | 67 | 54 | 47 | 42 | 38 | 36 | 33 |
| 12 | 23 | 105.5 | 96 | 69 | 56 | 49 | 44 | 40 | 37 | 35 |
| 14 | 25 | 121.9 | 96 | 68 | 56 | 48 | 43 | 39 | 36 | 34 |
| 16 | 27 | 150.2 | 95 | 67 | 55 | 47 | 42 | 39 | 36 | 33 |
| 18 | 28 | 181.2 | 93 | 66 | 54 | 47 | 42 | 38 | 35 | 33 |
| 20 | 30 | 214.6 | 89 | 63 | 52 | 45 | 40 | 36 | 34 | 32 |
| 24 | 32 | 290.4 | 82 | 58 | 47 | 41 | 36 | 33 | 31 | 29 |
| 26 | 32 | 332.4 | 79 | 56 | 45 | 39 | 35 | 32 | 30 | 28 |

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 MAXIUMUM SEISMIC BRACE SPACINGS ON A PROJECT BY PROJECT BASIS.
2. MAXIMUM GRAVITY SUPPORT SPACING IS BASED ON TABLE 316.2 OF THE 2013 CALIFORNIA MECHANICAL CODE (CMC 2013) & MSS SP-58 TABLE 4. PIPE WEIGHTS USED ARE BASED ON STANDARD SCHEDULE STEEL PIPES (40S) INCLUDING WATER AND INSULATION (REFER TO X-SERIES PAGES). 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 Fy = 35 ksi AND $S_A$ = 14.6 ksi AT MAXIMUM OPERATING PRESSURE AND TEMPERATURE OF 400psi AND 650°F, RESPECTIVELY. FOR ASTM A53, TYPE E, GRADE A WITH MINIMUM Fy = 30 ksi AND $S_A$ = 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 Fy AND $S_A$ VALUES MEETING OR EXCEEDING ABOVE STATES 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 1.33 UP 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.

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| STEEL PIPE SCHEDULE 80 (WATER FILLED WITH INSULATION) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TRADE SIZE (in) | MAX GRAVITY SUPPORT SPACING (ft) | MAX WEIGHT (lbs/ft) | MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING (ft) | | | | | | | |
| | | | G FORCE (ASD) | | | | | | | |
| | | | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 |
| 1.25 | 10 | 4.31 | 36 | 31 | 25 | 22 | 20 | 18 | 17 | 16 |
| 1.5 | 10 | 5.06 | 39 | 33 | 28 | 25 | 22 | 20 | 19 | 17 |
| 2 | 10 | 7.14 | 44 | 37 | 32 | 28 | 25 | 23 | 21 | 20 |
| 2.5 | 11 | 10.46 | 49 | 41 | 36 | 32 | 28 | 26 | 24 | 22 |
| 3 | 12 | 14.17 | 54 | 46 | 40 | 35 | 31 | 28 | 26 | 25 |
| 4 | 14 | 23.14 | 60 | 51 | 43 | 37 | 33 | 30 | 28 | 26 |
| 5 | 16 | 32.26 | 67 | 56 | 47 | 41 | 37 | 33 | 31 | 29 |
| 6 | 17 | 44.07 | 73 | 62 | 52 | 45 | 40 | 37 | 34 | 32 |
| 8 | 19 | 68.33 | 84 | 70 | 59 | 51 | 46 | 42 | 38 | 36 |
| 10 | 22 | 101.88 | 90 | 72 | 58 | 51 | 45 | 41 | 38 | 36 |

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 MAXIUMUM SEISMIC BRACE SPACINGS ON A PROJECT BY PROJECT BASIS.
2. MAXIMUM GRAVITY SUPPORT SPACING IS BASED ON TABLE 316.2 OF THE 2013 CALIFORNIA MECHANICAL CODE (CMC 2013) & MSS SP-58 TABLE 4. PIPE WEIGHTS USED ARE BASED ON STANDARD SCHEDULE STEEL PIPES (40S) INCLUDING WATER AND INSULATION (REFER TO X-SERIES PAGES). 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 Fy = 35 ksi AND $S_A$ = 14.6 ksi AT MAXIMUM OPERATING PRESSURE AND TEMPERATURE OF 400psi AND 650°F, RESPECTIVELY. FOR ASTM A53, TYPE E, GRADE A WITH MINIMUM Fy = 30 ksi AND $S_A$ = 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 Fy AND $S_A$ VALUES MEETING OR EXCEEDING ABOVE STATES 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 1.33 UP 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.

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| ELECTRICAL METAL TUBING (EMT) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TRADE SIZE (in) | MAX GRAVITY SUPPORT SPACING (ft) | MAX WEIGHT (lbs/ft) | MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING (ft) | | | | | | | |
| | | | G FORCE (ASD) | | | | | | | |
| | | | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 |
| 1.5 | 10 | 3.36 | 33 | 27 | 23 | 21 | 20 | 19 | 18 | 17 |
| 2 | 10 | 4.78 | 36 | 30 | 26 | 24 | 22 | 21 | 20 | 19 |
| 2.5 | 10 | 6.28 | 42 | 36 | 32 | 30 | 28 | 26 | 25 | 24 |
| 3 | 10 | 9.60 | 44 | 37 | 34 | 31 | 29 | 28 | 26 | 25 |
| 3.5 | 10 | 11.94 | 48 | 40 | 36 | 34 | 32 | 31 | 29 | 28 |
| 4 | 10 | 13.07 | 51 | 43 | 39 | 36 | 34 | 33 | 31 | 30 |

NOTES:

1. MAXIMUM BRACE SPACING IS BASED ON ASCE 7-10 SECTION 13.6.11, NOTE b, 70 PERCENT OF THE MATERIAL MINIMUM SPECIFIED TENSILE STRENGTH FOR STEEL TUBING WITH THREADED CONNECTIONS.
2. EMT USES CONDUCTOR CONTENT WHEN DETERMINING WEIGHT (REFER TO X-SERIES PAGES).
3. FOR LONGITUDINAL AND ALL-DIRECTIONAL BRACE SPACING, MULTIPLY THE TABULATED VALUE 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-80.1 WITH A MINIMUM YIELD STRENGTH OF 45,000 PSI.

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| INTERMEDIATE METAL CONDUIT (IMC) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TRADE SIZE (in) | MAX GRAVITY SUPPORT SPACING (ft) | MAX WEIGHT (lbs/ft) | MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING (ft) | | | | | | | |
| | | | G FORCE (ASD) | | | | | | | |
| | | | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 |
| 1.5 | 10 | 4.02 | 36 | 30 | 26 | 24 | 22 | 21 | 20 | 19 |
| 2 | 10 | 5.72 | 39 | 33 | 30 | 27 | 25 | 24 | 23 | 22 |
| 2.5 | 10 | 8.40 | 45 | 38 | 35 | 32 | 30 | 29 | 27 | 26 |
| 3 | 10 | 12.23 | 47 | 40 | 36 | 33 | 32 | 30 | 29 | 28 |
| 3.5 | 10 | 14.57 | 50 | 42 | 38 | 36 | 34 | 32 | 31 | 30 |
| 4 | 10 | 15.96 | 54 | 45 | 41 | 38 | 36 | 34 | 33 | 32 |

NOTES:

1. MAXIMUM BRACE SPACING IS BASED ON ASCE 7-10 SECTION 13.6.11, NOTE b, 70 PERCENT OF THE MATERIAL MINIMUM SPECIFIED TENSILE STRENGTH FOR STEEL TUBING WITH THREADED CONNECTIONS.
2. IMC USES CONDUCTOR CONTENT WHEN DETERMINING WEIGHT (REFER TO X-SERIES PAGES)
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 C80.6 WITH A MINIMUM YIELD STRENGTH OF 55,000 PSI

| RIGID METAL CONDUIT (RMC) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TRADE SIZE (in) | MAX GRAVITY SUPPORT SPACING (ft) | MAX WEIGHT (lbs/ft) | MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING (ft) | | | | | | | |
| | | | G FORCE (ASD) | | | | | | | |
| | | | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 |
| 1.5 | 10 | 4.83 | 37 | 32 | 28 | 25 | 24 | 22 | 21 | 20 |
| 2 | 10 | 6.8 | 42 | 35 | 32 | 29 | 27 | 26 | 24 | 23 |
| 2.5 | 10 | 9.71 | 47 | 39 | 36 | 33 | 31 | 30 | 28 | 27 |
| 3 | 10 | 14.24 | 50 | 42 | 38 | 36 | 34 | 32 | 31 | 30 |
| 3.5 | 10 | 17.25 | 54 | 45 | 41 | 38 | 36 | 35 | 33 | 32 |
| 4 | 10 | 19.438 | 58 | 49 | 44 | 41 | 39 | 37 | 36 | 35 |
| 5 | 10 | 30.95 | 63 | 53 | 48 | 44 | 42 | 40 | 38 | 36 |
| 6 | 10 | 57.7 | 62 | 52 | 47 | 44 | 41 | 38 | 35 | 33 |

NOTES:

1. MAXIMUM BRACE SPACING IS BASED ON ASCE 7-10 SECTION 13.6.11, NOTE b, 70 PERCENT OF THE MATERIAL MINIMUM SPECIFIED TENSILE STRENGTH FOR STEEL TUBING WITH THREADED CONNECTIONS.
2. RMC USES CONDUCTOR CONTENT WHEN DETERMINING WEIGHT (REFER TO X-SERIES PAGES).
3. FOR LONGITUDINAL AND ALL-DIRECTIONAL BRACING 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 35,000 PSI.

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| TYPE L - COPPER TUBING (WATER-FILLED & INSULATION) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TRADE SIZE (in) | MAX GRAVITY SUPPORT SPACING (ft) | MAX WEIGHT (lbs/ft) | MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING (ft) | | | | | | | |
| | | | G FORCE (ASD) | | | | | | | |
| | | | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 |
| 1.5 | 8 | 2.57 | 25 | 18 | 15 | 13 | 11 | 10 | 10 | 9 |
| 2 | 10 | 3.93 | 28 | 20 | 16 | 14 | 12 | 11 | 10 | 10 |
| 2.5 | 10 | 5.5 | 32 | 23 | 19 | 16 | 15 | 13 | 12 | 11 |
| 3 | 10 | 7.34 | 37 | 26 | 21 | 18 | 16 | 15 | 14 | 13 |
| 4 | 10 | 13.75 | 40 | 28 | 23 | 20 | 18 | 16 | 15 | 14 |
| 6 | 10 | 26.03 | 50 | 35 | 29 | 25 | 22 | 20 | 19 | 18 |
| 8 | 10 | 44.72 | 62 | 44 | 36 | 31 | 28 | 25 | 23 | 22 |
| 10 | 10 | 68.04 | 71 | 50 | 41 | 35 | 32 | 29 | 27 | 25 |

| TYPE L - COPPER TUBING (GAS PIPING) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TRADE SIZE (in) | MAX GRAVITY SUPPORT SPACING (ft) | MAX WEIGHT (lbs/ft) | MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING (ft) | | | | | | | |
| | | | G FORCE (ASD) | | | | | | | |
| | | | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 |
| 1.5 | 10 | 1.14 | 35 | 28 | 23 | 20 | 18 | 16 | 15 | 14 |
| 2 | 10 | 1.75 | 40 | 33 | 27 | 23 | 21 | 19 | 18 | 17 |
| 2.5 | 10 | 2.48 | 44 | 37 | 31 | 26 | 24 | 22 | 20 | 19 |
| 3 | 10 | 3.33 | 48 | 41 | 34 | 29 | 26 | 24 | 22 | 21 |
| 4 | 10 | 5.38 | 55 | 47 | 39 | 34 | 30 | 28 | 26 | 24 |
| 6 | 10 | 10.2 | 68 | 57 | 48 | 42 | 37 | 34 | 32 | 30 |
| 8 | 10 | 19.29 | 78 | 65 | 56 | 49 | 43 | 40 | 37 | 34 |
| 10 | 10 | 30.1 | 87 | 73 | 63 | 54 | 49 | 44 | 41 | 38 |

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
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 PIPE CONFORMING TO ASTM SPECIFICATION B88 TYPE L DRAWN OR ANNEALED COPPER PIPE WITH SOLDERED JOINTS AND MAXIMUM OPERATING PRESSURE AND TEMPERATURE OF 100 PSI AND 250° F, RESPECTIVELY. TYPE L DRAWN COPPER PIPE WITH BRAZED JOINTS MAY USE THESE CHARTS IF THEY OCCUR WITHIN 12" OF A GRAVITY SUPPORT.

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| TYPE K - COPPER TUBING (WATER-FILLED & INSULATION) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TRADE SIZE (in) | MAX GRAVITY SUPPORT SPACING (ft) | MAX WEIGHT (lbs/ft) | MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING (ft) | | | | | | | |
| | | | G FORCE (ASD) | | | | | | | |
| | | | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 |
| 1.5 | 8 | 2.76 | 27 | 19 | 16 | 13 | 12 | 11 | 10 | 10 |
| 2 | 10 | 4.21 | 30 | 21 | 17 | 15 | 13 | 12 | 11 | 11 |
| 2.5 | 10 | 5.88 | 34 | 24 | 20 | 17 | 15 | 14 | 13 | 12 |
| 3 | 10 | 8.03 | 39 | 27 | 22 | 19 | 17 | 16 | 15 | 14 |
| 4 | 10 | 14.75 | 43 | 30 | 25 | 21 | 19 | 17 | 16 | 15 |
| 6 | 10 | 29.28 | 56 | 40 | 32 | 28 | 25 | 23 | 21 | 20 |
| 8 | 10 | 50.54 | 66 | 48 | 39 | 34 | 31 | 28 | 26 | 24 |
| 10 | 10 | 77.07 | 74 | 55 | 45 | 39 | 35 | 32 | 29 | 27 |

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.
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 PIPE CONFORMING TO ASTM SPECIFICATION B88 TYPE K DRAWN OR ANNEALED COPPER PIPE WITH SOLDERED JOINTS AND MAXIMUM OPERATING PRESSURE AND TEMPERATURE OF 100 PSI AND 250° F, RESPECTIVELY. TYPE K DRAWN COPPER PIPE WITH BRAZED JOINTS MAY USE THESE CHARTS IF THEY OCCUR WITHIN 12" OF A GRAVITY SUPPORT.

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**NO HUB CAST IRON PIPING (ASTM A888 GRAY IRON - NO WATER)**

| TRADE SIZE (in) | MAX GRAVITY SUPPORT SPACING (ft) | MAX WEIGHT (lbs/ft) | MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING (ft) | | | | | | | | MAXIMUM ALLOWABLE LONGITUDINAL BRACE SPACING (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | G FORCE (ASD) | | | | | | | | G FORCE (ASD) | | | | | | | |
| | | | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 |
| 2 | 8 | 3.6 | 26 | 18 | 15 | 13 | 12 | 11 | 10 | 10 | 40 | 37 | 30 | 24 | 19 | 16 | 14 | 12 |
| 3 | 8 | 5.2 | 31 | 22 | 18 | 15 | 14 | 13 | 12 | 12 | 40 | 40 | 35 | 31 | 27 | 23 | 19 | 17 |
| 4 | 8 | 7.4 | 32 | 23 | 19 | 16 | 15 | 13 | 12 | 15 | 40 | 40 | 38 | 32 | 29 | 27 | 23 | 20 |
| 5 | 8 | 9.4 | 32 | 23 | 19 | 16 | 14 | 13 | 12 | 15 | 40 | 40 | 37 | 32 | 29 | 26 | 24 | 23 |
| 6 | 8 | 11 | 34 | 24 | 20 | 17 | 15 | 14 | 13 | 15 | 40 | 40 | 39 | 34 | 31 | 28 | 26 | 26 |
| 8 | 8 | 18 | 35 | 25 | 20 | 17 | 16 | 14 | 13 | 12 | 40 | 40 | 40 | 31 | 25 | 20 | 18 | 15 |
| 10 | 8 | 25.8 | 37 | 26 | 21 | 18 | 16 | 14 | 12 | 11 | 40 | 40 | 27 | 20 | 16 | 13 | 12 | 10 |
| 12 | 8 | 35.5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 20 | 18 | 14 | 11 | 10 | 10 | 10 |

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 12 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 X-SERIES PAGES).
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 REQUIREMENTS OF TABLE 313.1 OR THE 2013 CALIFORNIA PLUMBING CODE (CPC 2013) FOR NO-HUB CAST IRON PIPE.

**NO HUB CAST IRON PIPING (ASTM A888 GRAY IRON - WATER FILLED)**

| TRADE SIZE (in) | MAX GRAVITY SUPPORT SPACING (ft) | MAX WEIGHT (lbs/ft) | MAXIMUM ALLOWABLE TRANSVERSE BRACE SPACING (ft) | | | | | | | | MAXIMUM ALLOWABLE LONGITUDINAL BRACE SPACING (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | G FORCE (ASD) | | | | | | | | G FORCE (ASD) | | | | | | | |
| | | | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 | 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 |
| 2 | 8 | 4.96 | 20 | 14 | 12 | 10 | 10 | 10 | 10 | 10 | 40 | 28 | 23 | 17 | 14 | 12 | 10 | 10 |
| 3 | 8 | 8.26 | 24 | 17 | 14 | 12 | 11 | 10 | 10 | 10 | 40 | 34 | 28 | 21 | 17 | 14 | 12 | 11 |
| 4 | 8 | 12.84 | 25 | 17 | 14 | 12 | 11 | 10 | 10 | 10 | 40 | 35 | 28 | 23 | 19 | 16 | 13 | 12 |
| 5 | 8 | 17.9 | 23 | 17 | 13 | 12 | 10 | 10 | 10 | 10 | 40 | 33 | 27 | 23 | 20 | 16 | 14 | 12 |
| 6 | 8 | 23.23 | 23 | 17 | 14 | 12 | 11 | 10 | 10 | 10 | 40 | 33 | 27 | 23 | 19 | 16 | 14 | 12 |
| 8 | 8 | 39.75 | 23 | 17 | 14 | 11 | 10 | 10 | 10 | 10 | 40 | 28 | 19 | 14 | 11 | 10 | 10 | 10 |
| 10 | 8 | 59.78 | 24 | 17 | 12 | 10 | 10 | 10 | 10 | 10 | 35 | 17 | 12 | 10 | 10 | 10 | 10 | 10 |
| 12 | 8 | 84.43 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 12 | 10 | 10 | 10 | 10 | 10 | 10 |

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 12 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 X-SERIES PAGES).
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 REQUIREMENTS OF TABLE 313.1 OR THE 2013 CALIFORNIA PLUMBING CODE (CPC 2013) FOR NO-HUB CAST IRON PIPE.

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## *INDEX - BRACE ARM ANCHORAGE DETAILS*

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***D0.1***

## *INDEX - BRACE ARM ANCHORAGE DETAILS (CONTINUED)*

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## INDEX - BRACE ARM ANCHORAGE DETAILS (CONTINUED)

PAGE DESCRIPTION

### BLUE BANGER HANGER (BBH) STEEL DECK INSERT (SDI)

### CONNECTIONS TO METAL PAN DECKS, LWC/NWC (CONTINUED)

### HEADED BOLT "SDI-HB"

SINGLE "SDI-HB" CONNECTIONS

### PUSH ROD HANGER "PIP" CAST-IN PLACE DECK INSERTS

### A. POST INSTALLED CONCRETE ANCHORS

### HILTI KWIK BOLT TZ EXPANSION ANCHOR

SINGLE ANCHOR CONNECTIONS

DUAL ANCHOR CONNECTIONS

- FOUR BOLT ANCHOR CONNECTION DETAILS

### POWERS POWER-STUD+ SD2 WEDGE EXPANSION ANCHOR

SINGLE ANCHOR CONNECTIONS

DUAL ANCHOR CONNECTIONS

- FOUR BOLT ANCHOR CONNECTION DETAILS

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# INDEX - BRACE ARM ANCHORAGE DETAILS (CONTINUED)

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## INDEX - BRACE ARM ANCHORAGE DETAILS (CONTINUED)

PAGE DESCRIPTION

D5. OPEN WEB STEEL TRUSS AND BAR JOIST

D6. CONNECTIONS TO WOOD STRUCTURE

A. CONNECTIONS TO STRUCTURAL LUMBER

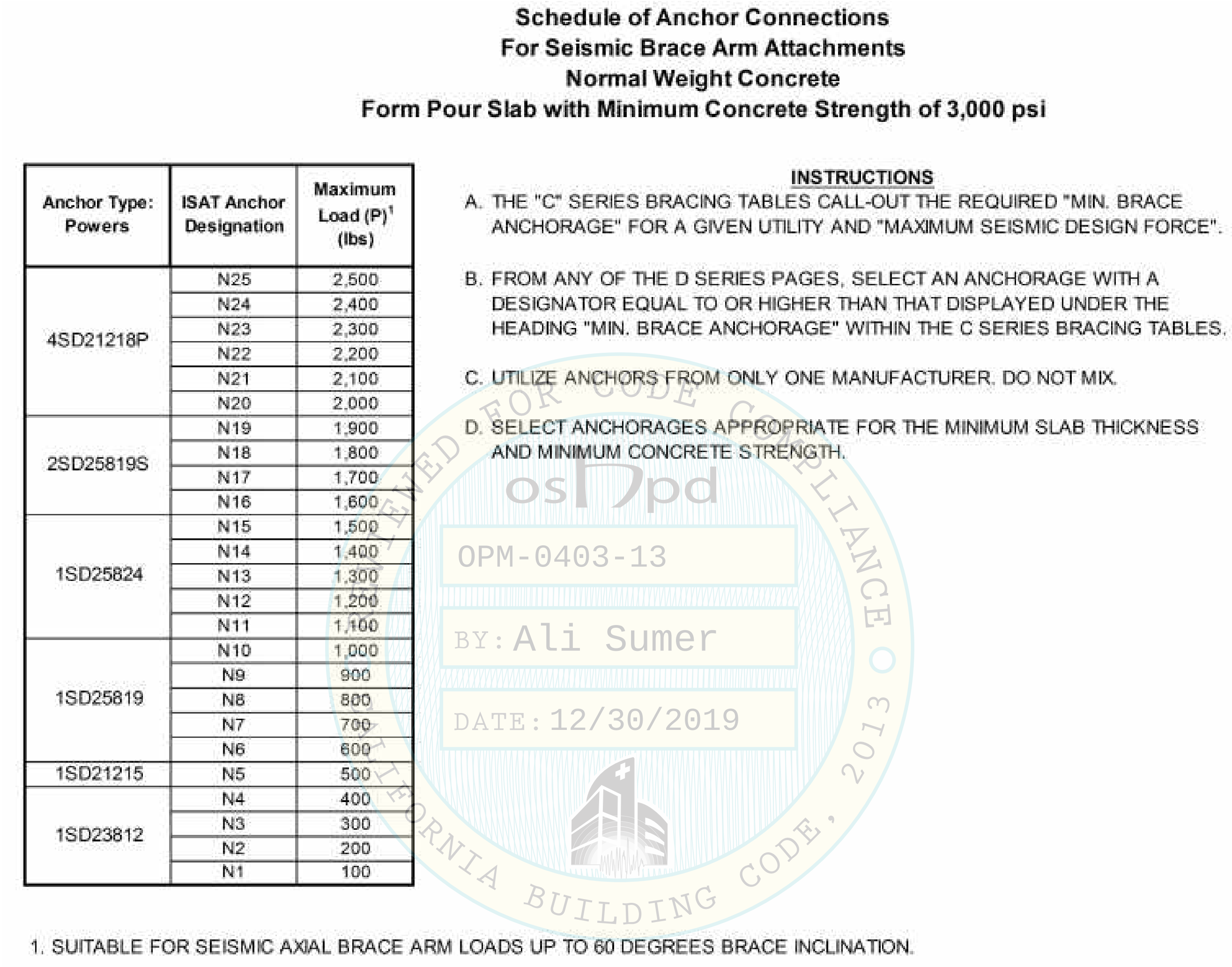
D7. CONNECTIONS TO WOOD TJI'S

D8. WALL CONNECTIONS

A. POURED IN PLACE AND CMU

B. METAL STUD GYPSUM BOARD WALLS

C. WALL MOUNT BRACKET



## Schedule of Anchor Connections
## For Seismic Brace Arm Attachments
## Normal Weight Concrete
## Form Pour Slab with Minimum Concrete Strength of 3,000 psi

| Anchor Type: Powers | ISAT Anchor Designation | Maximum Load (P)[1] (lbs) |
|---|---|---|
| 4SD21218P | N25 | 2,500 |
| | N24 | 2,400 |
| | N23 | 2,300 |
| | N22 | 2,200 |
| | N21 | 2,100 |
| | N20 | 2,000 |
| 2SD25819S | N19 | 1,900 |
| | N18 | 1,800 |
| | N17 | 1,700 |
| | N16 | 1,600 |
| 1SD25824 | N15 | 1,500 |
| | N14 | 1,400 |
| | N13 | 1,300 |
| | N12 | 1,200 |
| | N11 | 1,100 |
| 1SD25819 | N10 | 1,000 |
| | N9 | 900 |
| | N8 | 800 |
| | N7 | 700 |
| | N6 | 600 |
| 1SD21215 | N5 | 500 |
| 1SD23812 | N4 | 400 |
| | N3 | 300 |
| | N2 | 200 |
| | N1 | 100 |

**INSTRUCTIONS**

A. THE "C" SERIES BRACING TABLES CALL-OUT THE REQUIRED "MIN. BRACE ANCHORAGE" FOR A GIVEN UTILITY AND "MAXIMUM SEISMIC DESIGN FORCE".

B. FROM ANY OF THE D SERIES PAGES, SELECT AN ANCHORAGE WITH A DESIGNATOR EQUAL TO OR HIGHER THAN THAT DISPLAYED UNDER THE HEADING "MIN. BRACE ANCHORAGE" WITHIN THE C SERIES BRACING TABLES.

C. UTILIZE ANCHORS FROM ONLY ONE MANUFACTURER. DO NOT MIX.

D. SELECT ANCHORAGES APPROPRIATE FOR THE MINIMUM SLAB THICKNESS AND MINIMUM CONCRETE STRENGTH.

[1] SUITABLE FOR SEISMIC AXIAL BRACE ARM LOADS UP TO 60 DEGREES BRACE INCLINATION.

# FORM POUR SLAB
# SEISMIC RESTRAINT ANCHORAGE CONNECTIONS

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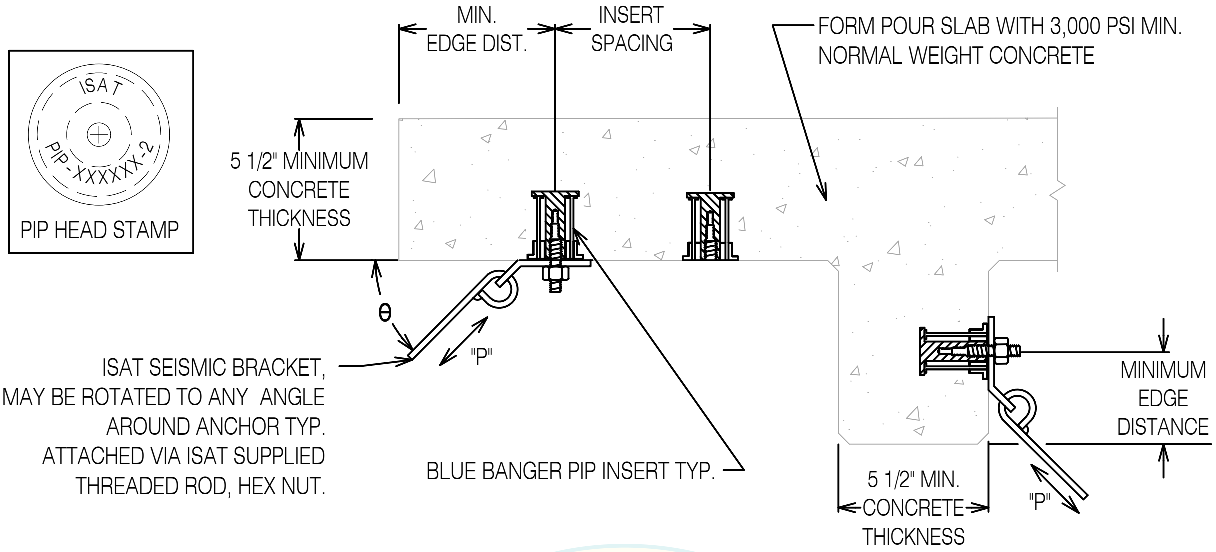
***D1***

2013 CBC OSHPD



**Blue Banger Hanger Poured-In-Place (PIP) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table 1**

| Brace Anchorage Designation | Deck Insert Part No. | All Thread Rod Dia. (ATR) Inch | Minimum Concrete Strength psi | Maximum Brace Reaction (Fp)[1] | | | | | | Nominal Insert Height Inch | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 6" Min.[2] Lbs | | 5" Min.[2] Lbs | | 4" Min.[2] Lbs | | | |
| | | | | $30° \le \theta \le 36°$ | $36° < \theta \le 60°$ | $30° \le \theta \le 36°$ | $36° < \theta \le 60°$ | $30° \le \theta \le 36°$ | $36° < \theta \le 60°$ | | |
| N6B3 | PIP143812-2 | 1/2 | 3,000 | 763 | 729 | 720 | 689 | 653 | 624 | 2 | 6 |
| N6.1B3 | PIP381258-2 | 5/8 | | 812 | 776 | 752 | 719 | 683 | 652 | | |
| N7B4 | PIP143812-2 | 1/2 | 4,000 | 881 | 842 | 832 | 795 | 754 | 720 | | |
| N7.1B4 | PIP381258-2 | 5/8 | | 937 | 896 | 868 | 830 | 788 | 753 | | |
| N8B5 | PIP143812-2 | 1/2 | 5,000 | 985 | 941 | 930 | 889 | 843 | 805 | | |
| N8.1B5 | PIP381258-2 | 5/8 | | 1,048 | 1,001 | 971 | 1,001 | 881 | 842 | | |
| N8B6 | PIP143812-2 | 1/2 | 6,000 | 1,079 | 1,031 | 1,019 | 974 | 923 | 882 | | |
| N9B6 | PIP381258-2 | 5/8 | | 1,148 | 1,097 | 1,063 | 1,016 | 965 | 923 | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
2. MINIMUM INSERT SPACING

# SINGLE BLUE BANGER HANGER "PIP" INSERT SEISMIC BRACE CONNECTION

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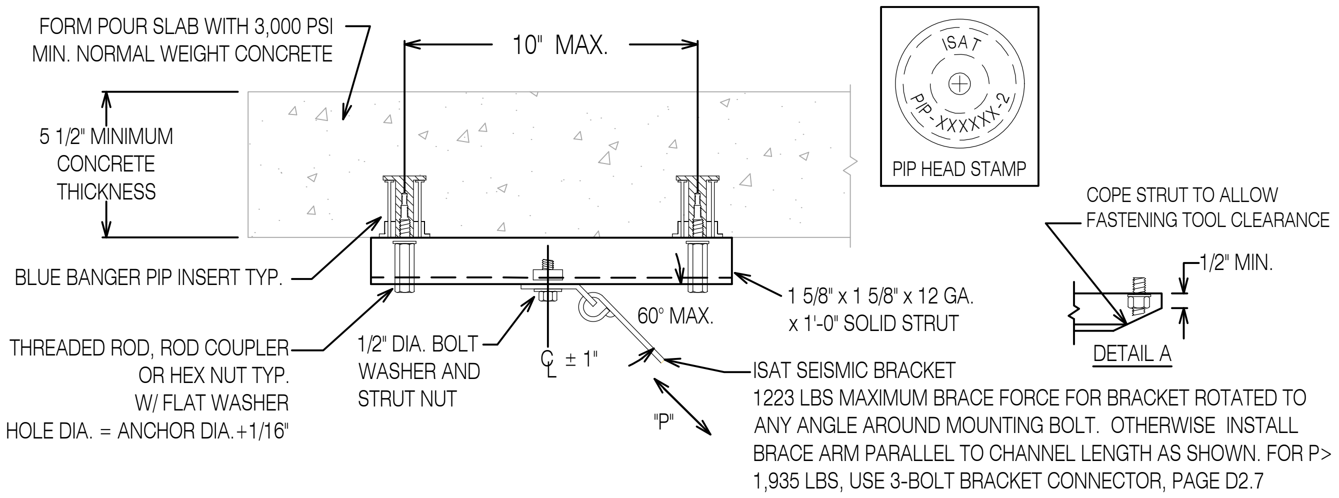

**Blue Banger Hanger Poured-In-Place (PIP) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table 1**

| Brace[3] Anchorage Designation | Deck Insert Part No. | All Thread Rod Dia. (ATR) Inch | Minimum Concrete Strength psi | Maximum Brace Reaction (P) At Minimum Insert Spacing 6" Min.[4] Lbs | 5" Min.[4] Lbs | 4" Min.[4] Lbs | Nominal Insert Height Inch | Full Capacity Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|
| N10B3 | PIP143812-2 | 1/2 | 3,000 Bracket Rotated | 1,223 | 1,155 | 1,047 | 2 | 10 |
| N10.1B3 | PIP381258-2 | 5/8[2] | | 1,302 | 1,207 | 1,095 | | |
| N10.2B3 | PIP143812-2 | 1/2 | 3,000[5] | 1,273 | 1,202 | 1,089 | | |
| N11B3 | PIP381258-2 | 5/8[2] | | 1,354 | 1,256 | 1,139 | | |
| N12B4 | PIP143812-2 | 1/2 | 4,000[5] | 1,471 | 1,389 | 1,257 | | |
| N13B4 | PIP381258-2 | 5/8[2] | | 1,564 | 1,450 | 1,316 | | |
| N14B5 | PIP143812-2 | 1/2 | 5,000[5] | 1,644 | 1,552 | 1,406 | | |
| N14.1B5 | PIP381258-2 | 5/8[2] | | 1,748 | 1,620 | 1,471 | | |
| N15B6 | PIP143812-2 | 1/2 | 6,000[5] | 1,800 | 1,701 | 1,540 | | |
| N16B6 | PIP381258-2 | 5/8[2] | | 1,916 | 1,776 | 1,611 | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o = 2.0$
2. USE DETAIL"A".
3. ANCHORAGE DESIGNATION BASED ON MINIMUM 6" SPACING.
4. TO THE NEAREST SOLITARY INSERT OR NEAREST PAIR OF DUAL INSERTS.
5. IN-LINE CAPACITIES SHOWN. USE 1223 LBS MAXIMUM FOR BRACKET ROTATED TO ANY ANGLE ABOUT MOUNTING BOLT.

# DUAL BLUE BANGER HANGER "PIP" INSERT SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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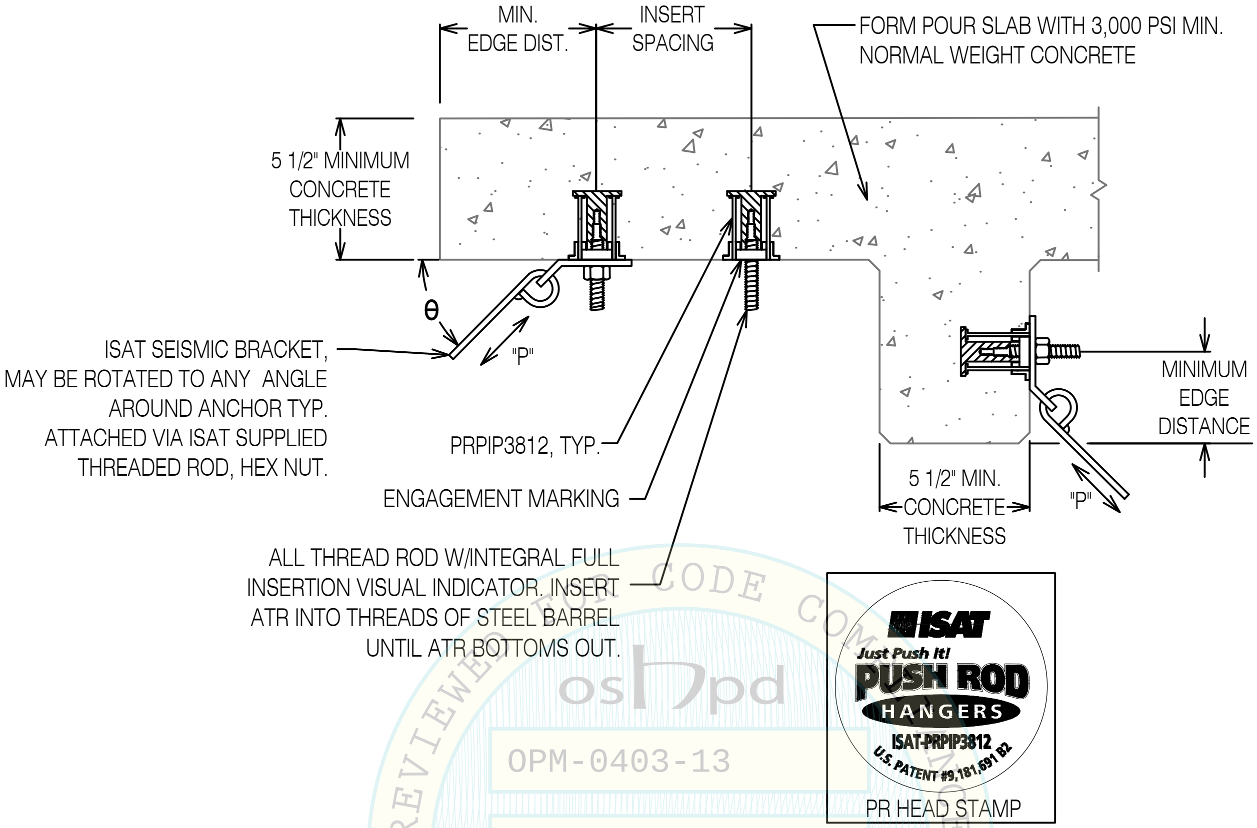

**Push Rod Poured-In-Place (PRPIP) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November 2017), Table 2A**

| Brace Anchorage Designation | Deck Insert & All Thread Part No. | All Thread Rod Dia. (ATR) Inch [3] | Minimum Concrete Strength psi | Maximum Brace Reaction (P) [1] | | | | | | Nominal Insert Height Inch | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 6" Min. [2] Lbs | | 5" Min. [2] Lbs | | 4" Min. [2] Lbs | | | |
| | | | | $30^\circ \le \theta \le 36^\circ$ | $36^\circ < \theta \le 60^\circ$ | $30^\circ \le \theta \le 36^\circ$ | $36^\circ < \theta \le 60^\circ$ | $30^\circ \le \theta \le 36^\circ$ | $36^\circ < \theta \le 60^\circ$ | | |
| N6PR3 | PRPIP3812 & PRPIPR124 | 1/2 | 3,000 | 812 | 776 | 752 | 719 | 683 | 652 | 2 | 6 |
| N7PR4 | | | 4,000 | 889 | 861 | 857 | 822 | 788 | 753 | | |
| N8PR5 | | | 5,000 | 935 | 917 | 903 | 879 | 863 | 830 | | |
| N8PR6 | | | 6,000 | 972 | 961 | 941 | 925 | 901 | 876 | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o=2.0$
2. MINIMUM INSERT SPACING
3. ISAT SUPPLIED ALL THREAD ROD REQUIRED WITH INTEGRAL "FULL INSERTION VISUAL INDICATOR".

# SINGLE PUSH ROD POURED-IN-PLACE (PRPIP) INSERT SEISMIC BRACE CONNECTION

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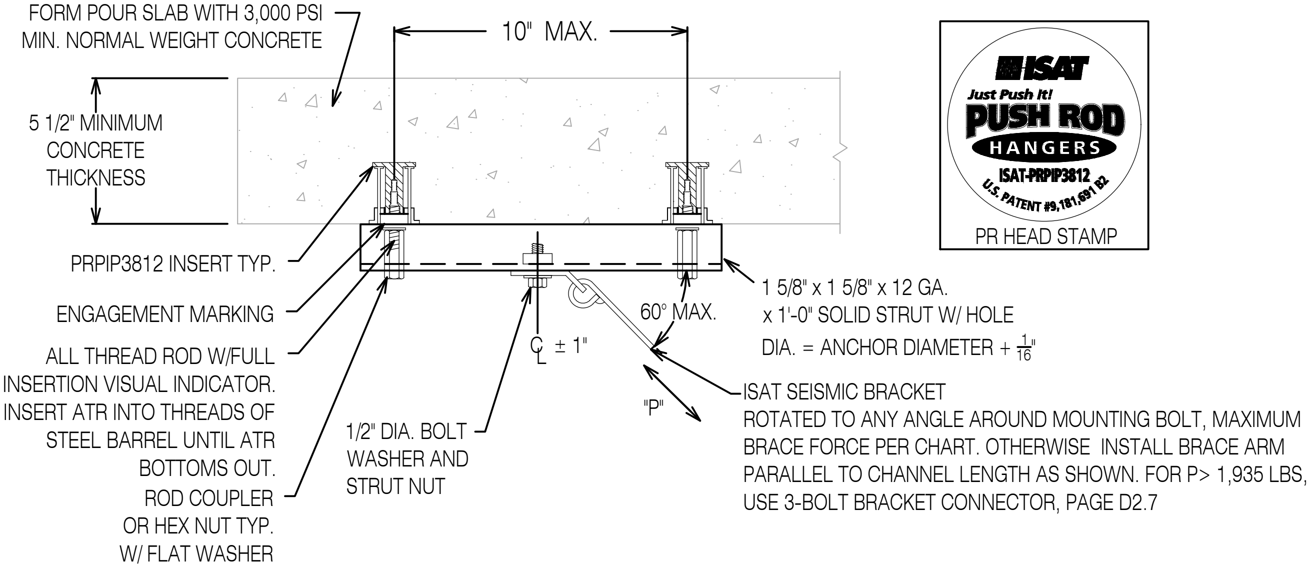

**Push Rod Poured-In-Place (PRPIP) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November 2017), Table 2A**

| Brace [2] Anchorage Designation | Deck Insert & All Thread Part No. | All Thread Rod Dia. (ATR) Inch | Minimum Concrete Strength psi | Maximum Brace Reaction (P) At Minimum Insert Spacing | | | Nominal Insert Height Inch | Full Capacity Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|
| | | | | 6" Min. [3] Lbs | 5" Min. [3] Lbs | 4" Min. [3] Lbs | | |
| N10PR3 | PRPIP3812 & 2PRPIPR124 | 1/2 | 3,000 [6] | 1,302 | 1,207 | 1,095 | 2 | 10 |
| N11PR3 | | | 3,000 [4] | 1,354 | 1,256 | 1,139 | | |
| N13PR4 | | | 4,000 [4] | 1,500 | 1,438 | 1,316 | | |
| N14PR5 | | | 5,000 [4] | 1,592 | 1,530 | 1,450 | | |
| N15PR6 | | | 6,000 [4] | 1,667 | 1,604 | 1,524 | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
2. ANCHORAGE DESIGNATION BASED ON MINIMUM 6" SPACING.
3. TO THE NEAREST SOLITARY INSERT OR NEAREST PAIR OF DUAL INSERTS.
4. IN-LINE CAPACITIES SHOWN.
5. ISAT SUPPLIED ALL THREAD ROD REQUIRED WITH INTEGRAL "FULL INSERTION VISUAL INDICATOR".
6. BRACKET ROTATED.

# DUAL PUSH ROD POURED-IN-PLACE (PRPIP) INSERT CONNECTION IN FORM POUR SLAB

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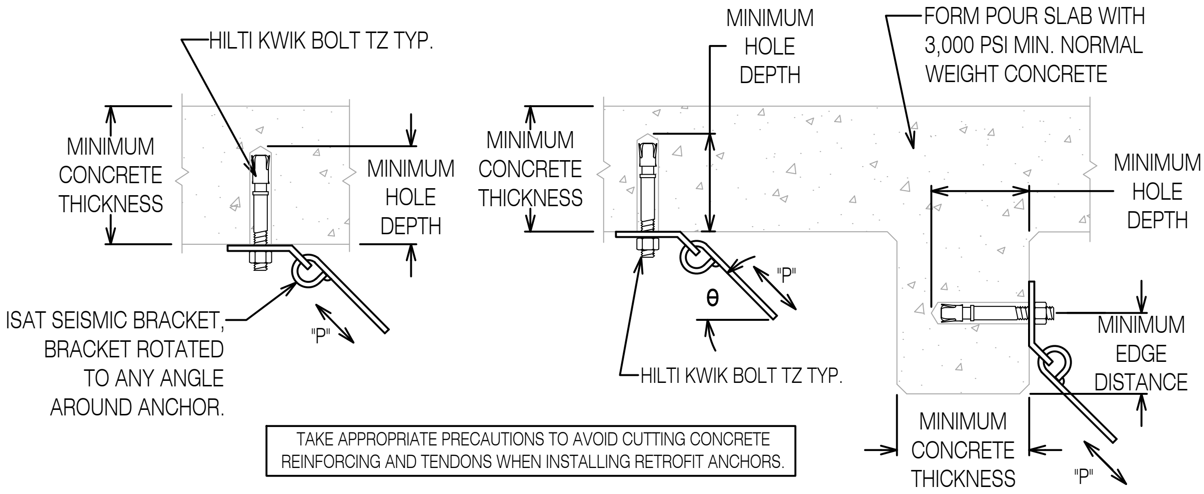

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Edge[3] Distance for Pmax Inch | Min.[2] Anchor Spacing Inch | Min. Edge Dist. Inch | Brace Load (P) at Min. Edge Distance[4] Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 30°≤ θ ≤ 36° Maximum Brace Load Pmax[4] Lbs. | 36°< θ ≤ 60° Maximum Brace Load Pmax[4] Lbs. | | | | | | | | |
| 1TZ3815 | 3/8 | 496 | 480 | 2 5/8 | 2 | 4 | 25 | 4 1/2 | 6 | 2 1/2 | 327 |
| 1TZ1215 | 1/2 | 574 | 542 | 2 5/8 | 2 | 4 | 40 | 4 1/2 | 6 | 2 3/4 | 385 |
| 1TZ1222 | 1/2 | 1,142 | 1,088 | 4 | 3 1/4 | 6 | 40 | 6 | 9 3/4 | 2 3/8 | 417 |
| 1TZ5819 | 5/8 | 1,144 | 1,073 | 3 3/4 | 3 1/8 | 5 | 60 | 6 | 9 3/8 | 3 5/8 | 697 |
| 1TZ5834 | 5/8 | 1,579 | 1,505 | 4 3/4 | 4 | 6 | 60 | 8 3/4 | 12 | 3 1/4 | 692 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ANCHOR HILTI KWIK BOLT TZ FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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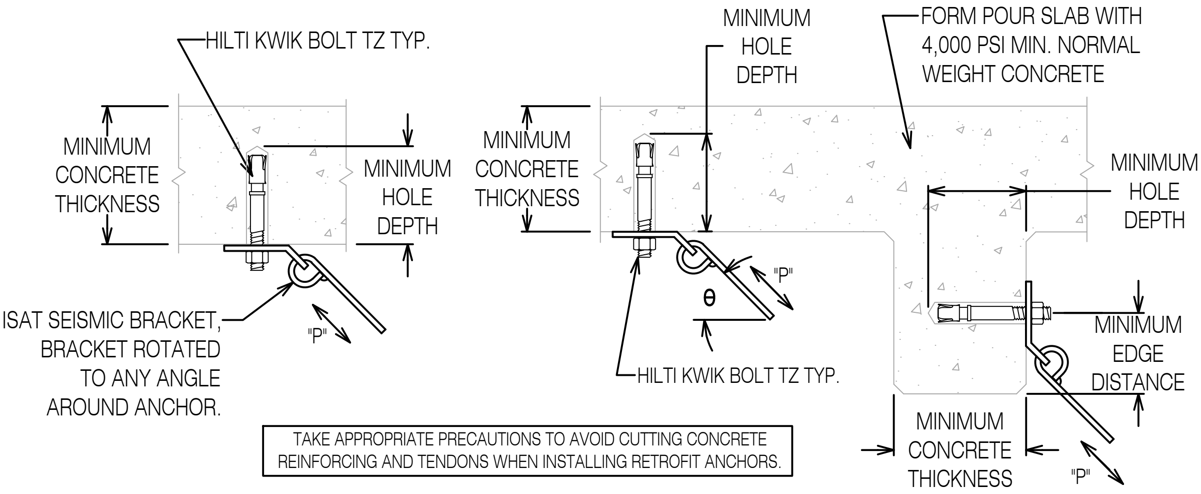

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle 30°≤ θ ≤ 36° Maximum Brace Load Pmax[4] Lbs. | Brace Angle 36°< θ ≤ 60° Maximum Brace Load Pmax[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Edge[3] Distance for Pmax Inch | Min.[2] Anchor Spacing Inch | Min. Edge Dist. Inch | Brace Load (P) at Min. Edge Distance[4] Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1TZ3815 | 3/8 | 529 | 521 | 2 5/8 | 2 | 4 | 25 | 4 1/2 | 6 | 2 1/2 | 377 |
| 1TZ1215 | 1/2 | 662 | 626 | 2 5/8 | 2 | 4 | 40 | 4 1/2 | 6 | 2 3/4 | 444 |
| 1TZ1222 | 1/2 | 1,223 | 1,189 | 4 | 3 1/4 | 6 | 40 | 6 | 9 3/4 | 2 3/8 | 482 |
| 1TZ5819 | 5/8 | 1,321 | 1,239 | 3 3/4 | 3 1/8 | 5 | 60 | 6 | 9 3/8 | 3 5/8 | 805 |
| 1TZ5834 | 5/8 | 1,692 | 1,644 | 4 3/4 | 4 | 6 | 60 | 8 3/4 | 12 | 3 1/4 | 799 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0

# SINGLE ANCHOR HILTI KWIK BOLT TZ FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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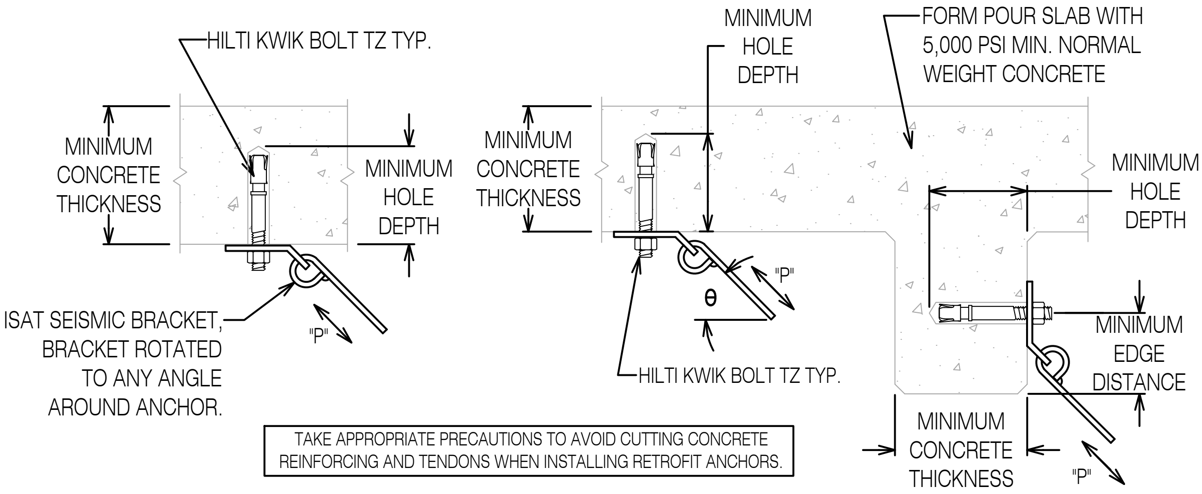

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 5000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle<br>$30° \le \theta \le 36°$<br>Maximum Brace Load Pmax[4] Lbs. | <br>$36° < \theta \le 60°$<br>Maximum Brace Load Pmax[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Edge[3] Distance for Pmax Inch | Min.[2] Anchor Spacing Inch | Min. Edge Dist. Inch | Brace Load (P) at Min. Edge Distance[4] Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1TZ3815 | 3/8 | 554 | 550 | 2 5/8 | 2 | 4 | 25 | 4 1/2 | 6 | 2 1/2 | 422 |
| 1TZ1215 | 1/2 | 740 | 700 | 2 5/8 | 2 | 4 | 40 | 4 1/2 | 6 | 2 3/4 | 497 |
| 1TZ1222 | 1/2 | 1,286 | 1,264 | 4 | 3 1/4 | 6 | 40 | 6 | 9 3/4 | 2 3/8 | 539 |
| 1TZ5819 | 5/8 | 1,477 | 1,385 | 3 3/4 | 3 1/8 | 5 | 60 | 6 | 9 3/8 | 3 5/8 | 900 |
| 1TZ5834 | 5/8 | 1,779 | 1,749 | 4 3/4 | 4 | 6 | 60 | 8 3/4 | 12 | 3 1/4 | 893 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0

# SINGLE ANCHOR HILTI KWIK BOLT TZ FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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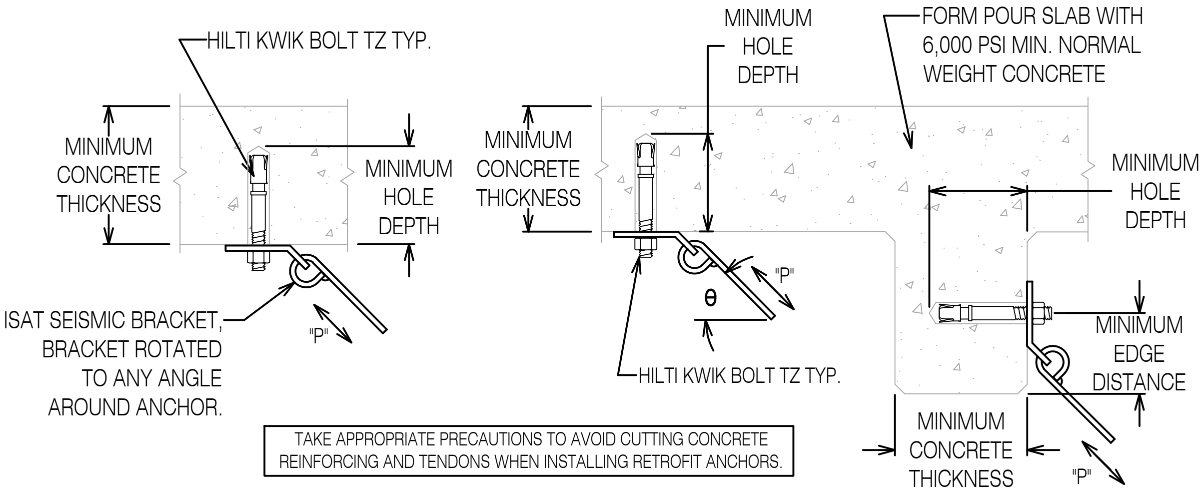

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 6000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle 30°≤ θ ≤ 36° Maximum Brace Load Pmax[4] Lbs. | Brace Angle 36°< θ ≤ 60° Maximum Brace Load Pmax[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Edge[3] Distance for Pmax Inch | Min.[2] Anchor Spacing Inch | Min. Edge Dist. Inch | Brace Load (P) at Min. Edge Distance[4] Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1TZ3815 | 3/8 | 575 | 573 | 2 5/8 | 2 | 4 | 25 | 4 1/2 | 6 | 2 1/2 | 462 |
| 1TZ1215 | 1/2 | 811 | 767 | 2 5/8 | 2 | 4 | 40 | 4 1/2 | 6 | 2 3/4 | 544 |
| 1TZ1222 | 1/2 | 1,336 | 1,324 | 4 | 3 1/4 | 6 | 40 | 6 | 9 3/4 | 2 3/8 | 590 |
| 1TZ5819 | 5/8 | 1,561 | 1,482 | 3 3/4 | 3 1/8 | 5 | 60 | 6 | 9 3/8 | 3 5/8 | 986 |
| 1TZ5834 | 5/8 | 1,848 | 1,831 | 4 3/4 | 4 | 6 | 60 | 8 3/4 | 12 | 3 1/4 | 979 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ANCHOR HILTI KWIK BOLT TZ FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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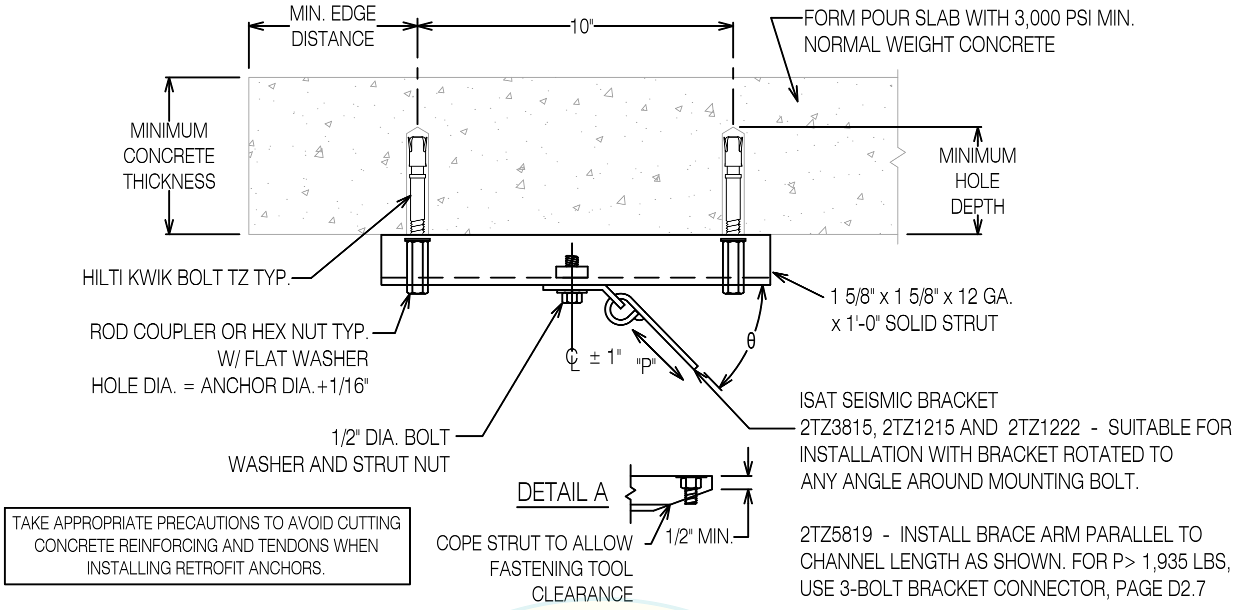

ISAT SEISMIC BRACKET
2TZ3815, 2TZ1215 AND 2TZ1222 - SUITABLE FOR INSTALLATION WITH BRACKET ROTATED TO ANY ANGLE AROUND MOUNTING BOLT.

2TZ5819 - INSTALL BRACE ARM PARALLEL TO CHANNEL LENGTH AS SHOWN. FOR P> 1,935 LBS, USE 3-BOLT BRACKET CONNECTOR, PAGE D2.7

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle $30° \le \theta \le 36°$ Maximum Brace Load (P) Lbs. | Brace Angle $36° < \theta \le 60°$ Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|
| 2TZ3815S | 3/8 | 827 | 804 | 2 5/8 | 2 | 4 | 25 | 4 1/2 |
| 2TZ1215S | 1/2 | 956 | 906 | 2 5/8 | 2 | 4 | 40 | 4 1/2 |
| 2TZ1222S | 1/2 | 1,315 | 1,315 | 4 | 3 1/4 | 6 | 40 | 6 |
| 2TZ5819S | 5/8 [4] | 1,936 | 1,879 | 3 3/4 | 3 1/8 | 5 | 60 | 6 |

1. MINIMUM EFFECTIVE DEPTH IS AFTER THE ANCHOR HAS BEEN SET.
2. MINIMUM SPACING TO AN ADJACENT ANCHOR IS TWO TIMES THE TABULATED EDGE DISTANCE.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o$=2.0
4. USE DETAIL A.

# DUAL ANCHOR HILTI KWIK BOLT TZ WITH STRUT SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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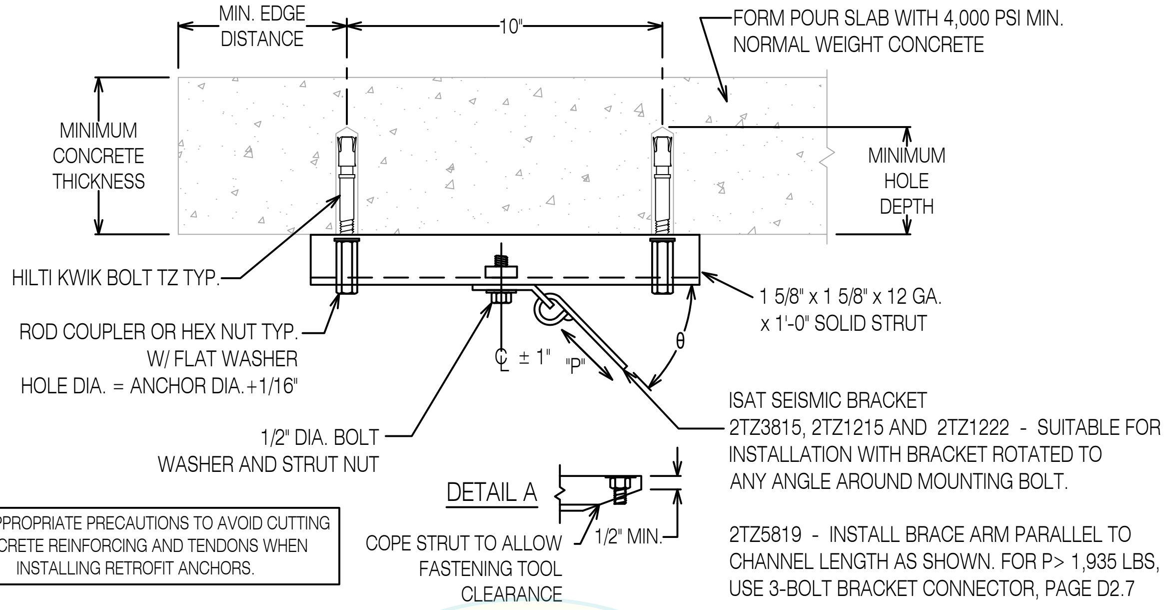

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle 30° ≤ θ ≤ 36° Maximum Brace Load (P) Lbs. | Brace Angle 36° < θ ≤ 60° Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|
| 2TZ3815S | 3/8 | 882 | 868 | 2 5/8 | 2 | 4 | 25 | 4 1/2 |
| 2TZ1215S | 1/2 | 1,104 | 1,047 | 2 5/8 | 2 | 4 | 40 | 4 1/2 |
| 2TZ1222S | 1/2 | 1,315 | 1,315 | 4 | 3 1/4 | 6 | 40 | 6 |
| 2TZ5819S | 5/8 [4] | 1,936 | 1,936 | 3 3/4 | 3 1/8 | 5 | 60 | 6 |

1. MINIMUM EFFECTIVE DEPTH IS AFTER THE ANCHOR HAS BEEN SET.
2. MINIMUM SPACING TO AN ADJACENT ANCHOR IS TWO TIMES THE TABULATED EDGE DISTANCE.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
4. USE DETAIL A.

# DUAL ANCHOR HILTI KWIK BOLT TZ WITH STRUT SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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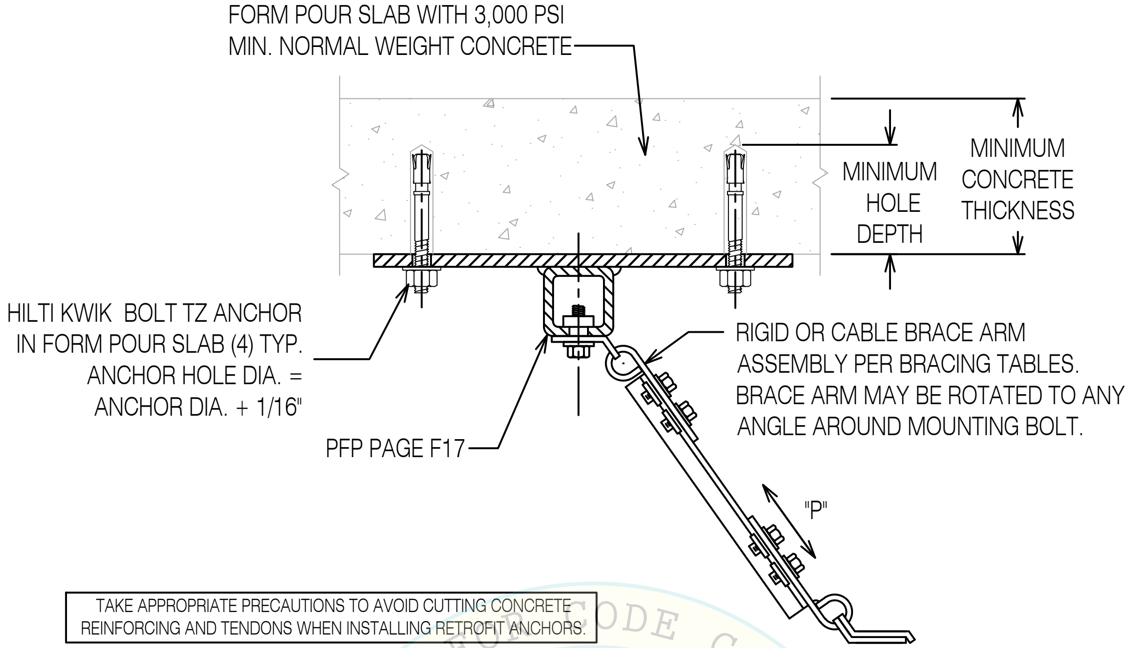


TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

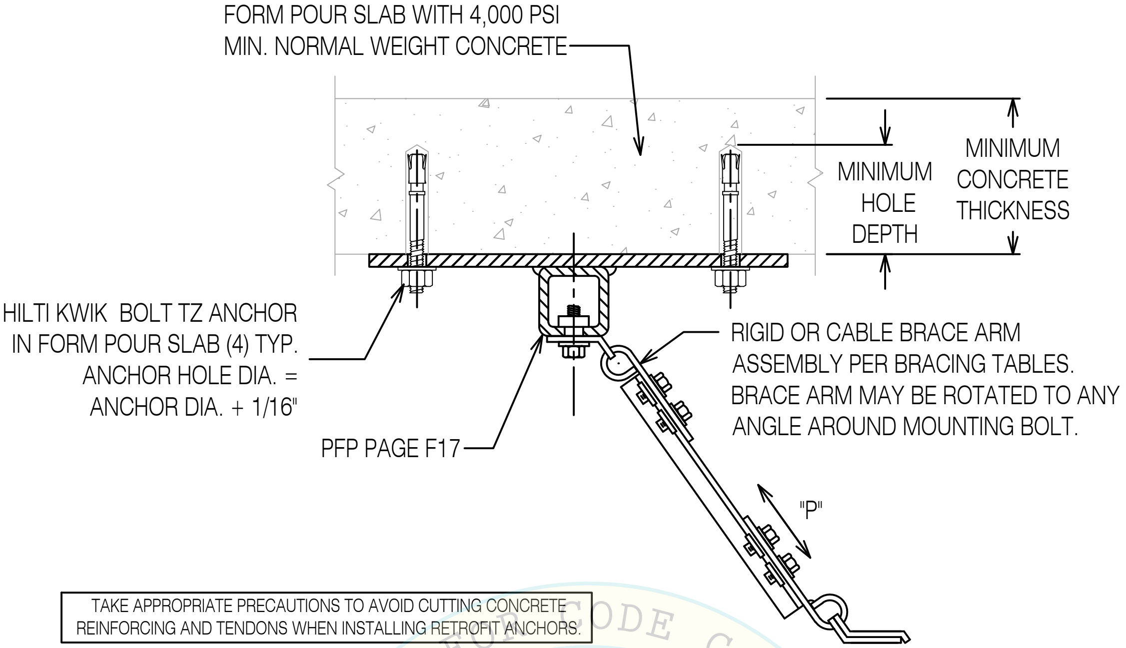
**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Plate Number Page F17 | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|---|---|---|
| 4TZ3815P | 3/8 | 1,362 | 2 5/8 | 2 | 4 | 25 | 4 1/2 | D134 | 1/2 |
| 4TZ1222P | 1/2 | 3,026 | 4 | 3 1/4 | 6 | 40 | 6 | D145 | 5/8 |
| 4TZ5834P | 5/8 | 4,186 | 4 3/4 | 4 | 6 | 60 | 8 3/4 | D155 | 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o$=2.0

# 4-ANCHOR HILTI KWIK BOLT TZ PLATE IN FORM POUR SLAB (PFP)

ANTHONY A. RUBALCAVA
S 4710



TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Plate Number Page F17 | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|---|---|---|
| 4TZ3815P | 3/8 | 1,499 | 2 5/8 | 2 | 4 | 25 | 4 1/2 | D134 | 1/2 |
| 4TZ1222P | 1/2 | 3,343 | 4 | 3 1/4 | 6 | 40 | 6 | D145 | 5/8 |
| 4TZ5834P | 5/8 | 4,238 | 4 3/4 | 4 | 6 | 60 | 8 3/4 | D155 | 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# 4-ANCHOR HILTI KWIK BOLT TZ PLATE IN FORM POUR SLAB (PFP)

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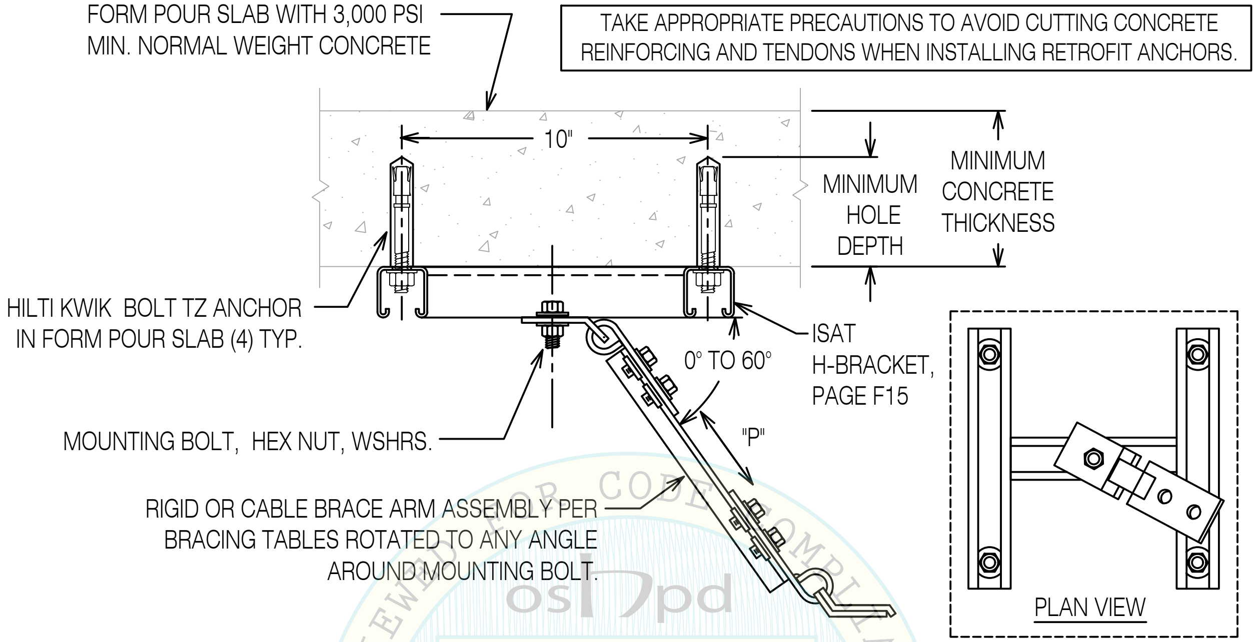
TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.



**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|---|---|
| 4TZ1222F | 1/2 | 1,846 | 4 | 3 1/4 | 6 | 40 | 7 1/2 | 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# 4-ANCHOR HILTI KWIK BOLT TZ H-BRACKET ATTACHMENT TO FORM POUR SLAB

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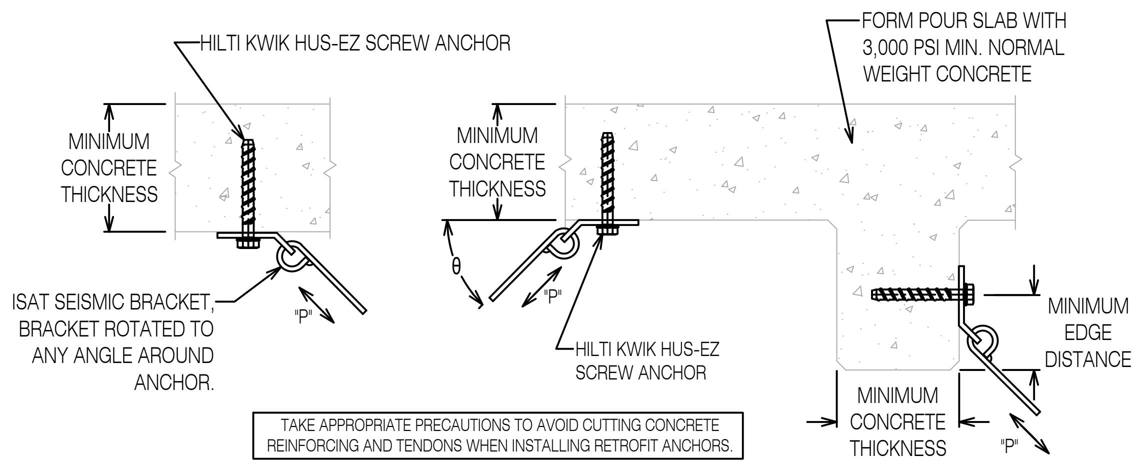

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 2, 3 and 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle<br>30°≤ θ ≤ 36° Maximum Brace Load Pmax[4] Lbs. | Brace Angle<br>36°< θ ≤ 60° Maximum Brace Load Pmax[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing [2] Inch | Edge Distance[3] Inch |
|---|---|---|---|---|---|---|---|---|---|
| 1HUS147 | 1/4 | 168 | 141 | 2 | 1.18 | 3 1/4 | 114 | 6.75 | 2.67 |
| 1HUS388 | 3/8 | 199 | 178 | 1 7/8 | 1.11 | 3 1/4 | 114 | 6.75 | 2.67 |
| 1HUS1210 | 1/2 | 316 | 312 | 2 5/8 | 1.52 | 4 1/2 | 137 | 6.75 | 2.75 |
| 1HUS1218 | 1/2 | 1,015 | 995 | 4 5/8 | 3.22 | 6 3/4 | 450 | 9.66 | 5.25 |
| 1HUS5814 | 5/8 | 601 | 596 | 3 5/8 | 2.39 | 5 | 450 | 7.17 | 3.63 |
| 1HUS5822 | 5/8 | 1,352 | 1,323 | 5 3/8 | 3.88 | 7 | 450 | 11.64 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE HILTI KWIK HUS-EZ SCREW ANCHOR FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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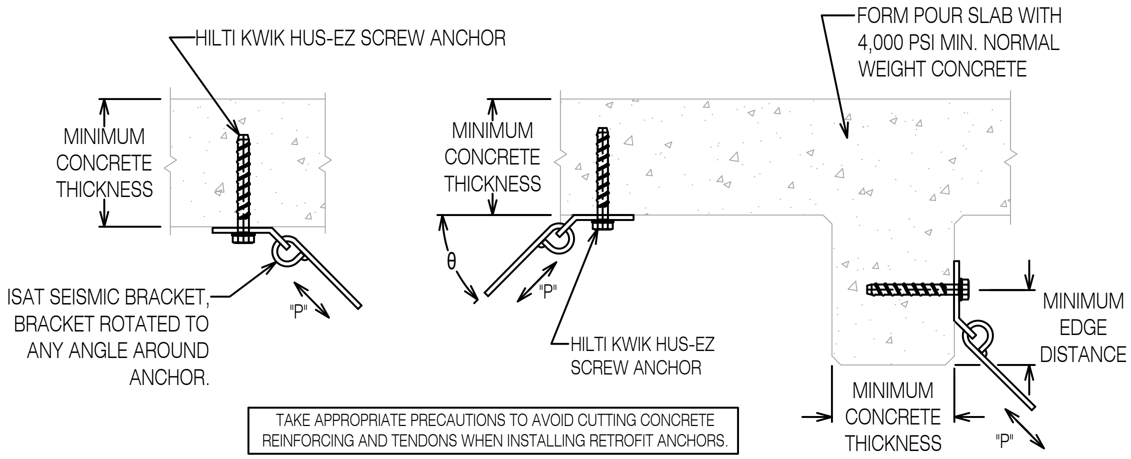


TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

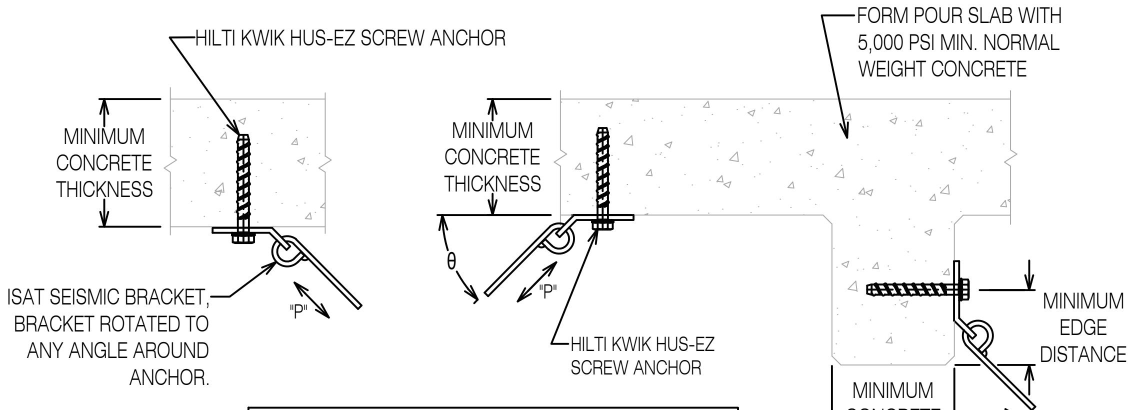
**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 2, 3 and 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle 30°≤ θ ≤ 36° Maximum Brace Load Pmax[4] Lbs. | Brace Angle 36°< θ ≤ 60° Maximum Brace Load Pmax[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing [2] Inch | Edge Distance[3] Inch |
|---|---|---|---|---|---|---|---|---|---|
| 1HUS147 | 1/4 | 187 | 160 | 2 | 1.18 | 3 1/4 | 114 | 6.75 | 2.67 |
| 1HUS388 | 3/8 | 230 | 205 | 1 7/8 | 1.11 | 3 1/4 | 114 | 6.75 | 2.67 |
| 1HUS1210 | 1/2 | 365 | 360 | 2 5/8 | 1.52 | 4 1/2 | 137 | 6.75 | 2.75 |
| 1HUS1218 | 1/2 | 1,172 | 1,149 | 4 5/8 | 3.22 | 6 3/4 | 450 | 9.66 | 5.25 |
| 1HUS5814 | 5/8 | 694 | 688 | 3 5/8 | 2.39 | 5 | 450 | 7.17 | 3.63 |
| 1HUS5822 | 5/8 | 1,482 | 1,463 | 5 3/8 | 3.88 | 7 | 450 | 11.64 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE HILTI KWIK HUS-EZ SCREW ANCHOR FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

ANTHONY A. RUBALCAVA
S 4710



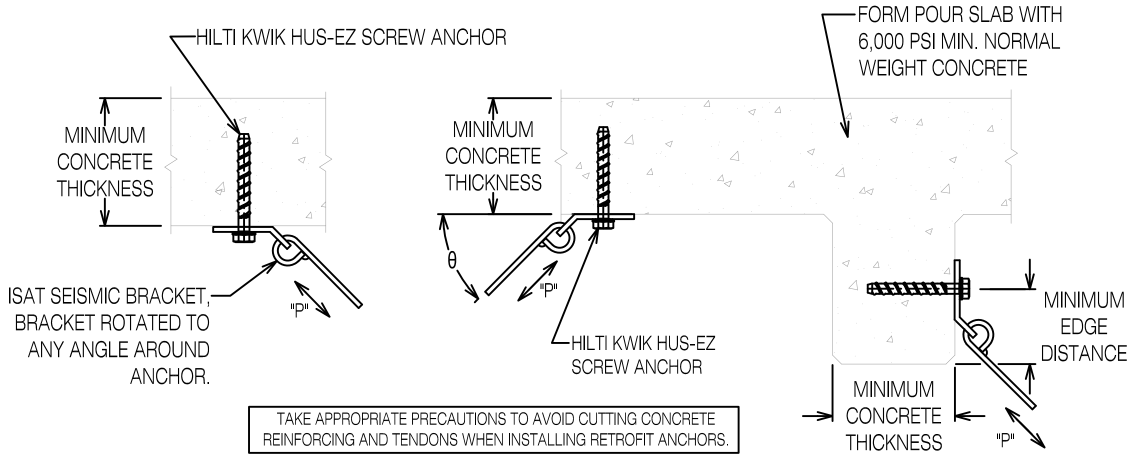
TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 5000 psi NWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 2, 3 and 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing [2] Inch | Edge Distance[3] Inch |
|---|---|---|---|---|---|---|---|---|---|
| | | 30°≤ θ ≤ 36° Maximum Brace Load Pmax[4] Lbs. | 36°< θ ≤ 60° Maximum Brace Load Pmax[4] Lbs. | | | | | | |
| 1HUS147 | 1/4 | 201 | 175 | 2 | 1.18 | 3 1/4 | 114 | 6.75 | 2.67 |
| 1HUS388 | 3/8 | 257 | 230 | 1 7/8 | 1.11 | 3 1/4 | 114 | 6.75 | 2.67 |
| 1HUS1210 | 1/2 | 408 | 403 | 2 5/8 | 1.52 | 4 1/2 | 137 | 6.75 | 2.75 |
| 1HUS1218 | 1/2 | 1,234 | 1,221 | 4 5/8 | 3.22 | 6 3/4 | 450 | 9.66 | 5.25 |
| 1HUS5814 | 5/8 | 776 | 769 | 3 5/8 | 2.39 | 5 | 450 | 7.17 | 3.63 |
| 1HUS5822 | 5/8 | 1,552 | 1,543 | 5 3/8 | 3.88 | 7 | 450 | 11.64 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE HILTI KWIK HUS-EZ SCREW ANCHOR FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB



TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 6000 psi NWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 2, 3 and 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle $30° \le \theta \le 36°$ Maximum Brace Load Pmax[4] Lbs. | Brace Angle $36° < \theta \le 60°$ Maximum Brace Load Pmax[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing[2] Inch | Edge Distance[3] Inch |
|---|---|---|---|---|---|---|---|---|---|
| 1HUS147 | 1/4 | 212 | 188 | 2 | 1.18 | 3 1/4 | 114 | 6.75 | 2.67 |
| 1HUS388 | 3/8 | 282 | 251 | 1 7/8 | 1.11 | 3 1/4 | 114 | 6.75 | 2.67 |
| 1HUS1210 | 1/2 | 447 | 441 | 2 5/8 | 1.52 | 4 1/2 | 137 | 6.75 | 2.75 |
| 1HUS1218 | 1/2 | 1,280 | 1,274 | 4 5/8 | 3.22 | 6 3/4 | 450 | 9.66 | 5.25 |
| 1HUS5814 | 5/8 | 850 | 843 | 3 5/8 | 2.39 | 5 | 450 | 7.17 | 3.63 |
| 1HUS5822 | 5/8 | 1,607 | 1,604 | 5 3/8 | 3.88 | 7 | 450 | 11.64 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0

# SINGLE HILTI KWIK HUS-EZ SCREW ANCHOR FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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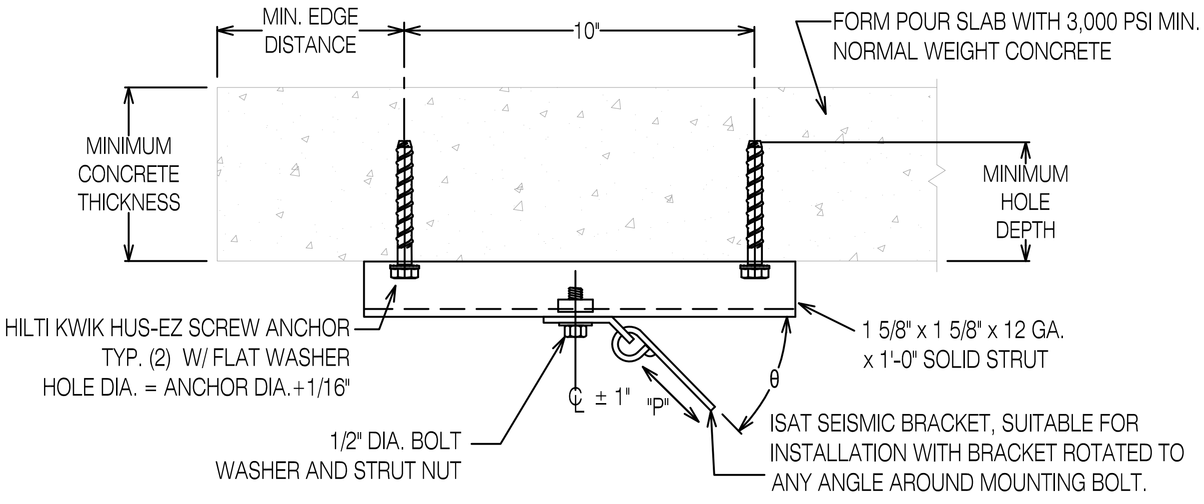

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 2, 3 and 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Min.[2] Anchor Spacing Inch | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|---|
| | | 30° ≤ θ ≤ 36° Maximum Brace Load (P) Lbs. | 36° < θ ≤ 60° Maximum Brace Load (P) Lbs. | | | | | | |
| 2HUS147S | 1/4 | 280 | 235 | 2 | 1.18 | 3 1/4 | 114 | 6.75 | 2.67 |
| 2HUS388S | 3/8 | 332 | 296 | 1 7/8 | 1.11 | 3 1/4 | 114 | 6.75 | 2.67 |
| 2HUS1210S | 1/2 | 527 | 520 | 2 5/8 | 1.52 | 4 1/2 | 137 | 6.75 | 2.75 |
| 2HUS1218S | 1/2 | 1,315 | 1,315 | 4 5/8 | 3.22 | 6 3/4 | 450 | 9.66 | 5.25 |
| 2HUS5822S | 5/8 | 1,936 | 1,936 | 5 3/8 | 3.88 | 7 | 450 | 11.64 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN ADJACENT ANCHORS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0

# DUAL ANCHOR HILTI KWIK HUS-EZ SCREW ANCHOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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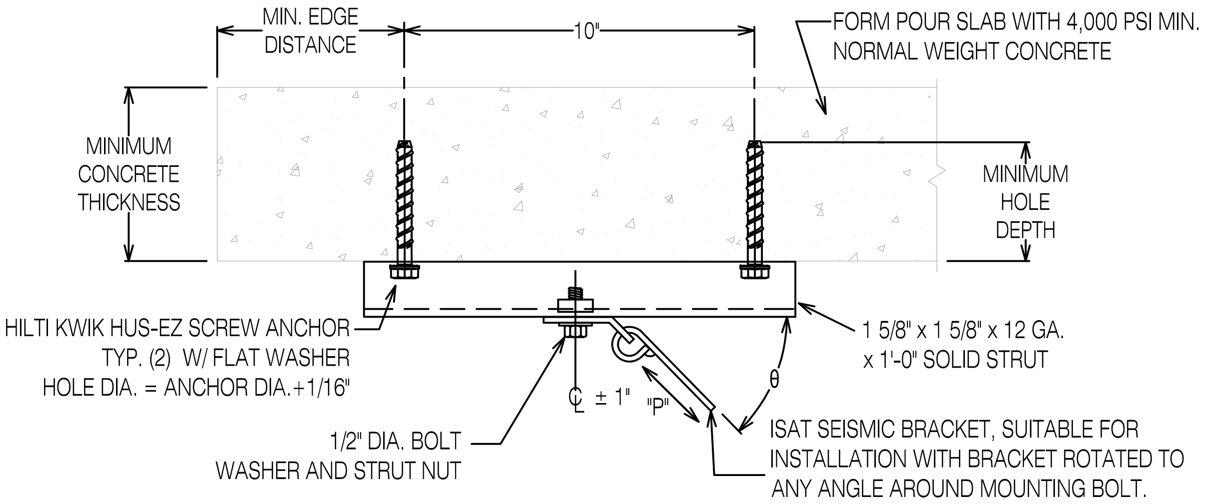

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 2, 3 and 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle<br>30° ≤ θ ≤ 36° Maximum Brace Load (P) Lbs. | <br>36° < θ ≤ 60° Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Min.[2] Anchor Spacing Inch | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|---|
| 2HUS147S | 1/4 | 312 | 266 | 2 | 1.18 | 3 1/4 | 114 | 6.75 | 2.67 |
| 2HUS388S | 3/8 | 384 | 342 | 1 7/8 | 1.11 | 3 1/4 | 114 | 6.75 | 2.67 |
| 2HUS1210S | 1/2 | 609 | 600 | 2 5/8 | 1.52 | 4 1/2 | 137 | 6.75 | 2.75 |
| 2HUS1218S | 1/2 | 1,315 | 1,315 | 4 5/8 | 3.22 | 6 3/4 | 450 | 9.66 | 5.25 |
| 2HUS5822S | 5/8 | 1,936 | 1,936 | 5 3/8 | 3.88 | 7 | 450 | 11.64 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN ADJACENT ANCHORS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0

# DUAL ANCHOR HILTI KWIK HUS-EZ SCREW ANCHOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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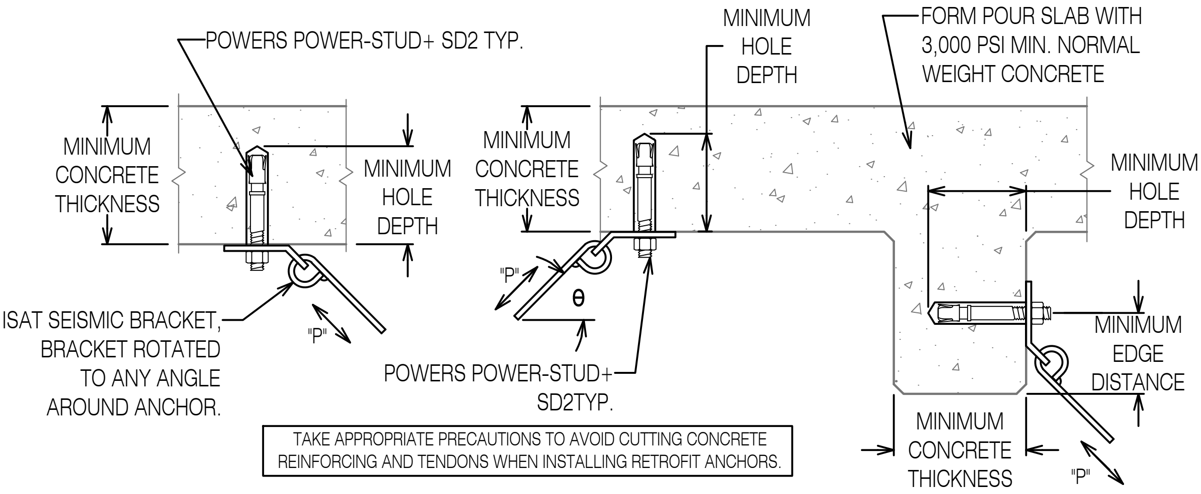

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Edge[3] Distance for Pmax Inch | Min.[2] Anchor Spacing Inch | Min. Edge Dist. Inch | Brace Load (P) at Min. Edge Distance[4] Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 30°≤ θ ≤ 36° Maximum Brace Load Pmax[4] Lbs. | 36°< θ ≤ 60° Maximum Brace Load Pmax[4] Lbs. | | | | | | | | |
| 1SD23812 | 3/8 | 499 | 472 | 2 5/8 | 2 | 4 | 20 | 4 1/2 | 6 | 2 1/2 | 324 |
| 1SD21215 | 1/2 | 574 | 542 | 2 3/4 | 2 | 4 1/2 | 40 | 4 1/2 | 6 | 4 | 544 |
| 1SD21218 | 1/2 | 1,008 | 963 | 4 | 3 1/4 | 5 3/4 | 40 | 6 | 9 3/4 | 4 | 732 |
| 1SD25819 | 5/8 | 1,184 | 1,120 | 4 1/4 | 3 1/4 | 5 3/4 | 60 | 6 | 9 3/4 | 4 1/4 | 876 |
| 1SD25824 | 5/8 | 1,551 | 1,517 | 5 1/4 | 4 1/4 | 6 1/2 | 60 | 8 3/4 | 12 3/4 | 4 1/4 | 975 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ANCHOR POWERS POWER-STUD+ SD2 FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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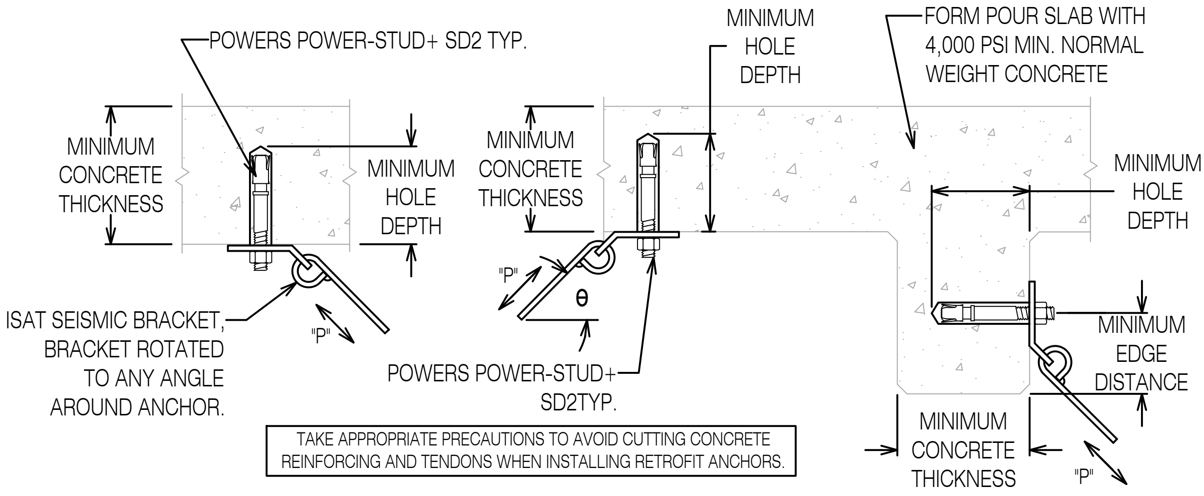

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle<br>30°≤ θ ≤ 36°<br>Maximum Brace Load Pmax[4] Lbs. | Brace Angle<br>36°< θ ≤ 60°<br>Maximum Brace Load Pmax[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Edge[3] Distance for Pmax Inch | Min.[2] Anchor Spacing Inch | Min. Edge Dist. Inch | Brace Load (P) at Min. Edge Distance[4] Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1SD23812 | 3/8 | 524 | 503 | 2 5/8 | 2 | 4 | 20 | 4 1/2 | 6 | 2 1/2 | 375 |
| 1SD21215 | 1/2 | 662 | 626 | 2 3/4 | 2 | 4 1/2 | 40 | 4 1/2 | 6 | 4 | 628 |
| 1SD21218 | 1/2 | 1,080 | 1,051 | 4 | 3 1/4 | 5 3/4 | 40 | 6 | 9 3/4 | 4 | 845 |
| 1SD25819 | 5/8 | 1,367 | 1,293 | 4 1/4 | 3 1/4 | 5 3/4 | 60 | 6 | 9 3/4 | 4 1/4 | 1012 |
| 1SD25824 | 5/8 | 1,649 | 1,634 | 5 1/4 | 4 1/4 | 6 1/2 | 60 | 8 3/4 | 12 3/4 | 4 1/4 | 1125 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ANCHOR POWERS POWER-STUD+ SD2 FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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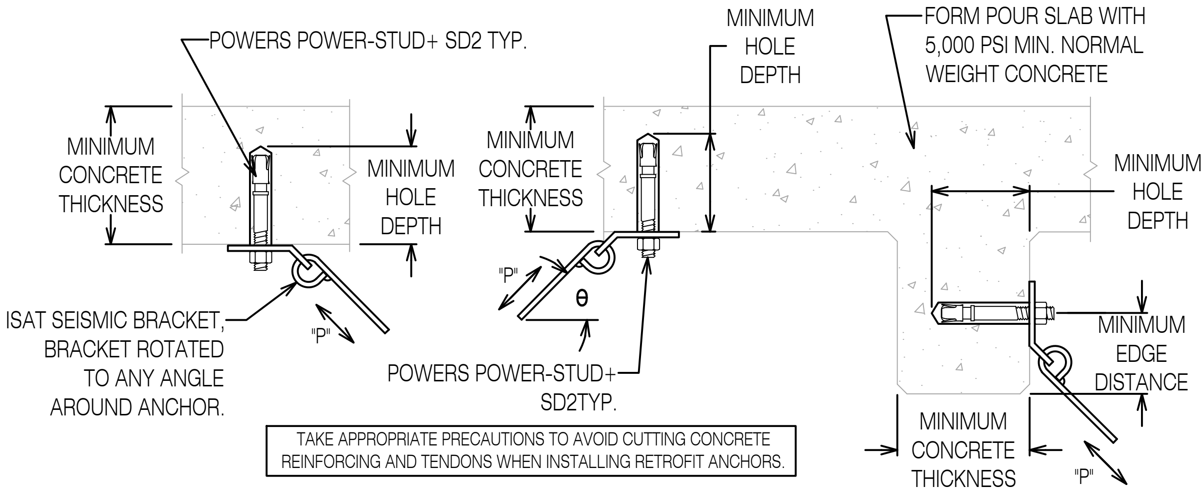

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 5000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Edge[3] Distance for Pmax Inch | Min.[2] Anchor Spacing Inch | Min. Edge Dist. Inch | Brace Load (P) at Min. Edge Distance[4] Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $30° \le \theta \le 36°$ Maximum Brace Load Pmax[4] Lbs. | $36° < \theta \le 60°$ Maximum Brace Load Pmax[4] Lbs. | | | | | | | | |
| 1SD23812 | 3/8 | 543 | 526 | 2 5/8 | 2 | 4 | 20 | 4 1/2 | 6 | 2 1/2 | 419 |
| 1SD21215 | 1/2 | 740 | 700 | 2 3/4 | 2 | 4 1/2 | 40 | 4 1/2 | 6 | 4 | 702 |
| 1SD21218 | 1/2 | 1,134 | 1,117 | 4 | 3 1/4 | 5 3/4 | 40 | 6 | 9 3/4 | 4 | 944 |
| 1SD25819 | 5/8 | 1,449 | 1,392 | 4 1/4 | 3 1/4 | 5 3/4 | 60 | 6 | 9 3/4 | 4 1/4 | 1131 |
| 1SD25824 | 5/8 | 1,724 | 1,718 | 5 1/4 | 4 1/4 | 6 1/2 | 60 | 8 3/4 | 12 3/4 | 4 1/4 | 1258 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$

# SINGLE ANCHOR POWERS POWER-STUD+ SD2 FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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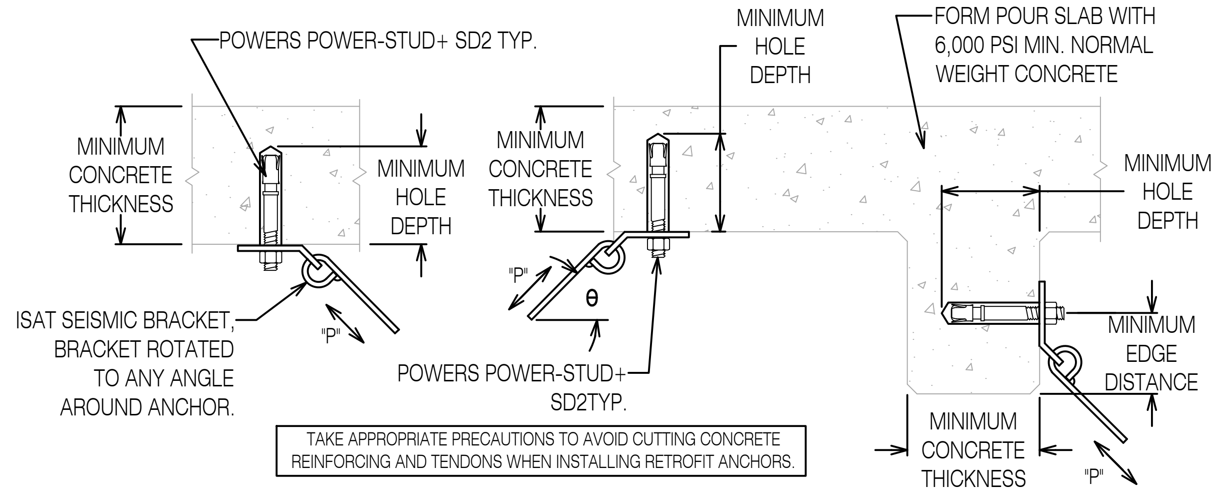

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 6000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Edge[3] Distance for Pmax Inch | Min.[2] Anchor Spacing Inch | Min. Edge Dist. Inch | Brace Load (P) at Min. Edge Distance[4] Lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 30° ≤ θ ≤ 36° Maximum Brace Load Pmax[4] Lbs. | 36° < θ ≤ 60° Maximum Brace Load Pmax[4] Lbs. | | | | | | | | |
| 1SD23812 | 3/8 | 558 | 545 | 2 5/8 | 2 | 4 | 20 | 4 1/2 | 6 | 2 1/2 | 459 |
| 1SD21215 | 1/2 | 811 | 767 | 2 3/4 | 2 | 4 1/2 | 40 | 4 1/2 | 6 | 4 | 769 |
| 1SD21218 | 1/2 | 1,179 | 1,169 | 4 | 3 1/4 | 5 3/4 | 40 | 6 | 9 3/4 | 4 | 1035 |
| 1SD25819 | 5/8 | 1,512 | 1,470 | 4 1/4 | 3 1/4 | 5 3/4 | 60 | 6 | 9 3/4 | 4 1/4 | 1239 |
| 1SD25824 | 5/8 | 1,784 | 1,782 | 5 1/4 | 4 1/4 | 6 1/2 | 60 | 8 3/4 | 12 3/4 | 4 1/4 | 1378 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0

# SINGLE ANCHOR POWERS POWER-STUD+ SD2 FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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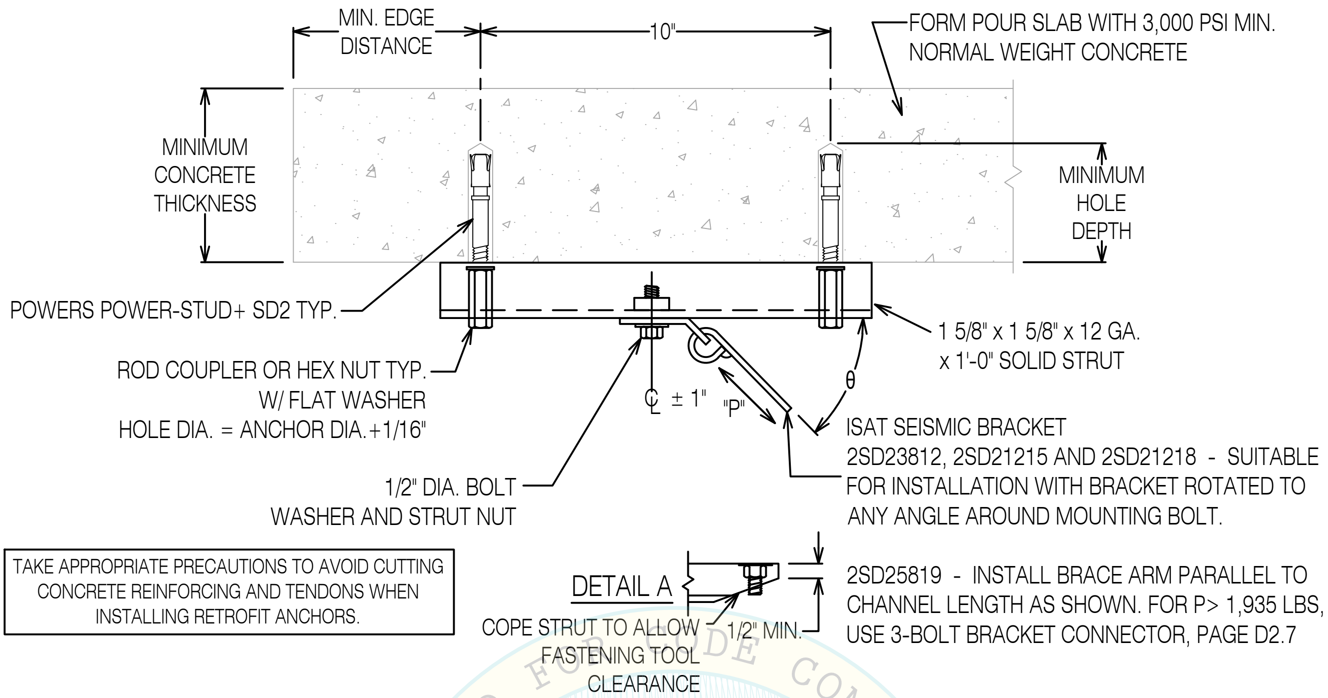

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle $30° \le \theta \le 36°$ Maximum Brace Load (P) Lbs. | Brace Angle $36° < \theta < 60°$ Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|
| 2SD23812S | 3/8 | 832 | 790 | 2 5/8 | 2 | 4 | 20 | 4 1/2 |
| 2SD21215S | 1/2 | 956 | 906 | 2 3/4 | 2 | 4 1/2 | 40 | 4 1/2 |
| 2SD21218S | 1/2 | 1,315 | 1,315 | 4 | 3 1/4 | 5 3/4 | 40 | 6 |
| 2SD25819S | 5/8[4] | 1,936 | 1,936 | 4 1/4 | 3 1/4 | 5 3/4 | 60 | 6 |

1. MINIMUM EFFECTIVE DEPTH IS AFTER THE ANCHOR HAS BEEN SET.
2. MINIMUM SPACING TO AN ADJACENT ANCHOR IS TWO TIMES THE TABULATED EDGE DISTANCE.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$
4. USE DETAIL A.

# DUAL ANCHOR POWERS POWER-STUD+ SD2 WITH STRUT SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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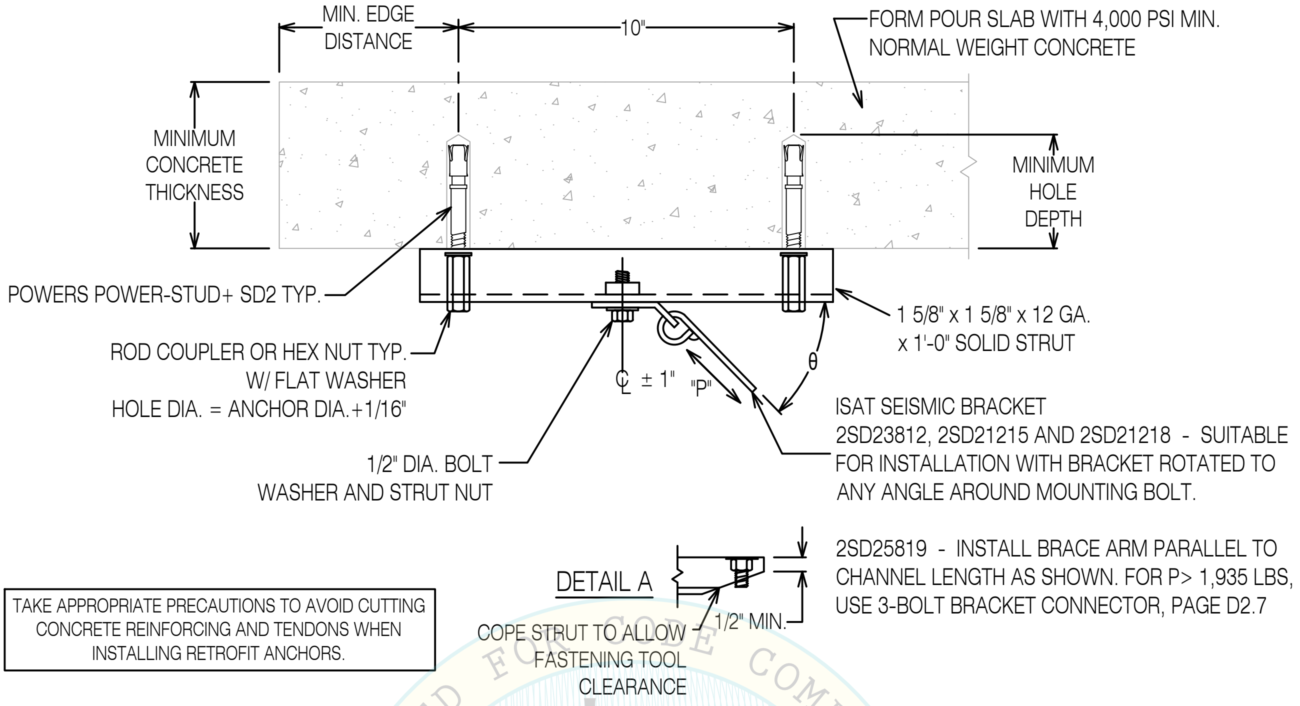

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle $30° \le \theta \le 36°$ Maximum Brace Load (P) Lbs. | Brace Angle $36° < \theta < 60°$ Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|
| 2SD23812S | 3/8 | 873 | 844 | 2 5/8 | 2 | 4 | 20 | 4 1/2 |
| 2SD21215S | 1/2 | 1,104 | 1,047 | 2 3/4 | 2 | 4 1/2 | 40 | 4 1/2 |
| 2SD21218S | 1/2 | 1,315 | 1,315 | 4 | 3 1/4 | 5 3/4 | 40 | 6 |
| 2SD25819S | 5/8[4] | 1,936 | 1,936 | 4 1/4 | 3 1/4 | 5 3/4 | 60 | 6 |

1. MINIMUM EFFECTIVE DEPTH IS AFTER THE ANCHOR HAS BEEN SET.
2. MINIMUM SPACING TO AN ADJACENT ANCHOR IS TWO TIMES THE TABULATED EDGE DISTANCE.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
4. USE DETAIL A.

# DUAL ANCHOR POWERS POWER-STUD+ SD2 WITH STRUT SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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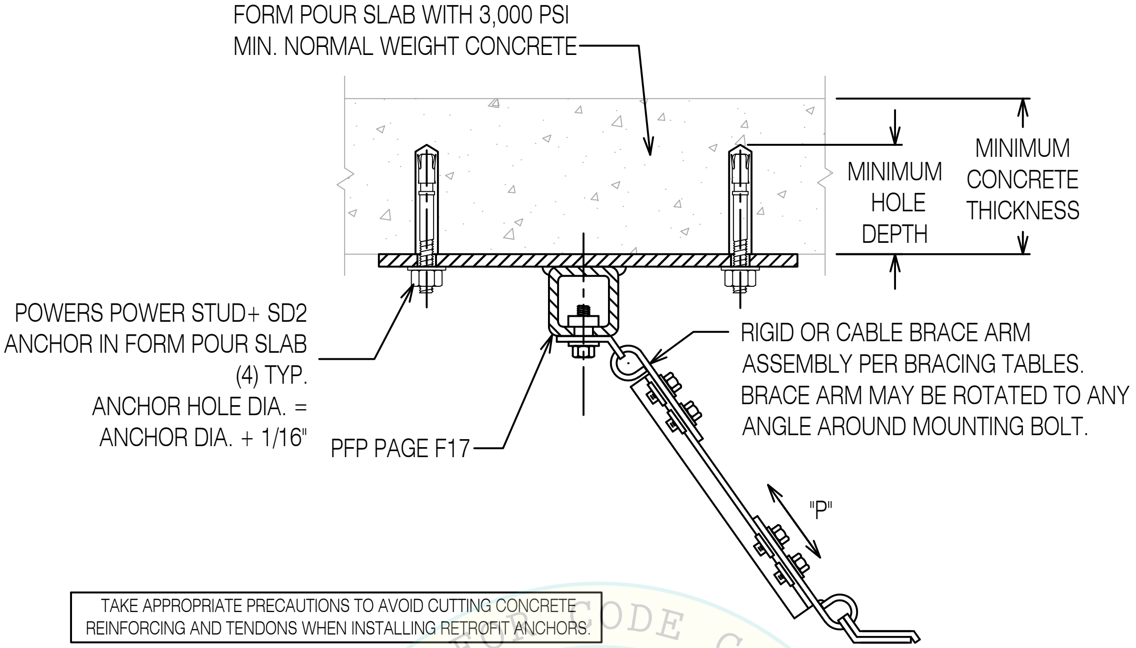

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Plate Number Page F17 | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|---|---|---|
| 4SD23812P | 3/8 | 1,325 | 2 5/8 | 2 | 4 | 20 | 4 1/2 | D134 | 1/2 |
| 4SD21218P | 1/2 | 2,681 | 4 | 3 1/4 | 5 3/4 | 40 | 6 | D145 | 5/8 |
| 4SD25824P | 5/8 | 4,238 | 5 1/4 | 4 1/4 | 6 1/2 | 60 | 8 3/4 | D155 | 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0

# 4-ANCHOR POWERS POWER-STUD +SD2 PLATE IN FORM POUR SLAB (PFP)

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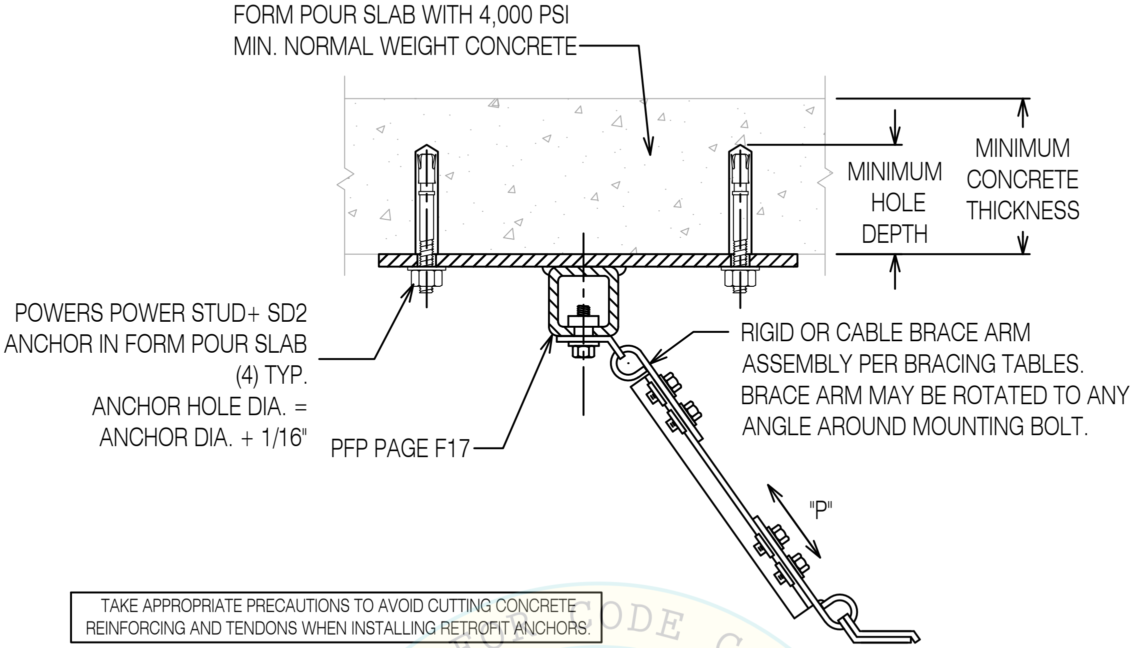

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Plate Number Page F17 | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|---|---|---|
| 4SD23812P | 3/8 | 1,418 | 2 5/8 | 2 | 4 | 20 | 4 1/2 | D134 | 1/2 |
| 4SD21218P | 1/2 | 2,961 | 4 | 3 1/4 | 5 3/4 | 40 | 6 | D145 | 5/8 |
| 4SD25824P | 5/8 | 4,238 | 5 1/4 | 4 1/4 | 6 1/2 | 60 | 8 3/4 | D155 | 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# 4-ANCHOR POWERS POWER-STUD +SD2 PLATE IN FORM POUR SLAB (PFP)

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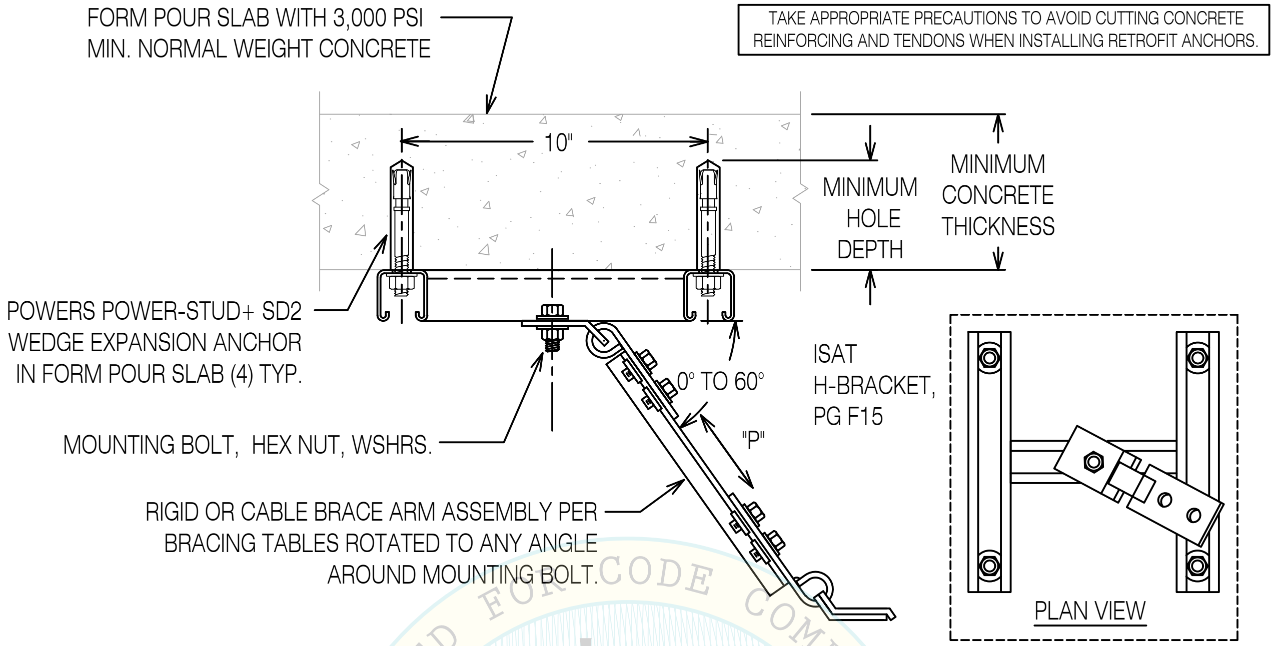
TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.



**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|---|---|
| 4SD21218F | 1/2 | 1,846 | 4 | 3 1/4 | 6 | 40 | 7 1/2 | 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# 4-ANCHOR POWERS POWER-STUD+ SD 2 H-BRACKET ATTACHMENT TO FORM POUR SLAB

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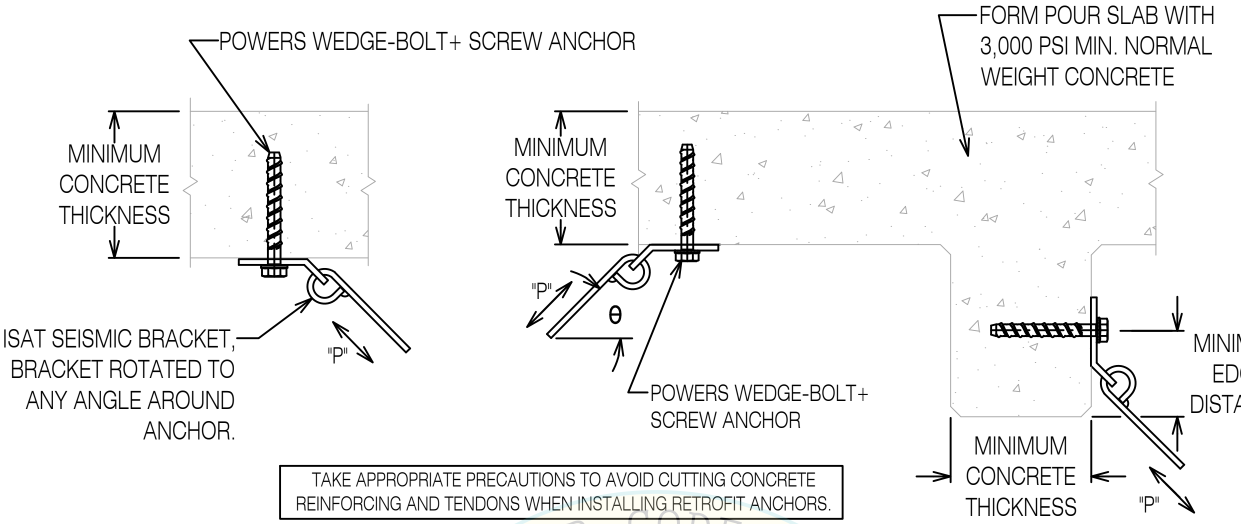

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2526 (Dated June 2017), Table 1, 2 and 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing [2] Inch | Edge Distance[3] Inch |
|---|---|---|---|---|---|---|---|---|---|
| | | $30° \le \theta \le 36°$ Maximum Brace Load Pmax[4] Lbs. | $36° < \theta \le 60°$ Maximum Brace Load Pmax[4] Lbs. | | | | | | |
| 1WB3810 | 3/8 | 275 | 254 | 2 1/4 | 1.43 | 3 1/2 | 245 | 6.75 | 2.67 |
| 1WB1212 | 1/2 | 296 | 287 | 2 3/4 | 1.65 | 4 | 300 | 6.75 | 2.75 |
| 1WB1216 | 1/2 | 701 | 622 | 4 | 2.50 | 6 | 300 | 7.50 | 5.25 |
| 1WB5816 | 5/8 | 554 | 543 | 4 | 2.15 | 6 | 350 | 6.75 | 3.63 |
| 1WB5820 | 5/8 | 1,078 | 999 | 5 | 3.10 | 7 | 350 | 9.30 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$

# SINGLE POWERS WEDGE-BOLT+ SCREW ANCHOR FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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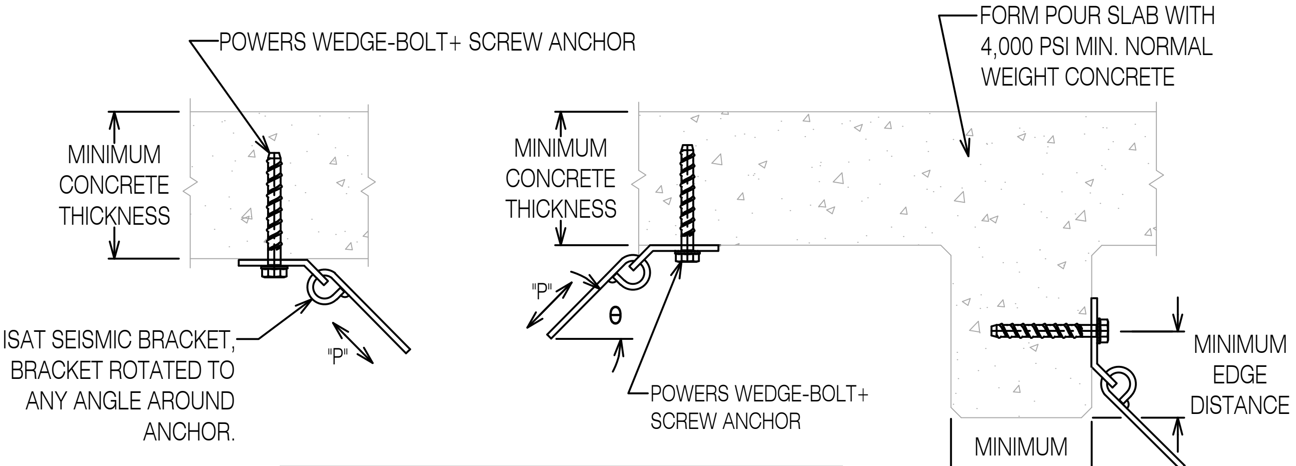

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-2526 (Dated June 2017), Table 1, 2 and 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle 30°≤ θ ≤ 36° Maximum Brace Load Pmax[4] Lbs. | 36°< θ ≤ 60° Maximum Brace Load Pmax[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing [2] Inch | Edge Distance[3] Inch |
|---|---|---|---|---|---|---|---|---|---|
| 1WB3810 | 3/8 | 317 | 293 | 2 1/4 | 1.43 | 3 1/2 | 245 | 6.75 | 2.67 |
| 1WB1212 | 1/2 | 342 | 331 | 2 3/4 | 1.65 | 4 | 300 | 6.75 | 2.75 |
| 1WB1216 | 1/2 | 809 | 718 | 4 | 2.50 | 6 | 300 | 7.50 | 5.25 |
| 1WB5816 | 5/8 | 640 | 626 | 4 | 2.15 | 6 | 350 | 6.75 | 3.63 |
| 1WB5820 | 5/8 | 1,244 | 1,154 | 5 | 3.10 | 7 | 350 | 9.30 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$

# SINGLE POWERS WEDGE-BOLT+ SCREW ANCHOR FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

ANTHONY A. RUBALCAVA
S 4710

ISAT
A Division of Tomarco Contractor Specialties

**International Seismic Application Technology**
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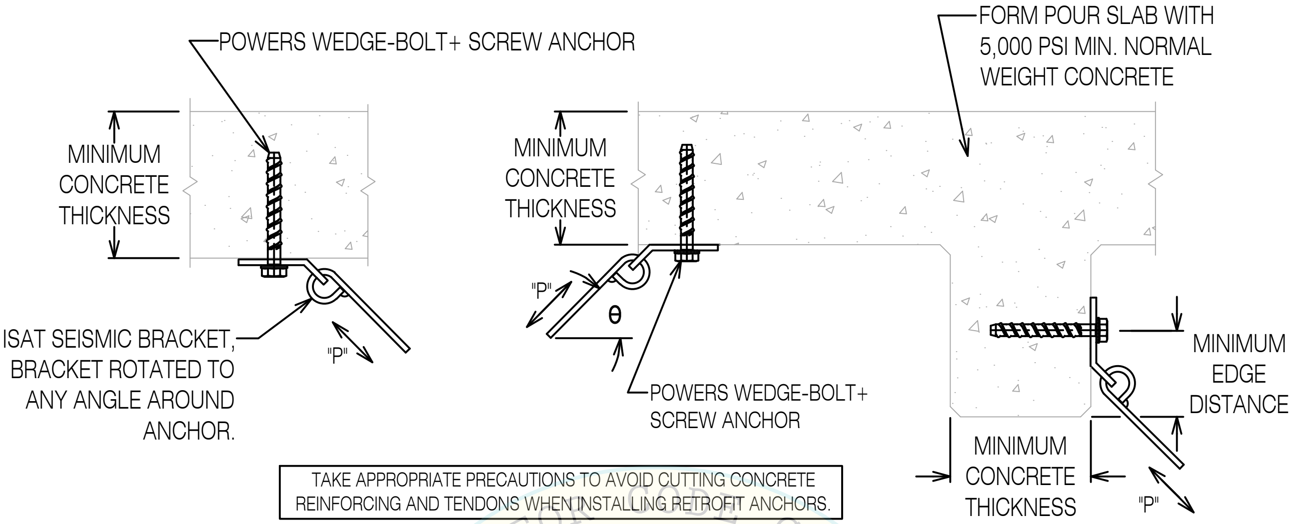

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 5000 psi NWC**
**ICC Report No. ESR-2526 (Dated June 2017), Table 1, 2 and 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle<br>30°≤ θ ≤ 36°<br>Maximum Brace Load Pmax$^4$ Lbs. | <br>36°< θ ≤ 60°<br>Maximum Brace Load Pmax$^4$ Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.$^1$ Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing $^2$ Inch | Edge Distance$^3$ Inch |
|---|---|---|---|---|---|---|---|---|---|
| 1WB3810 | 3/8 | 355 | 328 | 2 1/4 | 1.43 | 3 1/2 | 245 | 6.75 | 2.67 |
| 1WB1212 | 1/2 | 383 | 370 | 2 3/4 | 1.65 | 4 | 300 | 6.75 | 2.75 |
| 1WB1216 | 1/2 | 905 | 803 | 4 | 2.50 | 6 | 300 | 7.50 | 5.25 |
| 1WB5816 | 5/8 | 715 | 700 | 4 | 2.15 | 6 | 350 | 6.75 | 3.63 |
| 1WB5820 | 5/8 | 1,391 | 1,290 | 5 | 3.10 | 7 | 350 | 9.30 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

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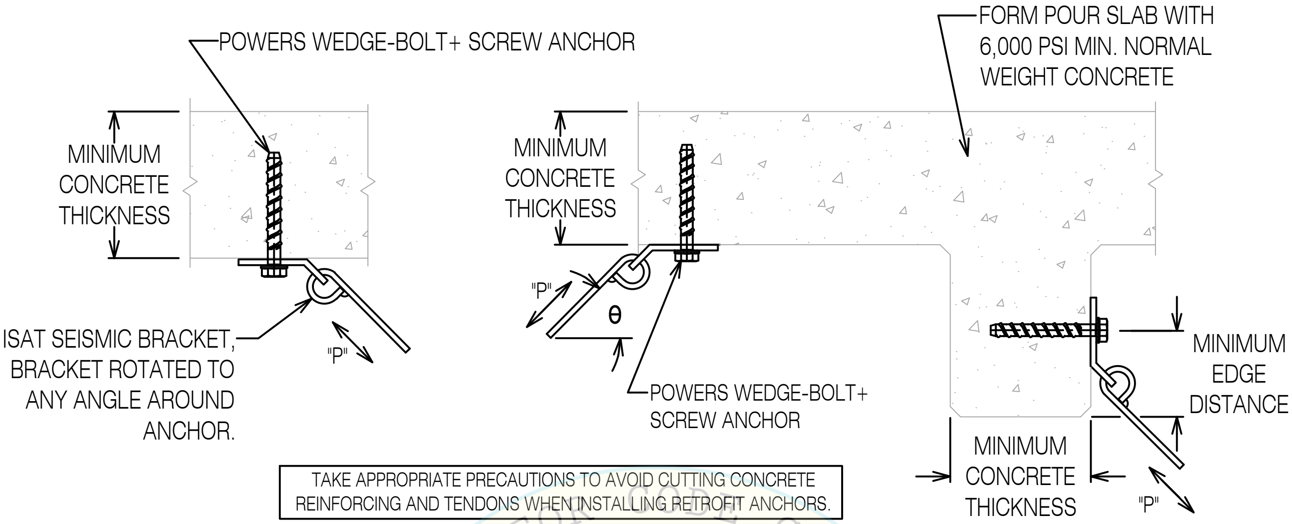

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 6000 psi NWC**
**ICC Report No. ESR-2526 (Dated June 2017), Table 1, 2 and 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle<br>30°< θ < 36°<br>Maximum Brace Load Pmax[4] Lbs. | <br>36°< θ < 60°<br>Maximum Brace Load Pmax[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing [2] Inch | Edge Distance[3] Inch |
|---|---|---|---|---|---|---|---|---|---|
| 1WB3810 | 3/8 | 389 | 359 | 2 1/4 | 1.43 | 3 1/2 | 245 | 6.75 | 2.67 |
| 1WB1212 | 1/2 | 419 | 405 | 2 3/4 | 1.65 | 4 | 300 | 6.75 | 2.75 |
| 1WB1216 | 1/2 | 991 | 879 | 4 | 2.50 | 6 | 300 | 7.50 | 5.25 |
| 1WB5816 | 5/8 | 784 | 767 | 4 | 2.15 | 6 | 350 | 6.75 | 3.63 |
| 1WB5820 | 5/8 | 1,524 | 1,413 | 5 | 3.10 | 7 | 350 | 9.30 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN TWO ANCHORS.
3. AT CONCRETE CORNERS USE THE TABULATED VALUE FOR "EDGE DISTANCE FOR PMAX" FOR ONE EDGE WHERE THE "MIN. EDGE DISTANCE" IS USED FOR THE PERPENDICULAR CONCRETE FACE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE POWERS WEDGE-BOLT+ SCREW ANCHOR FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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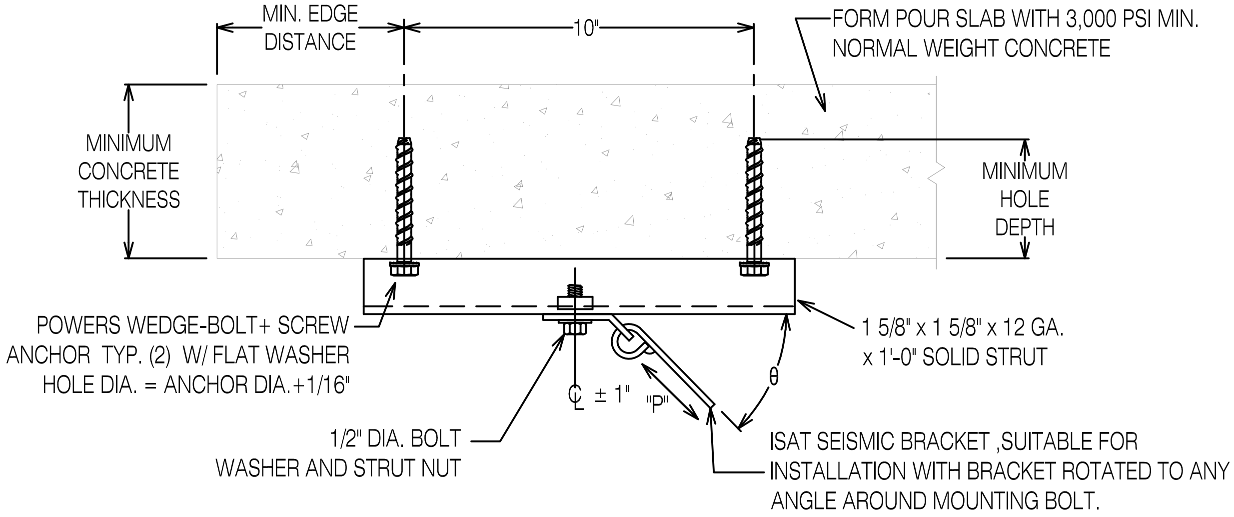

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2526 (Dated June 2018), Table 1, 2 and 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Min. [2] Anchor Spacing Inch | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|---|
| | | 30° ≤ θ ≤ 36° Maximum Brace Load (P) Lbs. | 36° < θ ≤ 60° Maximum Brace Load (P) Lbs. | | | | | | |
| 2WB3810S | 3/8 | 458 | 423 | 2 1/4 | 1.43 | 3 1/2 | 245 | 6.75 | 2.67 |
| 2WB1212S | 1/2 | 494 | 480 | 2 3/4 | 1.65 | 4 | 300 | 6.75 | 2.75 |
| 2WB1216S | 1/2 | 1,168 | 1,036 | 4 | 2.50 | 6 | 300 | 7.50 | 5.25 |
| 2WB5820S | 5/8 | 1,936 | 1,743 | 5 | 3.10 | 7 | 350 | 9.30 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN ADJACENT ANCHORS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0

# DUAL ANCHOR POWERS WEDGE-BOLT+ SCREW ANCHOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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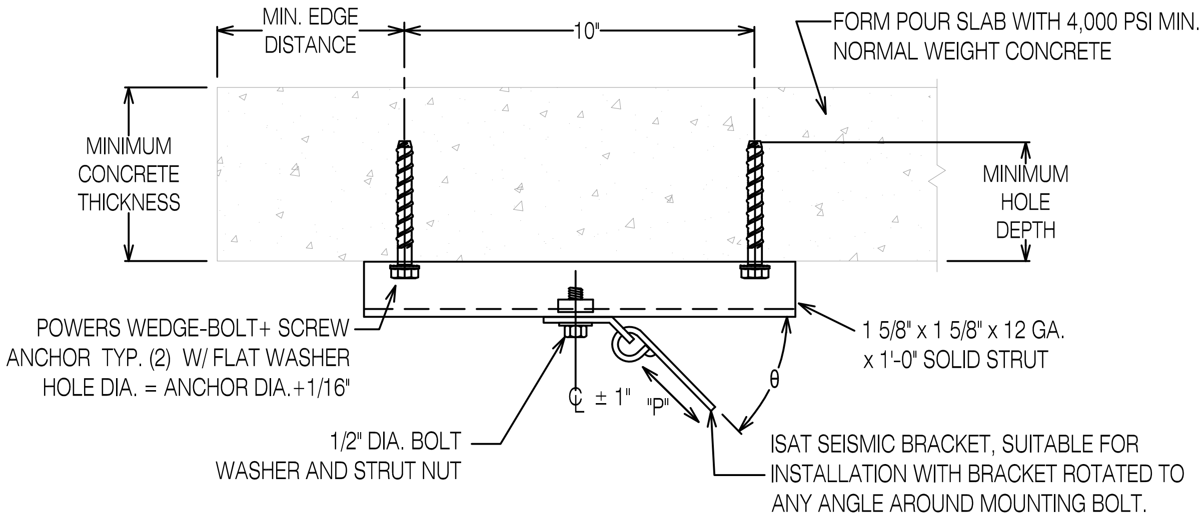

TAKE APPROPRIATE PRECAUTIONS TO AVOID CUTTING CONCRETE REINFORCING AND TENDONS WHEN INSTALLING RETROFIT ANCHORS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-2526 (Dated June 2018), Table 1, 2 and 3**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle<br>30° ≤ θ ≤ 36° Maximum Brace Load (P) Lbs. | <br>36° < θ ≤ 60° Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Minimum Concrete Thickness Inch | Maximum Impact Wrench Torque Ft-Lbs. | Min. [2] Anchor Spacing Inch | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|---|
| 2WB3810S | 3/8 | 529 | 489 | 2 1/4 | 1.43 | 3 1/2 | 245 | 6.75 | 2.67 |
| 2WB1212S | 1/2 | 570 | 554 | 2 3/4 | 1.65 | 4 | 300 | 6.75 | 2.75 |
| 2WB1216S | 1/2 | 1,315 | 1,196 | 4 | 2.50 | 6 | 300 | 7.50 | 5.25 |
| 2WB5820S | 5/8 | 1,936 | 1,936 | 5 | 3.10 | 7 | 350 | 9.30 | 5.82 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR SPACING IS THE CENTER-TO-CENTER DISTANCE BETWEEN ADJACENT ANCHORS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0

# DUAL ANCHOR POWERS WEDGE-BOLT+ SCREW ANCHOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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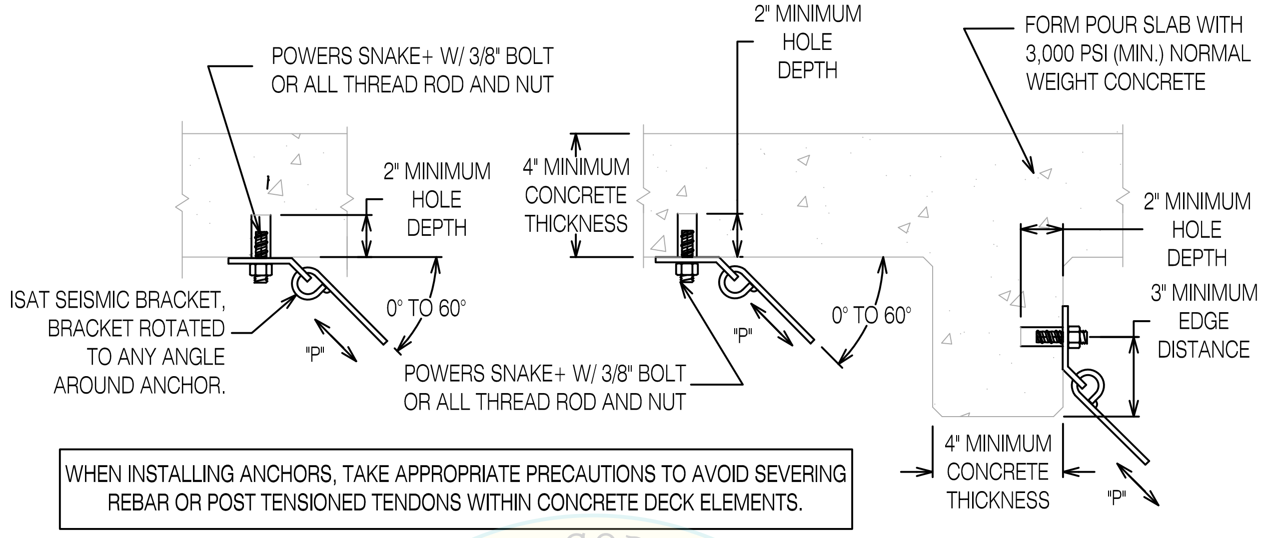

WHEN INSTALLING ANCHORS, TAKE APPROPRIATE PRECAUTIONS TO AVOID SEVERING REBAR OR POST TENSIONED TENDONS WITHIN CONCRETE DECK ELEMENTS.

**SINGLE ANCHOR CONNECTION DETAILS N1SN**

**Normal Weight Concrete**
**Form Pour Slab with Minimum Concrete Strength of 3,000 psi**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Powers Snake+ Anchor**
**ICC Report No. ESR-2272 (Dated December, 2017), Table 2 and 3.**
**Special Inspection Required By Manufacturer's ICC Report**

| Brace Anchorage Designation | Anchor Quantity | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth[1] Inch | Minimum Effective Embedment[2] Inch | Minimum Anchor Spacing Inch | Critical Edge Distance Inch | Screwdriver Installation Max. Torque Ft-Lbs. | Rod or Bolt Installation Max. Torque Ft-Lbs. |
|---|---|---|---|---|---|---|---|---|---|
| N1SN | 1 | 3/8 | 186 | 2 | 1 1/8 | 6 3/4 | 3 | 345 | 8 |

1. MINIMUM HOLE DEPTH IS TO BE VERIFIED BY THE INSPECTOR.
2. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ANCHOR POWERS SNAKE+ FOR SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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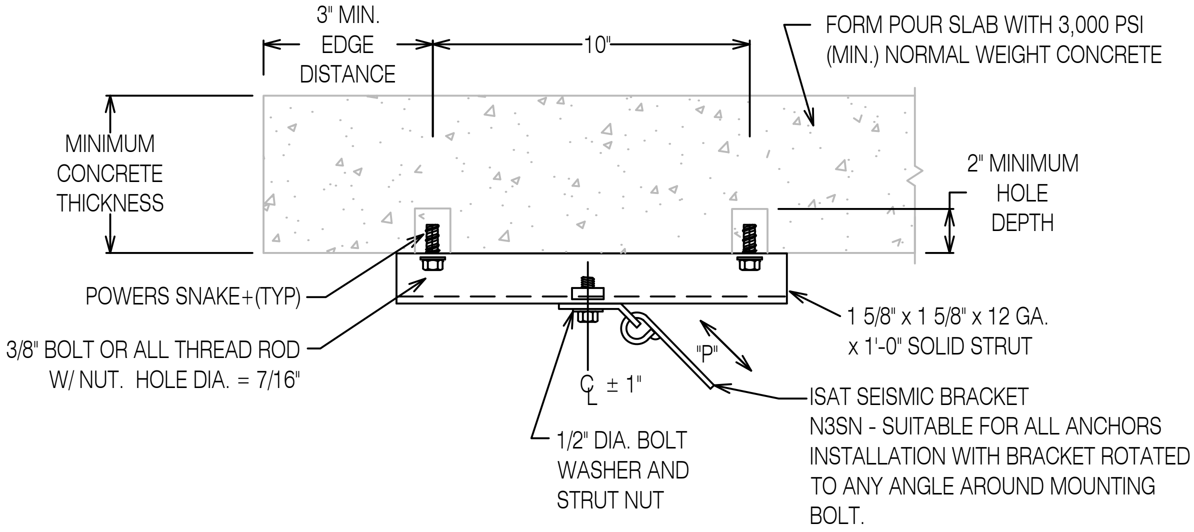

WHEN INSTALLING ANCHORS, TAKE APPROPRIATE PRECAUTIONS TO AVOID SEVERING REBAR OR POST TENSIONED TENDONS WITHIN CONCRETE DECK ELEMENTS.

**DUAL ANCHOR CONNECTION DETAILS**
**Normal Weight Concrete**
**Form Pour Slab with Minimum Concrete Strength of 3,000 psi**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Powers Snake+ Anchor**
**ICC Report No. ESR-2272 (Dated December, 2017), Table 2 and 3.**

| Brace Anchorage Designation | Anchor Quantity | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth[1] Inch | Minimum Effective Embedment[2] Inch | Minimum Anchor Spacing Inch | Critical Edge Distance Inch | Screwdriver Installation Max. Torque Ft-Lbs. | Rod or Bolt Installation Max. Torque Ft-Lbs. |
|---|---|---|---|---|---|---|---|---|---|
| 2PSN38S | 2 | 3/8 | 310 | 2 | 1 1/8 | 6 3/4 | 3 | 345 | 8 |

1. MINIMUM HOLE DEPTH IS TO BE VERIFIED BY THE INSPECTOR.
2. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0

# DUAL ANCHOR POWERS SNAKE+ WITH STRUT SEISMIC BRACE CONNECTION IN FORM POUR SLAB

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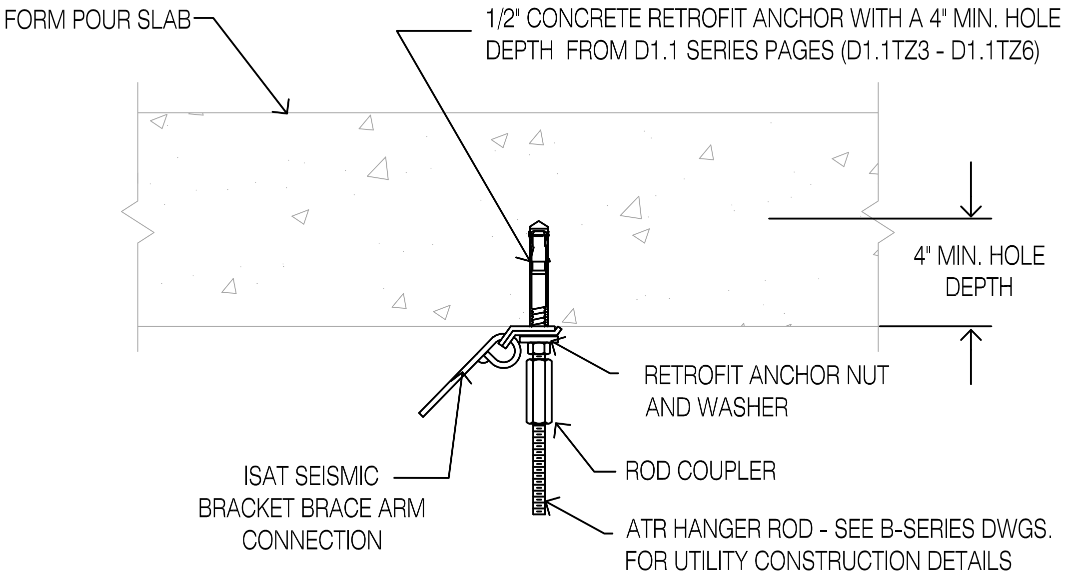

| Max. Seismic Design Acceleration G [1] | Max. Utility Trapeze Load Lbs./Ft. | Max. Vertical Support Spacing Ft. | Transverse Brace Spacing Ft | Longitudinal Brace Spacing Ft |
|---|---|---|---|---|
| 0.2 | 50 | 10 | 40 | 60 |
| 0.40 | 40 | 10 | 40 | 60 |
| 0.60 | 30 | 10 | 40 | 60 |
| 0.60 | 50 | 10 | 20 | 30 |
| 0.80 | 20 | 10 | 40 | 60 |
| 0.80 | 40 | 10 | 20 | 30 |
| 1.00 | 20 | 10 | 40 | 60 |

| Maximum Equipment Weight - Lbs. [3] | | | | |
|---|---|---|---|---|
| G = 0.20 | G = 0.40 | G = 0.60 | G = 0.80 | G = 1.00 |
| 1100 | 900 | 800 | 700 | 600 |

1. SEISMIC G-FORCE AT WORKING LOADS.
2. DESIGN IS BASED ON 2013 CBC AND INCLUDES PROVISIONS FOR VERTICAL SEISMIC ACCELERATIONS AND A FORCE INCREASE FOR ANCHORAGE INTO CONCRETE FROM ASCE 7 SECTION 13.4.2.
3. EQUIPMENT SUSPENDED BY ONLY TWO RODS IS LIMITED TO 100 POUNDS FOR ALL DESIGN ACCELERATIONS.

# BRACE CONNECTION TO VERTICAL SUPPORT ROD

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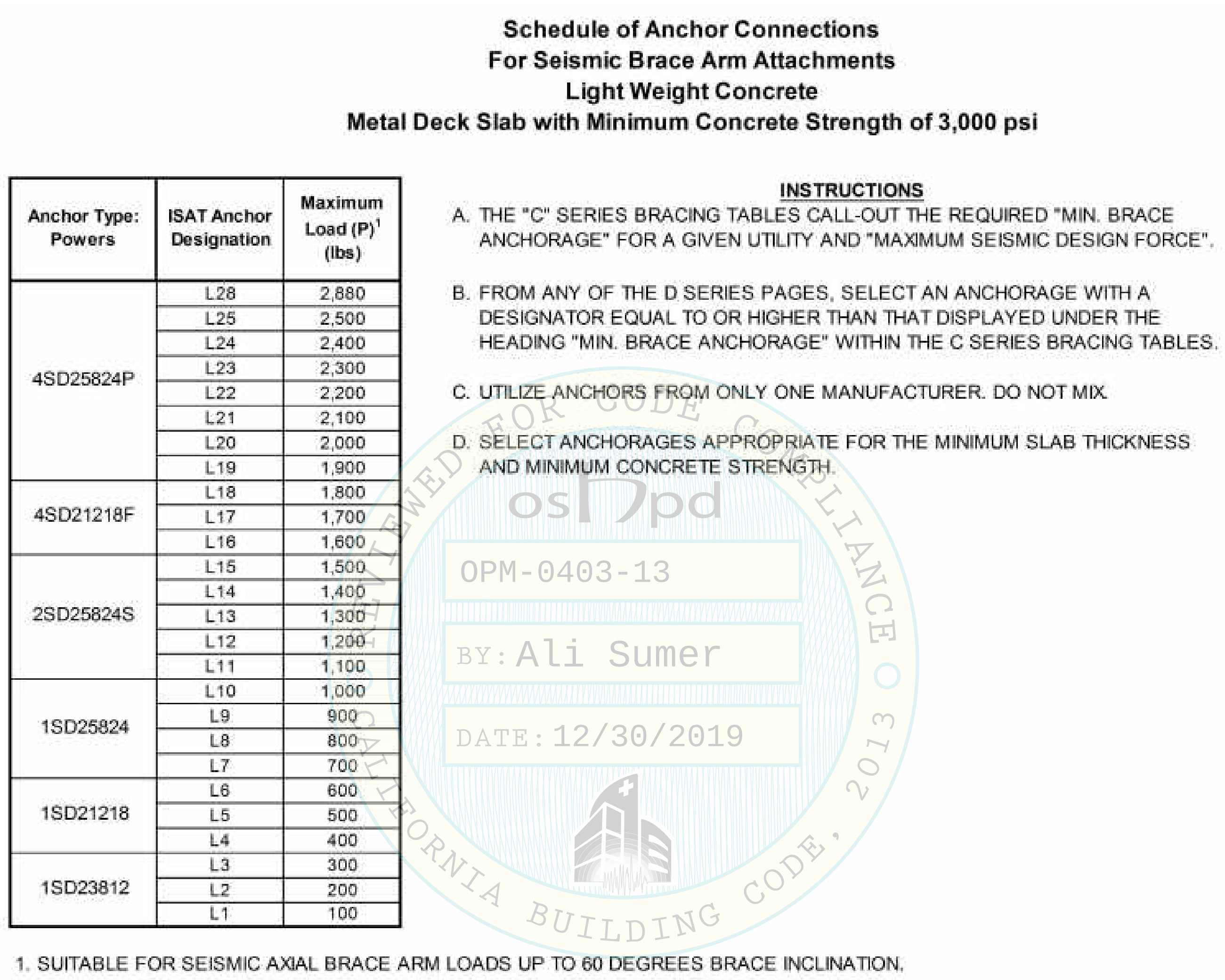

### Schedule of Anchor Connections
### For Seismic Brace Arm Attachments
### Light Weight Concrete
### Metal Deck Slab with Minimum Concrete Strength of 3,000 psi

| Anchor Type: Powers | ISAT Anchor Designation | Maximum Load (P)[1] (lbs) |
|---|---|---|
| 4SD25824P | L28 | 2,880 |
| | L25 | 2,500 |
| | L24 | 2,400 |
| | L23 | 2,300 |
| | L22 | 2,200 |
| | L21 | 2,100 |
| | L20 | 2,000 |
| | L19 | 1,900 |
| 4SD21218F | L18 | 1,800 |
| | L17 | 1,700 |
| | L16 | 1,600 |
| 2SD25824S | L15 | 1,500 |
| | L14 | 1,400 |
| | L13 | 1,300 |
| | L12 | 1,200 |
| | L11 | 1,100 |
| 1SD25824 | L10 | 1,000 |
| | L9 | 900 |
| | L8 | 800 |
| | L7 | 700 |
| 1SD21218 | L6 | 600 |
| | L5 | 500 |
| | L4 | 400 |
| 1SD23812 | L3 | 300 |
| | L2 | 200 |
| | L1 | 100 |

**INSTRUCTIONS**

A. THE "C" SERIES BRACING TABLES CALL-OUT THE REQUIRED "MIN. BRACE ANCHORAGE" FOR A GIVEN UTILITY AND "MAXIMUM SEISMIC DESIGN FORCE".

B. FROM ANY OF THE D SERIES PAGES, SELECT AN ANCHORAGE WITH A DESIGNATOR EQUAL TO OR HIGHER THAN THAT DISPLAYED UNDER THE HEADING "MIN. BRACE ANCHORAGE" WITHIN THE C SERIES BRACING TABLES.

C. UTILIZE ANCHORS FROM ONLY ONE MANUFACTURER. DO NOT MIX.

D. SELECT ANCHORAGES APPROPRIATE FOR THE MINIMUM SLAB THICKNESS AND MINIMUM CONCRETE STRENGTH.

1. SUITABLE FOR SEISMIC AXIAL BRACE ARM LOADS UP TO 60 DEGREES BRACE INCLINATION.

REVIEWED FOR CODE COMPLIANCE
OPM-0403-13
BY: Ali Sumer
DATE: 12/30/2019

# CONCRETE ON METAL DECK
# SEISMIC RESTRAINT ANCHORAGE CONNECTIONS

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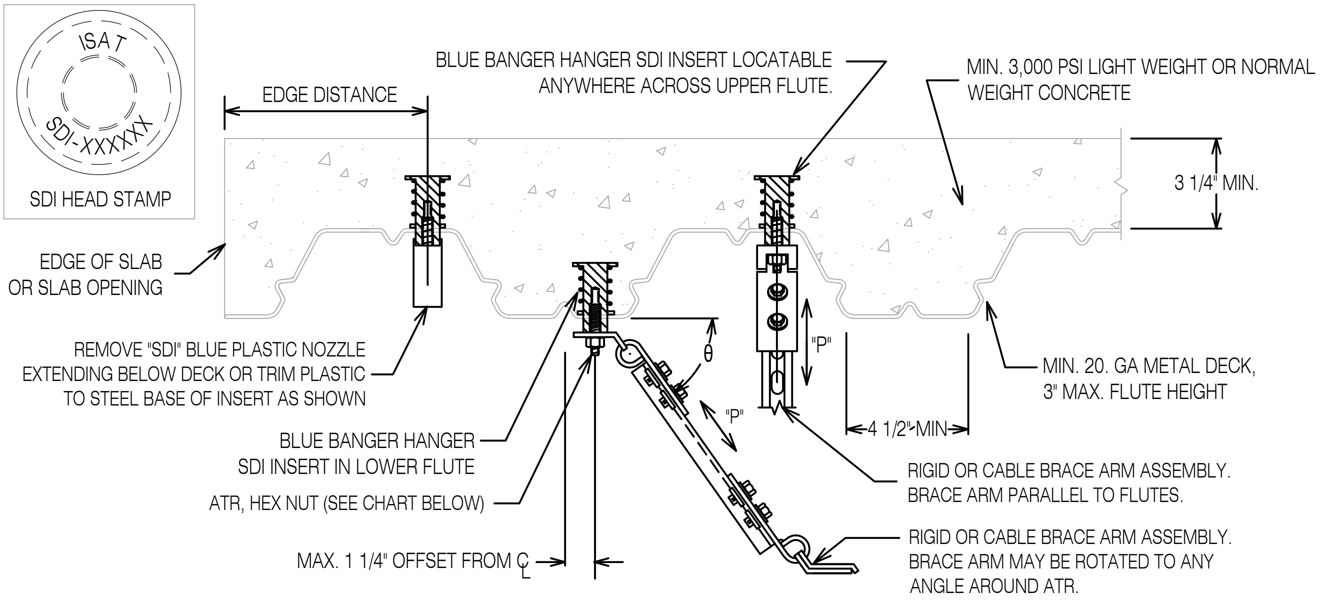

**Blue Banger Hanger Steel Deck Insert (SDI)**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table $^2$**

| Brace Anchorage Designation | Deck Insert Part No. | All Thread Rod Dia. (ATR) Inch | Flute Installat'n Location | Maximum Brace Reaction (P) At Minimum Concrete Strength | | | | Nominal Insert Height Inch | Minimum Edge Distance Inch | Min.$^3$ Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3,000 psi LWC Lbs | | 4,000 psi LWC Lbs | | | | |
| | | | | $30^\circ \le \theta \le 36^\circ$ | $36^\circ < \theta \le 60^\circ$ | $30^\circ \le \theta \le 36^\circ$ | $36^\circ < \theta \le 60^\circ$ | | | |
| L4BL3 | SDI143812 | 1/2 $^4$ | Lower | 512 | 463 | - | - | 2 | 6 | 6 |
| L7BU3 | | | Upper | 744 | 729 | | | | | |
| L5BL4 | SDI143812 | 1/2 $^4$ | Lower | - | - | 554 | 515 | | | |
| L7BU4 | | | Upper | | | 791 | 785 | | | |
| L4.1BL3 | SDI381258 | 5/8 | Lower | 473 | 442 | - | - | | | |
| L4BU3 | | | Upper | 466 | 470 | | | | | |
| L4BL4 | SDI381258 | 5/8 | Lower | - | - | 509 | 487 | | | |
| L4BU4 | | | Upper | | | 481 | 488 | | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o = 2.0$
2. LIGHT WEIGHT CONCRETE OR NORMAL WEIGHT CONCRETE.
3. SPACING MEASURED ALONG LENGTH OF FLUTE. EDGE DISTANCE PERPENDICULAR TO DIRECTION SHOWN (END DISTANCE) SHALL BE 6 INCHES.
4. $f_{uta}$ MAX = 60 KSI

# SINGLE BLUE BANGER HANGER "SDI" DECK INSERT
# SEISMIC BRACE CONNECTION

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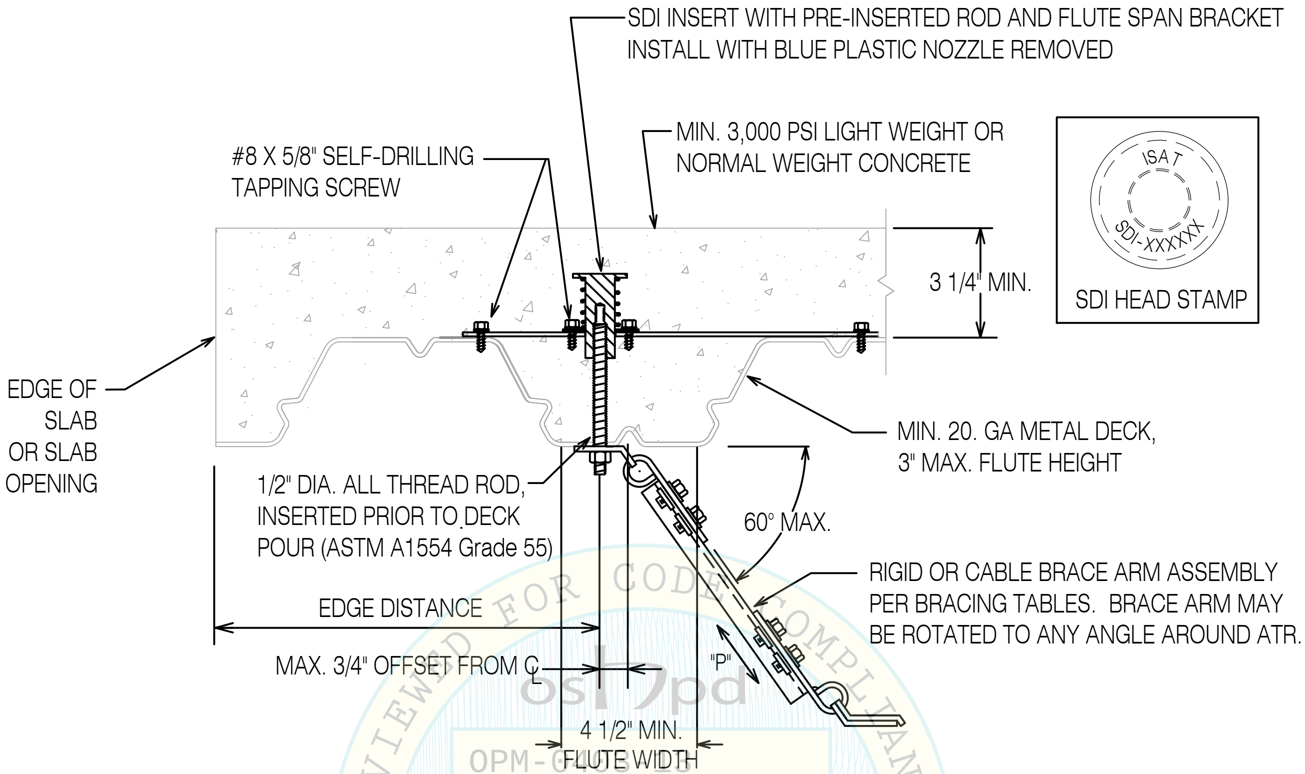

**Blue Banger Hanger Steel Deck Insert (SDI)**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table 2**

| Brace Anchorage Designation | Deck Insert Part No. | All Thread Rod Diameter (ATR) Inch | Maximum Brace Load (P) Lbs | Full Capacity Insert Spacing Inch | Brace Load (P) At 10" Spacing Lbs | Brace Load (P) At 9" Spacing Lbs | Brace Load (P) At 5" Spacing Lbs | Minimum Edge Distance Inch | Minimum Concrete Strength |
|---|---|---|---|---|---|---|---|---|---|
| L17B3 | SDI143812 OR<br>SDI381258 | 1/2 [4] | 1,741 | 16 | 1,508 | 1,437 | 1,222 | 6 | 3000 |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$
2. LIGHT WEIGHT CONCRETE OR NORMAL WEIGHT CONCRETE.
3. SPACING MEASURED PARALLEL TO FLUTE MAIN AXIS.
4. $f_{uta}$MAX = 60 KSI

# SINGLE BLUE BANGER HANGER "SDI" INSERT MOUNTED IN HIGH FLUTE WITH FLUTE SPAN BRACKET (FSB) SEISMIC BRACE CONNECTION

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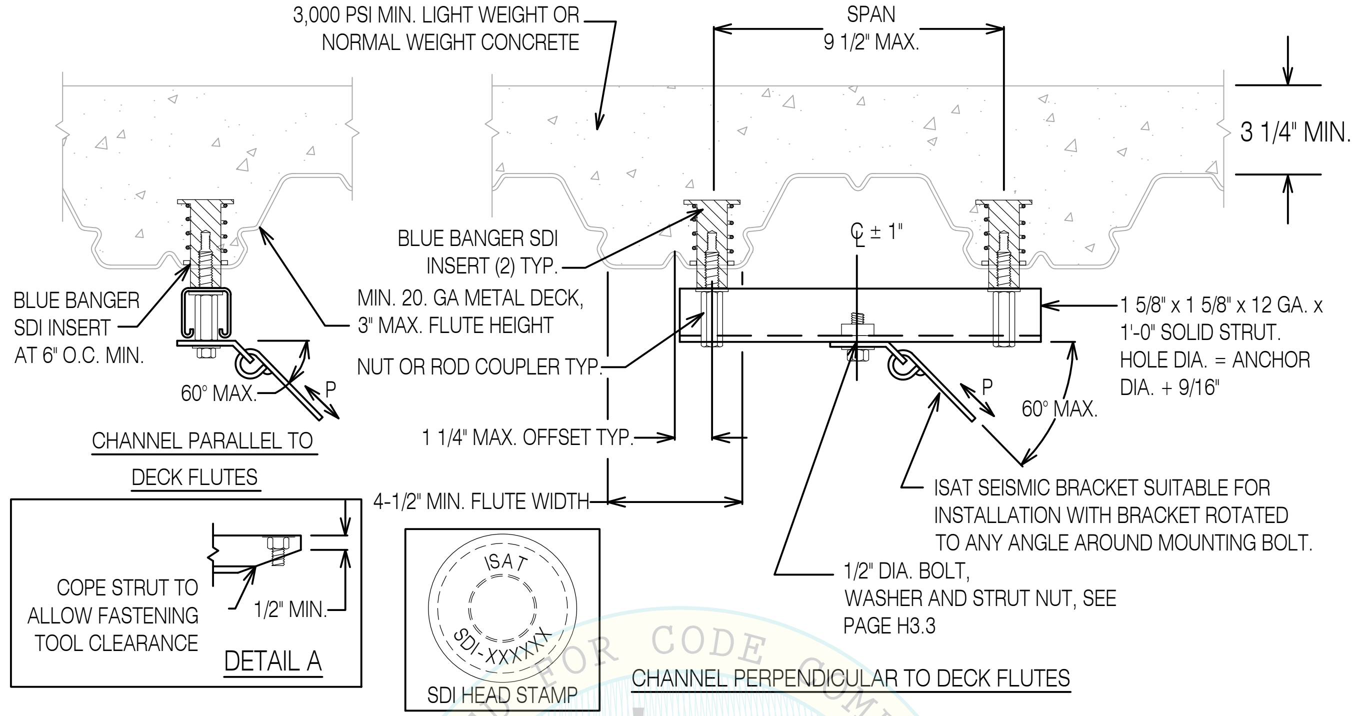

**Blue Banger Hanger Steel Deck Insert (SDI)**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table [2]**

| Brace Anchorage Designation | Deck Insert Part No. | All Thread Rod Dia. (ATR) Inch | Max. Brace Reaction (P) At Min. Concrete Strength | | Nominal Insert Height Inch | Minimum Edge Distance Inch | Minimum Spacing Inch |
|---|---|---|---|---|---|---|---|
| | | | 3,000 psi LWC Lbs | 4,000 psi LWC Lbs | | | |
| L7B3 | SDI143812 | 1/2 [4] | 768 | - | 2 | 6 | 6 |
| L7.1B3 | SDI381258 | 5/8 [2] | 735 | - | | | |
| L8B4 | SDI143812 | 1/2 [4] | - | 856 | | | |
| L8.1B4 | SDI381258 | 5/8 [2] | - | 815 | | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
2. USE DETAIL A
3. LIGHT WEIGHT CONCRETE OR NORMAL WEIGHT CONCRETE.
4. $f_{uta}$ MAX = 60 KSI

# DUAL BLUE BANGER HANGER SDI INSERT IN LOW FLUTE SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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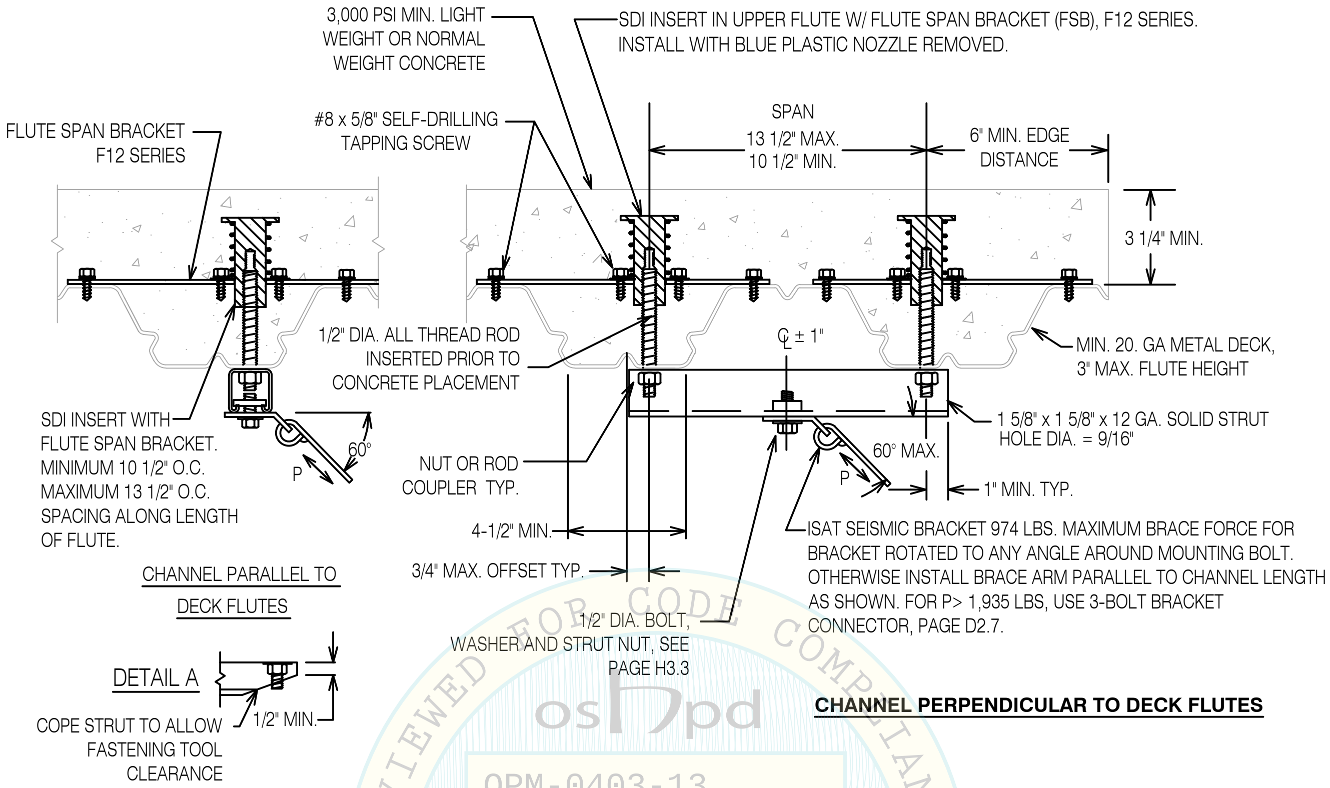

**Blue Banger Hanger Steel Deck Insert (SDI)**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table** [2]

| **Brace Anchorage Designation** | **Deck Insert Part No.** | **Span Inch** | **Maximum Brace Load (P) Lbs** | **Bracket Orientation** | **Minimum Insert Spacing [1] Inch** | Minimum Concrete Strength |
|---|---|---|---|---|---|---|
| L9B3 | SDI143812 or SDI381258 | 13 1/2 | 974 | Rotated, 1-Bolt | 5 | 3000 |
| L12B3 | | 10 1/2 | 1,252 | Rotated, 1-Bolt | 5 | 3000 |
| L15B3 | | 13 1/2 | 1,582 | In-Line, 3-Bolt | 5 | 3000 |
| L19B3 | | 10 1/2 | 1,992 | In-Line, 3-Bolt | 5 | 3000 |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0
2. USE DETAIL A FOR 5/8" Ø ATR.
3. LIGHT WEIGHT CONCRETE OR NORMAL WEIGHT CONCRETE.
4. ALL THREAD ROD ASTM A1554, GRADE 55.

# DUAL BLUE BANGER HANGER SDI INSERTS MOUNTED IN HIGH FLUTE WITH FLUTE SPAN BRACKET (FSB) SEISMIC BRACE CONNECTION

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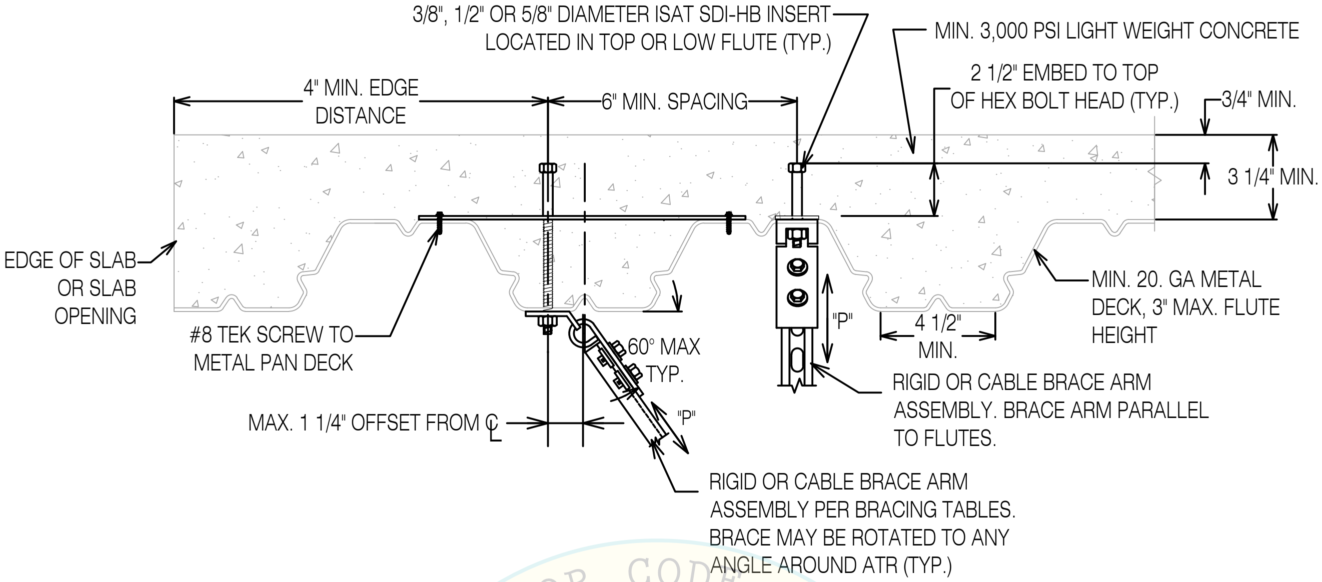

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ISAT SDI-HB, Minimum 3000 psi LWC**

| Brace Anchorage Designation | Anchor Diameter Inch | Max. Brace Load Lbs. | Min. Anchor Embed. Inch |
|---|---|---|---|
| 1HBF3826 | 3/8 | 679 | 2 1/2 |
| 1HBF1226 | 1/2 | 813 | 2 1/2 |
| 1HBF5826 | 5/8 | 863 | 2 1/2 |

1. ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3000 PSI LIGHTWEIGHT CONCRETE.
2. CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE. " FASTENER OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.
3. MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS, A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.
4. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE BUILDING STRUCTURE FOR ACTUAL IMPOSED LOADS AS PROVIDED IN THE COMBINED TRADES POINT LOAD DRAWINGS.
5. MINIMUM SPACING BETWEEN INSERTS SHALL BE THE GREATER OF 3 TIMES THE EMBEDMENT DEPTH, OR 6" PARALLEL TO THE FLUTES.
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$

# SINGLE ISAT SDI-HB INSERT SEISMIC BRACE CONNECTION

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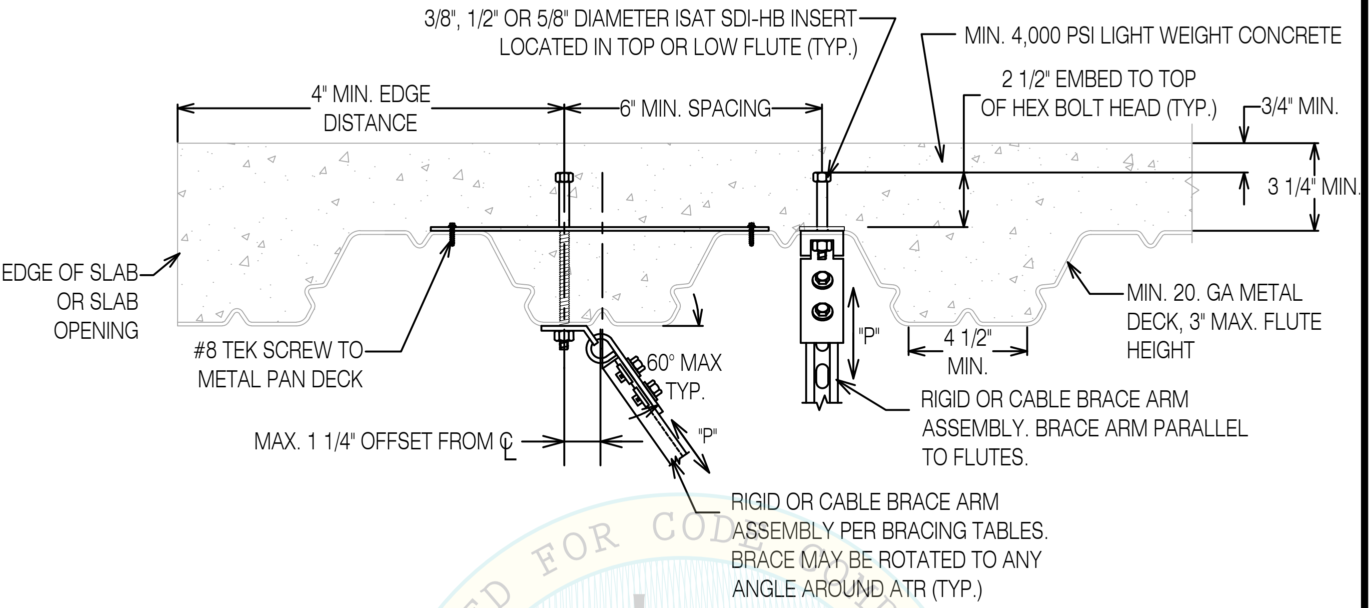

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ISAT SDI-HB, Minimum 4000 psi LWC**

| Brace Anchorage Designation | Anchor Diameter Inch | Max. Brace Load Lbs. | Min. Anchor Embed. Inch |
|---|---|---|---|
| 1HBF3826 | 3/8 | 724 | 2 1/2 |
| 1HBF1226 | 1/2 | 905 | 2 1/2 |
| 1HBF5826 | 5/8 | 971 | 2 1/2 |

1. ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3000 PSI LIGHTWEIGHT CONCRETE.
2. CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE. " FASTENER OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.
3. MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS, A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.
4. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE BUILDING STRUCTURE FOR ACTUAL IMPOSED LOADS AS PROVIDED IN THE COMBINED TRADES POINT LOAD DRAWINGS.
5. MINIMUM SPACING BETWEEN INSERTS SHALL BE THE GREATER OF 3 TIMES THE EMBEDMENT DEPTH, OR 6" PARALLEL TO THE FLUTES.
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ISAT SDI-HB INSERT SEISMIC BRACE CONNECTION

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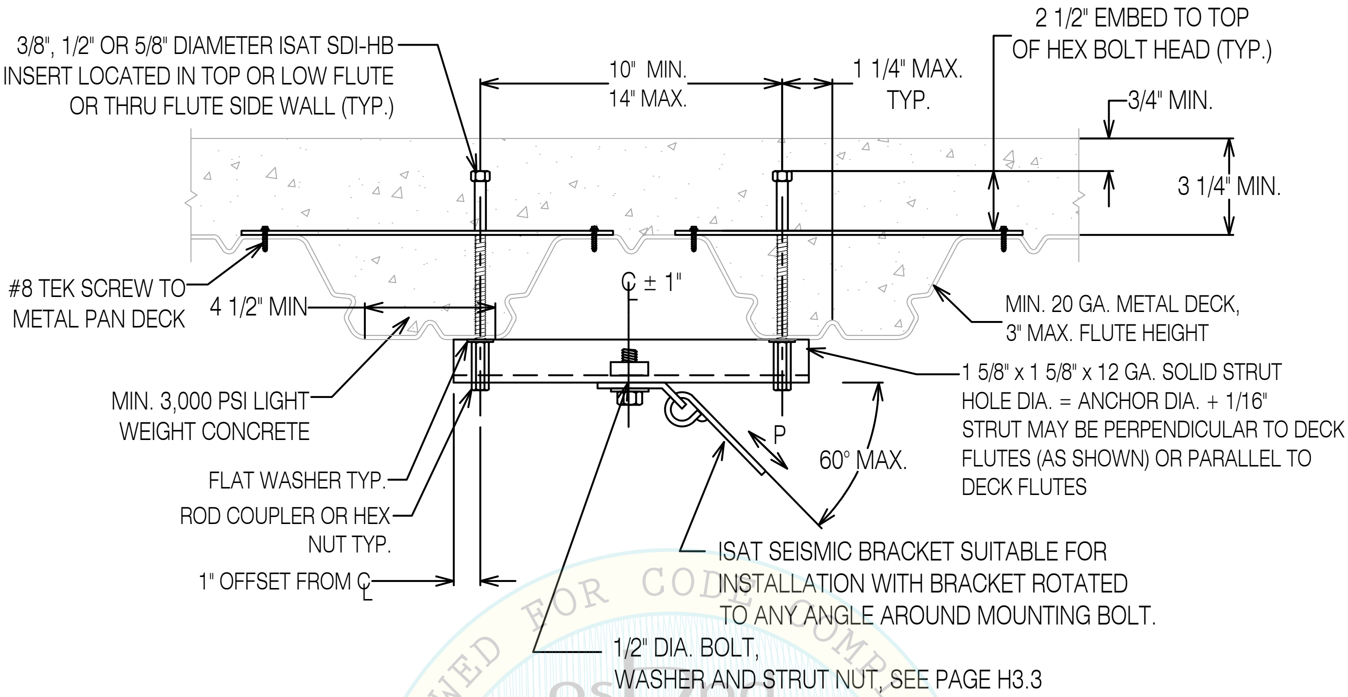

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ISAT SDI-HB, Minimum 3000 psi LWC**

| Brace Anchorage Designation | Anchor Diameter Inch | Max. Brace Load Lbs. | Min. Anchor Embed. Inch |
|---|---|---|---|
| 1HBF3826S | 3/8 | 1,213 | 2 1/2 |
| 1HBF1226S | 1/2 | 1,270 | 2 1/2 |
| 1HBF5826S | 5/8 | 1,270 | 2 1/2 |

1. ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3000 PSI LIGHTWEIGHT CONCRETE.
2. CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE. " FASTENER OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.
3. MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS, A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.
4. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE BUILDING STRUCTURE FOR ACTUAL IMPOSED LOADS AS PROVIDED IN THE COMBINED TRADES POINT LOAD DRAWINGS.
5. MINIMUM SPACING BETWEEN INSERTS SHALL BE THE GREATER OF 3 TIMES THE EMBEDMENT DEPTH, OR 6" PARALLEL TO THE FLUTES.
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o$=2.0

# DUAL ISAT SDI-HB INSERT
# SEISMIC BRACE CONNECTION

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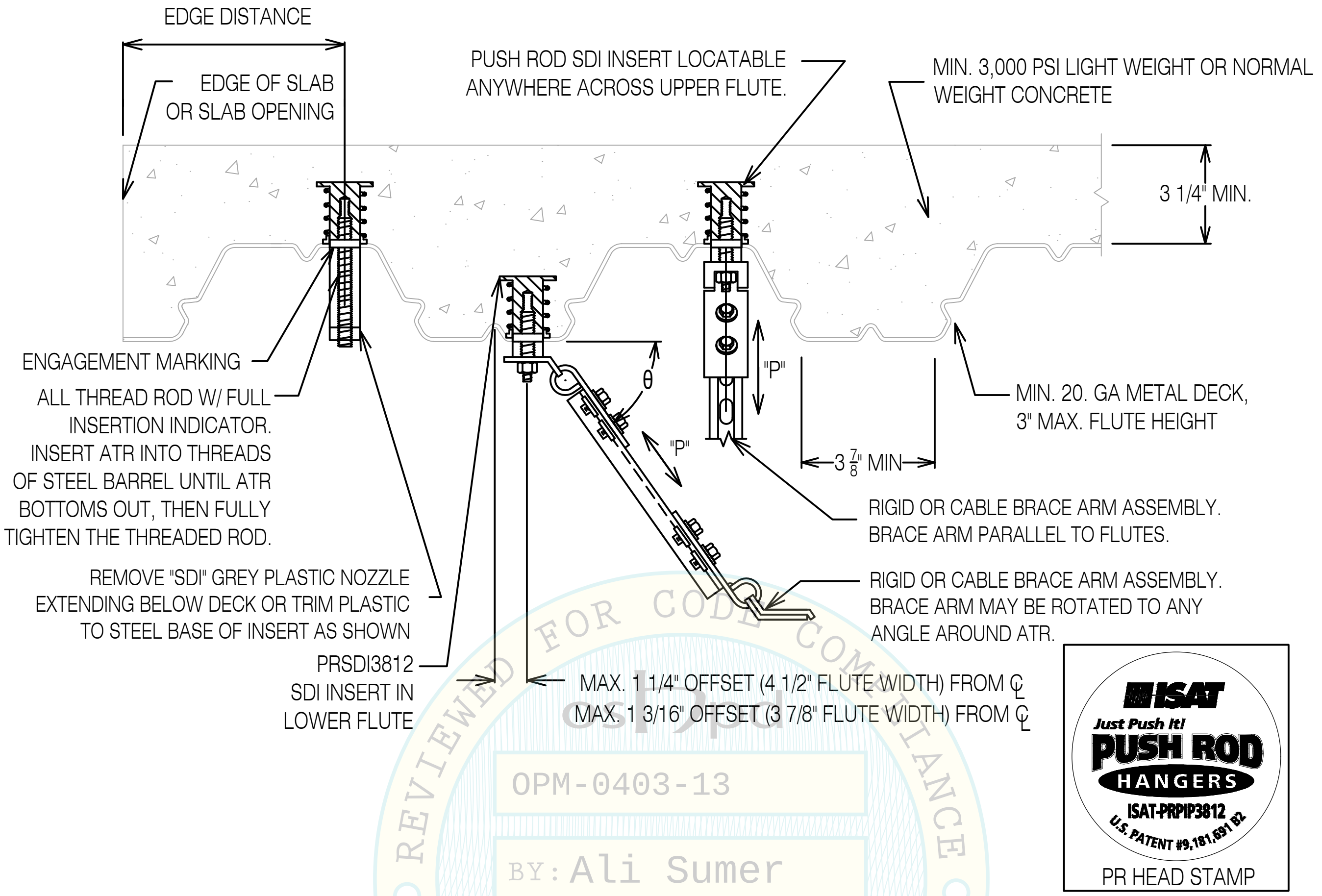

**Push Rod Steel Deck (PRSDI) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November 2017), Table 3A**

| Brace Anchorage Designation | Deck Insert & All Thread Part No. | All Thread Rod Dia. (ATR) Inch[4] | Flute Install. Location | Maximum Brace Reaction (P) At Minimum Concrete Strength | | | | Nominal Insert Height Inch | Minimum Edge Distance Inch | Minimum[3] Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 3,000 psi LWC Lbs | | 4,000 psi LWC Lbs | | | | |
| | | | | $30° \le \theta \le 36°$ | $36° < \theta \le 60°$ | $30° \le \theta \le 36°$ | $36° < \theta \le 60°$ | | | |
| L4PRL3 | PRSDI3812 & PRSDIR124 | 1/2 | Lower | 430 | 402 | - | - | 2 | 6 | 6 |
| L7PRU3 | | | Upper | 837 | 797 | | | | | |
| L4PRL4 | | 1/2 | Lower | - | - | 463 | 443 | | | |
| L8PRU4 | | | Upper | | | 897 | 871 | | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$
2. LIGHT WEIGHT CONCRETE OR NORMAL WEIGHT CONCRETE.
3. SPACING MEASURED ALONG LENGTH OF FLUTE. EDGE DISTANCE PERPENDICULAR TO DIRECTION SHOWN (END DISTANCE) SHALL BE 6 INCHES.
4. ISAT SUPPLIED ALL THREAD ROD REQUIRED WITH INTEGRAL "FULL INSERTION VISUAL INDICATOR".

# PUSH ROD STEEL DECK (PRSDI) INSERT SEISMIC BRACE CONNECTION

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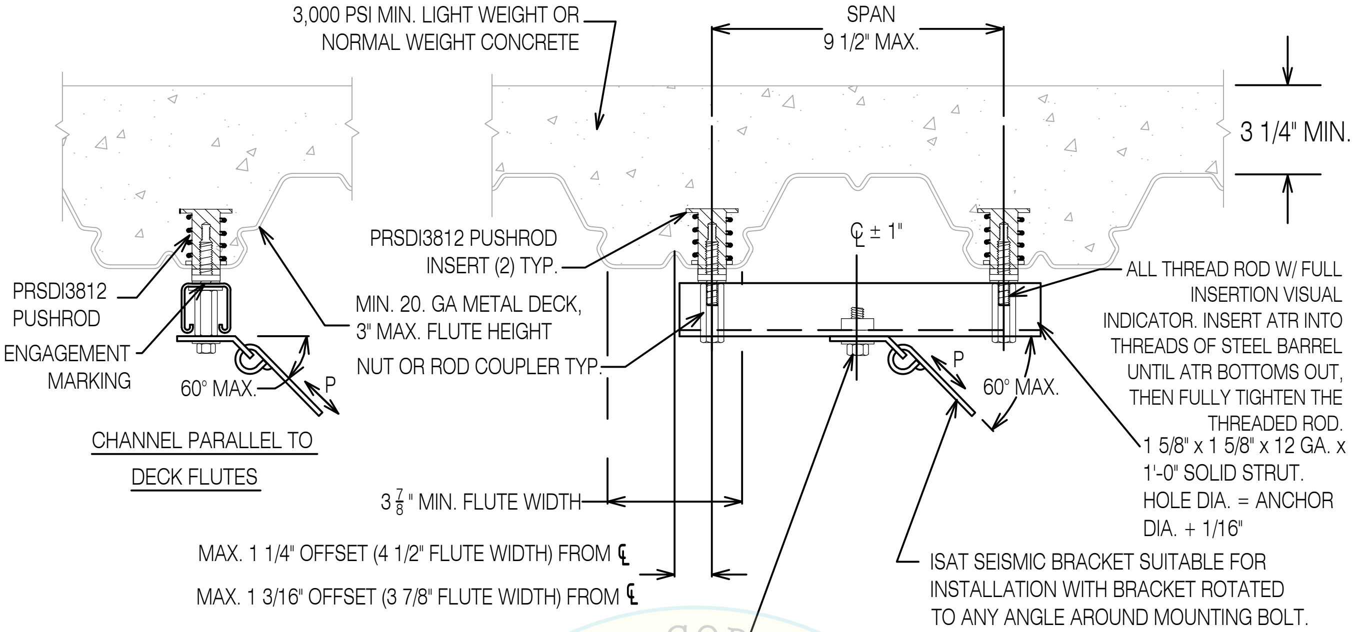

CHANNEL PERPENDICULAR TO DECK FLUTES

PR HEAD STAMP

**Push Rod Steel Deck (PRSDI) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November 2017), Table 3A**

| Brace Anchorage Designation | Deck Insert & All Thread Part No. | All Thread Rod Dia. (ATR) Inch[3] | Max. Brace Reaction (P) At Concrete Strength | | Nominal Insert Height Inch | Minimum Edge Distance Inch | Minimum[4] Spacing Inch |
|---|---|---|---|---|---|---|---|
| | | | 3ksi LWC Lbs | 4ksi LWC Lbs | | | |
| L6PR3 | PRSDI3812 & 2PRSDIR124 | 1/2 | 666 | - | 2 | 6 | 6 |
| L7PR4 | | | - | 737 | | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o$=2.0
2. LIGHT WEIGHT CONCRETE OR NORMAL WEIGHT CONCRETE.
3. ISAT SUPPLIED ALL THREAD ROD REQUIRED WITH INTEGRAL "FULL INSERTION VISUAL INDICATOR".
4. SPACING MEASURED ALONG LENGTH OF FLUTE. EDGE DISTANCE PERPENDICULAR TO DIRECTION SHOWN (END DISTANCE) SHALL BE 6 INCHES.

# DUAL PUSH ROD STEEL DECK (PRSDI)INSERT CONNECTION IN METAL DECK SLAB

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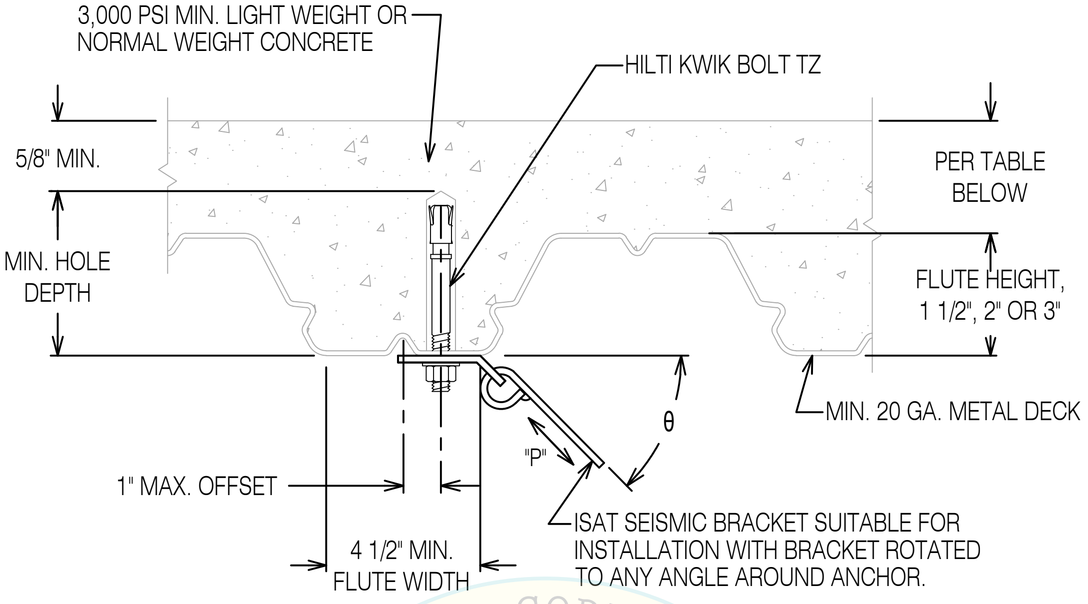

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle 30°≤ θ ≤ 36° Maximum Brace Load (P)[4] Lbs. | Brace Angle 36°< θ ≤ 60° Maximum Brace Load (P)[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing [2] Inch | Min. Concrete Thickness Above Top Flute (Inch)[3] Metal Deck Flute Height 1 1/2" | 2" | 3" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1TZ3815 | 3/8 | 293 | 283 | 2 5/8 | 2 | 25 | 4 1/2 | 6 3/4 | 1 3/4 | 1 1/2 | 1 1/2 |
| 1TZ1215 | 1/2 | 415 | 349 | 2 5/8 | 2 | 40 | 4 1/2 | 6 3/4 | 1 3/4 | 1 1/2 | 1 1/2 |
| 1TZ1222 | 1/2 | 722 | 617 | 4 | 3 1/4 | 40 | 6 | 9 3/4 | 3 1/8 | 2 5/8 | 1 5/8 |
| 1TZ5834 | 5/8 | 1,074 | 993 | 4 3/4 | 4 | 60 | 8 3/4 | 12 | 3 7/8 | 3 3/8 | 2 3/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o$=2.0

# SINGLE ANCHOR HILTI KWIK BOLT TZ
# SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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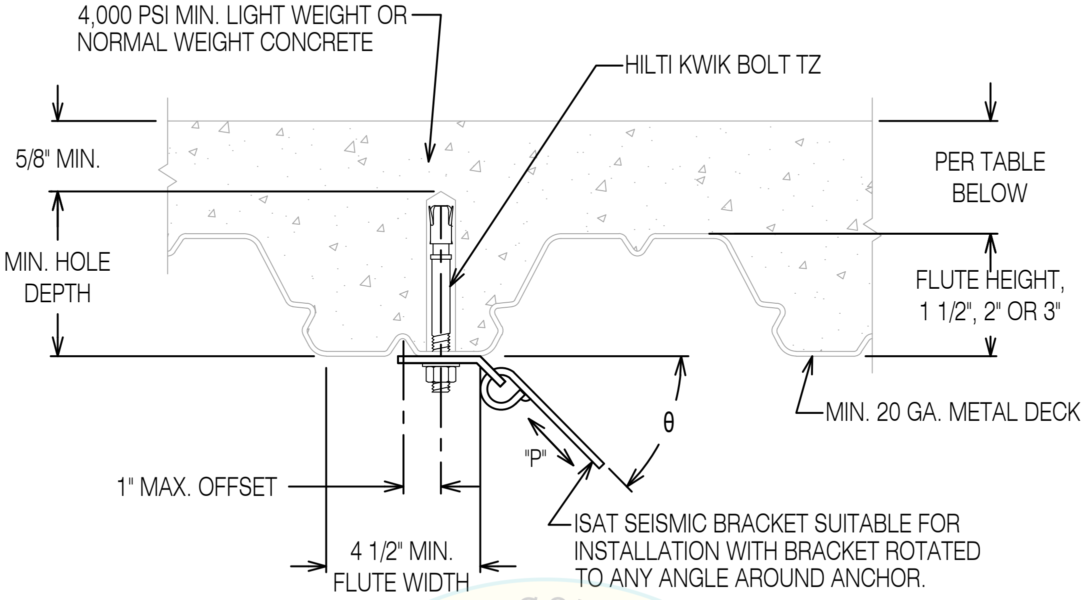

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Brace Anchorage Designation | Anchor Diameter | Brace Angle $30^\circ \le \theta \le 36^\circ$ Maximum Brace Load (P)[4] | Brace Angle $36^\circ \le \theta \le 60^\circ$ Maximum Brace Load (P)[4] | Minimum Hole Depth | Minimum Effective Embed.[1] | Installation Torque | Edge Distance | Minimum Anchor Spacing [2] | Min. Concrete Thickness Above Top Flute (Inch)[3] Metal Deck Flute Height | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inch | Lbs. | Lbs. | Inch | Inch | Ft-Lbs. | Inch | Inch | 1 1/2" | 2" | 3" |
| 1TZ3815 | 3/8 | 313 | 307 | 2 5/8 | 2 | 25 | 4 1/2 | 6 3/4 | 1 3/4 | 1 1/2 | 1 1/2 |
| 1TZ1215 | 1/2 | 455 | 393 | 2 5/8 | 2 | 40 | 4 1/2 | 6 3/4 | 1 3/4 | 1 1/2 | 1 1/2 |
| 1TZ1222 | 1/2 | 791 | 692 | 4 | 3 1/4 | 40 | 6 | 9 3/4 | 3 1/8 | 2 5/8 | 1 5/8 |
| 1TZ5834 | 5/8 | 1,158 | 1,097 | 4 3/4 | 4 | 60 | 8 3/4 | 12 | 3 7/8 | 3 3/8 | 2 3/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ANCHOR HILTI KWIK BOLT TZ SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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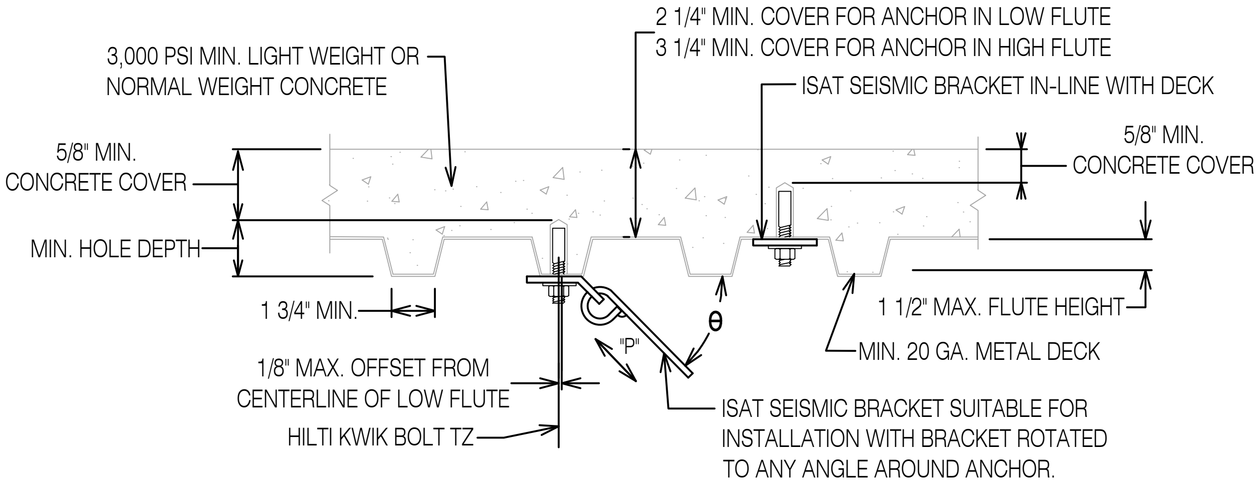

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5C**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle $30° \le \theta \le 36°$ Maximum Brace Load (P)[4] Lbs. | Brace Angle $36° < \theta \le 60°$ Maximum Brace Load (P)[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing[2] Inch | Minimum Concrete Thickness[3] Metal Deck Flute Height 1 1/2" |
|---|---|---|---|---|---|---|---|---|---|
| **Minimum Concrete Strength = 3,000 psi** | | | | | | | | | |
| 1TZ3815 | 3/8 | 362 | 342 | 2 5/8 | 2 | 25 | 4 1/2 | 6 | 2 1/4 |
| 1TZ1215 | 1/2 | 370 | 314 | 2 5/8 | 2 | 40 | 4 1/2 | 6 | 2 1/4 |
| 1TZ1222 | 1/2 | 718 | 654 | 4 | 3 1/4 | 40 | 6 | 9 3/4 | 3 1/8 |
| 1TZ5819 | 5/8 | 735 | 651 | 3 3/4 | 3 1/8 | 60 | 6 | 9 3/8 | 2 7/8 |
| **Minimum Concrete Strength = 4,000 psi** | | | | | | | | | |
| 1TZ3815 | 3/8 | 388 | 375 | 2 5/8 | 2 | 25 | 4 1/2 | 6 | 2 1/4 |
| 1TZ1215 | 1/2 | 405 | 353 | 2 5/8 | 2 | 40 | 4 1/2 | 6 | 2 1/4 |
| 1TZ1222 | 1/2 | 776 | 726 | 4 | 3 1/4 | 40 | 6 | 9 3/4 | 3 1/8 |
| 1TZ5819 | 5/8 | 799 | 727 | 3 3/4 | 3 1/8 | 60 | 6 | 9 3/8 | 2 7/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. BASED ON INSTALLATION IN LOWER FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ANCHOR HILTI KWIK BOLT TZ FOR SEISMIC BRACE CONNECTION IN 1.5" METAL DECK SLAB

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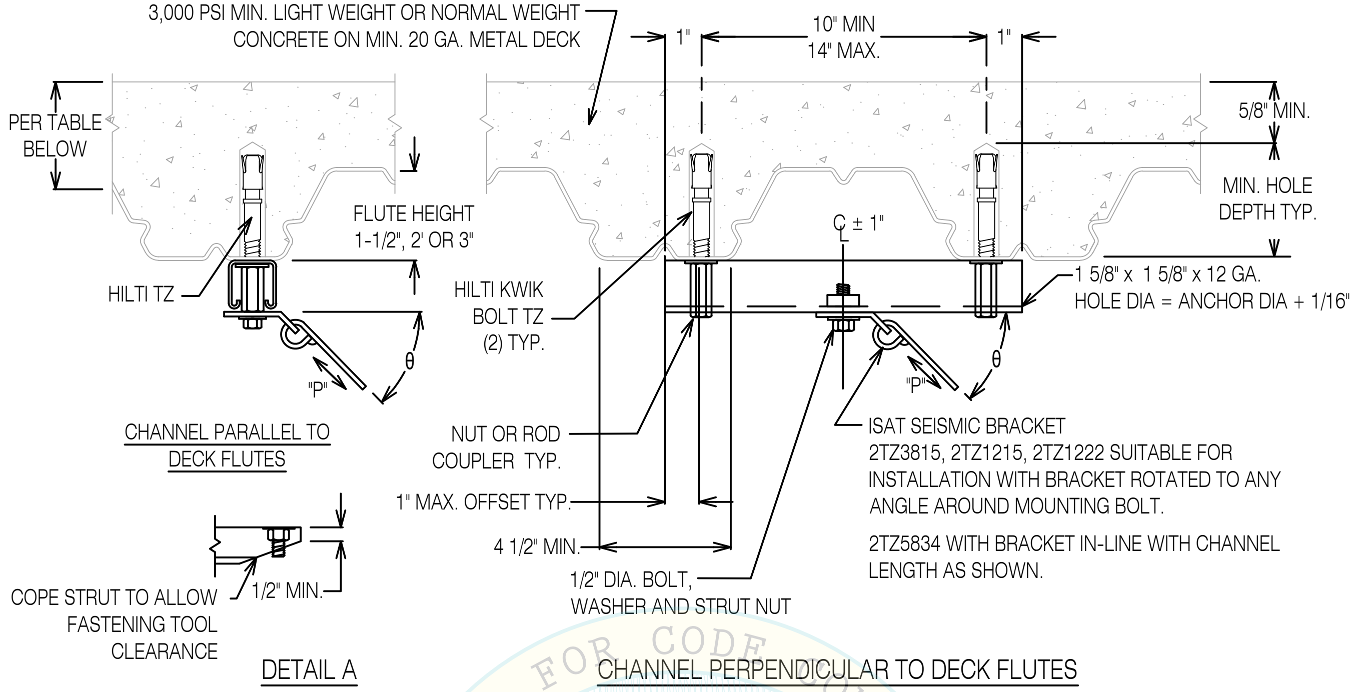

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | Brace Angle | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch) [4] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $30^\circ \leq \theta \leq 36^\circ$ Maximum Brace Load (P) Lbs. | $36^\circ < \theta \leq 60^\circ$ Maximum Brace Load (P) Lbs. | | | | | | Metal Deck Flute Height | | |
| | | | | | | | | | 1 1/2" | 2" | 3" |
| 2TZ3815S | 3/8 | 488 | 475 | 2 5/8 | 2 | 25 | 4 1/2 | 6 3/4 | 1 3/4 | 1 1/2 | 1 1/2 |
| 2TZ1215S | 1/2 | 691 | 582 | 2 5/8 | 2 | 40 | 4 1/2 | 6 3/4 | 1 3/4 | 1 1/2 | 1 1/2 |
| 2TZ1222S | 1/2 | 939 | 939 | 4 | 3 1/4 | 40 | 6 | 9 3/4 | 3 1/8 | 2 5/8 | 1 5/8 |
| 2TZ5834S | 5/8 [2] | 1,529 | 1,529 | 4 3/4 | 4 | 60 | 8 3/4 | 12 | 3 7/8 | 3 3/8 | 2 3/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. USE DETAIL A.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o$=2.0
4. BASED ON INSTALLATION IN LOWER FLUTE.

# DUAL ANCHOR HILTI KWIK BOLT TZ WITH STRUT SEISMIC BRACE CONNECTION IN METAL DECK SLAB

ANTHONY A. RUBALCAVA
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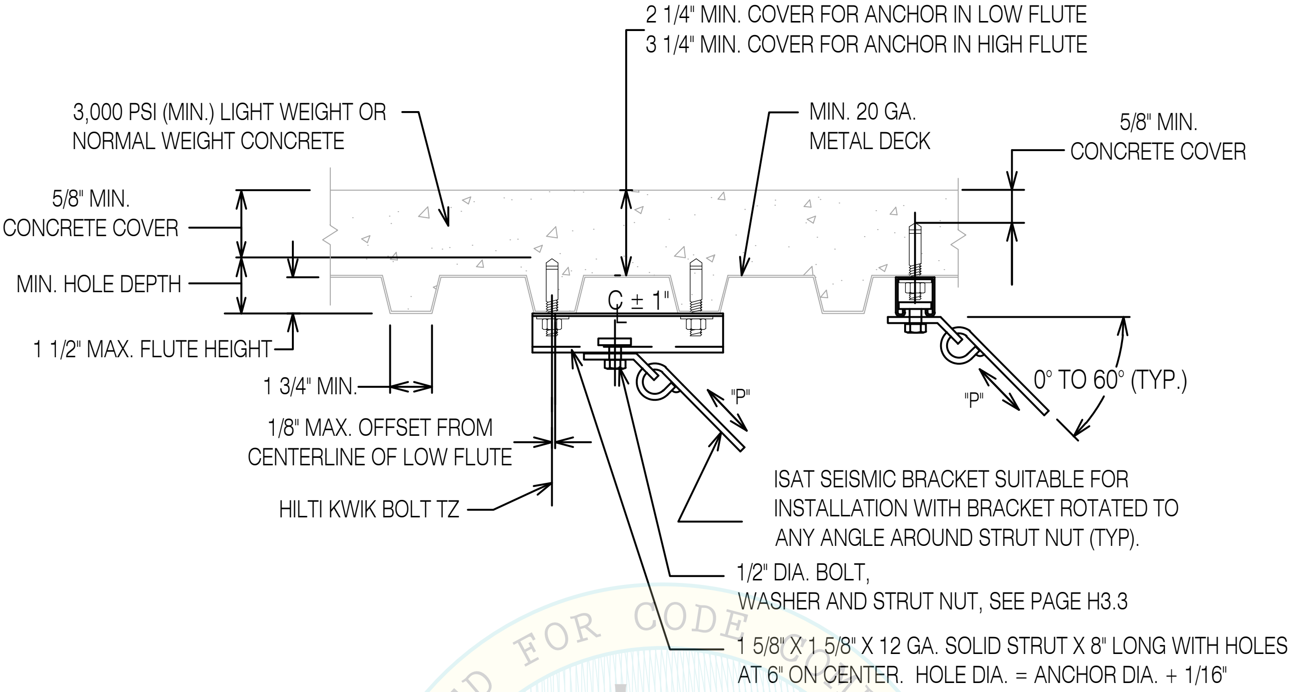

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5C**

| Brace Anchorage Designation | Anchor Quantity | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth [1] Inch | Minimum Effective Embed. [2] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|
| **Minimum Concrete Strength = 3000 psi** | | | | | | | | |
| 2TZ3815S | 2 | 3/8 | 514 | 2 5/8 | 2 | 25 | 4 1/2 | 6 |
| 2TZ1215S | 2 | 1/2 | 471 | 2 5/8 | 2 | 40 | 4 1/2 | 6 |
| **Minimum Concrete Strength = 4000 psi** | | | | | | | | |
| 2TZ3815S | 2 | 3/8 | 565 | 2 5/8 | 2 | 25 | 4 1/2 | 6 |
| 2TZ1215S | 2 | 1/2 | 529 | 2 5/8 | 2 | 40 | 4 1/2 | 6 |

1. MINIMUM HOLE DEPTH IS TO BE VERIFIED BY THE INSPECTOR.
2. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
3. REFER TO PAGE D2.1TZB FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0

# DUAL ANCHOR HILTI KWIK BOLT TZ FOR SEISMIC BRACE CONNECTION IN 1.5" METAL DECK SLAB

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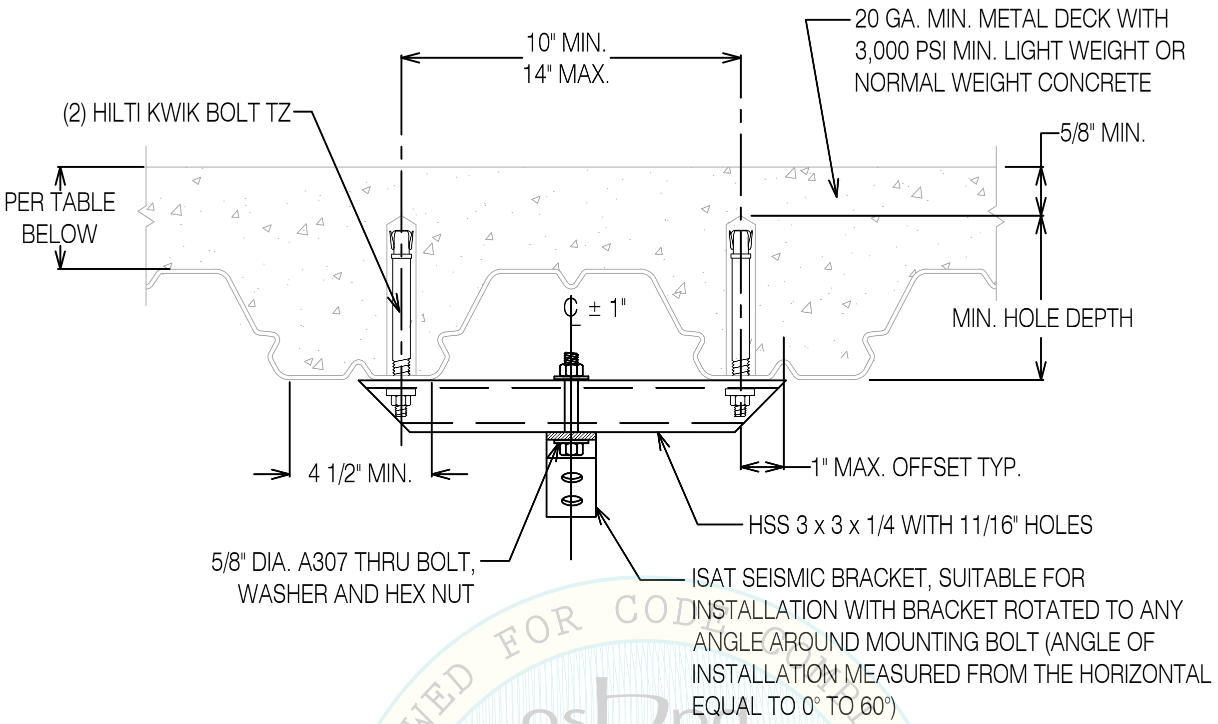

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch)[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Metal Deck Flute Height | | |
| | | | | | | | | 1 1/2" | 2" | 3" |
| 2TZ5834H | 5/8 | 1575 | 4 3/4 | 4 | 60 | 8 3/4 | 12 | 3 7/8 | 3 3/8 | 2 3/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o$=2.0
3. BASED ON INSTALLATION IN LOWER FLUTE.

# DUAL ANCHOR HILTI TZ WITH TUBE SEISMIC BRACE CONNECTION

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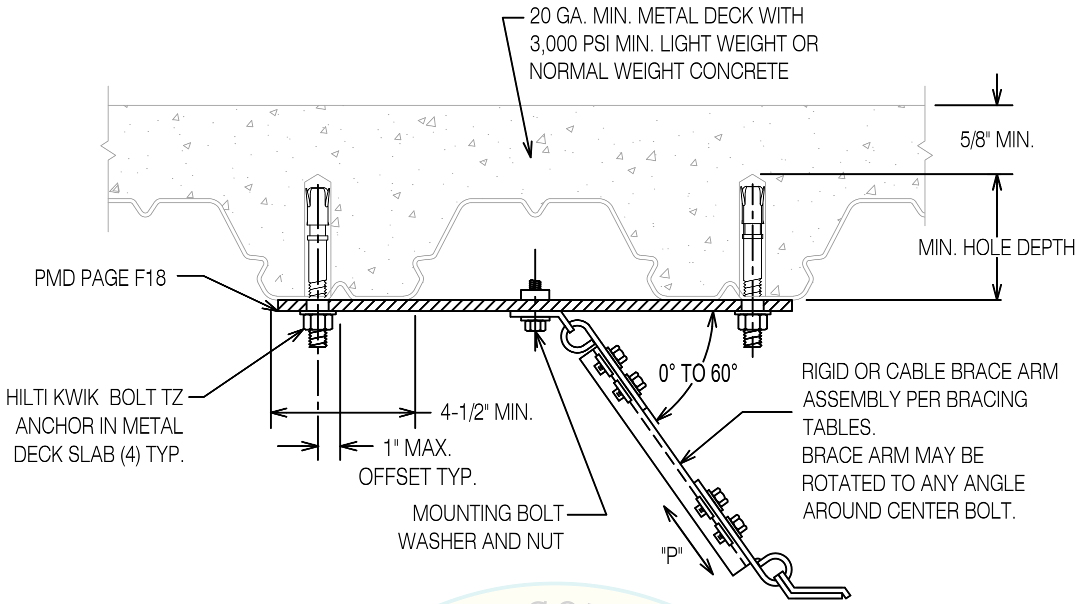

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Plate Number Page F18 | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|---|---|
| 4TZ3815P | 3/8 | 1,075 | 2 5/8 | 2 | 25 | 4 1/2 | D243 | 1/2 |
| 4TZ1222P | 1/2 | 2,467 | 4 | 3 1/4 | 40 | 6 | D245 | 1/2 |
| 4TZ5834P | 5/8 | 3,824 | 4 3/4 | 4 | 60 | 8 3/4 | D255 | 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$
3. REFER TO PAGE D2.1TZ FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# 4-ANCHOR HILTI KWIK BOLT TZ PLATE IN METAL DECK SLAB (PMD)

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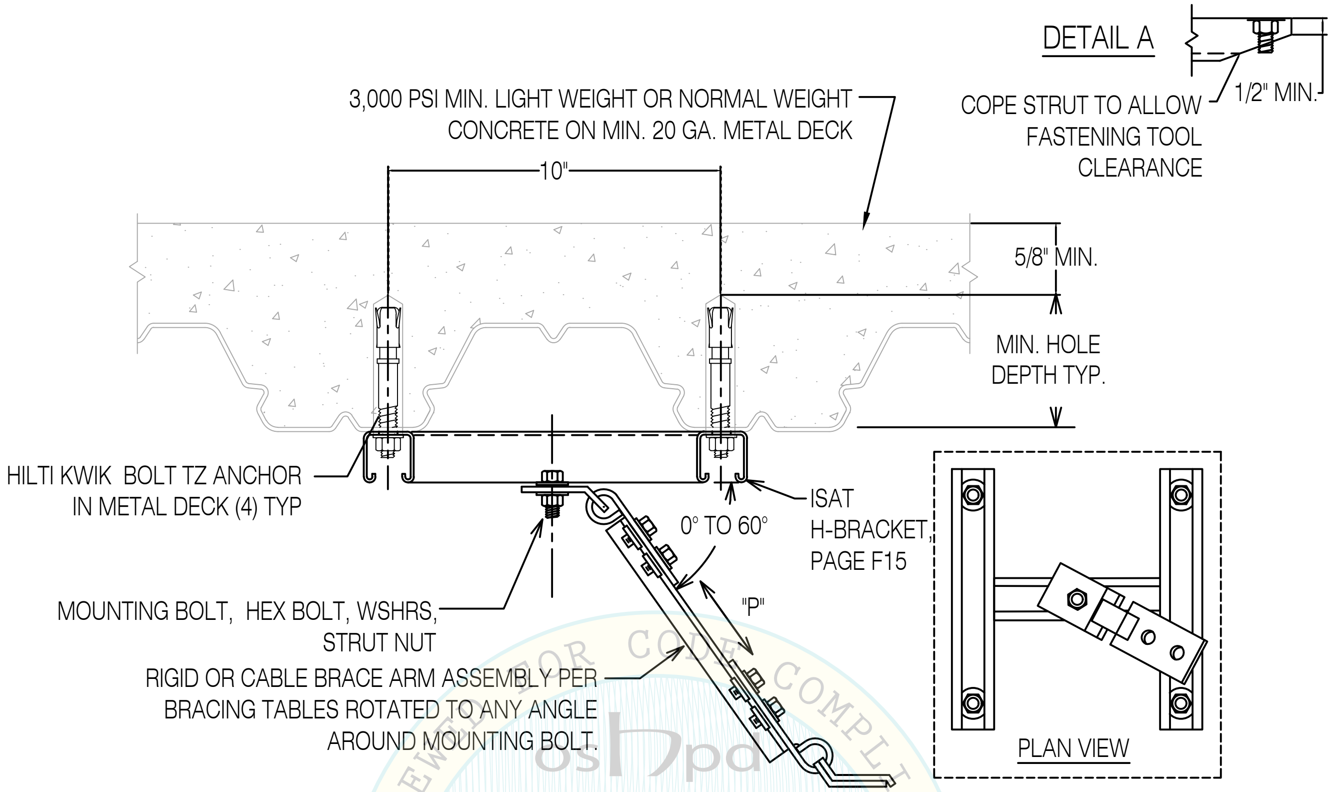

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | H-Bracket Number Pg. F15 | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|---|---|
| 4TZ3815F | 3/8 | 1,139 | 2 5/8 | 2 | 25 | 4 1/2 | H13.1 | 1/2 |
| 4TZ1215F | 1/2 | 1,396 | 2 5/8 | 2 | 40 | 4 1/2 | H13.2 | 5/8 |
| 4TZ1222F | 1/2 | 1,846 | 4 | 3 1/4 | 40 | 6 | H13.2 | 5/8 |
| 4TZ5834F | 5/8 | 1,846 | 4 3/4 | 4 | 60 | 8 3/4 | H13.3 | 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$
3. REFER TO PAGE D2.1TZ FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# 4-ANCHOR HILTI KWIK BOLT TZ
# H-BRACKET ATTACHMENT TO METAL DECK

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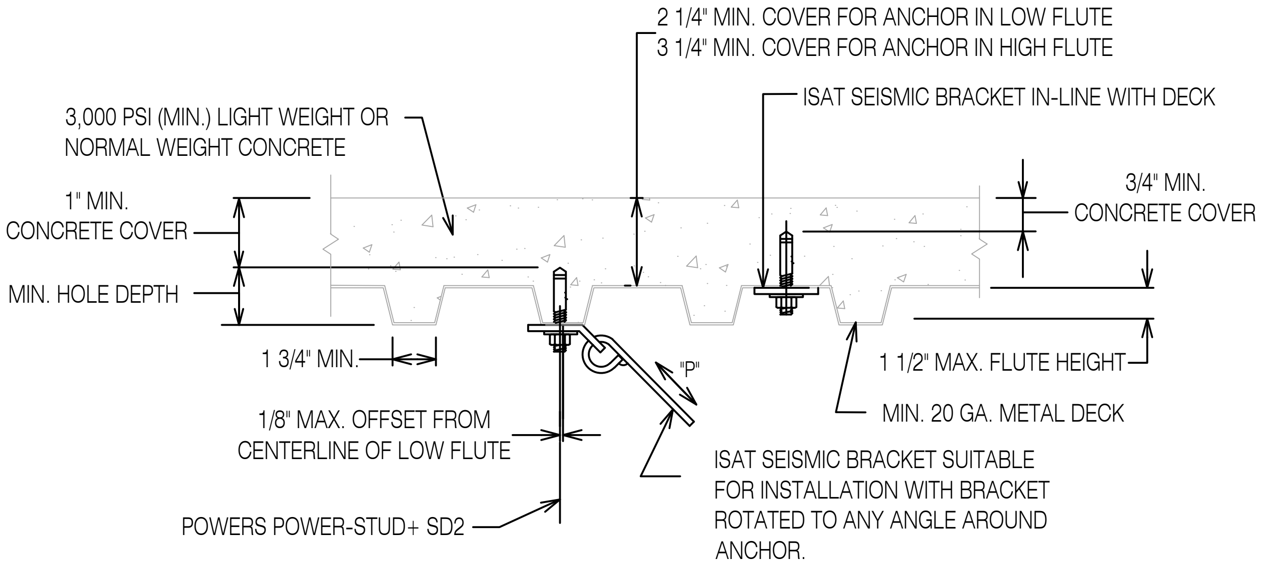

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5C.**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle 30°≤ θ ≤ 36° Maximum Brace Load (P)$^4$ Lbs. | Brace Angle 36°< θ ≤ 60° Maximum Brace Load (P)$^4$ Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.$^1$ Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing$^2$ Inch | Minimum Concrete Thickness$^5$ Metal Deck Flute Height 1 1/2" |
|---|---|---|---|---|---|---|---|---|---|
| **Minimum Concrete Strength = 3,000 psi** | | | | | | | | | |
| 1SD23812 | 3/8 | 304 | 275 | 2 5/8 | 2 | 20 | 4 1/2 | 6 | 2 1/4 |
| 1SD21215 | 1/2 | 404 | 342 | 2 3/4 | 2 | 40 | 4 1/2 | 6 | 2 1/4 |
| **Minimum Concrete Strength = 4,000 psi** | | | | | | | | | |
| 1SD23812 | 3/8 | 321 | 296 | 2 5/8 | 2 | 20 | 4 1/2 | 6 | 2 1/4 |
| 1SD21215 | 1/2 | 443 | 384 | 2 3/4 | 2 | 40 | 4 1/2 | 6 | 2 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. LOWER FLUTE INSTALLATION ONLY.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
5. BASED ON INSTALLATION IN LOWER FLUTE.

# SINGLE ANCHOR POWERS POWER-STUD+ SD2 FOR SEISMIC BRACE CONNECTION IN 1.5" METAL DECK SLAB

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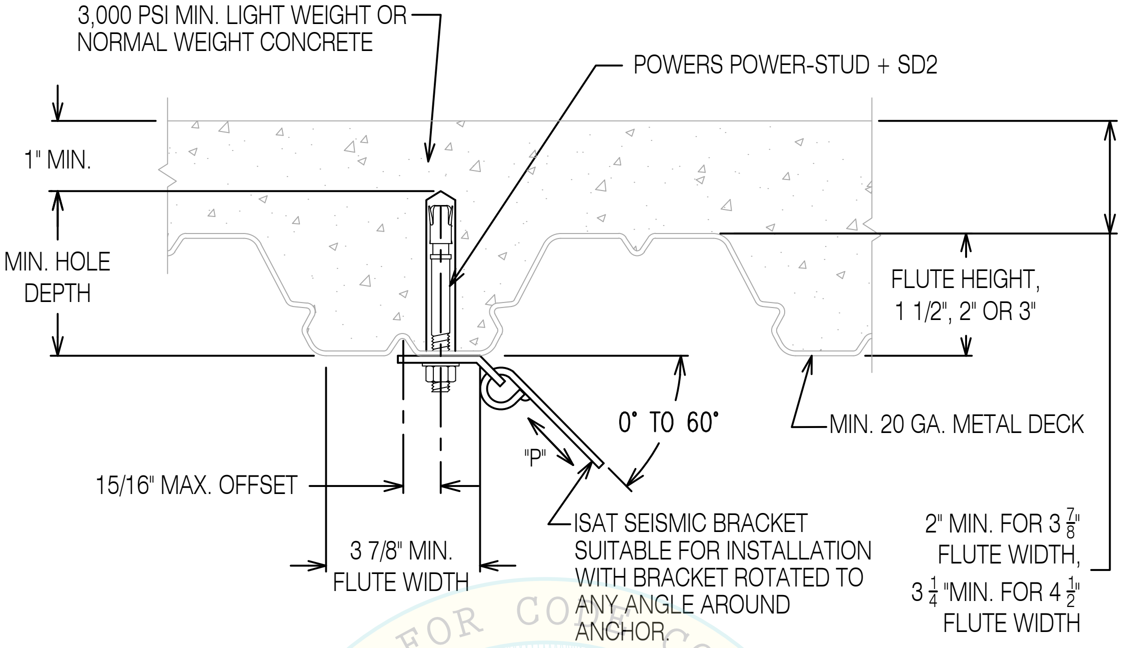

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2018), Table 1, Table 5 and Fig. 5B.**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle 30°≤ θ ≤ 36° Maximum Brace Load (P)[4] Lbs. | Brace Angle 36°< θ ≤ 60° Maximum Brace Load (P)[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing [2] Inch | Min. Concrete Thickness Above Top Flute (Inch)[3] Metal Deck Flute Height 1 1/2" | 2" | 3" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1SD23812 | 3/8 | 330 | 306 | 2 5/8 | 2 | 20 | 4 1/2 | 6 3/4 | 2 1/8 | 2 | 2 |
| 1SD21215 | 1/2 | 399 | 343 | 2 3/4 | 2 | 40 | 4 1/2 | 6 3/4 | 2 1/4 | 2 | 2 |
| 1SD21218 | 1/2 | 718 | 613 | 4 | 3 1/4 | 40 | 6 | 9 3/4 | - | - | 2 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ANCHOR POWERS POWER-STUD+ SD2 SEISMIC BRACE CONNECTION IN METAL DECK SLAB (SHALLOW TOPPING SLAB)

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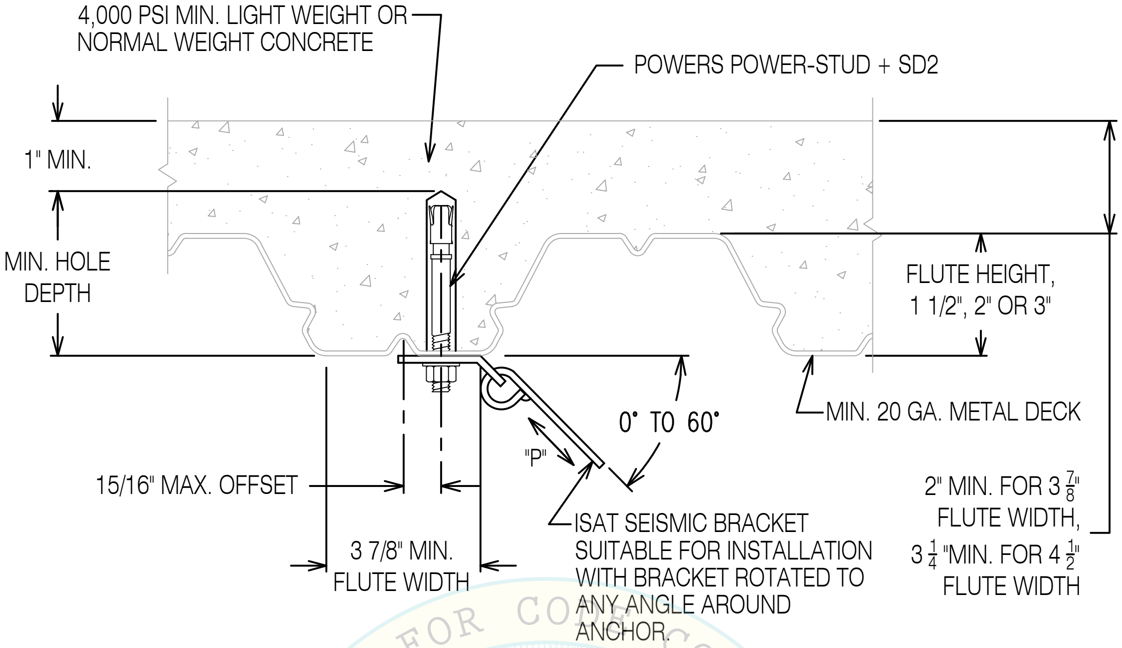

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2018), Table 1, Table 5 and Fig. 5B.**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle<br>30°≤ θ ≤ 36° Maximum Brace Load (P)[4] Lbs. | 36°< θ ≤ 60° Maximum Brace Load (P)[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing [2] Inch | Min. Concrete Thickness Above Top Flute (Inch)[3]<br>Metal Deck Flute Height<br>1 1/2" | 2" | 3" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1SD23812 | 3/8 | 347 | 327 | 2 5/8 | 2 | 20 | 4 1/2 | 6 3/4 | 2 1/8 | 2 | 2 |
| 1SD21215 | 1/2 | 437 | 384 | 2 3/4 | 2 | 40 | 4 1/2 | 6 3/4 | 2 1/4 | 2 | 2 |
| 1SD21218 | 1/2 | 786 | 688 | 4 | 3 1/4 | 40 | 6 | 9 3/4 | - | - | 2 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ANCHOR POWERS POWER-STUD+ SD2 SEISMIC BRACE CONNECTION IN METAL DECK SLAB (SHALLOW TOPPING SLAB)

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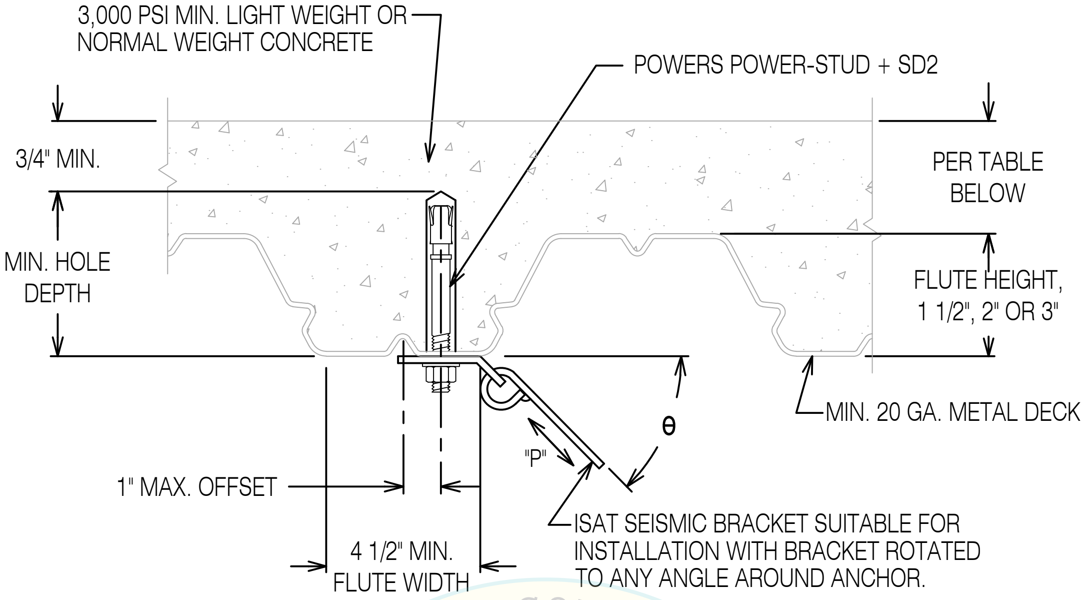

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle $30° \le \theta \le 36°$ Maximum Brace Load (P)[4] Lbs. | Brace Angle $36° < \theta \le 60°$ Maximum Brace Load (P)[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing [2] Inch | Min. Concrete Thickness Above Top Flute (Inch)[3] Metal Deck Flute Height 1 1/2" | 2" | 3" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1SD23812 | 3/8 | 330 | 306 | 2 5/8 | 2 | 20 | 4 1/2 | 6 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1SD21215 | 1/2 | 447 | 364 | 2 3/4 | 2 | 40 | 4 1/2 | 6 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1SD21218 | 1/2 | 724 | 615 | 4 | 3 1/4 | 40 | 6 | 9 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1SD25824 | 5/8 | 1,006 | 982 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 | 4 1/2 | 4 | 3 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o$=2.0

# SINGLE ANCHOR POWERS POWER-STUD+ SD2 SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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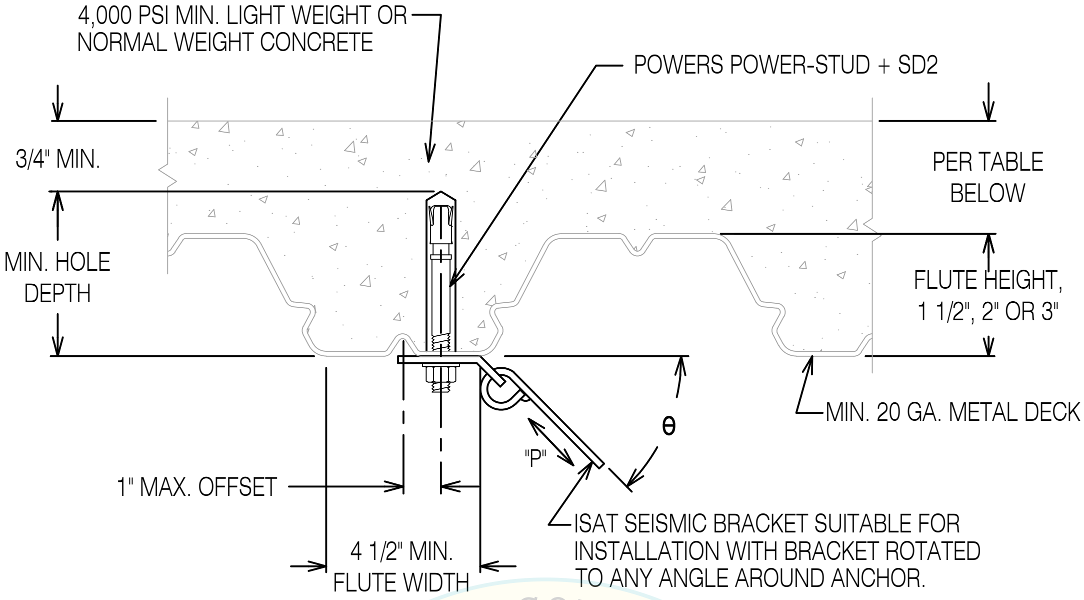

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed.$^{1}$ Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing $^{2}$ Inch | Min. Concrete Thickness Above Top Flute (Inch)$^{3}$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 30°≤ θ ≤ 36° | 36°< θ ≤ 60° | | | | | | Metal Deck Flute Height | | |
| | | Maximum Brace Load (P)$^{4}$ Lbs. | Maximum Brace Load (P)$^{4}$ Lbs. | | | | | | 1 1/2" | 2" | 3" |
| 1SD23812 | 3/8 | 347 | 327 | 2 5/8 | 2 | 20 | 4 1/2 | 6 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1SD21215 | 1/2 | 495 | 411 | 2 3/4 | 2 | 40 | 4 1/2 | 6 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1SD21218 | 1/2 | 793 | 691 | 4 | 3 1/4 | 40 | 6 | 9 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1SD25824 | 5/8 | 1,071 | 1,059 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 | 4 1/2 | 4 | 3 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ANCHOR POWERS POWER-STUD+ SD2 SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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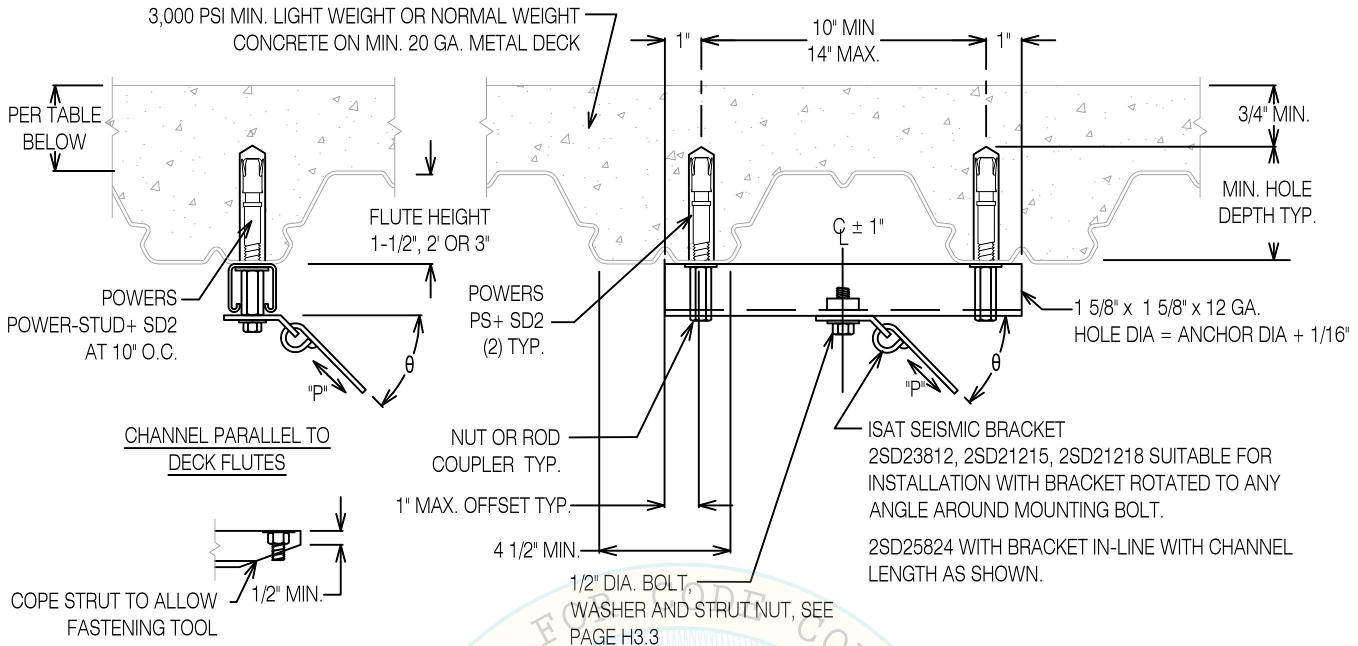

CHANNEL PARALLEL TO DECK FLUTES

DETAIL A

CHANNEL PERPENDICULAR TO DECK FLUTES

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle $30° \le \theta \le 36°$ Maximum Brace Load (P) Lbs. | Brace Angle $36° < \theta \le 60°$ Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch)[4] Metal Deck Flute Height 1 1/2" | 2" | 3" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2SD23812S | 3/8 | 549 | 511 | 2 5/8 | 2 | 20 | 4 1/2 | 6 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2SD21215S | 1/2 | 746 | 606 | 2 3/4 | 2 | 40 | 4 1/2 | 6 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2SD21218S | 1/2 | 939 | 939 | 4 | 3 1/4 | 40 | 6 | 9 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2SD25824S | 5/8[2] | 1,529 | 1,529 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 | 4 1/2 | 4 | 3 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. USE DETAIL A.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o$=2.0
4. BASED ON INSTALLATION IN LOWER FLUTE.

# DUAL ANCHOR POWERS POWER-STUD+ SD2 WITH STRUT SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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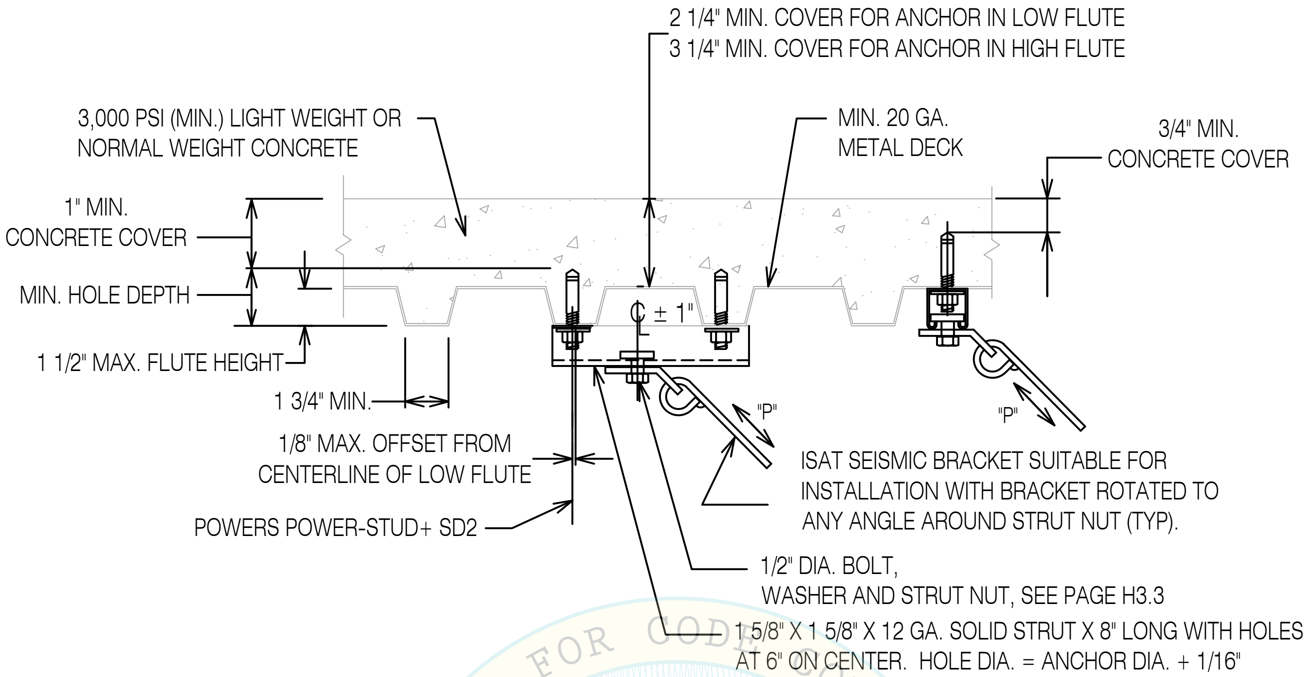
***D2.2SD2***



**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5C.**

| Brace Anchorage Designation | Anchor Quantity | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth [1] Inch | Minimum Effective Embed. [2] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|
| **Minimum Concrete Strength = 3000 psi** | | | | | | | | |
| 2SD22112S | 2 | 3/8 | 413 | 2 5/8 | 2 | 20 | 4 1/2 | 6 |
| 2SD22115S | 2 | 1/2 | 513 | 2 3/4 | 2 | 40 | 4 1/2 | 6 |
| **Minimum Concrete Strength = 4000 psi** | | | | | | | | |
| 2SD22112S | 2 | 3/8 | 443 | 2 5/8 | 2 | 20 | 4 1/2 | 6 |
| 2SD22115S | 2 | 1/2 | 576 | 2 3/4 | 2 | 40 | 4 1/2 | 6 |

1. MINIMUM HOLE DEPTH IS TO BE VERIFIED BY THE INSPECTOR.
2. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
3. REFER TO PAGE D2.1SD2B FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o$=2.0

# DUAL ANCHOR POWERS POWER-STUD+ SD2
# FOR SEISMIC BRACE CONNECTION IN 1.5" METAL DECK SLAB

ANTHONY A. RUBALCAVA
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***D2.2SD2B***

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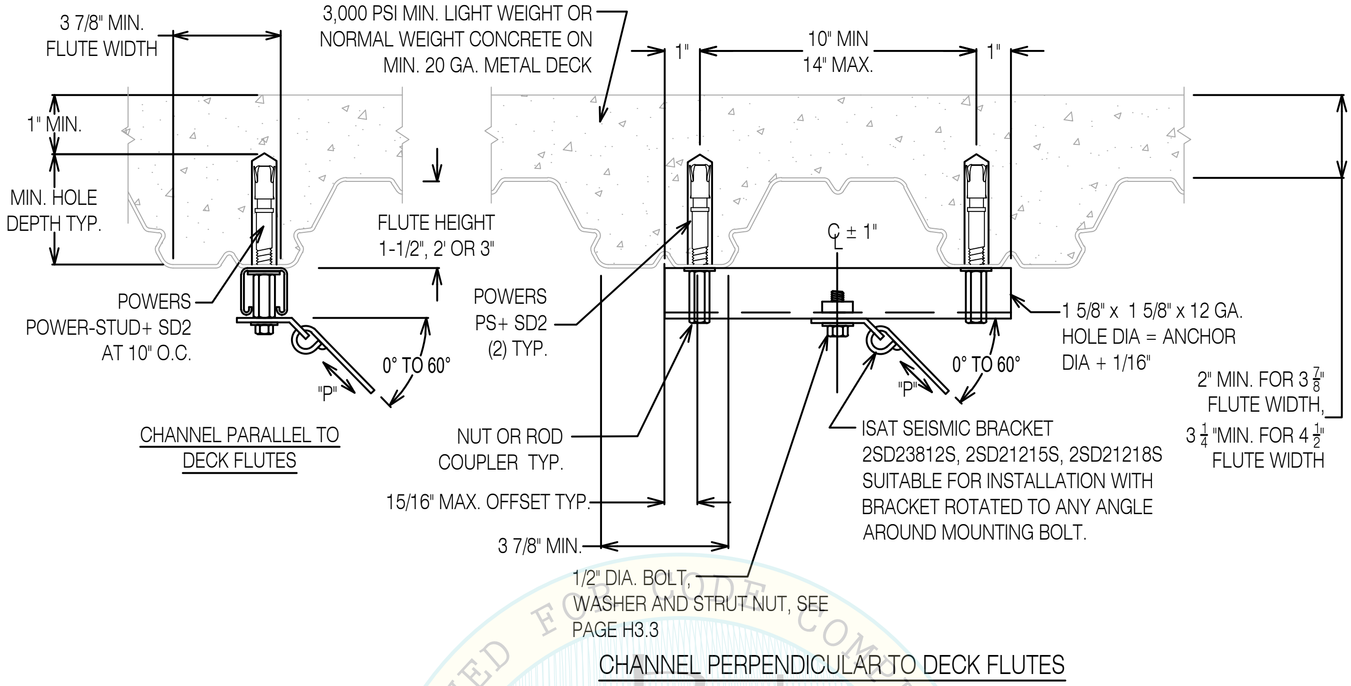

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2018), Table 1, Table 5 and Fig. 5B.**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle 30°≤ θ ≤ 36° Maximum Brace Load (P) Lbs. | Brace Angle 36°< θ ≤ 60° Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch) [4] Metal Deck Flute Height 1 1/2" | 2" | 3" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2SD23812S | 3/8 | 549 | 511 | 2 5/8 | 2 | 20 | 4 1/2 | 6 3/4 | 2 1/8 | 2 | 2 |
| 2SD21215S | 1/2 | 665 | 571 | 2 3/4 | 2 | 40 | 4 1/2 | 6 3/4 | 2 1/4 | 2 | 2 |
| 2SD21218S | 1/2 | 939 | 939 | 4 | 3 1/4 | 40 | 6 | 9 3/4 | - | - | 2 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
3. BASED ON INSTALLATION IN LOWER FLUTE.

# DUAL ANCHOR POWERS POWER-STUD+ SD2 WITH STRUT SEISMIC BRACE CONNECTION IN METAL DECK SLAB (SHALLOW TOPPING SLAB)

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***D2.2SD2S***

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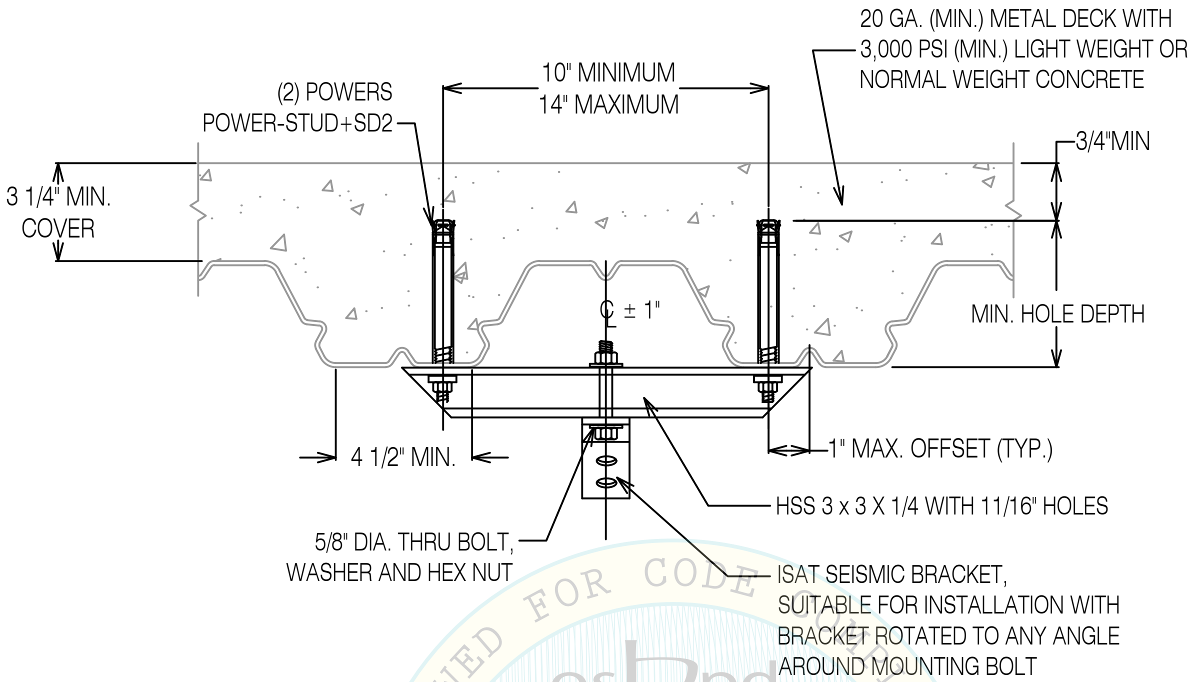

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch)[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Metal Deck Flute Height | | |
| | | | | | | | | 1 1/2" | 2" | 3" |
| 2SD25824H | 5/8 | 1569 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 | 4 1/2 | 4 | 3 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
3. BASED ON INSTALLATION IN LOWER FLUTE.

# DUAL ANCHOR POWERS POWER-STUD+ SD2 WITH TUBE SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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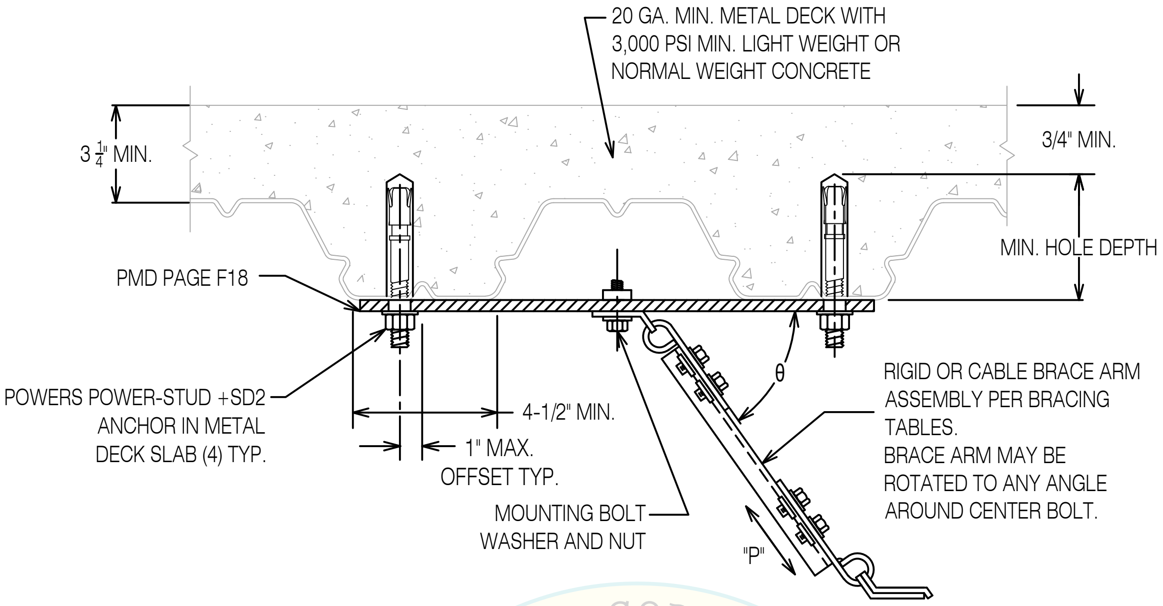
***D2.3SD2***



**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Edge Distance Inch | Plate Number Page F18 | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|---|---|
| 4SD23812P | 3/8 | 1,177 | 2 5/8 | 2 | 20 | 4 1/2 | D243 | 1/2 |
| 4SD21218P | 1/2 | 2,465 | 4 | 3 1/4 | 40 | 6 | D245 | 1/2 |
| 4SD25824P | 5/8 | 3,719 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | D255 | 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$
3. REFER TO PAGE D2.1SD2 FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# 4-ANCHOR POWERS POWER-STUD +SD2 PLATE IN METAL DECK SLAB (PMD)

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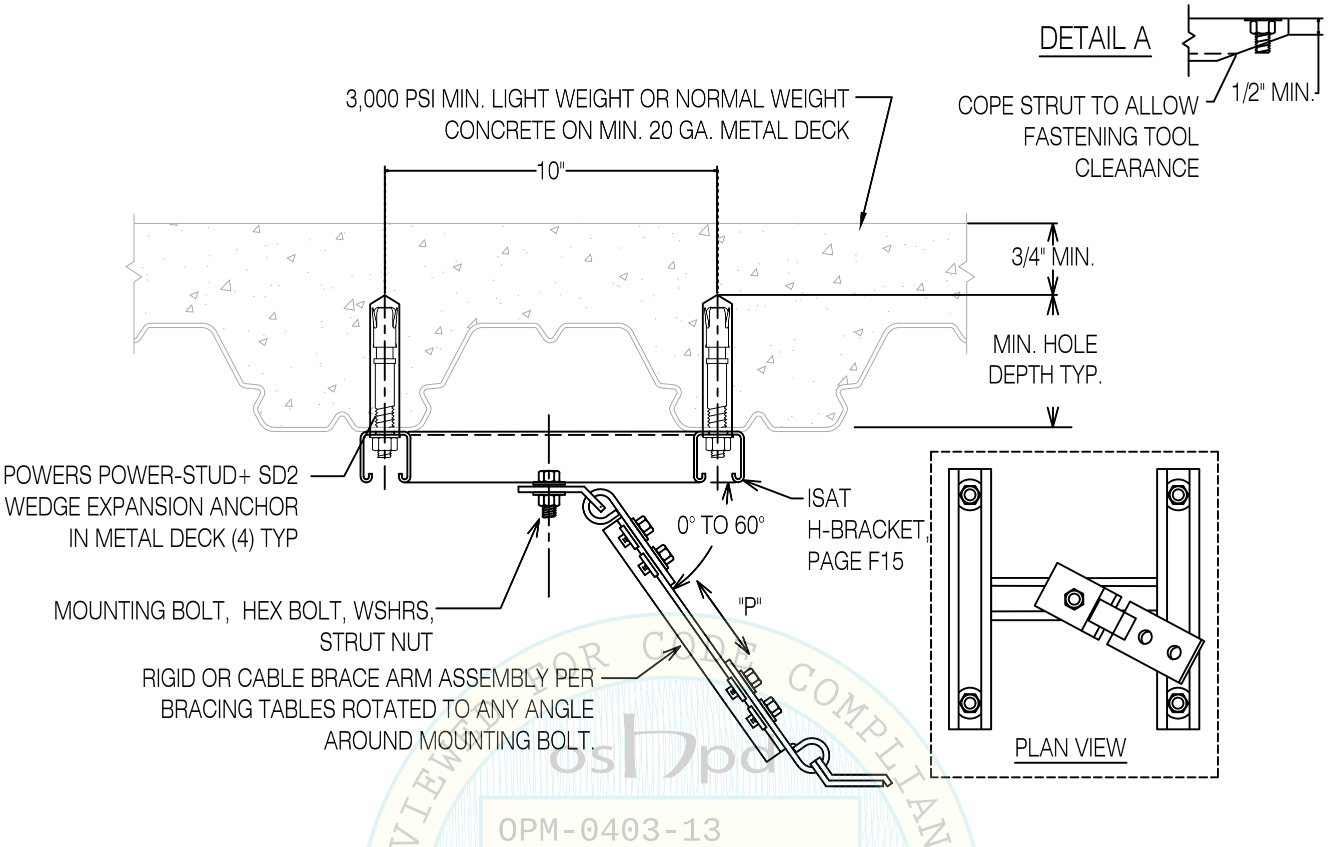

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Brace Anchorage Designation | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | H-Bracket Number Pg. F15 | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|---|---|
| 4SD23812F | 3/8 | 1,226 | 2 5/8 | 2 | 20 | 4 1/2 | H13.1 | 1/2 |
| 4SD21215F | 1/2 | 1,455 | 2 3/4 | 2 | 40 | 4 1/2 | H13.2 | 5/8 |
| 4SD21218F | 1/2 | 1,846 | 4 | 3 1/4 | 40 | 6 | H13.2 | 5/8 |
| 4SD25824F | 5/8 | 1,846 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | H13.3 | 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
3. REFER TO PAGE D2.1SD2 FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# 4-ANCHOR POWERS POWER-STUD+ SD2 H-BRACKET ATTACHMENT TO FORM POUR SLAB

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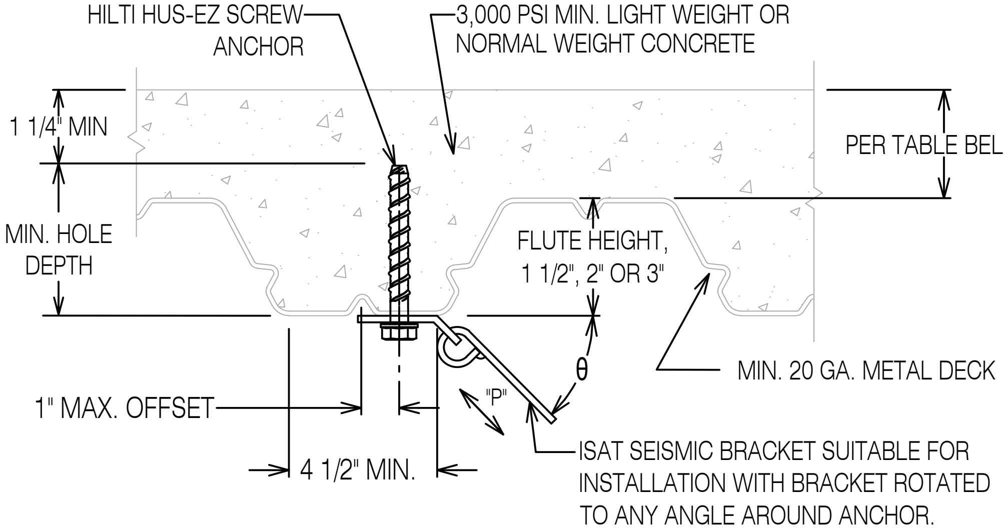

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 5**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing [2] Inch | Edge Distance Inch | Min. Concrete Thickness Above Top Flute (Inch)[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 30°≤ θ ≤ 36° Maximum Brace Load (P)[4] Lbs. | 36°< θ ≤ 60° Maximum Brace Load (P)[4] Lbs. | | | | | | Metal Deck Flute Height 1 1/2" | 2" | 3" |
| 1HUS147 | 1/4 | 155 | 138 | 2 | 1.18 | 114 | 6.75 | 4 1/2 | 2 1/2 | 2 1/2 | 2 1/2 |
| 1HUS388 | 3/8 | 180 | 169 | 1 7/8 | 1.11 | 114 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1HUS1210 | 1/2 | 186 | 173 | 2 5/8 | 1.52 | 137 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1HUS1218 | 1/2 | 550 | 549 | 4 5/8 | 3.22 | 450 | 9.66 | 6 | 4 3/8 | 3 7/8 | 3 1/4 |
| 1HUS5822 | 5/8 | 733 | 740 | 5 3/8 | 3.88 | 450 | 11.64 | 8 3/4 | 5 1/8 | 4 5/8 | 3 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE HILTI KWIK HUS-EZ SCREW ANCHOR FOR SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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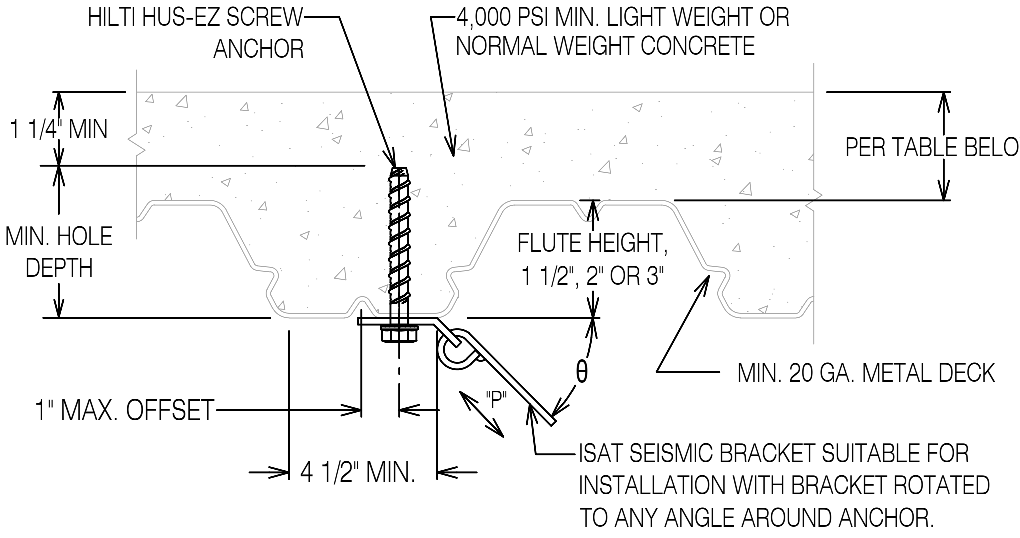

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 5**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle $30° \le \theta \le 36°$ Maximum Brace Load (P)$^4$ Lbs. | Brace Angle $36° < \theta \le 60°$ Maximum Brace Load (P)$^4$ Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.$^1$ Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing $^2$ Inch | Edge Distance Inch | Min. Concrete Thickness Above Top Flute (Inch)$^3$ Metal Deck Flute Height 1 1/2" | 2" | 3" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1HUS147 | 1/4 | 168 | 154 | 2 | 1.18 | 114 | 6.75 | 4 1/2 | 2 1/2 | 2 1/2 | 2 1/2 |
| 1HUS388 | 3/8 | 193 | 185 | 1 7/8 | 1.11 | 114 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1HUS1210 | 1/2 | 201 | 191 | 2 5/8 | 1.52 | 137 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1HUS1218 | 1/2 | 580 | 580 | 4 5/8 | 3.22 | 450 | 9.66 | 6 | 4 3/8 | 3 7/8 | 3 1/4 |
| 1HUS5822 | 5/8 | 758 | 771 | 5 3/8 | 3.88 | 450 | 11.64 | 8 3/4 | 5 1/8 | 4 5/8 | 3 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$

# SINGLE HILTI KWIK HUS-EZ SCREW ANCHOR FOR SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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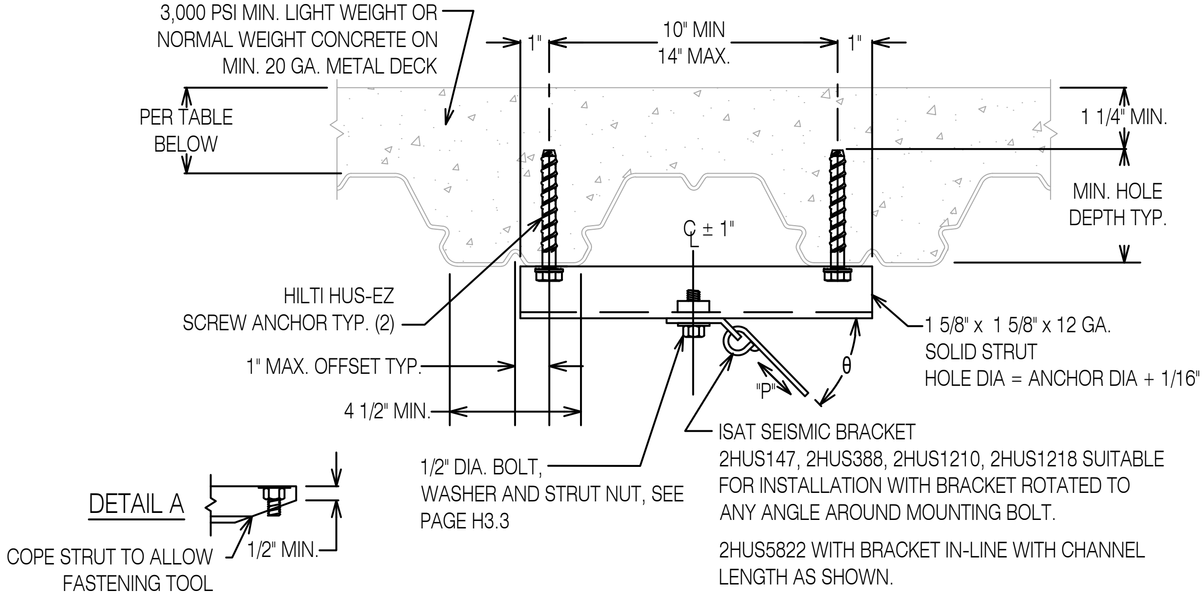

CHANNEL PERPENDICULAR TO DECK FLUTES

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 5**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing Inch | Edge Distance Inch | Min. Concrete Thickness Above Top Flute (Inch)[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 30° ≤ θ ≤ 36° Maximum Brace Load (P) Lbs. | 36° < θ ≤ 60° Maximum Brace Load (P) Lbs. | | | | | | Metal Deck Flute Height | | |
| | | | | | | | | | 1 1/2" | 2" | 3" |
| 2HUS147S | 1/4 | 258 | 231 | 2 | 1.18 | 114 | 6.75 | 4 1/2 | 2 1/2 | 2 1/2 | 2 1/2 |
| 2HUS388S | 3/8 | 299 | 282 | 1 7/8 | 1.11 | 114 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2HUS1210S | 1/2 | 311 | 289 | 2 5/8 | 1.52 | 137 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2HUS1218S | 1/2 | 917 | 917 | 4 5/8 | 3.22 | 450 | 9.66 | 6 | 4 3/8 | 3 7/8 | 3 1/4 |
| 2HUS5822S | 5/8 [4] | 1,355 | 1,355 | 5 3/8 | 3.88 | 450 | 11.64 | 8 3/4 | 5 1/8 | 4 5/8 | 3 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
3. BASED ON INSTALLATION IN LOWER FLUTE.
4. USE DETAIL A.

# DUAL ANCHOR HILTI KWIK HUS-EZ SCREW ANCHOR WITH STRUT SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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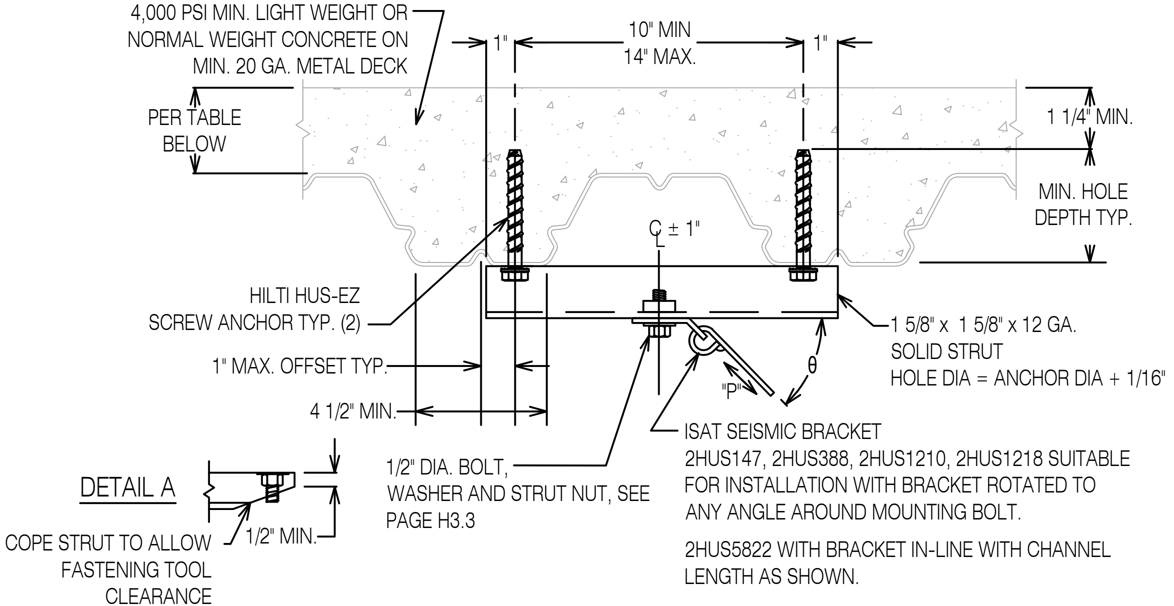

CHANNEL PERPENDICULAR TO DECK FLUTES

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 5**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle 30° ≤ θ ≤ 36° Maximum Brace Load (P) Lbs. | Brace Angle 36° < θ ≤ 60° Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing Inch | Edge Distance Inch | Min. Concrete Thickness Above Top Flute (Inch)[3] Metal Deck Flute Height 1 1/2" | 2" | 3" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2HUS147S | 1/4 | 280 | 257 | 2 | 1.18 | 114 | 6.75 | 4 1/2 | 2 1/2 | 2 1/2 | 2 1/2 |
| 2HUS388S | 3/8 | 322 | 311 | 1 7/8 | 1.11 | 114 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2HUS1210S | 1/2 | 334 | 321 | 2 5/8 | 1.52 | 137 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2HUS1218S | 1/2 | 939 | 939 | 4 5/8 | 3.22 | 450 | 9.66 | 6 | 4 3/8 | 3 7/8 | 3 1/4 |
| 2HUS5822S | 5/8[4] | 1,420 | 1,422 | 5 3/8 | 3.88 | 450 | 11.64 | 8 3/4 | 5 1/8 | 4 5/8 | 3 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
3. BASED ON INSTALLATION IN LOWER FLUTE.
4. USE DETAIL A.

# DUAL ANCHOR HILTI KWIK HUS-EZ SCREW ANCHOR WITH STRUT SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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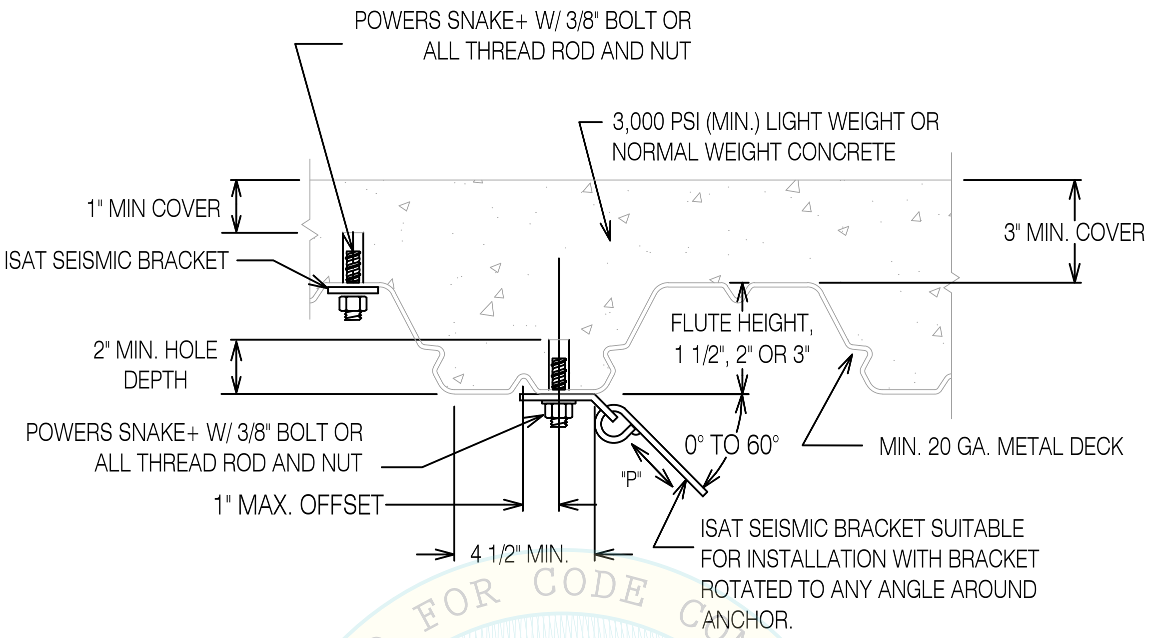

**SINGLE ANCHOR CONNECTION DETAILS**

**Metal Deck With Minimum 3,000 psi Light Weight or Normal Weight Concrete**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Powers Snake+ Anchor**
**ICC Report No. ESR-2272 (Dated December, 2017), Table 2 and 3.**

| Brace Anchorage Designation | Anchor Quantity | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth [1] Inch | Minimum Effective Embedment [2] Inch | Minimum Anchor Spacing Inch | Critical Edge Distance Inch | Screwdriver Installation Max. Torque Ft-Lbs. | Rod or Bolt Installation Max. Torque Ft-Lbs. | Min. Concrete Thickness Above Top Flute (Inch) Metal Deck Flute Height | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 1 1/2" | 2" | 3" |
| 1PSN38 | 1 | 3/8 | 186 | 2 | 1 1/8 | 6 3/4 | 3 | 345 | 8 | 3 | 3 | 3 |

1. MINIMUM HOLE DEPTH IS TO BE VERIFIED BY THE INSPECTOR.
2. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE ANCHOR POWERS SNAKE+ FOR SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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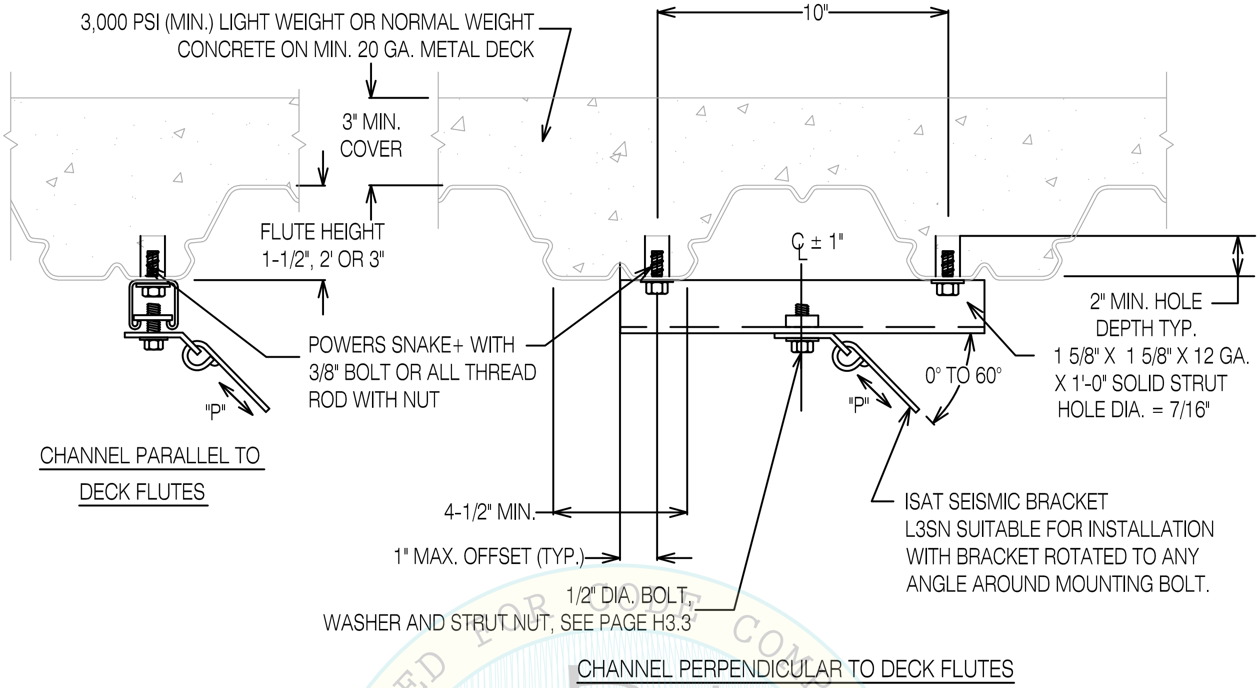

**DUAL ANCHOR CONNECTION DETAILS L3SN**

**Metal Deck With Minimum 3,000 psi Light Weight or Normal Weight Concrete**

**Seismically Qualified for Anchorage In Cracked Concrete**

**Powers Snake+ Anchor**

**ICC Report No. ESR-2272 (Dated December, 2017), Table 2 and 3.**

| Brace Anchorage Designation | Anchor Quantity | Anchor Diameter Inch | Maximum Brace Load (P) Lbs. | Minimum Hole Depth 1 Inch | Minimum Effective Embedment 2 Inch | Minimum Anchor Spacing Inch | Critical Edge Distance Inch | Screwdriver Installation Max. Torque Ft-Lbs. | Rod or Bolt Installation Max. Torque Ft-Lbs. | Min. Concrete Thickness Above Top Flute (Inch) Metal Deck Flute Height | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 1 1/2" | 2" | 3" |
| L3SNS | 2 | 3/8 | 310 | 2 | 1 1/8 | 6 3/4 | 3 | 345 | 8 | 3 | 3 | 3 |

1. MINIMUM HOLE DEPTH IS TO BE VERIFIED BY THE INSPECTOR.
2. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# DUAL ANCHOR POWERS SNAKE+WITH STRUT SEISMIC BRACE CONNECTION IN METAL DECK SLAB

2013 CBC OSHPD

ANTHONY A. RUBALCAVA
S 4710

ISAT
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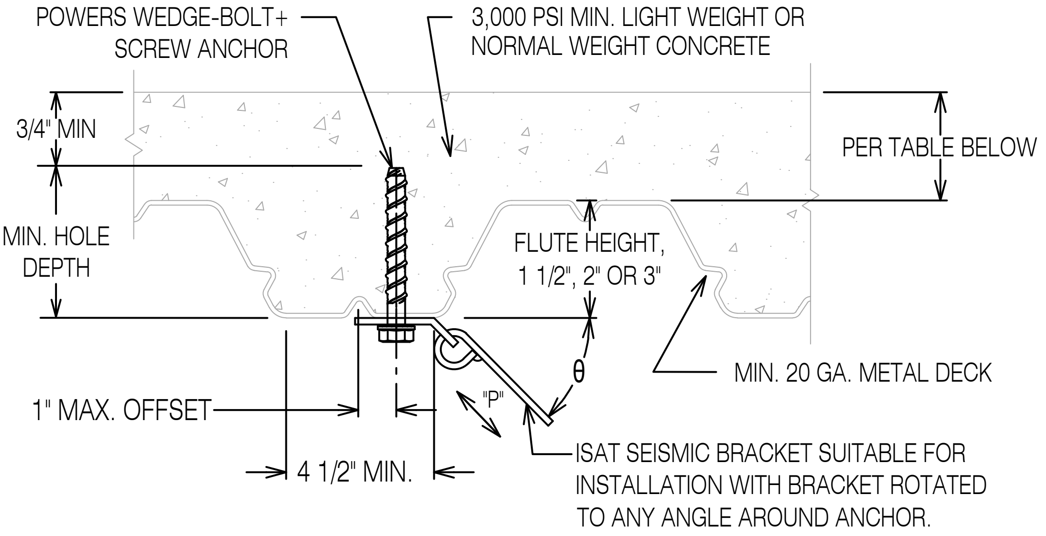

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2526 (Dated June 2017), Table 1, 2 and 3, and Fig. 5**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle<br>30°≤ θ ≤ 36° Maximum Brace Load (P)[4] Lbs. | Brace Angle<br>36°< θ ≤ 60° Maximum Brace Load (P)[4] Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing [2] Inch | Edge Distance Inch | Min. Concrete Thickness Above Top Flute (Inch)[3]<br>Metal Deck Flute Height<br>1 1/2" | <br><br>2" | <br><br>3" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1WB3810 | 3/8 | 279 | 272 | 2 1/4 | 1.43 | 245 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1WB1212 | 1/2 | 472 | 408 | 2 3/4 | 1.65 | 300 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1WB1216 | 1/2 | 472 | 408 | 4 | 2.50 | 300 | 7.50 | 6 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1WB5820 | 5/8 | 620 | 572 | 5 | 3.10 | 350 | 9.30 | 8 3/4 | 4 1/4 | 3 3/4 | 3 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE POWERS WEDGE-BOLT+ SCREW ANCHOR FOR SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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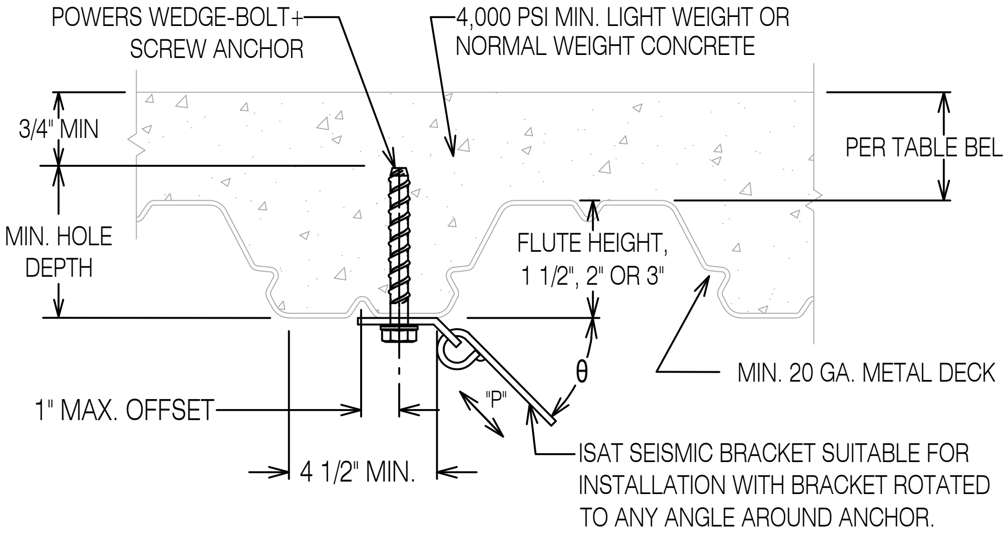

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-2526 (Dated June 2017), Table 1, 2 and 3, and Fig. 5**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed.1 Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing 2 Inch | Edge Distance Inch | Min. Concrete Thickness Above Top Flute (Inch)[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 30°≤ θ ≤ 36° Maximum Brace Load (P)4 Lbs. | 36°< θ ≤ 60° Maximum Brace Load (P)4 Lbs. | | | | | | Metal Deck Flute Height | | |
| | | | | | | | | | 1 1/2" | 2" | 3" |
| 1WB3810 | 3/8 | 298 | 294 | 2 1/4 | 1.43 | 245 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1WB1212 | 1/2 | 515 | 457 | 2 3/4 | 1.65 | 300 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1WB1216 | 1/2 | 515 | 457 | 4 | 2.50 | 300 | 7.50 | 6 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1WB5820 | 5/8 | 669 | 633 | 5 | 3.10 | 350 | 9.30 | 8 3/4 | 4 1/4 | 3 3/4 | 3 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. SPACING MEASURED ALONG THE FLUTE.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0

# SINGLE POWERS WEDGE-BOLT+ SCREW ANCHOR FOR SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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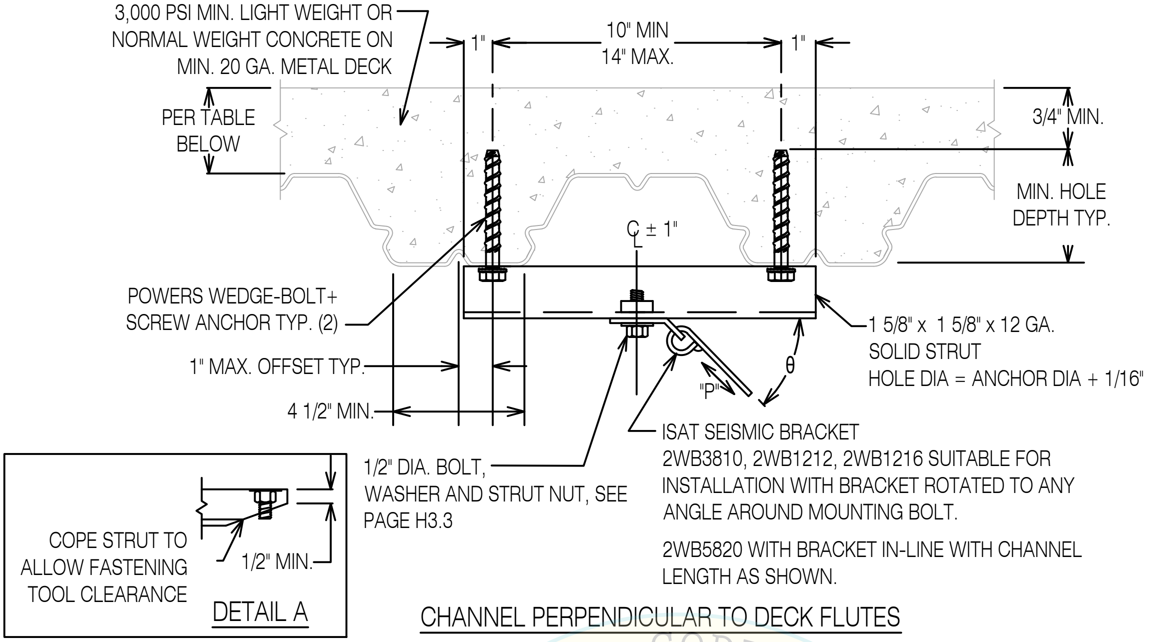

CHANNEL PERPENDICULAR TO DECK FLUTES

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2526 (Dated June 2017), Table 1, 2 and 3, and Fig. 5**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle 30° ≤ θ ≤ 36° Maximum Brace Load (P) Lbs. | Brace Angle 36° ≤ θ ≤ 60° Maximum Brace Load (P) Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing Inch | Edge Distance Inch | Min. Concrete Thickness Above Top Flute (Inch)[3] Metal Deck Flute Height 1 1/2" | 2" | 3" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2WB3810S | 3/8 | 465 | 454 | 2 1/4 | 1.43 | 245 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2WB1212S | 1/2 | 787 | 680 | 2 3/4 | 1.65 | 300 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2WB1216S | 1/2 | 787 | 680 | 4 | 2.50 | 300 | 7.50 | 6 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2WB5820S | 5/8 [4] | 1,062 | 931 | 5 | 3.10 | 350 | 9.30 | 8 3/4 | 4 1/4 | 3 3/4 | 3 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. Ωo=2.0
3. BASED ON INSTALLATION IN LOWER FLUTE.
4. USE DETAIL A.

# DUAL ANCHOR POWERS WEDGE-BOLT+ SCREW ANCHOR WITH STRUT SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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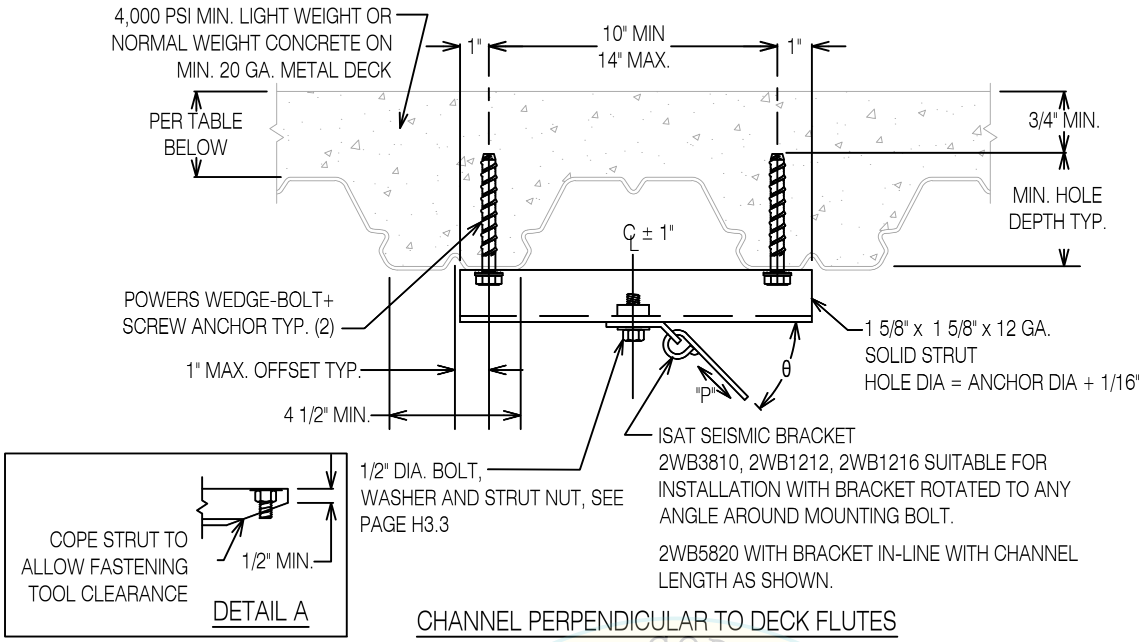

CHANNEL PERPENDICULAR TO DECK FLUTES

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-2526 (Dated June 2017), Table 1, 2 and 3, and Fig. 5**

| Brace Anchorage Designation | Anchor Diameter Inch | Brace Angle | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Maximum Impact Wrench Torque Ft-Lbs. | Minimum Anchor Spacing Inch | Edge Distance Inch | Min. Concrete Thickness Above Top Flute (Inch)[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $30^\circ \leq \theta \leq 36^\circ$ Maximum Brace Load (P) Lbs. | $36^\circ < \theta \leq 60^\circ$ Maximum Brace Load (P) Lbs. | | | | | | Metal Deck Flute Height | | |
| | | | | | | | | | 1 1/2" | 2" | 3" |
| 2WB3810S | 3/8 | 496 | 489 | 2 1/4 | 1.43 | 245 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2WB1212S | 1/2 | 859 | 762 | 2 3/4 | 1.65 | 300 | 6.75 | 4 1/2 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2WB1216S | 1/2 | 859 | 762 | 4 | 2.50 | 300 | 7.50 | 6 | 3 1/4 | 3 1/4 | 3 1/4 |
| 2WB5820S | 5/8[4] | 1,156 | 1,041 | 5 | 3.10 | 350 | 9.30 | 8 3/4 | 4 1/4 | 3 3/4 | 3 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega_o$=2.0
3. BASED ON INSTALLATION IN LOWER FLUTE.
4. USE DETAIL A.

# DUAL ANCHOR POWERS WEDGE-BOLT+ SCREW ANCHOR WITH STRUT SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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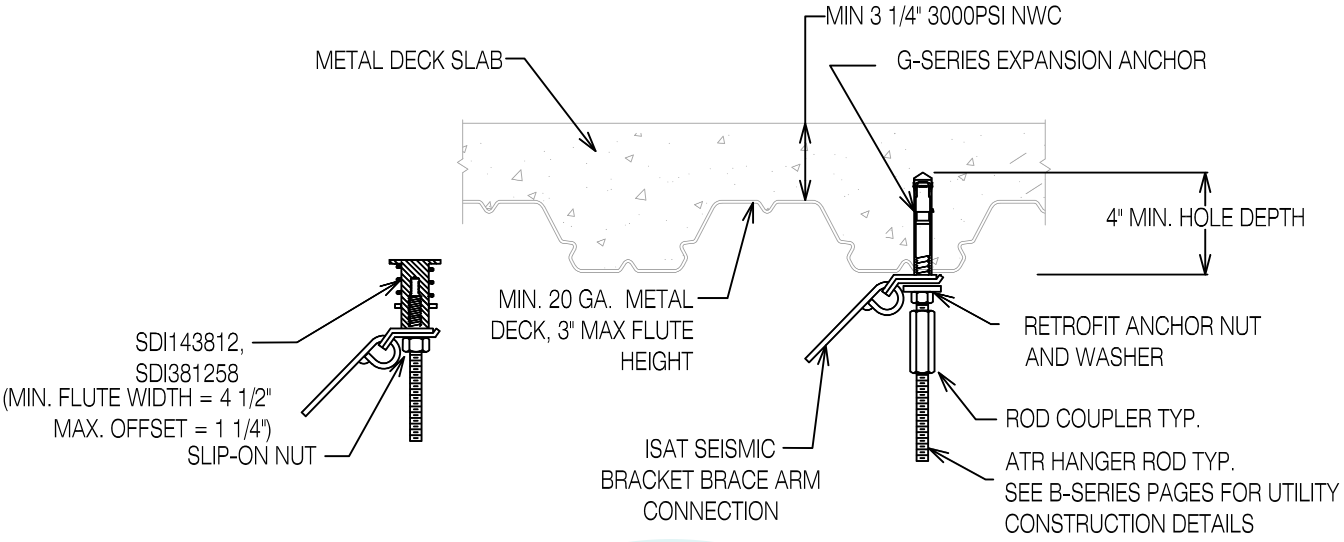

| Max. Seismic Design Acceleration G [1] | Max. Utility Trapeze Load Lbs./Ft. | Max. Vertical Support Spacing Ft. | Transverse Brace Spacing Ft | Longitudinal Brace Spacing Ft |
|---|---|---|---|---|
| 0.20 | 40 | 10 | 40 | 60 |
| 0.40 | 20 | 10 | 40 | 60 |
| 0.60 | 20 | 10 | 40 | 60 |
| 0.60 | 30 | 10 | 20 | 30 |
| 0.80 | 20 | 10 | 20 | 30 |
| 1.00 | 20 | 10 | 20 | 30 |

| Maximum Equipment Weight - Lbs. [3] | | | | |
|---|---|---|---|---|
| G = 0.20 | G = 0.40 | G = 0.60 | G = 0.80 | G = 1.00 |
| 750 | 600 | 500 | 400 | 350 |

1. SEISMIC G-FORCE AT WORKING LOADS.
2. DESIGN IS BASED ON 2013 CBC & REFERENCED STANDARDS AND INCLUDES PROVISIONS FOR VERTICAL SEISMIC ACCELERATIONS AND A FORCE INCREASE FOR ANCHORAGE INTO CONCRETE FROM ASCE 7 SECTION 13.4.2.
3. EQUIPMENT SUSPENDED BY ONLY TWO RODS IS LIMITED TO 100 POUNDS FOR ALL DESIGN ACCELERATIONS.

# TRAPEZE LONGITUDINAL BRACE CONNECTION TO VERTICAL SUPPORT ROD

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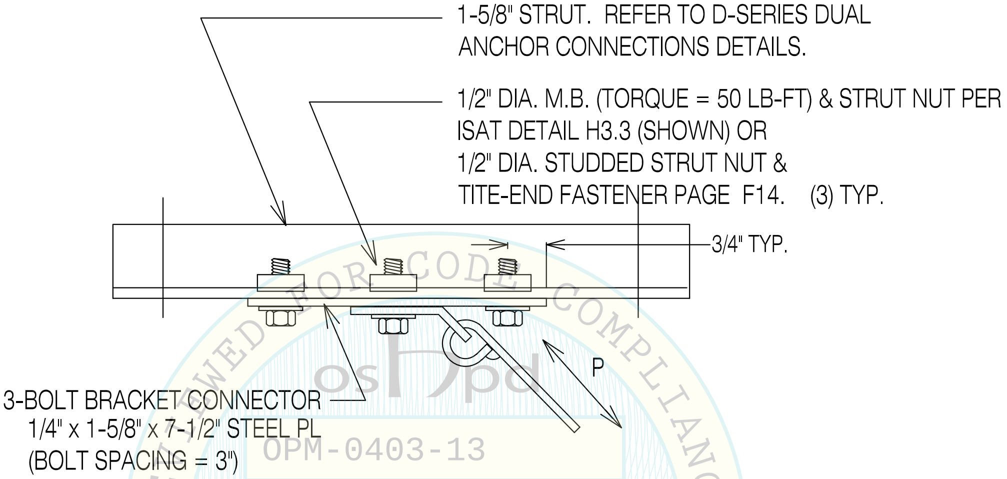

REQUIRED FOR D-SERIES DUAL ANCHOR SEISMIC ANCHORAGES WHERE BRACE REACTION P > 1,935 LBS.
P MAX = 3,300 LBS.

# 3-BOLT BRACKET CONNECTOR

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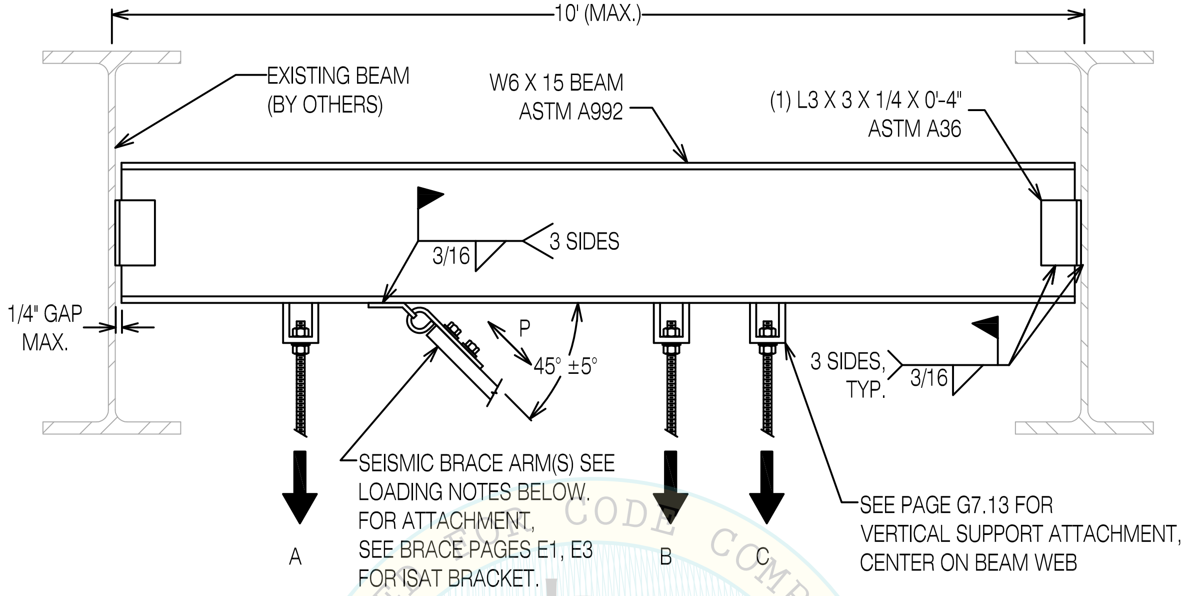

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS AND DIAPHRAM FOR THE ACTUAL LOADING COMBINATIONS.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

MAXIMUM LOADING EXAMPLES (VERTICAL SUPPORTS AND SEISMIC BRACE ARMS):

1). MAXIMUM (COMBINED, A+B+C) VERTICAL SUPPORT LOADING = 5,000 LBS, MAXIMUM (COMBINED) SEISMIC BRACE LOAD = 6,000 LBS PARALLEL TO W6 LENGTH (AS SHOWN).

2). MAXIMUM (COMBINED, A+B+C) VERTICAL SUPPORT LOADING = 500 LBS, MAXIMUM (COMBINED) SEISMIC BRACE LOAD = 2,000 LBS AT ANY ANGLE.

# WIDE FLANGED BEAM SUPPLEMENTAL STEEL AS SEISMIC ANCHORAGE

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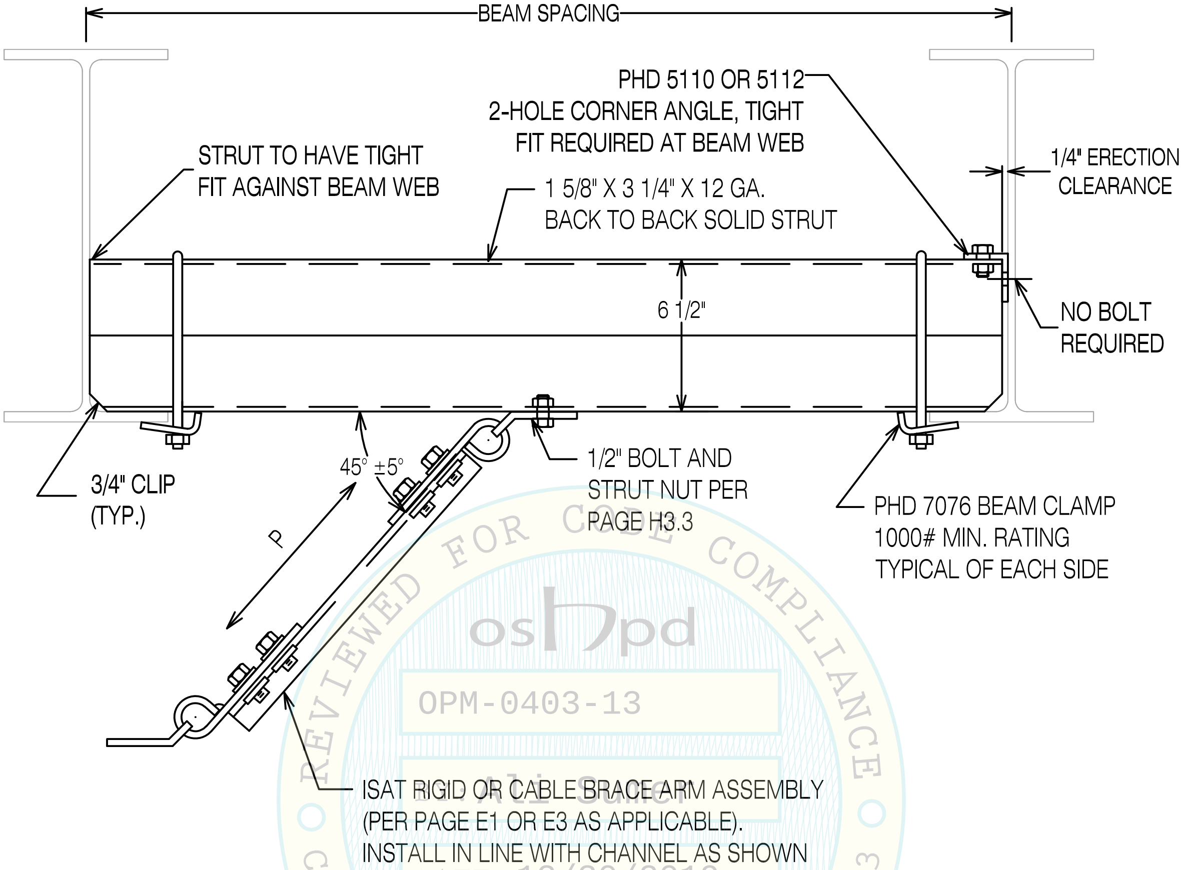

SEISMIC BRACE SUPPORT & ATTACHMENT LOADING NOTES:

1. FOR 10'-0" BEAM SPACING, PMAX = 650#
2. FOR 8'-0" BEAM SPACING , PMAX = 850#
3. FOR 6'-0" BEAM SPACING , PMAX = 1700#

NO ATTACHMENTS IN PROTECTED ZONE AS DEFINED IN AISC 341

# 1 5/8" X 3 1/4" BACK TO BACK STRUT IN-LINE BRACE ARM CONNECTION DETAIL

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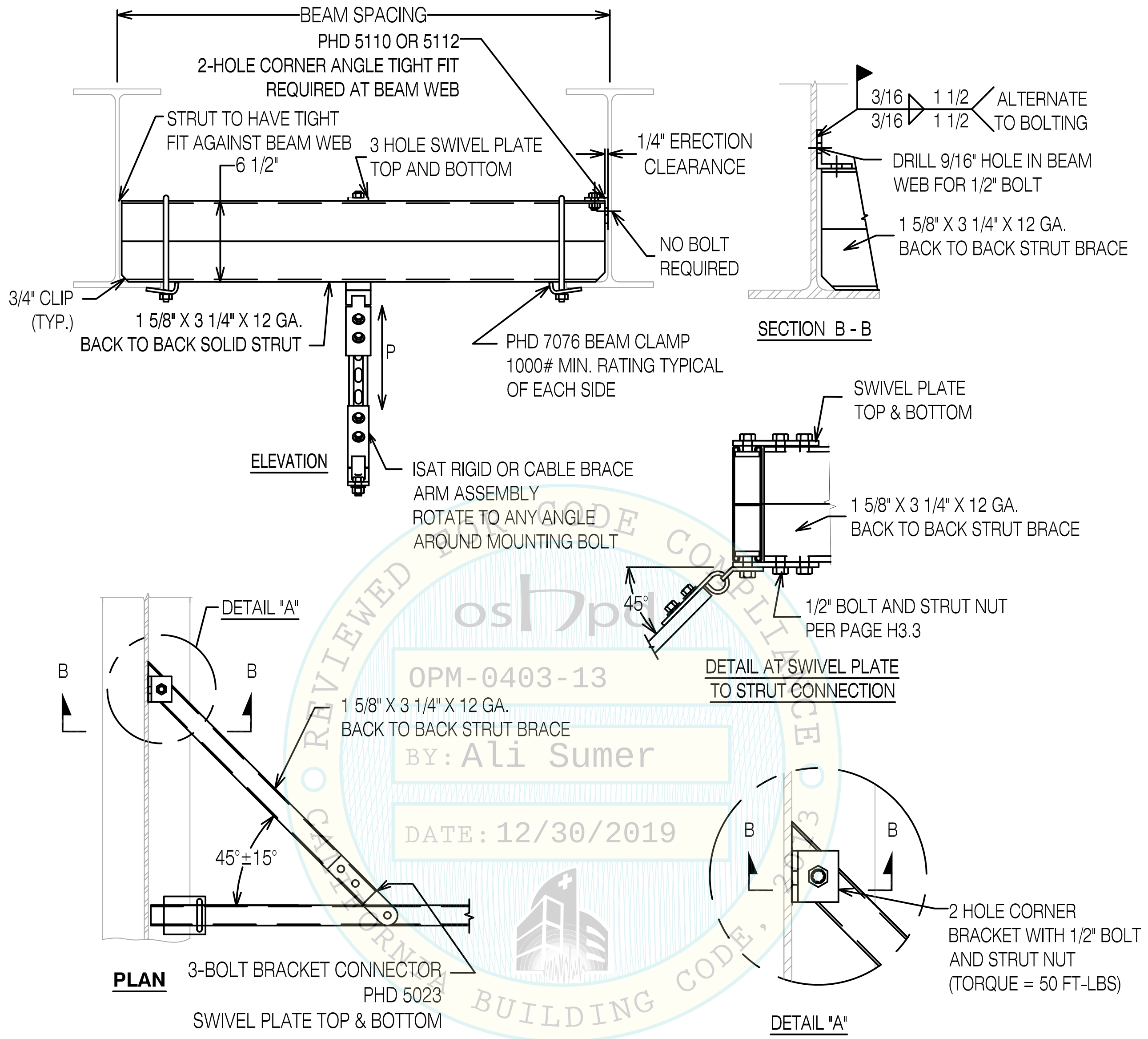

SEISMIC BRACE SUPPORT & ATTACHMENT LOADING NOTES:

1. FOR 10'-0" MAX. BEAM SPACING, PMAX = 1000# AT ANY ANGLE

NO ATTACHMENTS IN PROTECTED ZONE AS DEFINED IN AISC 341

# 1 5/8" X 3 1/4" BACK TO BACK STRUT WITH STRUT BRACE SEISMIC BRACE AT ANY ANGLE

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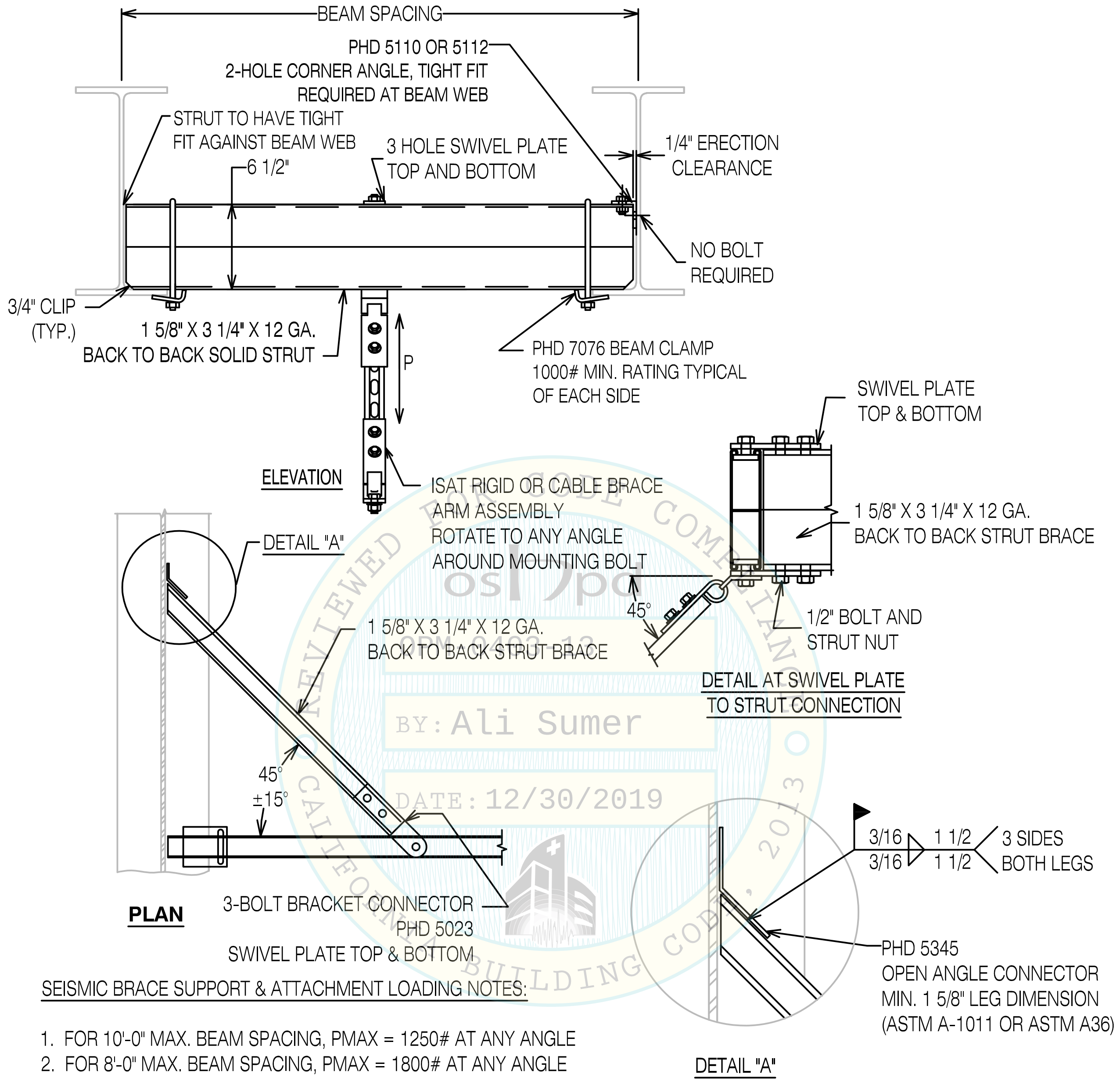

SEISMIC BRACE SUPPORT & ATTACHMENT LOADING NOTES:

1. FOR 10'-0" MAX. BEAM SPACING, PMAX = 1250# AT ANY ANGLE
2. FOR 8'-0" MAX. BEAM SPACING, PMAX = 1800# AT ANY ANGLE
3. FOR 6'-0" MAX. BEAM SPACING, PMAX = 2500# AT ANY ANGLE

NO ATTACHMENTS IN PROTECTED
ZONE AS DEFINED IN AISC 341

# 1 5/8" X 3 1/4" BACK TO BACK STRUT WITH STRUT BRACE SEISMIC BRACE AT ANY ANGLE- WELDED CONNECTION TO BEAM

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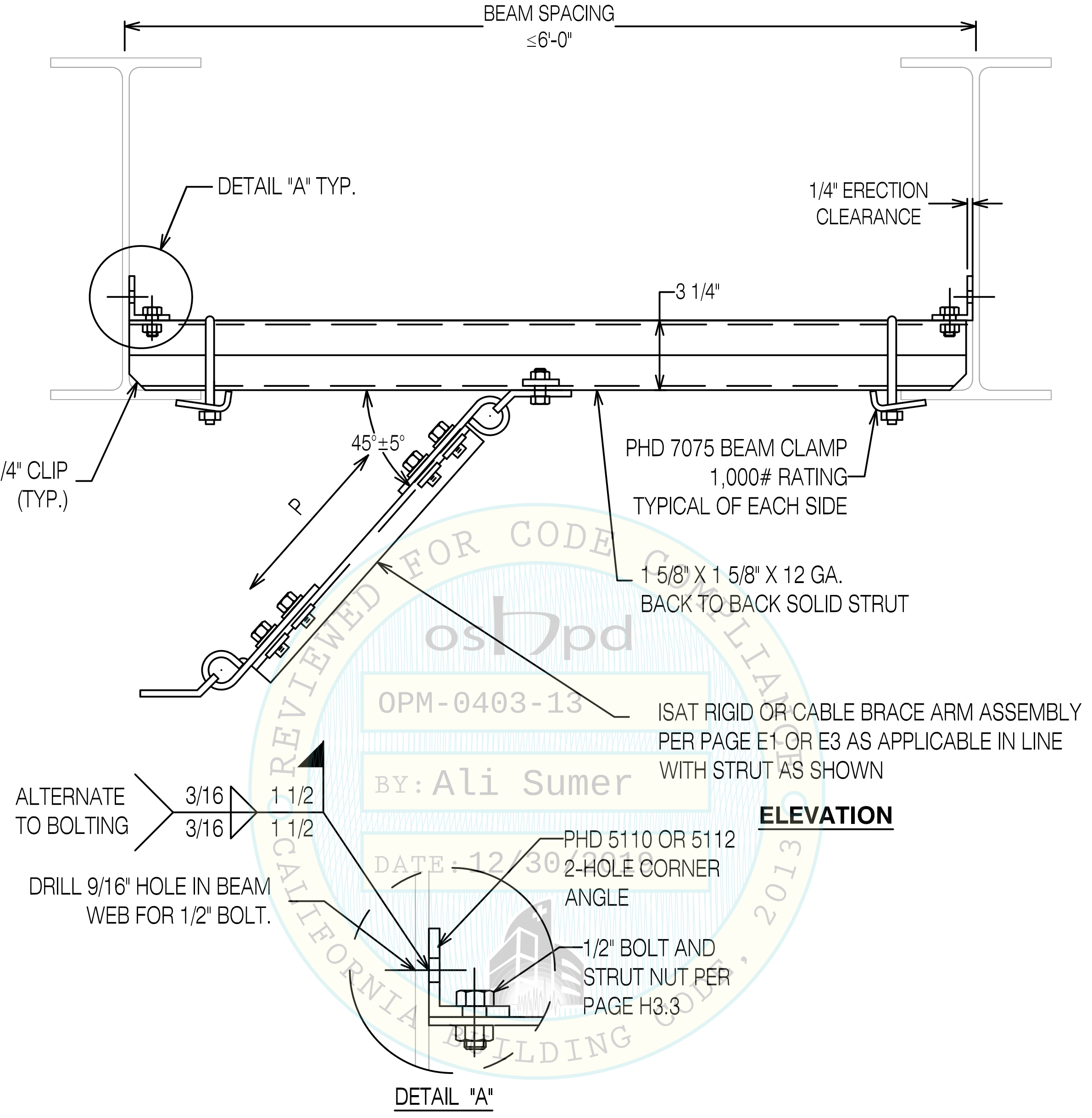

SEISMIC BRACE SUPPORT & ATTACHMENT LOADING NOTES:

1. FOR 6'-0" BEAM SPACING , PMAX = 500#

NO ATTACHMENTS IN PROTECTED ZONE AS DEFINED IN AISC 341

# 1 5/8" X 1 5/8" BACK TO BACK STRUT IN-LINE BRACE ARM CONNECTION DETAIL

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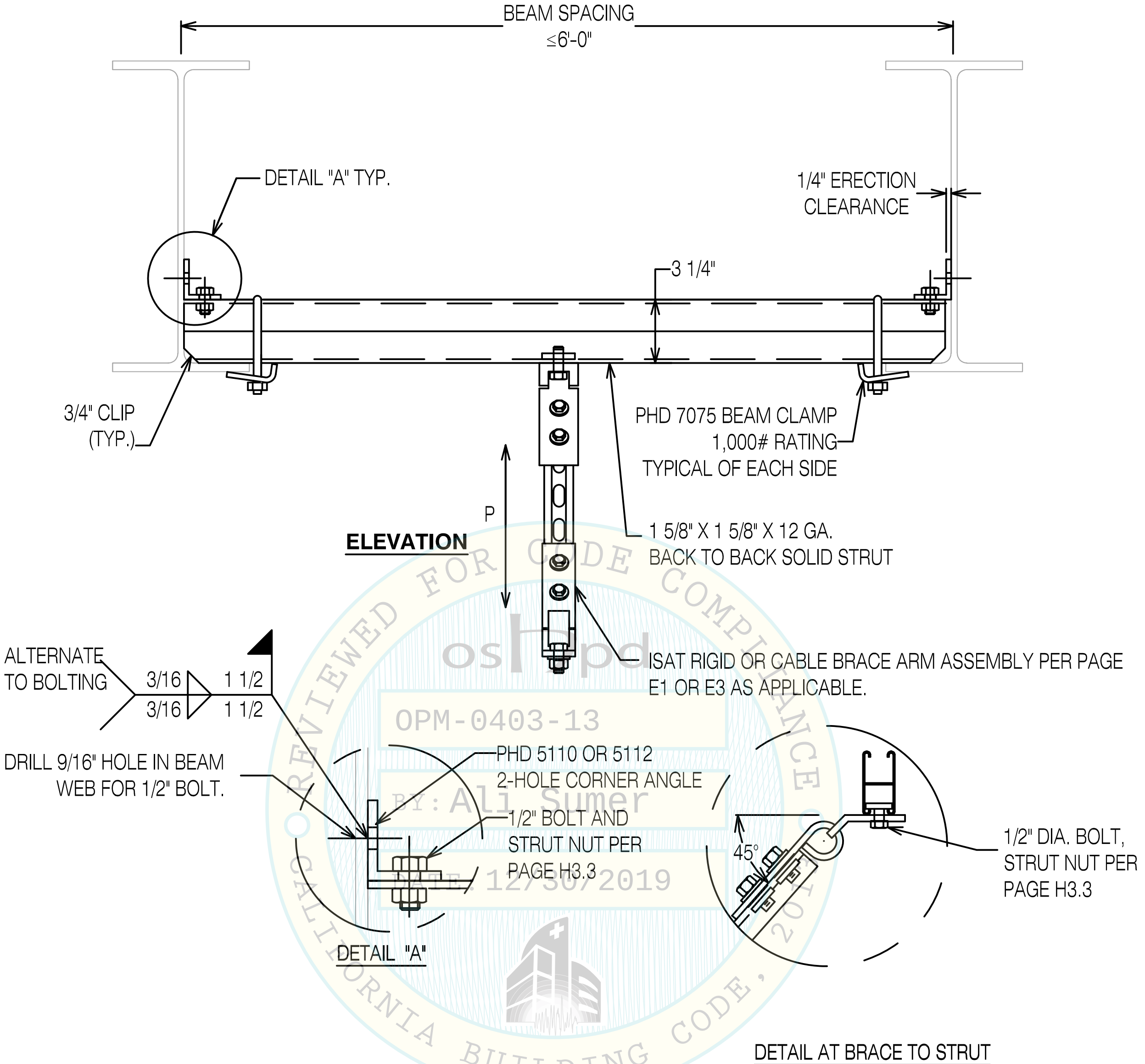

SEISMIC BRACE SUPPORT & ATTACHMENT LOADING NOTES:
1. FOR 6'-0" BEAM SPACING , PMAX = 300#

NO ATTACHMENTS IN PROTECTED
ZONE AS DEFINED IN AISC 341

# 1 5/8" X 1 5/8" BACK TO BACK STRUT
# WITH BRACE ARM

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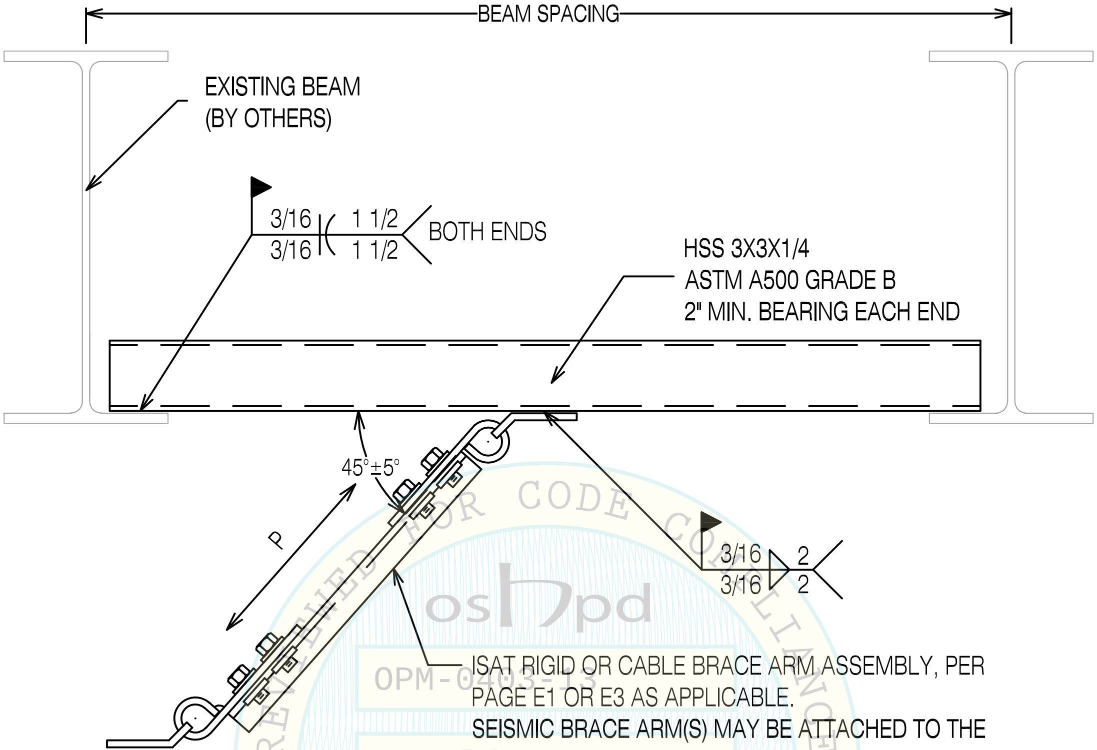

ISAT RIGID OR CABLE BRACE ARM ASSEMBLY, PER PAGE E1 OR E3 AS APPLICABLE.
SEISMIC BRACE ARM(S) MAY BE ATTACHED TO THE SIDES OR BOTTOM OF THE HSS. BRACE ARM MAY BE ROTATED TO ANY ANGLE ABOUT HSS.

SEISMIC BRACE SUPPORT & ATTACHMENT LOADING NOTES:

1. FOR 12'-6" BEAM SPACING, PMAX = 1250#
2. FOR 10'-0" BEAM SPACING, PMAX = 1500#
3. FOR 8'-0" BEAM SPACING , PMAX = 1800#
4. FOR 6'-0" BEAM SPACING , PMAX = 2400#

STRUCTURAL ENGINEER OF RECORD IS TO VERIFY THE ADEQUACY OF THE EXISTING BEAMS AND DIAPHRAGM.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

# HSS 3X3 SUPPLEMENTAL STEEL
# SEISMIC BRACE ARM CONNECTION DETAIL

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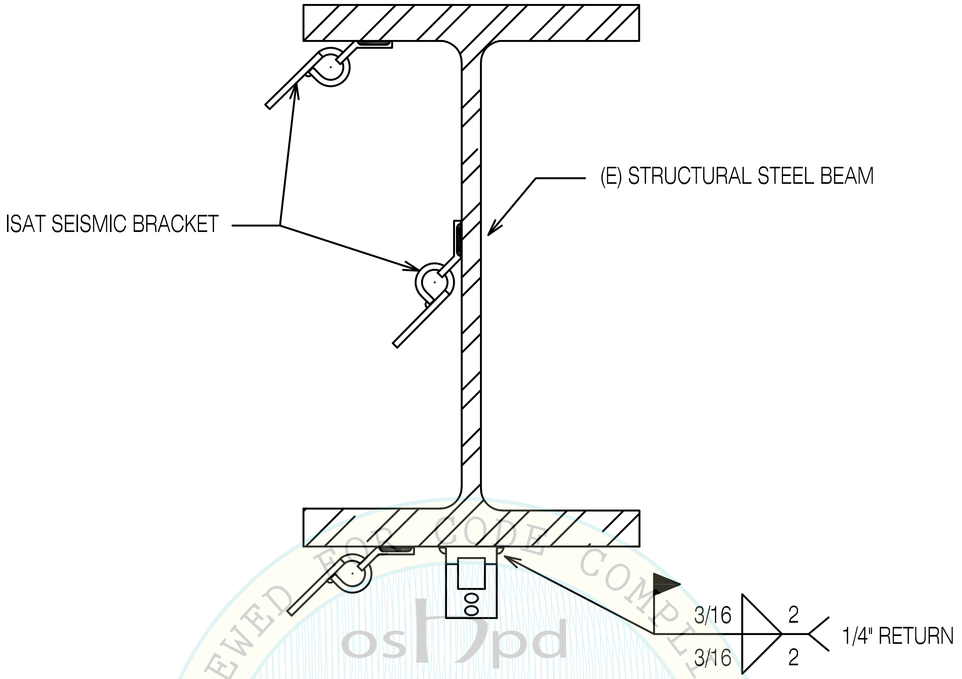

SUBMIT SEISMIC BRACE LOADS AND OBTAIN APPROVAL FROM ENGINEER OF RECORD BEFORE WELDING TO STRUCTURAL STEEL

| ISAT BRACKET | MAX ALLOWABLE BRACE LOAD @ 45 DEGREE BRACE ANGLE Lbs |
|---|---|
| ABHW12 | 2,200 |
| ABHWS12 | 2,030 |
| ABHWX12 | 3,750 |

# WELDED BRACKET CONNECTION
# STRUCTURAL STEEL BEAM OR CHANNEL

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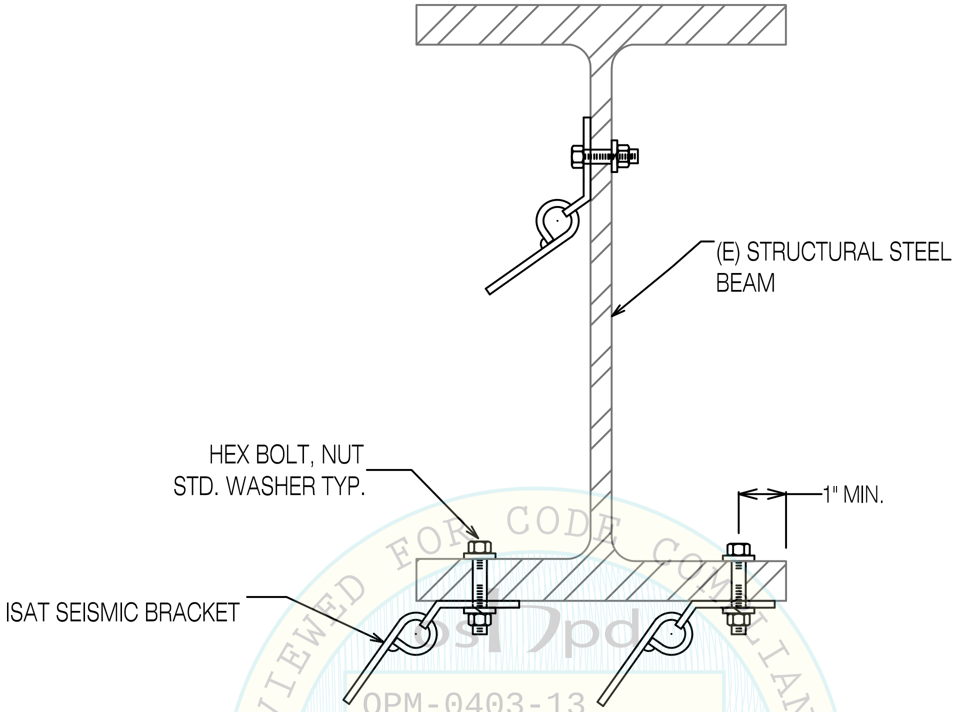

SUBMIT SEISMIC REACTION LOADS AND OBTAIN APPROVAL FROM ENGINEER OF RECORD BEFORE BOLTING TO STRUCTURAL STEEL

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

| ISAT BRACKET | MAX. ALLOWABLE BRACE LOAD @ 45 DEGREE BRACE ANGLE |  | HOLE DIA. |
|---|---|---|---|
|  | Lbs | Inch | Inch |
| ABHW12 | 2,200 | MIN 1/2 DIA. BOLT | 9/16 |
| ABHWS12 | 2,030 | MIN 1/2 DIA. BOLT | 9/16 |
| ABHWX12 | 2,900 | MIN 1/2 DIA. BOLT | 9/16 |
| RCTF12 | 2,045 | MIN 1/2 DIA. BOLT | 9/16 |

# BOLTED BRACKET CONNECTION
# STRUCTURAL STEEL BEAM OR CHANNEL

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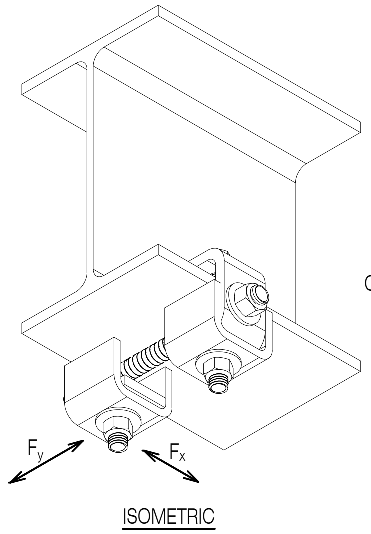

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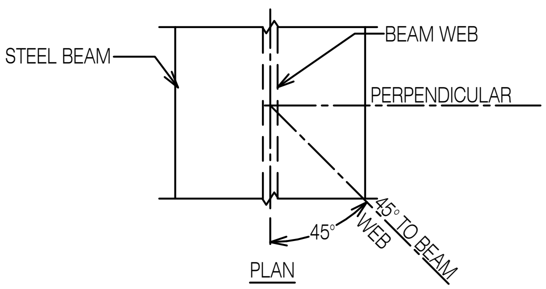
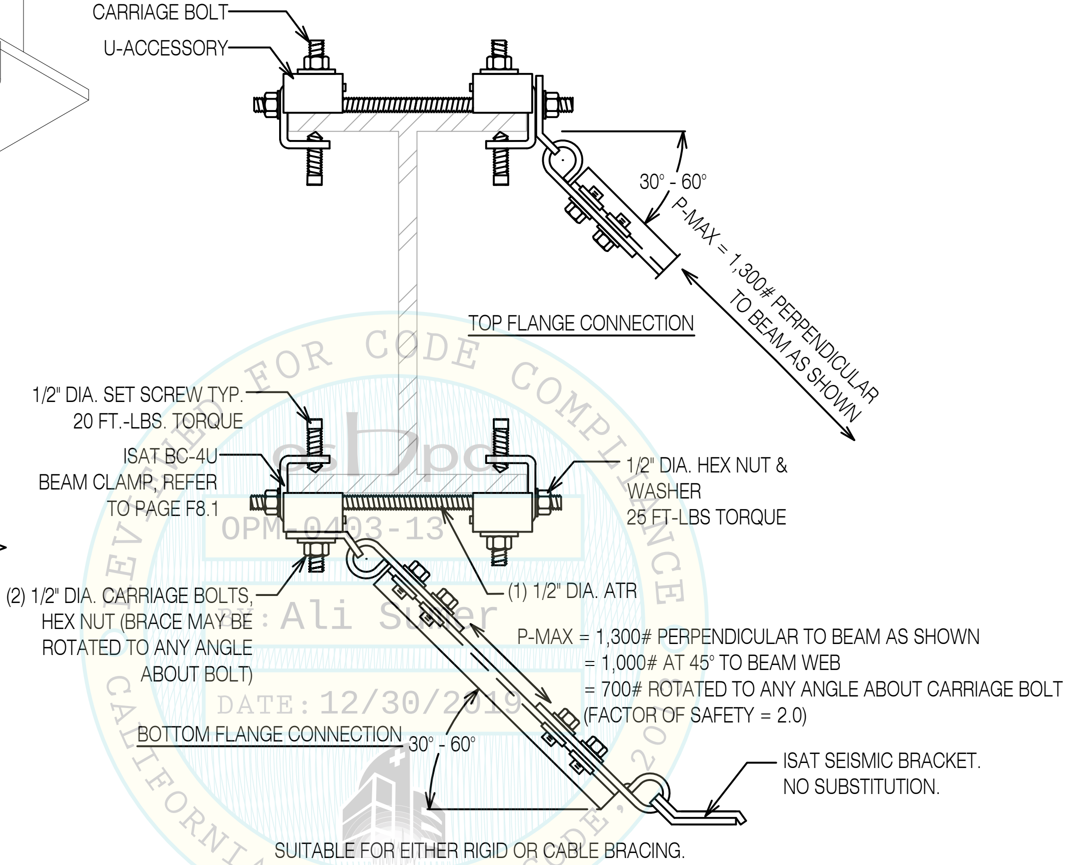


PLAN



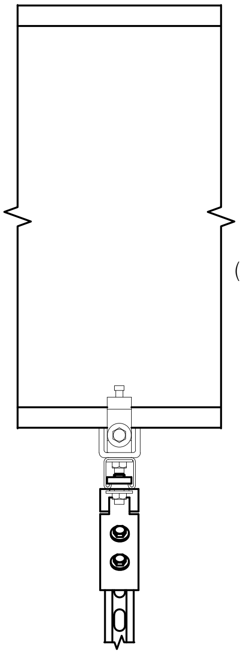
P-MAX = 1,300# PERPENDICULAR TO BEAM AS SHOWN

TOP FLANGE CONNECTION

P-MAX = 1,300# PERPENDICULAR TO BEAM AS SHOWN
= 1,000# AT 45° TO BEAM WEB
= 700# ROTATED TO ANY ANGLE ABOUT CARRIAGE BOLT
(FACTOR OF SAFETY = 2.0)

BOTTOM FLANGE CONNECTION

SUITABLE FOR EITHER RIGID OR CABLE BRACING.



SIDE VIEW

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD

| ISAT Part Number | Max. Beam Flange Thickness (in) |
|---|---|
| BC-4U ASSEMBLY | 1 1/8 |

# BC-4U BEAM CLAMP ASSEMBLY SEISMIC BRACE CONNECTION

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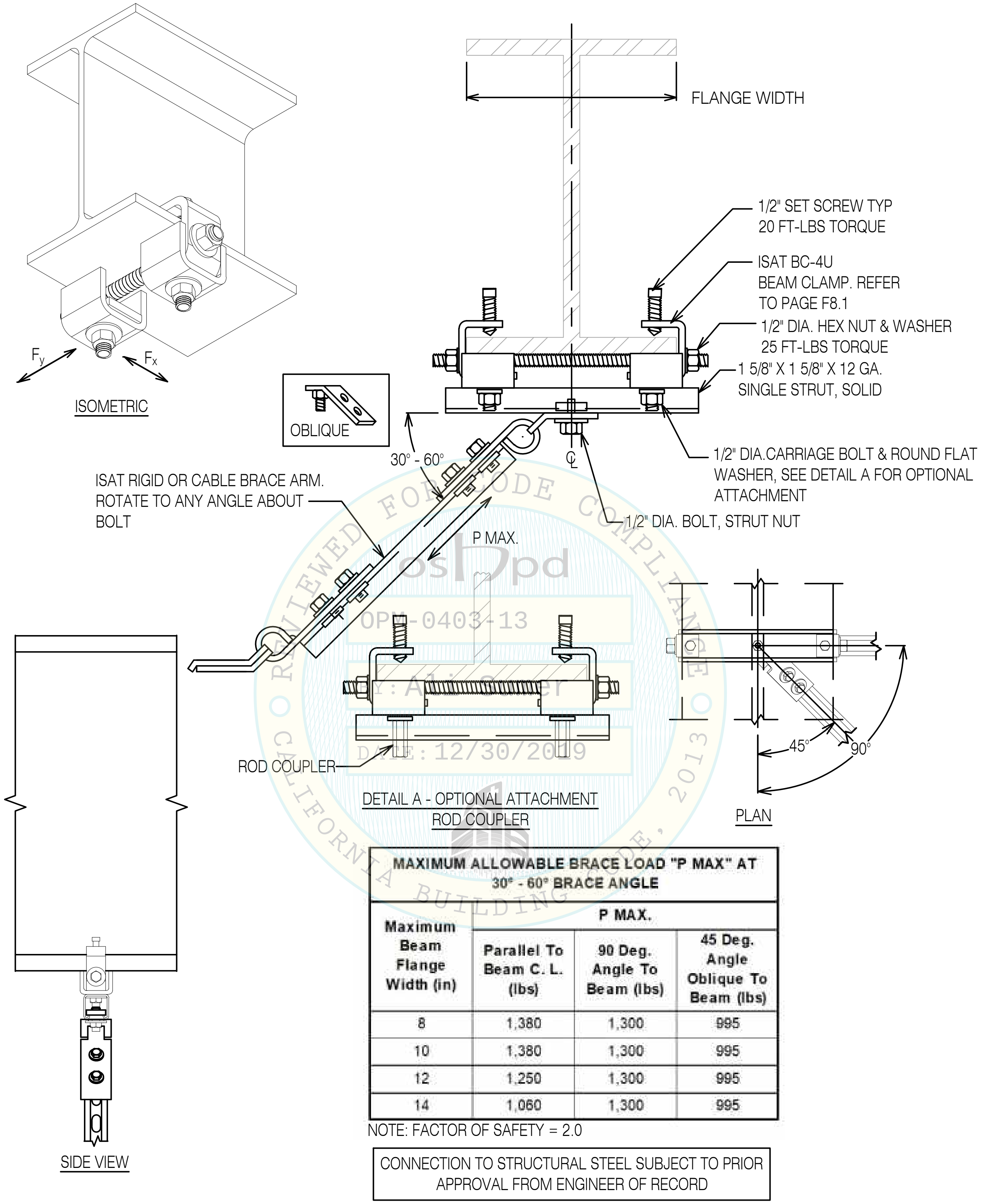

| **MAXIMUM ALLOWABLE BRACE LOAD "P MAX" AT 30° - 60° BRACE ANGLE** | | | |
|---|---|---|---|
| **Maximum Beam Flange Width (in)** | **P MAX.** | | |
| | **Parallel To Beam C. L. (lbs)** | **90 Deg. Angle To Beam (lbs)** | **45 Deg. Angle Oblique To Beam (lbs)** |
| 8 | 1,380 | 1,300 | 995 |
| 10 | 1,380 | 1,300 | 995 |
| 12 | 1,250 | 1,300 | 995 |
| 14 | 1,060 | 1,300 | 995 |

NOTE: FACTOR OF SAFETY = 2.0

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD

# BC-4U BEAM CLAMP ASSEMBLY SEISMIC BRACE CONNECTION

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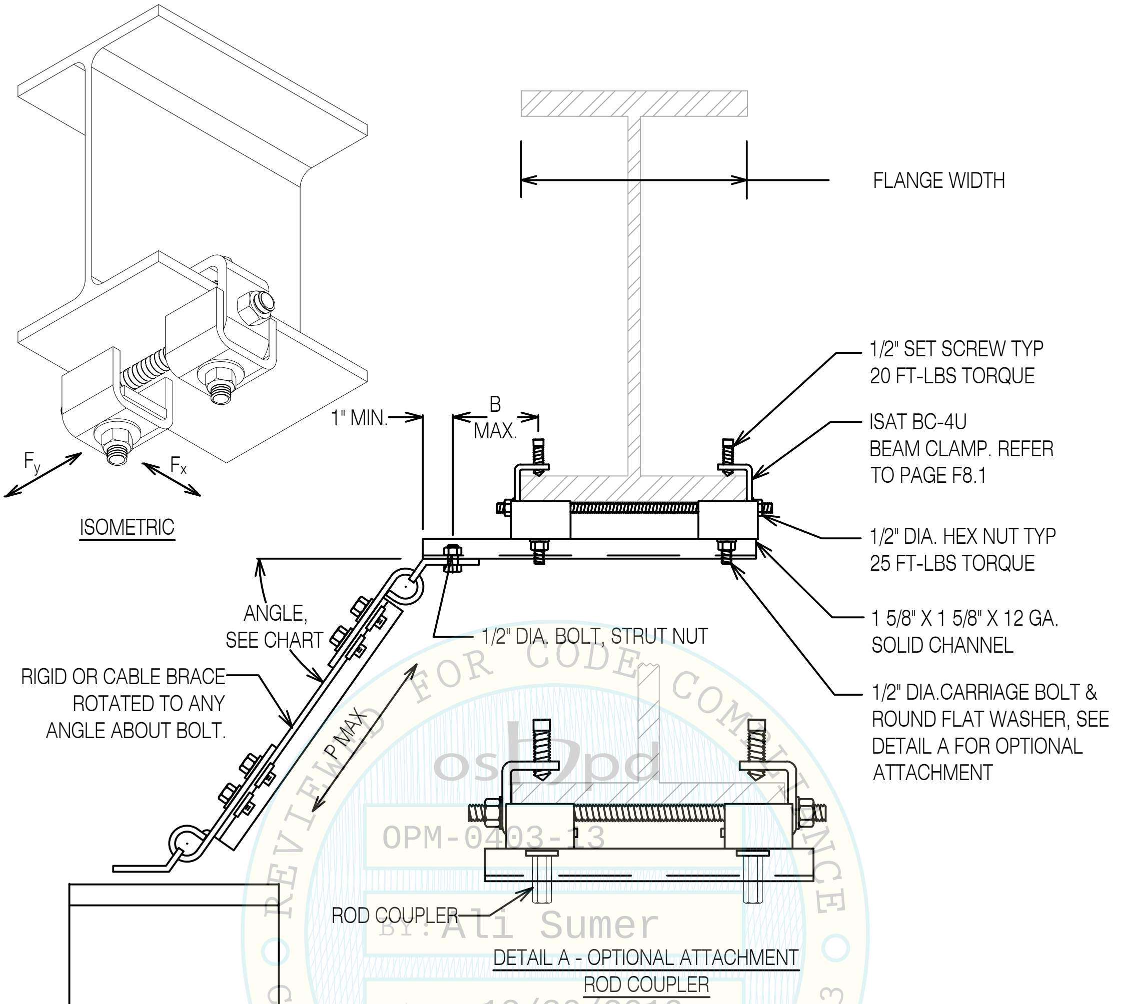

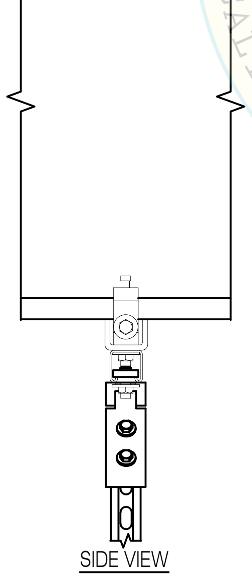

**MAXIMUM ALLOWABLE BRACE LOAD "P MAX" AT CANTILEVER WITH BRACE ANGLE FROM HORIZONTAL**

| B (in) | FLANGE WIDTH (in) | P MAX (lbs) | |
|---|---|---|---|
| | | 30° - 45° | 46° - 60° |
| 6 | ≥ 8 | 500 | 400 |
| 6 | < 8[1] | 290 | 295 |
| 10 | ≥ 8 | 300 | 300 |
| 10 | < 8[1] | 200 | 200 |

NOTE:

1. 5" MIN. FLANGE WIDTH.
2. FACTOR OF SAFETY = 2.0

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD

# BC-4U BEAM CLAMP WITH CANTILEVERED 1 5/8" X 1 5/8" STRUT SEISMIC BRACE CONNECTION

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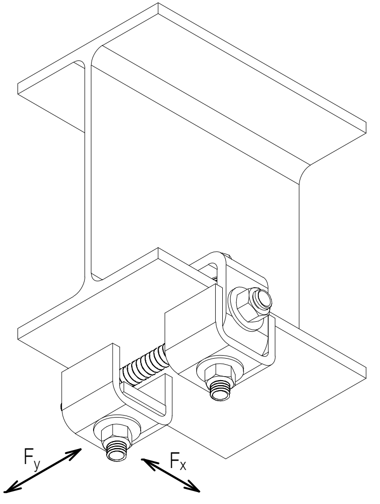

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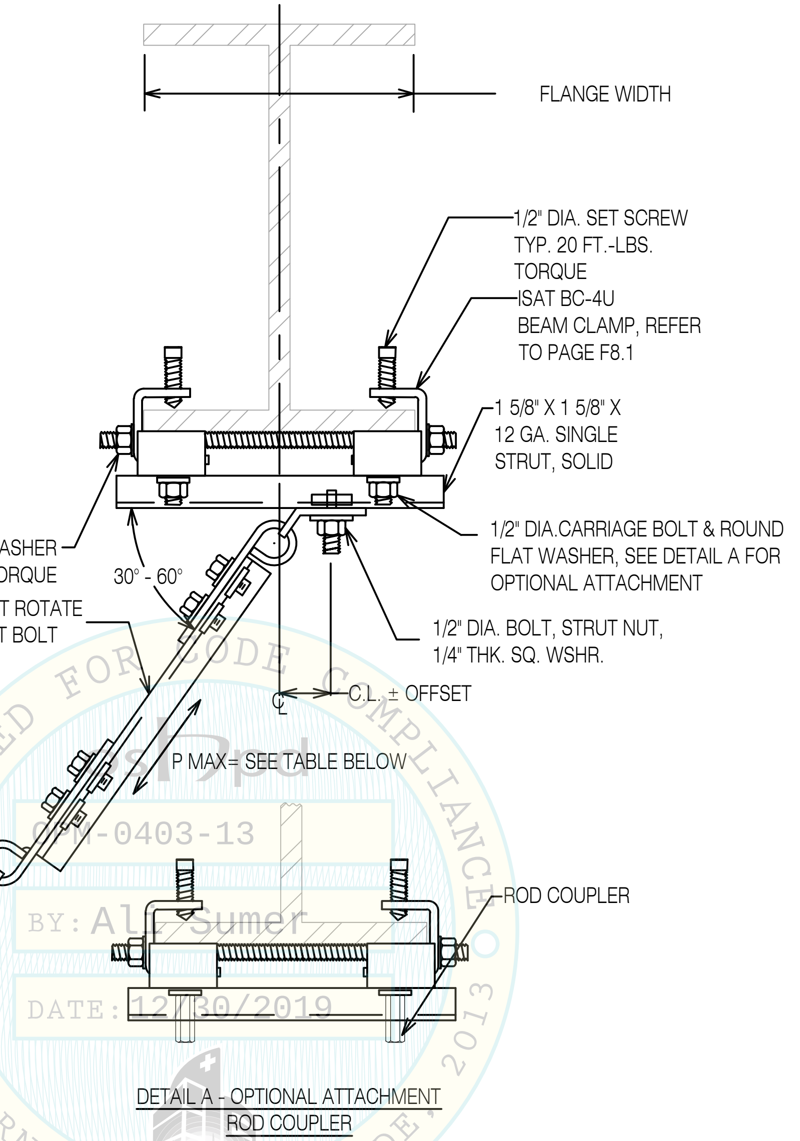
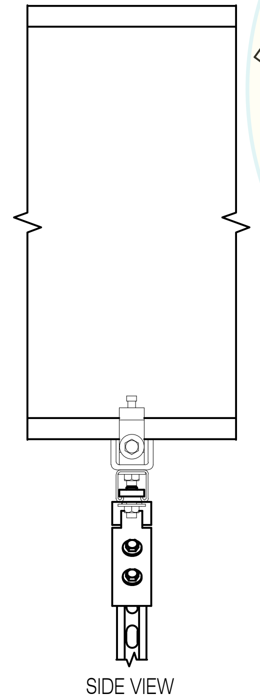


DETAIL A - OPTIONAL ATTACHMENT ROD COUPLER



SIDE VIEW

| MAXIMUM ALLOWABLE BRACE LOAD "P MAX" AT 30° - 60° DEGREE BRACE ANGLE | | | | | |
|---|---|---|---|---|---|
| **Beam Flange Width (in)** | **CL +/- 0" (lbs)** | **CL +/- 1" (lbs)** | **CL +/- 2" (lbs)** | **CL +/- 3" (lbs)** | **CL +/- 4" (lbs)** |
| 14 | 1,000 | 850 | 750 | 675 | 600 |
| 12 | 1,000 | 850 | 700 | 625 | 550 |
| 10 | 1,000 | 800 | 675 | 595 | - |
| 8 | 1,000 | 750 | 600 | - | - |

NOTE: FACTOR OF SAFETY = 2.0

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD

# BC-4U BEAM CLAMP ASSEMBLY SEISMIC BRACE CONNECTION

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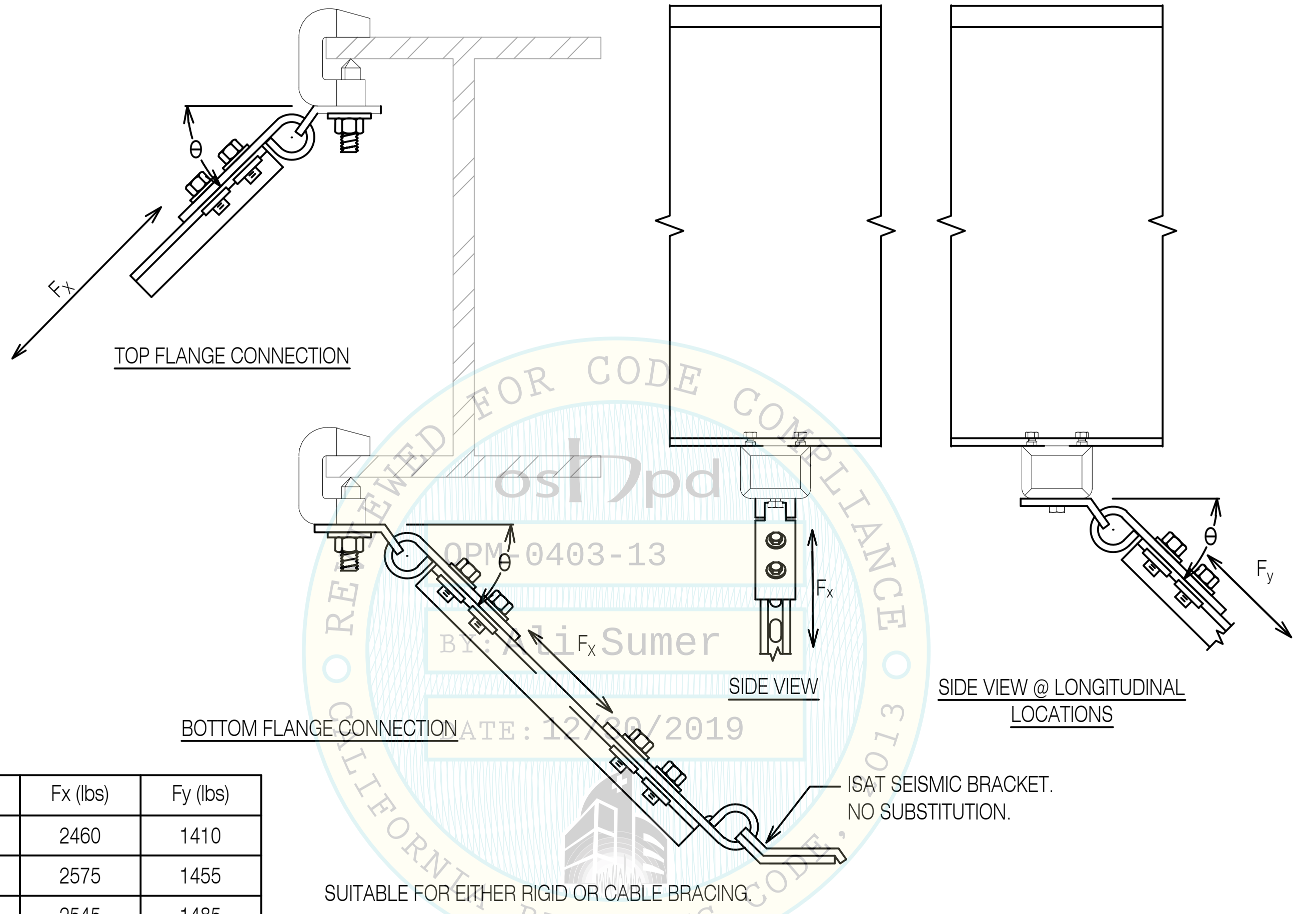

| θ | Fx (lbs) | Fy (lbs) |
|---|---|---|
| 0 | 2460 | 1410 |
| 30 | 2575 | 1455 |
| 45 | 2545 | 1485 |
| 60 | 2300 | 1800 |

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD

# PHD Fig. 045 BEAM CLAMP ASSEMBLY SEISMIC BRACE CONNECTION

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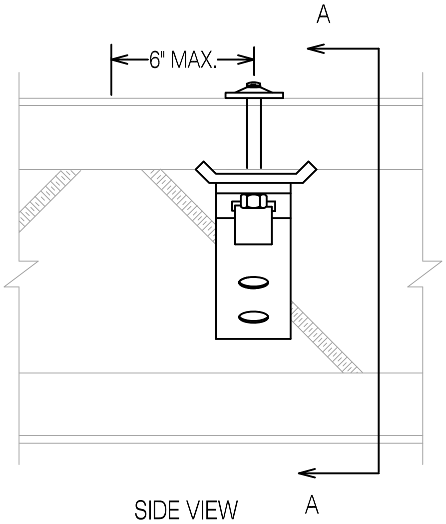
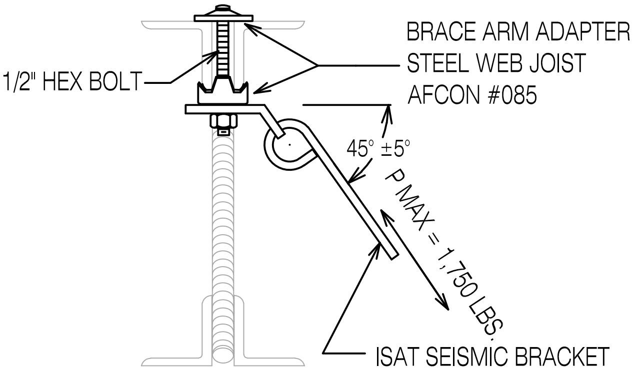


SIDE VIEW



SECTION A-A

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD.

JOIST BRIDGING, CHORD BENDING AND TRANSFER OF LOADS INTO THE STRUCTURAL DIAPHRAGM ARE TO BE DESIGNED BY THE ENGINEER OF RECORD.

# PERPENDICULAR SEISMIC BRACE CONNECTION TO TOP CHORD OF OPEN WEB STEEL JOIST

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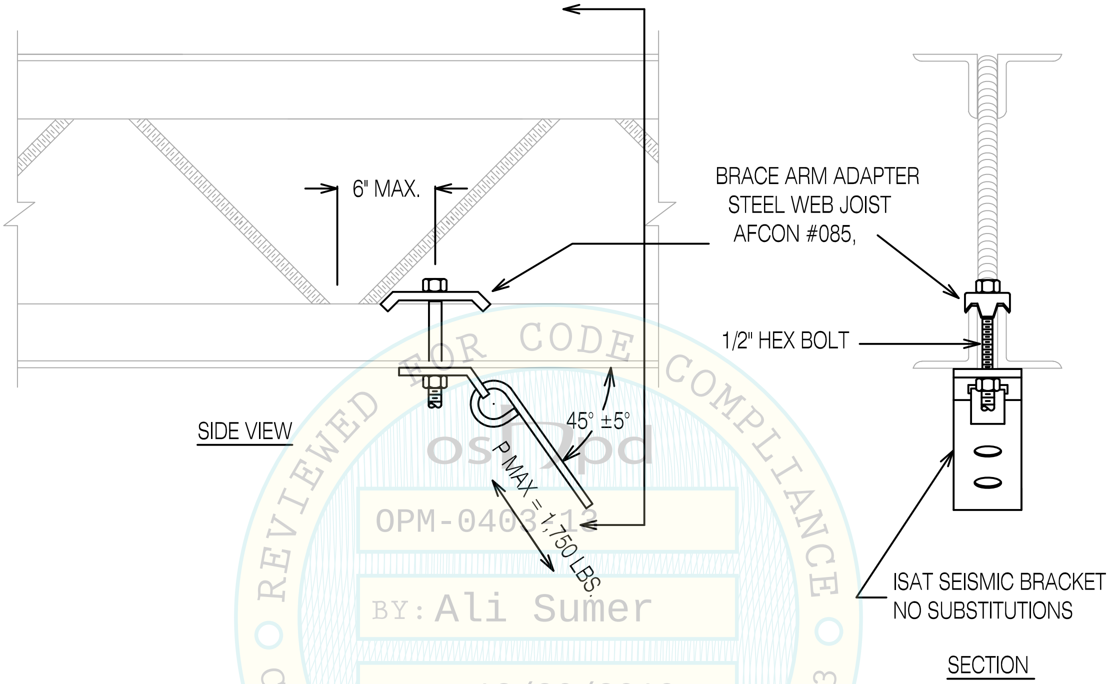

CONNECTION TO STRUCTURAL STEEL SUBJECT TO
PRIOR APPROVAL FROM ENGINEER OF RECORD.

JOIST BRIDGING, CHORD BENDING AND TRANSFER OF LOADS INTO THE
STRUCTURAL DIAPHRAGM ARE TO BE DESIGNED BY THE ENGINEER OF RECORD.

# IN-LINE SEISMIC BRACE CONNECTION TO BOTTOM OF CHORDS OF OPEN WEB STEEL JOIST

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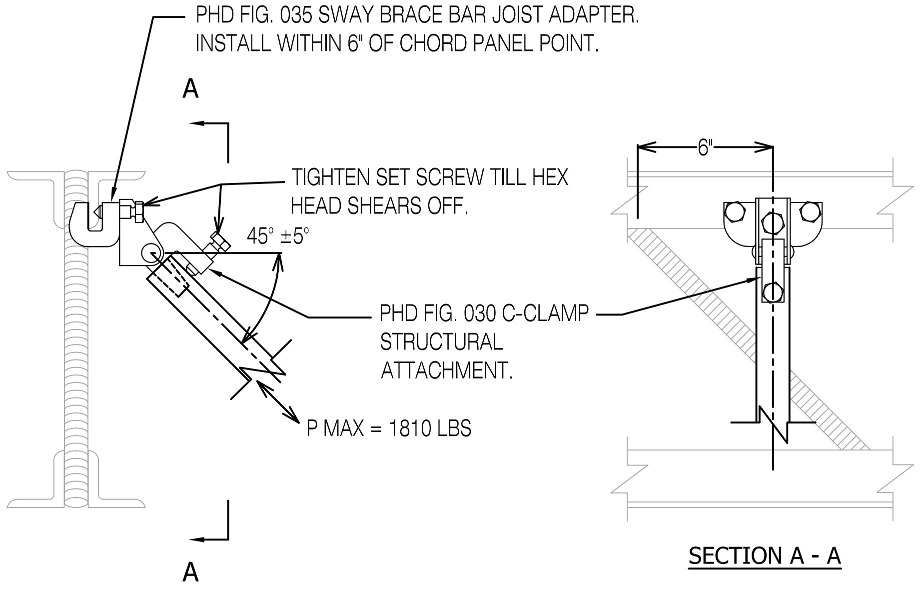
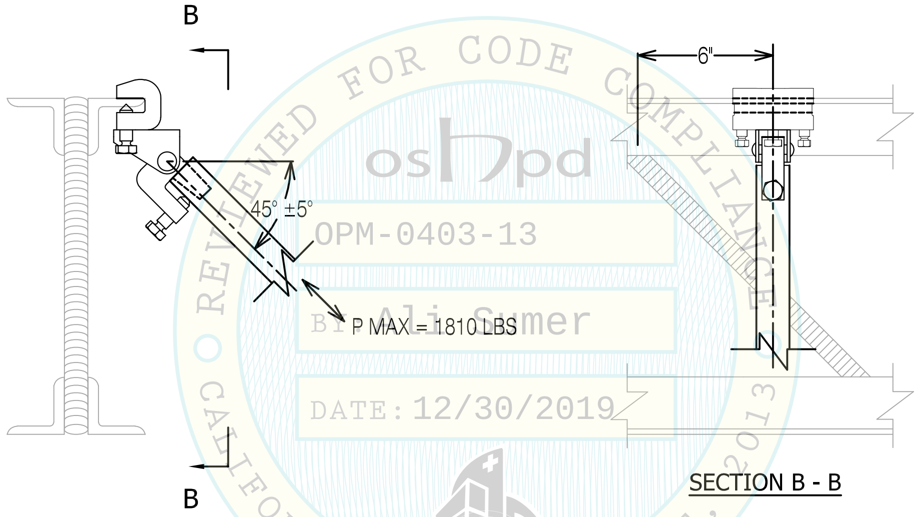


SECTION A - A



SECTION B - B

ALTERNATE ATTACHMENT TO HORIZONTAL FLANGE

NOTES:

1. FM APPROVED WHEN USED WITH 1 TO 2 INCH SCH. 40, GB/T3091, EN10255H OR JISG3454 BRACE PIPE.
2. FM APPROVED WITH BRACE ELEMENT OF STRUCTURAL STEEL 1/4" TO 3/8" INCH THICK.
3. FM APPROVED WITH BRACE ELEMENT OF PHD 1001 OR 1201 SERIES STRUT.

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD.

JOIST BRIDGING, CHORD BENDING AND TRANSFER OF LOADS INTO THE STRUCTURAL DIAPHRAGM ARE TO BE DESIGNED BY THE ENGINEER OF RECORD.

# PERPENDICULAR SEISMIC BRACE CONNECTION TO TOP CHORD OF OPEN WEB STEEL JOIST

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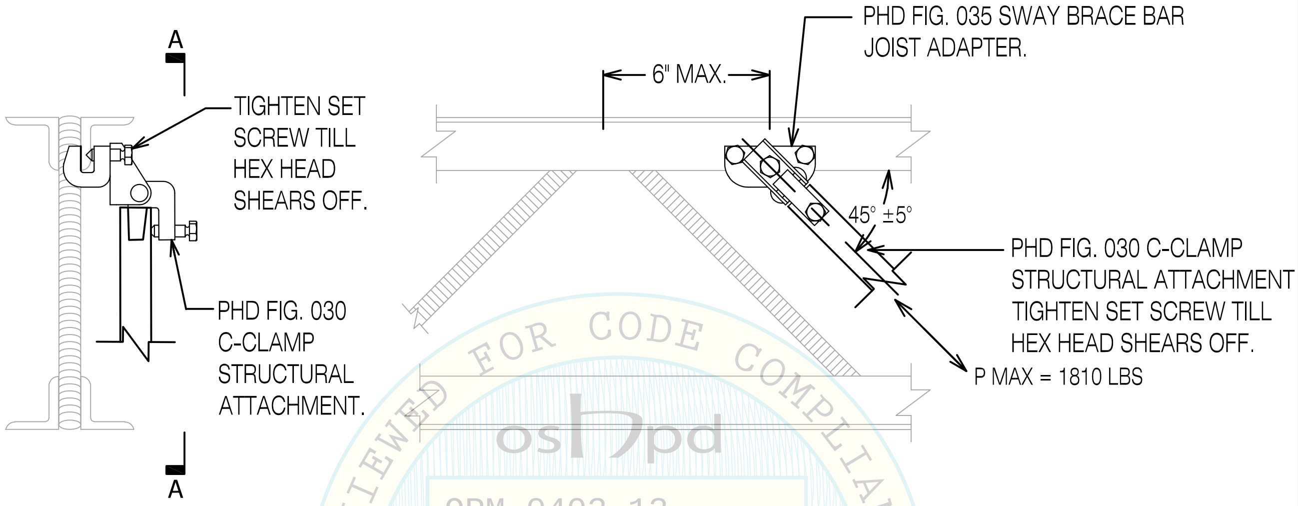

NOTES:

1. FM APPROVED WHEN USED WITH 1 TO 2 INCH SCH. 40, GB/T3091, EN10255H OR JISG3454 BRACE PIPE.
2. FM APPROVED WITH BRACE ELEMENT OF STRUCTURAL STEEL 1/4" TO 3/8" INCH THICK.
3. FM APPROVED WITH BRACE ELEMENT OF PHD 1001 OR 1201 SERIES STRUT.

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD.

JOIST BRIDGING, CHORD BENDING AND TRANSFER OF LOADS INTO THE STRUCTURAL DIAPHRAGM ARE TO BE DESIGNED BY THE ENGINEER OF RECORD.

# IN-LINE SEISMIC BRACE CONNECTION TO SINGLE TOP CHORD OF OPEN WEB STEEL JOIST

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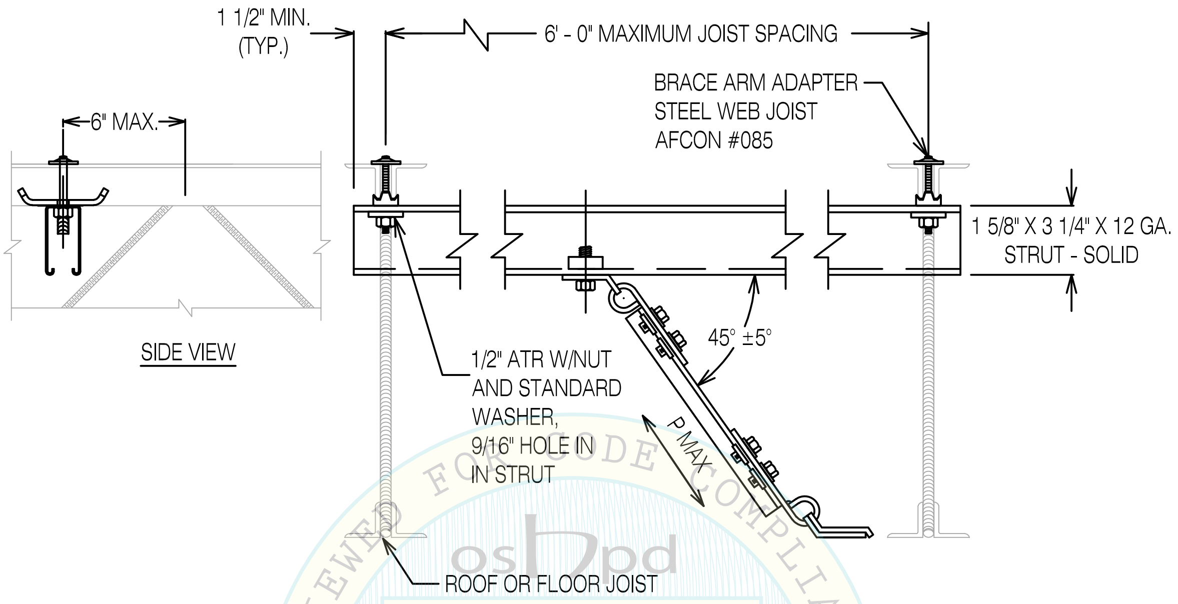

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD.

JOIST BRIDGING, CHORD BENDING AND TRANSFER OF LOADS INTO THE STRUCTURAL DIAPHRAGM ARE TO BE DESIGNED BY THE ENGINEER OF RECORD.

SEISMIC BRACE ANCHOR LOAD (P)
P MAX = 300 LBS PARALLEL TO STRUT AS SHOWN
P MAX = 150 LBS ROTATE TO ANY ANGLE AROUNG BOLT

# STRUT CONNECTION TO STEEL BAR JOIST
# SEISMIC BRACE CONNECTION

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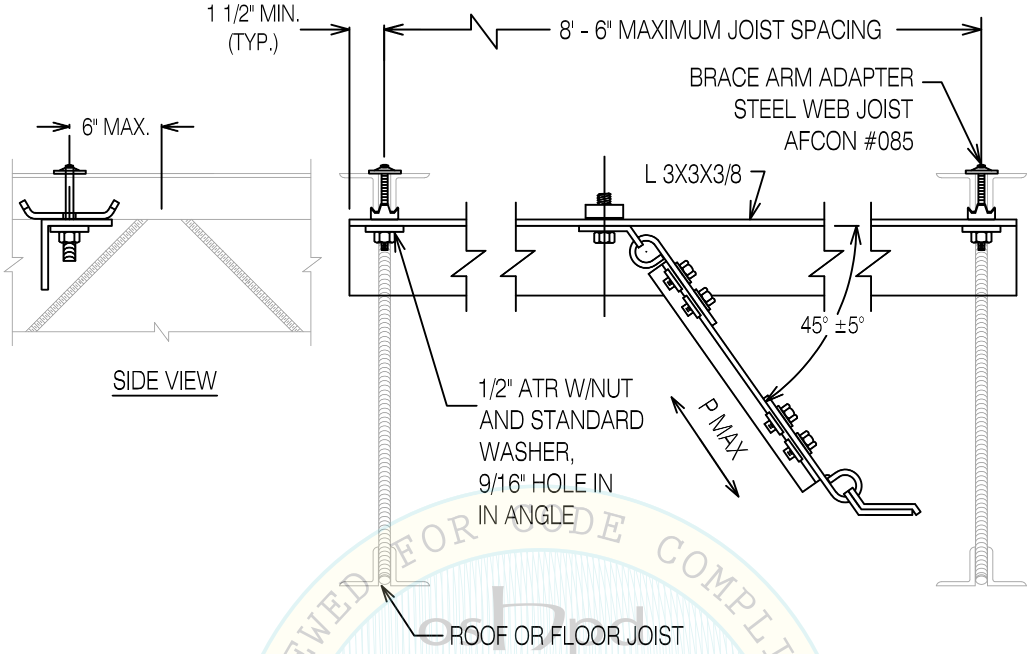

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD.

JOIST BRIDGING, CHORD BENDING AND TRANSFER OF LOADS INTO THE STRUCTURAL DIAPHRAGM ARE TO BE DESIGNED BY THE ENGINEER OF RECORD.

SEISMIC BRACE ANCHOR LOAD (P)

P MAX = 1,000 LBS PARALLEL TO STRUT AS SHOWN

P MAX = 500 LBS ROTATE TO ANY ANGLE AROUNG BOLT

# STRUCTURAL ANGLE AT STEEL BAR JOIST SEISMIC BRACE CONNECTION

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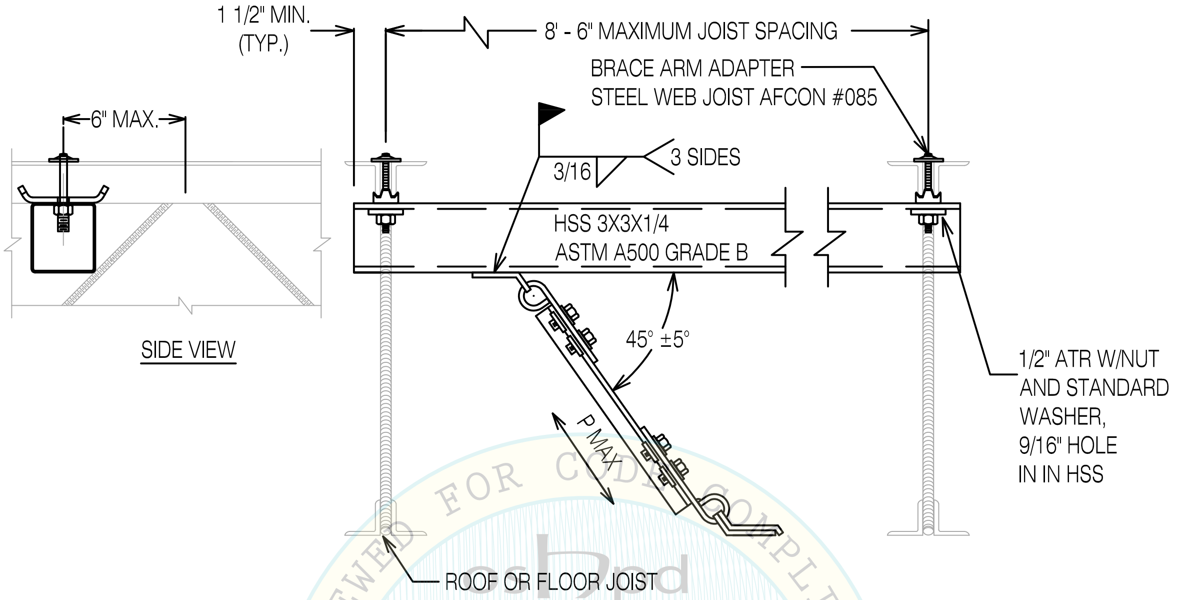

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD.

JOIST BRIDGING, CHORD BENDING AND TRANSFER OF LOADS INTO THE STRUCTURAL DIAPHRAGM ARE TO BE DESIGNED BY THE ENGINEER OF RECORD.

SEISMIC BRACE ANCHOR LOAD P MAX = 1500 LBS
BRACE MAY BE ROTATED TO ANY ANGLE

# HSS 3X3X1/4 CONNECTION TO STEEL BAR JOIST SEISMIC BRACE CONNECTION

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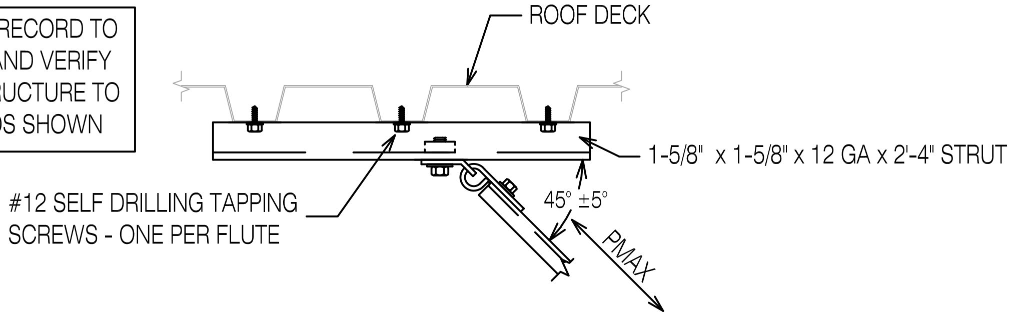
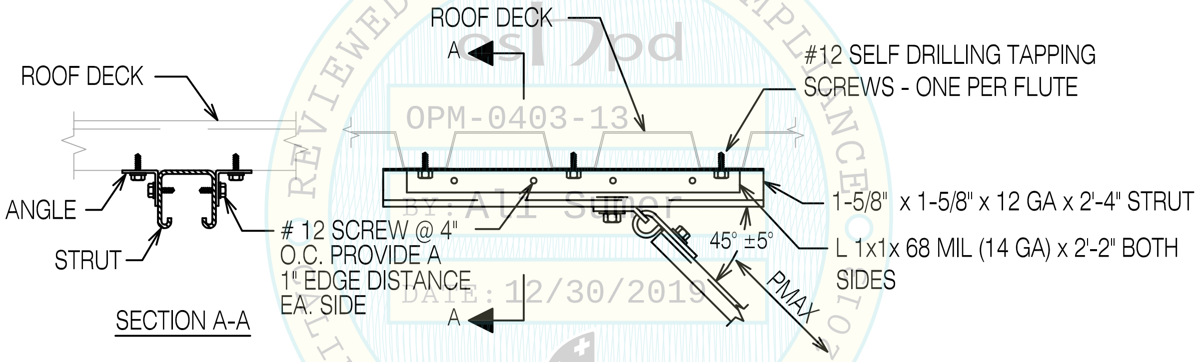
STRUCTURAL ENGINEER OF RECORD TO CHECK DECK DEFLECTION AND VERIFY CAPACITY OF DECK AND STRUCTURE TO ACCOMMODATE THE LOADS SHOWN



**P MAX FOR STRUT SCREWED DIRECTLY TO THE ROOF DECK (LBS.)**

| Fy (ksi) | DECK THICKNESS | BRACE IN-LINE WITH STRUT (AS SHOWN) | BRACE PERPENDICULAR TO STRUT (OR AT ANY ANGLE) |
|---|---|---|---|
| 33 | 33 MIL (20 GAGE) | 200 | 95 |
| 33 | 43 MIL (18 GAGE) | 250 | 125 |
| 50 | 54 MIL (16 GAGE) | 350 | 160 |

DETAIL 1 - SINGLE STRUT SCREWED DIRECTLY TO ROOF DECK



**P MAX FOR ANGLES SCREWED DIRECTLY TO THE ROOF DECK (LBS.)**

| Fy (ksi) | DECK THICKNESS | BRACE IN-LINE WITH STRUT (AS SHOWN) | BRACE PERPENDICULAR TO STRUT (OR AT ANY ANGLE) |
|---|---|---|---|
| 33 | 33 MIL (20 GAGE) | 400 | 190 |
| 33 | 43 MIL (18 GAGE) | 500 | 250 |
| 50 | 54 MIL (16 GAGE) | 700 | 320 |

DETAIL 2 - SINGLE STRUT WITH ANGLES ON BOTH SIDES

# ROOF DECK CONNECTION DETAILS AT SEISMIC BRACE LOCATIONS

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## INSTALLATION REQUIREMENTS
## CONNECTIONS TO WOOD FRAMING

### GENERAL

1. THE STRUCTURAL ENGINEER OF RECORD (SEOR) SHALL CONFIRM THE SUITABILITY OF THE STRUCTURE TO ACCOMMODATE THE LOADS SHOWN.
2. THE BLOCKING AND CONNECTION TO THE STRUCTURAL DIAPHRAGM REQUIRED TO TRANSFER THE LOADS SHOWN INTO THE STRUCTURAL SYSTEM ARE TO BE DESIGNED BY THE STRUCTURAL ENGINEER OF RECORD.
3. WOOD SPECIFIC GRAVITY SHALL BE 0.50 MINIMUM.

### LAG SCREWS

1. LAG SCREWS SHALL CONFORM TO DIMENSIONAL REQUIREMENTS OF ANSI/ASME STANDARD B18.2.1 - 2010. SAE J429 GRADE 1 OR A307 GRADE A.
2. LEAD HOLES FOR LAG SCREWS SHALL BE BORED AS FOLLOWS:
    A. THE CLEARANCE HOLE FOR THE SHANK SHALL HAVE THE SAME DIAMETER AS THE SHANK AND THE SAME DEPTH OF PENETRATION AS THE LENGTH FO UNTHREADED SHANK.
    B. THE LEAD HOLE FOR THE THREADED PORTION SHALL HAVE A DIAMETER EQUAL TO 40 % TO 70% OF THE SHANK DIAMETER AND A LENGTH OF AT LEAST THE LENGTH OF THE THREADED PORTION.
3. THE THREADED PORTION OF THE LAG BOLT SHALL BE INSERTED IN ITS LEAD HOLE BY TURNING WITH A WRENCH, NOT BY DRIVING WITH A HAMMER IN COMPLIANCE WITH PROVISIONS OF THE 2005 N.D.S., SECTION 11.1.3.4.
4. SOAP OR OTHER LUBRICANT SHALL BE USED ON THE LAG SCREW OR IN THE LEAD HOLES TO FACILITATE INSERTION AND PREVENT DAMAGE TO THE LAG SCREW

### THROUGH BOLT CONNECTIONS

1. BOLTS SHALL CONFORM TO DIMENSIONAL REQUIREMENTS OF ANSI/ASME STANDARD B18.2.1.
2. HOLES SHALL BE A MINIMUM OF 1/32" TO A MAXIMUM OF 1/16" LARGER THAN THE BOLT DIAMETER.
3. DESIGN VALUES APPLY TO CONNECTIONS WHICH HAVE BEEN TIGHTENED.
4. PLATE WASHERS ARE REQUIRED FOR ALL BOLTED CONNECTIONS.

MINIMUM SIZES FOR SQUARE PLATE
WASHER UNDER ALL BOLT HEADS AND/OR NUTS
NUTS IN CONTACT WITH WOOD MEMBERS

| BOLT SIZE | PLATE WASHER SIZE |
|---|---|
| 1/2" DIAMETER | 3/16" THK X 2" X 2" |
| 5/8" DIAMETER | 1/4" THK X 2 1/2" X 2 1/2" |
| 3/4" DIAMETER | 5/16" THK X 2 3/4" X 2 3/4" |

# INSTALLATION REQUIREMENTS - WOOD CONNECTIONS

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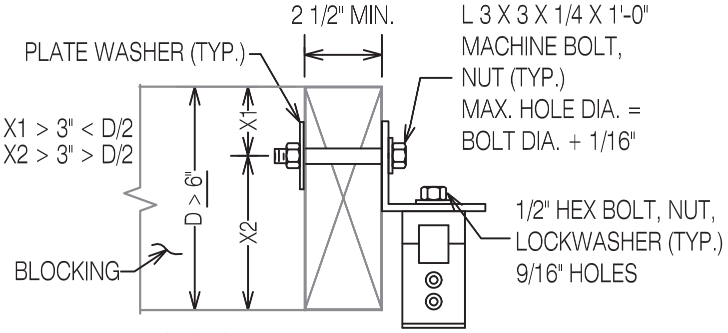

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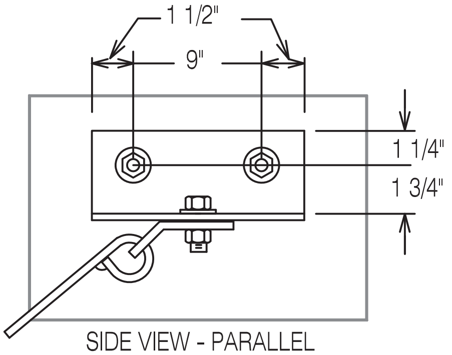
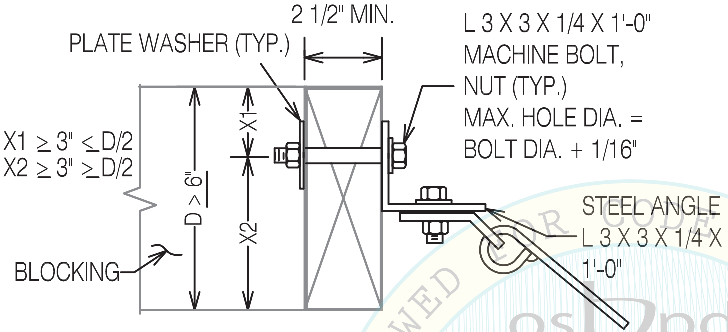


SIDE VIEW - PARALLEL



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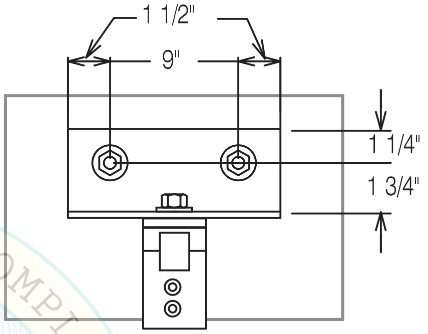
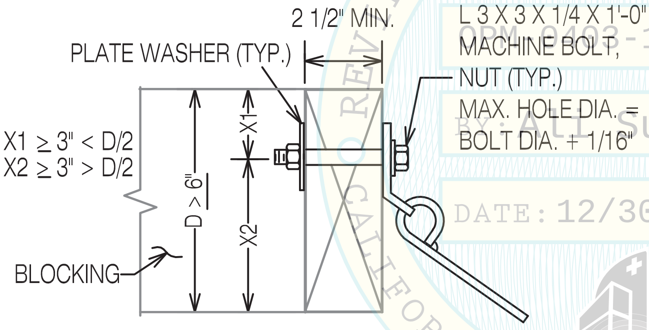


SIDE VIEW - PERPENDICULAR



SECTION

SINGLE BOLT

WOOD SPECIES SPECIFIC GRAVITY G = 0.50 MIN. PLATE WASHER REQ'D UNDER BOLT HEAD OR NUT BEARING ON WOOD. REFER TO INSTALLATION REQUIREMENTS PAGE D6.1.

NOTE: ENGINEER OF RECORD TO CONFIRM SUITABILITY OF STRUCTURE TO ACCOMMODATE THE LOADS SHOWN BELOW.

DESIGN AND DETAILING OF BLOCKING REQUIRED FOR STRUCTURAL STABILITY AND TIES TO HORIZONTAL DIAPHRAGM ARE TO BE BY THE STRUCTURAL ENGINEER OF RECORD (TYP OF ALL CONFIGURATIONS).

MAX. ALLOWABLE BRACE LOAD
AT 45 DEGREE BRACE ANGLE
BASED ON ALLOWABLE BOLT VALUES
SEISMIC LOAD DURATION FACTOR = 1.6

| BOLT DIAMETER | PARALLEL | | PERPENDICULAR | |
|---|---|---|---|---|
| | 1 BOLT | 2 BOLT | 1 BOLT | 2 BOLT |
| Inch | Lbs. | Lbs. | Lbs. | Lbs. |
| 1/2" | 825 | 1,125 | 720 | 1,560 |
| 5/8" | 1,025 | 1,400 | 920 | 1,840 |
| 3/4" | 1,225 | 1,650 | 1,075 | 2,150 |

# THRU BOLT CONNECTIONS TO STRUCTURAL LUMBER

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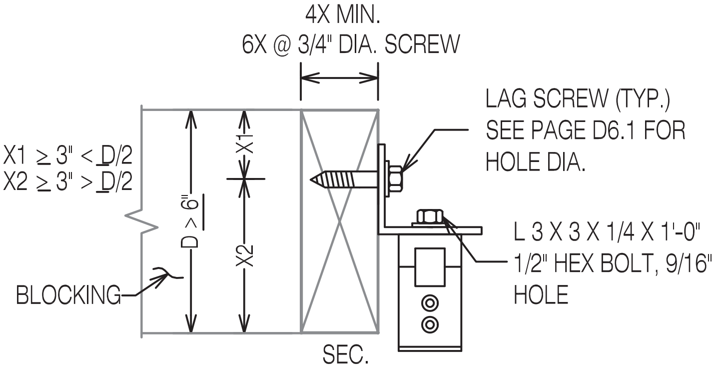

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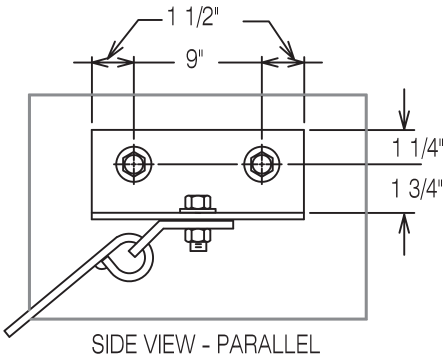
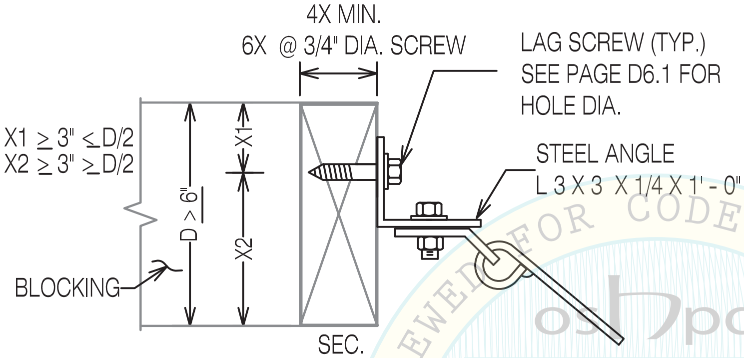


SIDE VIEW - PARALLEL



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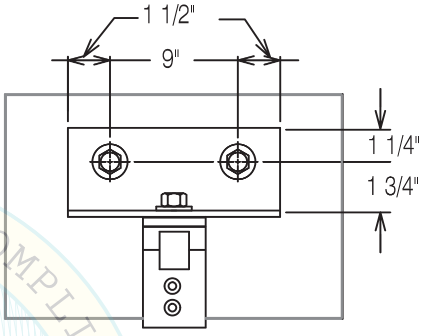
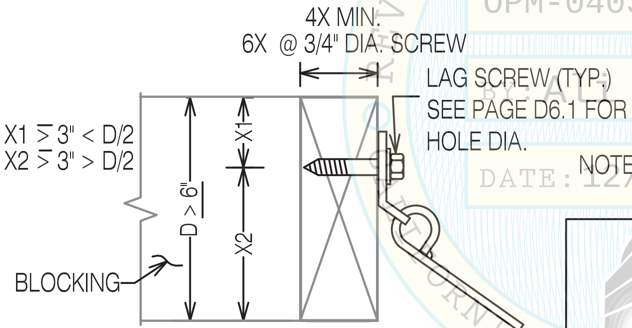


SIDE VIEW - PERPENDICULAR



REFER TO INSTALLATION REQUIREMENTS, PAGE D6.1.
WOOD SPECIES SPECIFIC GRAVITY = 0.50 MIN.

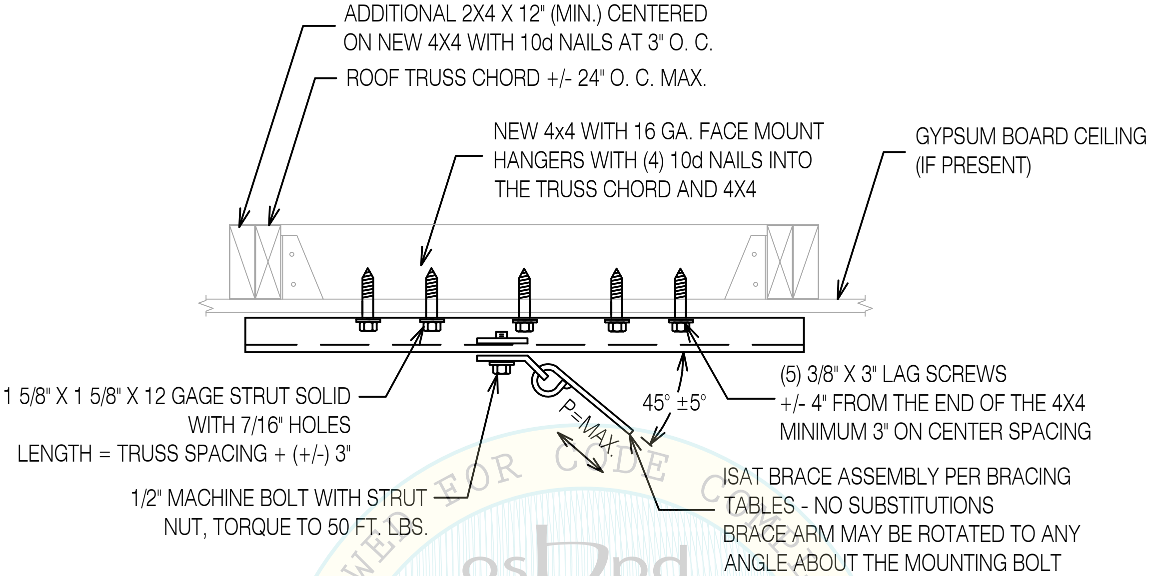
NOTE: ENGINEER OF RECORD TO CONFIRM SUITABILITY OF STRUCTURE TO ACCOMMODATE THE LOADS SHOWN BELOW.

DESIGN AND DETAILING OF BLOCKING REQUIRED FOR STRUCTURAL STABILITY AND TIES TO HORIZONTAL DIAPHRAGM ARE TO BE BY THE STRUCTURAL ENGINEER OF RECORD (TYPICAL OF ALL CONFIGURATIONS).

MAX. ALLOWABLE BRACE LOAD
AT 45 DEGREE BRACE ANGLE
BASED ON ALLOWABLE LAG SCREW VALUES (NDS 2012)
SEISMIC DURATION FACTOR = 1.6

| BOLT DIAMETER | PARALLEL | | PERPENDICULAR | |
|---|---|---|---|---|
| | 1 SCREW | 2 SCREWS | 1 SCREW | 2 SCREWS |
| 1/2" X 3 1/2" | 550 Lbs. | 650 Lbs. | 600 Lbs. | 1,200 Lbs. |
| 5/8" X 3 1/2" | 600 Lbs. | 700 Lbs. | 625 Lbs. | 1,250 Lbs. |
| 3/4" X 5 1/2" | 1,100 Lbs. | 1,500 Lbs. | 1,200 Lbs. | 2,400 Lbs. |

# LAG SCREW CONNECTIONS TO STRUCTURAL LUMBER



P MAX. = 600 LBS. FOR RIGID BRACING
P MAX. = 810 LBS. FOR CABLE BRACING

DESIGN AND DETAILING OF BLOCKING REQUIRED FOR STRUCTURAL STABILITY AND TIES TO HORIZONTAL DIAPHRAGM ARE TO BE BY THE STRUCTURAL ENGINEER OF RECORD.

REFER TO INSTALLATION REQUIREMENTS, PAGE D6.1.
WOOD SPECIES SPECIFIC GRAVITY = 0.50

ENGINEER OF RECORD TO CONFIRM SUITABILITY OF STRUCTURE TO ACCOMMODATE THE LOADS SHOWN.

## WOOD TRUSS DETAILS FOR SEISMIC BRACE CONNECTIONS

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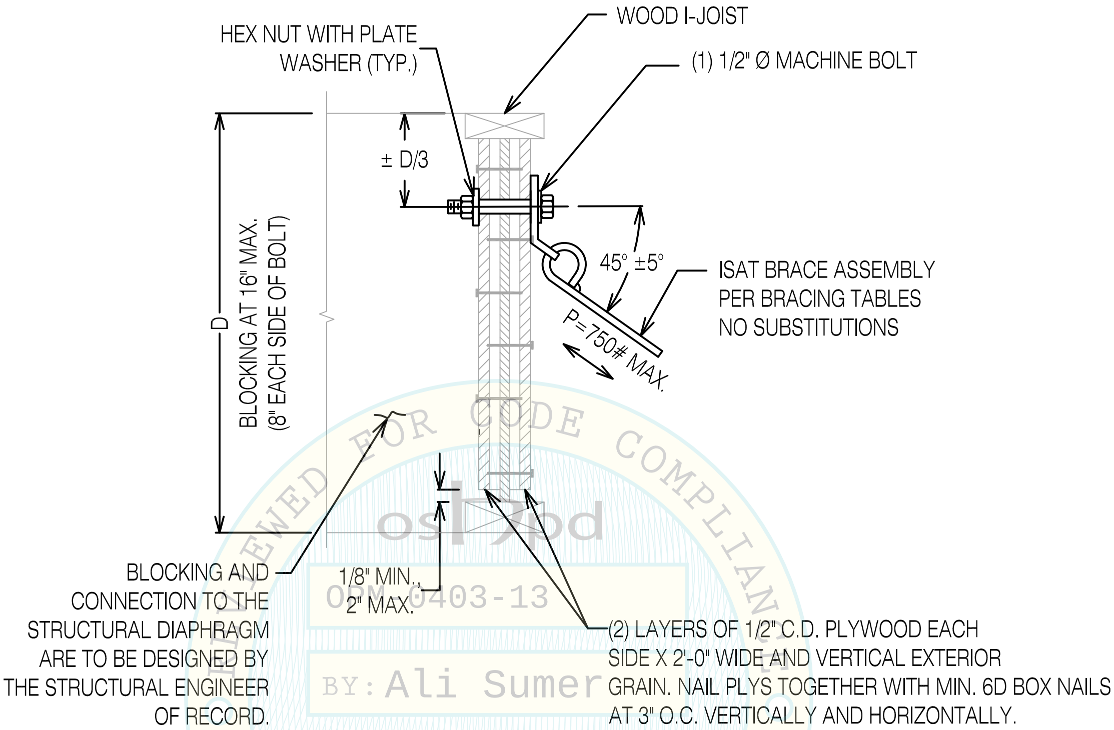

STRUCTURAL ENGINEER OF RECORD TO CONFIRM SUITABILITY OF STRUCTURE TO ACCOMMODATE THE LOADS SHOWN .

# WOOD JOIST WITH BRACE ARM PERPENDICULAR TO JOIST

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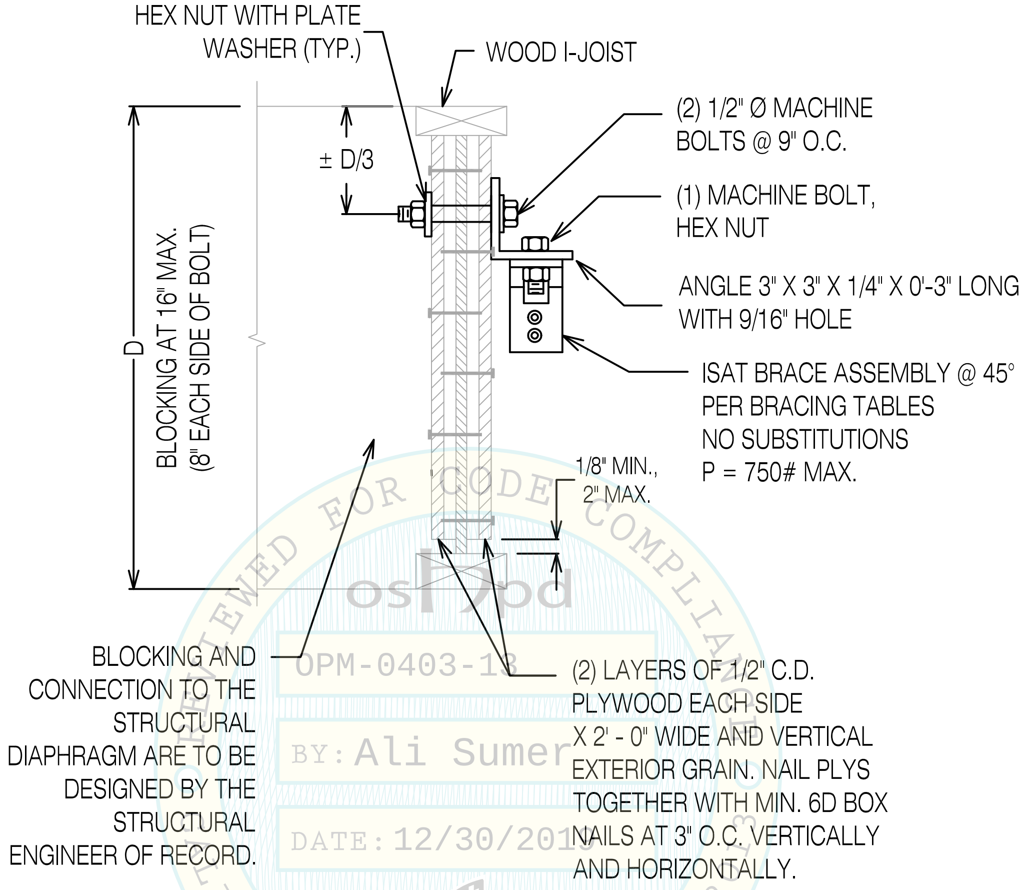

STRUCTURAL ENGINEER OF RECORD TO CONFIRM SUITABILITY OF STRUCTURE TO ACCOMMODATE THE LOADS SHOWN .

## WOOD JOIST WITH BRACE ARM PARALLEL TO JOIST

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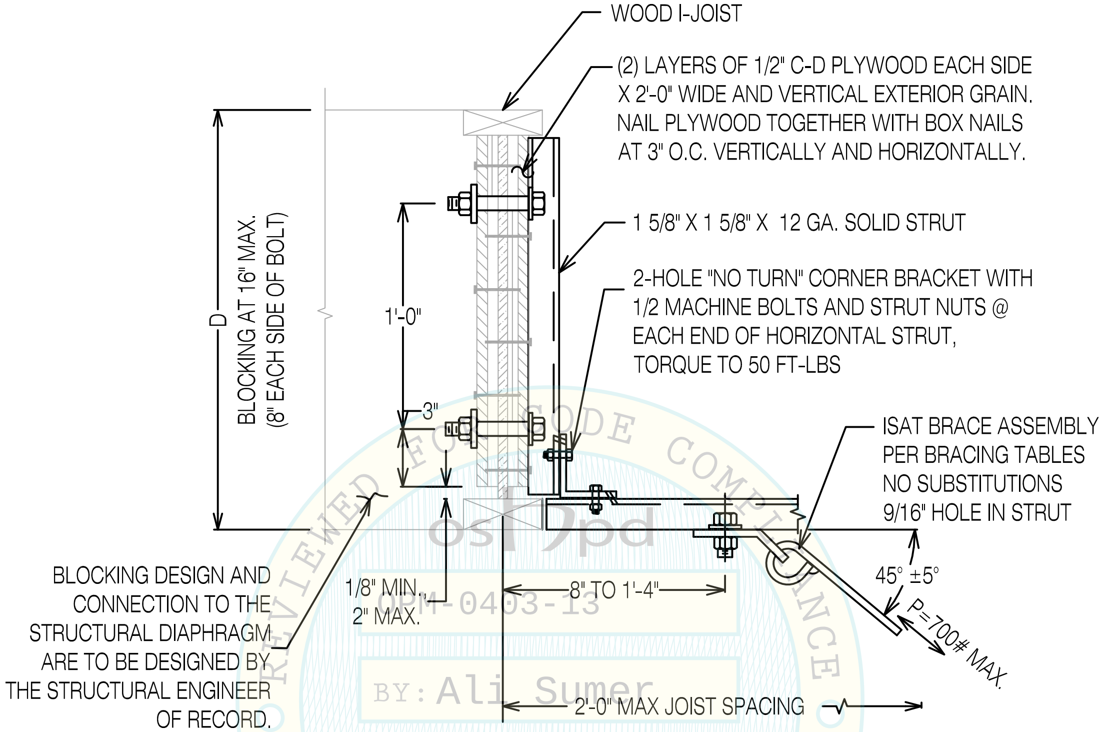

STRUCTURAL ENGINEER OF RECORD TO CONFIRM SUITABILITY OF STRUCTURE TO ACCOMMODATE THE LOADS SHOWN .

# WOOD JOIST WITH BRACE ARM CONNECTION TO STRUT

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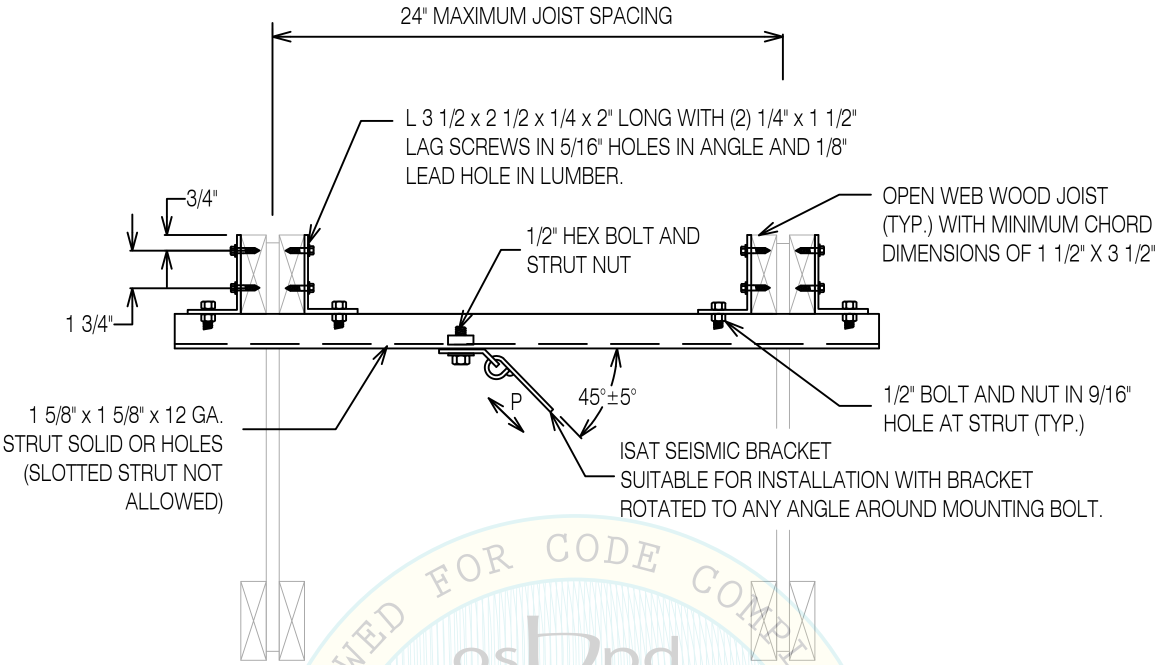

| STRUT | SPACING - INCH | P MAX. - LBS. [1] | BRACE LOCATION |
|---|---|---|---|
| SOLID | 24 | 500 | ANY LOCATION |
| HOLES | 24 | 450 | ANY LOCATION |
| SOLID | 16 | 800 | MIN. 6" FROM JOIST |
| HOLES | 16 | 700 | MIN. 6" FROM JOIST |
| SOLID | 16 | 500 | ANY LOCATION |
| HOLES | 16 | 450 | ANY LOCATION |

1. ALLOWABLE P MAX. BRACE LOAD IS TO BE REDUCED BY 50 PERCENT WHEN ONE ANGLE AND ONE SET OF LAG SCREWS ARE USED AT EACH JOIST.

STRUCTURAL ENGINEER OF RECORD TO CONFIRM SUITABILITY OF STRUCTURE TO ACCOMMODATE THE LOADS SHOWN.

# SPANNING OPEN WEB WOOD JOISTS SEISMIC BRACE CONNECTION

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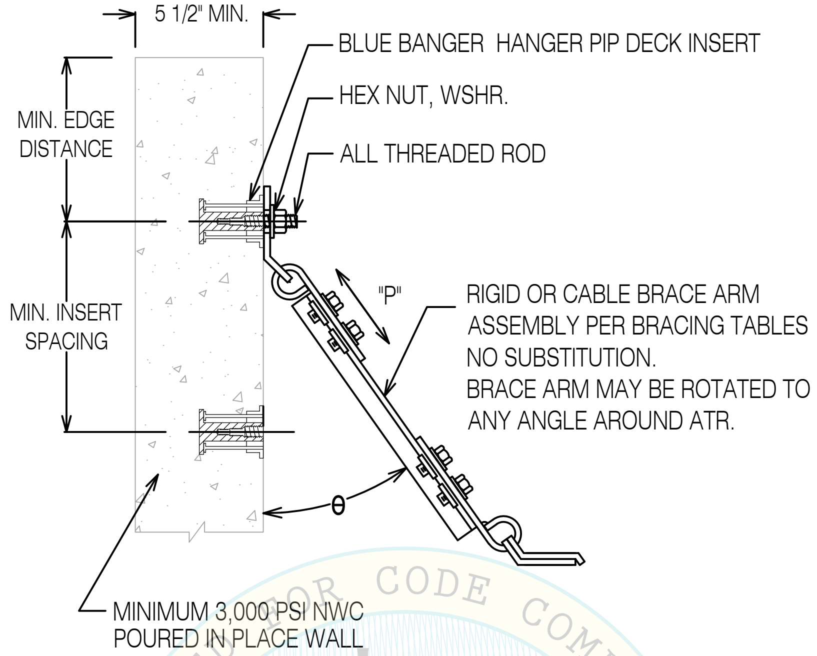

**Blue Banger Hanger Poured-In-Place (PIP) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table 1**

| Brace Anchorage Designation | Deck Insert Part No. | All Thread Rod Dia. (ATR) Inch | Minimum Concrete Strength psi | Maximum Brace Reaction (Fp)[1] | | | | | | Nominal Insert Height Inch | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 6" Min.[2] Lbs | | 5" Min.[2] Lbs | | 4" Min.[2] Lbs | | | |
| | | | | $0° \le \theta \le 45°$ | $45° < \theta \le 90°$ | $0° \le \theta \le 45°$ | $45° < \theta \le 90°$ | $0° \le \theta \le 45°$ | $45° < \theta \le 90°$ | | |
| N6B3 | PIP143812-2 | 1/2 | 3,000 | 736 | 729 | 695 | 689 | 630 | 624 | 2 | 6 |
| N6.1B3 | PIP381258-2 | 5/8 | | 783 | 776 | 726 | 719 | 659 | 652 | | |
| N7B4 | PIP143812-2 | 1/2 | 4,000 | 850 | 842 | 803 | 795 | 727 | 720 | | |
| N7.1B4 | PIP381258-2 | 5/8 | | 905 | 896 | 838 | 830 | 761 | 753 | | |
| N8B5 | PIP143812-2 | 1/2 | 5,000 | 951 | 941 | 898 | 889 | 813 | 805 | | |
| N8.1B5 | PIP381258-2 | 5/8 | | 1,011 | 1,001 | 937 | 1,001 | 851 | 842 | | |
| N8B6 | PIP143812-2 | 1/2 | 6,000 | 1,044 | 1,031 | 986 | 974 | 893 | 882 | | |
| N9B6 | PIP381258-2 | 5/8 | | 1,111 | 1,097 | 1,029 | 1,016 | 934 | 923 | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D. $\Omega o=2.0$
2. MINIMUM INSERT SPACING

# CONCRETE WALL - PIP SEISMIC CONNECTION

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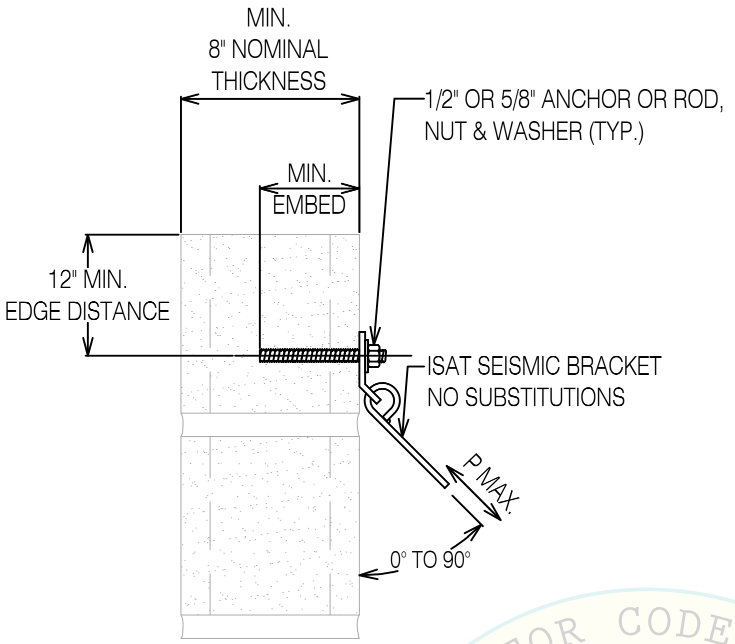
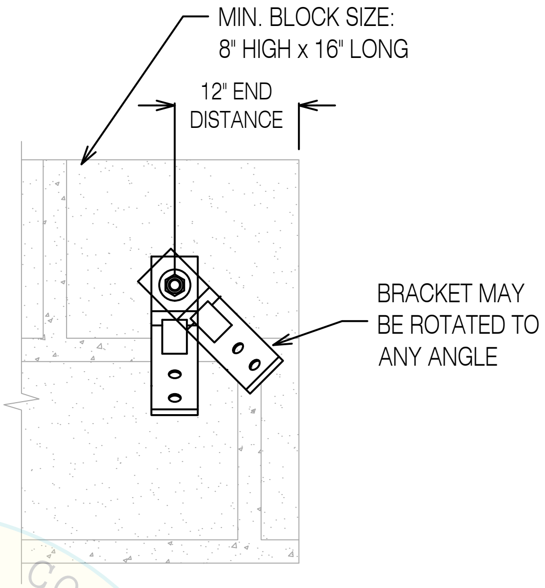


SECTION VIEW



FRONT VIEW

| Anchor Type | ESR Report No. | Anchor Dia. Inch | Min. Embed Inch | Installation Torque Ft-Lbs. | P Max. Tension/Shear Lbs. |
|---|---|---|---|---|---|
| HILTI HIT HY 70 ADHESIVE | 2682 | 1/2 | 4 1/2 | - | 650 |
| HILTI KWIK BOLT 3 EXPANSION | 1385 | 1/2 | 3 1/2 | 25 | 348 |
| | | 5/8 | 4 | 65 | 495 |
| POWERS WEDGE-BOLT SCREW | 1678 | 1/2 | 4 | - | 430 |
| | | 5/8 | 5 | - | 510 |

1. ANCHORS ARE LIMITED TO ONE PER CELL; f'm (@ 28 DAYS) $\geq$ 1500 psi; TYPE I, GRADE N, LIGHT WEIGHT, MEDIUM WEIGHT OR NORMAL WEIGHT CMU CONFORMING TO ASTM C90.
2. MINIMUM ANCHOR SPACING = 8".
3. ANCHORS ARE TO BE INSTALLED AT ANY LOCATION ON THE MASONRY FACE SHELL. ANCHORS MAY NOT BE LOCATED WITHIN 1 1/2" OF THE CENTERS OF THE WEB, HEAD JOINT, OR BED JOINT.
4. P MAX. = LOAD VALUES FOR ANGLES 0° TO 90°.
5. TO SATISFY CONDITIONS OF USE PER EACH OF ICC-ES ESR, SEOR SHALL SUBMIT CALCULATIONS TO DEMONSTRATE THE FOLLOWING:
    a. THE MASONRY WALL IS NOT CRACKED AS DEFINED IN ICC-ES AC-01 §2.3 AND
    b. THE MASONRY WALL WILL NOT CRACK UNDER THE DESIGN EARTHQUAKE LOADS UNDER ALL SERVICE LOAD LOAD CONDITIONS: i.e WALL REMAINS ELASTIC
6. CONDITION OF USE REQUIREMENTS IN ACCORDANCE WITH ESR REPORT, SECTION 5.0

# SINGLE ANCHOR IN UNCRACKED, FULLY GROUTED 8" CMU WALL SEISMIC BRACE CONNECTION

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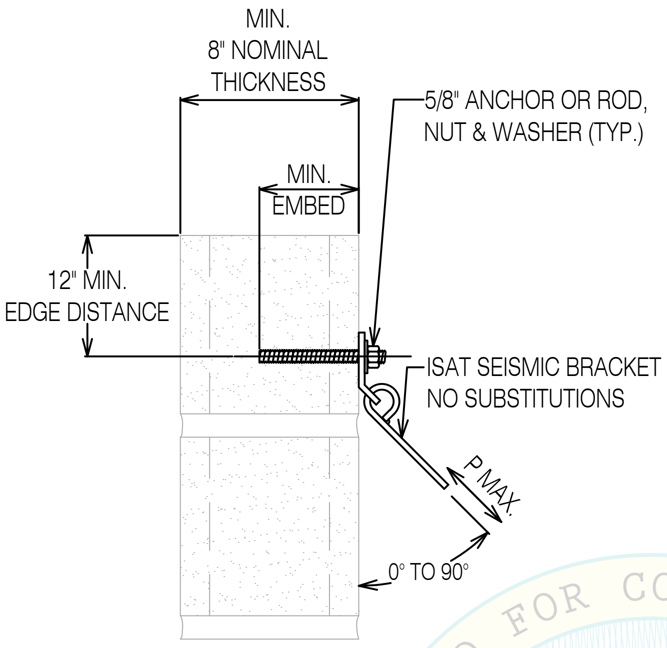
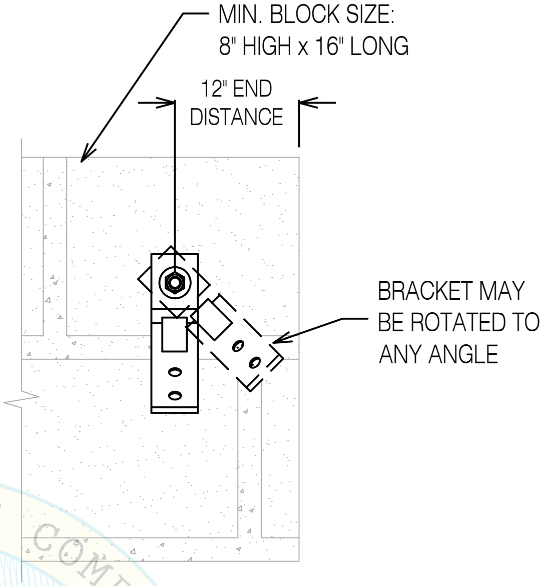


SECTION VIEW



FRONT VIEW

| Anchor Type | ESR Report No. | Anchor Dia. Inch | Min. Embed Inch | Installation Torque Ft-Lbs. | Combined Tension/Shear Lbs. |
|---|---|---|---|---|---|
| HILTI HIT HY 70 ADHESIVE | 2682 | 5/8 | 5 5/8 | - | 430 |
| HILTI KWIK BOLT 3 EXPANSION | 1385 | 5/8 | 4 | 65 | 496 |
| POWERS WEDGE-BOLT SCREW | 1678 | 5/8 | 5 | - | 510 |

1. ANCHORS ARE LIMITED TO ONE PER CELL; f'm (@ 28 DAYS) ≥ 1500 psi; TYPE I, GRADE N, LIGHT WEIGHT, MEDIUM WEIGHT OR NORMAL WEIGHT CMU CONFORMING TO ASTM C90.
2. MINIMUM ANCHOR SPACING = 8".
3. ANCHORS ARE TO BE INSTALLED AT ANY LOCATION ON THE MASONRY FACE SHELL. ANCHORS MAY NOT BE LOCATED WITHIN 1 1/2" OF THE CENTERS OF THE WEB, HEAD JOINT, OR BED JOINT.
4. P MAX. = LOAD VALUES FOR ANGLES 0° TO 90°.
5. TO SATISFY CONDITIONS OF USE PER EACH OF ICC-ES ESR, SEOR SHALL SUBMIT CALCULATIONS TO DEMONSTRATE THE FOLLOWING:
    a. THE MASONRY WALL IS NOT CRACKED AS DEFINED IN ICC-ES AC-01 §2.3 AND
    b. THE MASONRY WALL WILL NOT CRACK UNDER THE DESIGN EARTHQUAKE LOADS UNDER ALL SERVICE LOAD LOAD CONDITIONS: i.e WALL REMAINS ELASTIC
6. CONDITION OF USE REQUIREMENTS IN ACCORDANCE WITH ESR REPORT, SECTION 5.0

# SINGLE ANCHOR IN UNCRACKED, FULLY GROUTED 12" CMU WALL
# SEISMIC BRACE CONNECTION

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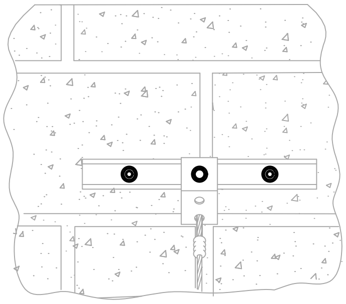
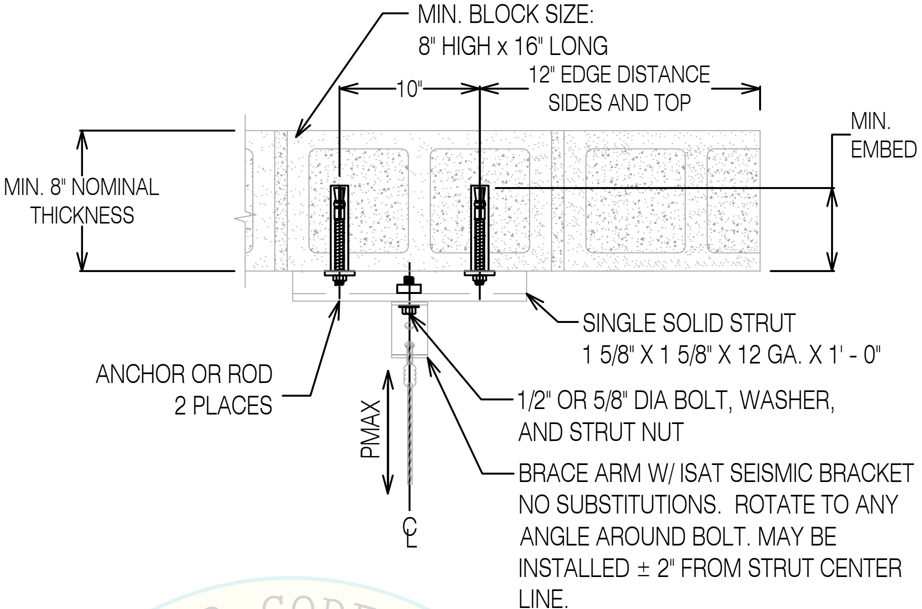


FRONT VIEW



TOP VIEW

| Anchor Type | ESR Report No. | Anchor Dia. Inch | Min. Embed Inch | Installation Torque Ft-Lbs. | P Max. Tension/Shear Lbs. |
|---|---|---|---|---|---|
| HILTI HIT HY 70 ADHESIVE | 2682 | 1/2 | 4 1/2 | - | 920 |
| HILTI KWIK BOLT 3 EXPANSION | 1385 | 1/2 | 3 1/2 | 25 | 620 |
| | | 5/8 | 4 | 65 | 850 |
| POWERS WEDGE-BOLT SCREW | 1678 | 1/2 | 4 | - | 610 |
| | | 5/8 | 5 | - | 730 |

1. ANCHORS ARE LIMITED TO ONE PER CELL; f'm (@ 28 DAYS) ≥ 1500 psi; TYPE I, GRADE N, LIGHT WEIGHT, MEDIUM WEIGHT OR NORMAL WEIGHT CMU CONFORMING TO ASTM C90.
2. MINIMUM ANCHOR SPACING = 8".
3. ANCHORS ARE TO BE INSTALLED AT ANY LOCATION ON THE MASONRY FACE SHELL. ANCHORS MAY NOT BE LOCATED WITHIN 1 1/2" OF THE CENTERS OF THE WEB, HEAD JOINT, OR BED JOINT.
4. P MAX. = LOAD VALUES FOR ANGLES 0° TO 90°.
5. TO SATISFY CONDITIONS OF USE PER EACH OF ICC-ES ESR, SEOR SHALL SUBMIT CALCULATIONS TO DEMONSTRATE THE FOLLOWING:
   a. THE MASONRY WALL IS NOT CRACKED AS DEFINED IN ICC-ES AC-01 §2.3 AND
   b. THE MASONRY WALL WILL NOT CRACK UNDER THE DESIGN EARTHQUAKE LOADS UNDER ALL SERVICE LOAD LOAD CONDITIONS: i.e WALL REMAINS ELASTIC
6. CONDITION OF USE REQUIREMENTS IN ACCORDANCE WITH ESR REPORT, SECTION 5.0

# DUAL ANCHOR IN UNCRACKED, FULLY GROUTED 8" CMU WALL SEISMIC BRACE CONNECTION

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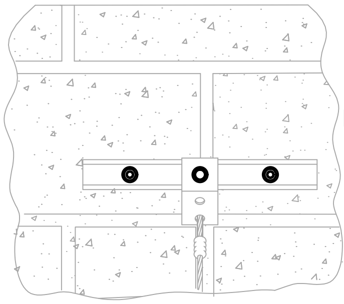
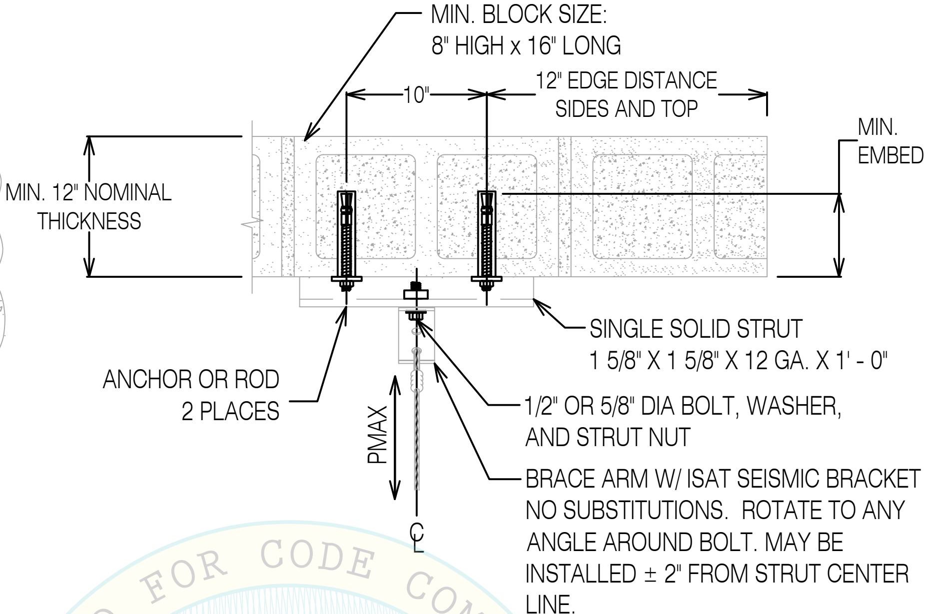


FRONT VIEW



TOP VIEW

| Anchor Type | ESR Report No. | Anchor Dia. Inch | Min. Embed Inch | Installation Torque Ft-Lbs. | P Max. Tension/Shear Lbs. |
|---|---|---|---|---|---|
| HILTI HIT HY 70 ADHESIVE | 2682 | 5/8 | 5 5/8 | - | 610 |
| HILTI KWIK BOLT 3 EXPANSION | 1385 | 1/2 | 3 1/2 | 25 | 620 |
| | | 5/8 | 4 | 65 | 850 |
| POWERS WEDGE-BOLT SCREW | 1678 | 1/2 | 4 | - | 610 |
| | | 5/8 | 5 | - | 730 |

1. ANCHORS ARE LIMITED TO ONE PER CELL; f'm (@ 28 DAYS) ≥ 1500 psi; TYPE I, GRADE N, LIGHT WEIGHT, MEDIUM WEIGHT OR NORMAL WEIGHT CMU CONFORMING TO ASTM C90.
2. MINIMUM ANCHOR SPACING = 8".
3. ANCHORS ARE TO BE INSTALLED AT ANY LOCATION ON THE MASONRY FACE SHELL. ANCHORS MAY NOT BE LOCATED WITHIN 1 1/2" OF THE CENTERS OF THE WEB, HEAD JOINT, OR BED JOINT.
4. P MAX. = LOAD VALUES FOR ANGLES 0° TO 90°.
5. TO SATISFY CONDITIONS OF USE PER EACH OF ICC-ES ESR, SEOR SHALL SUBMIT CALCULATIONS TO DEMONSTRATE THE FOLLOWING:
   a. THE MASONRY WALL IS NOT CRACKED AS DEFINED IN ICC-ES AC-01 §2.3 AND
   b. THE MASONRY WALL WILL NOT CRACK UNDER THE DESIGN EARTHQUAKE LOADS UNDER ALL SERVICE LOAD LOAD CONDITIONS: i.e WALL REMAINS ELASTIC
6. CONDITION OF USE REQUIREMENTS IN ACCORDANCE WITH ESR REPORT, SECTION 5.0

# DUAL ANCHOR IN UNCRACKED, FULLY GROUTED 12" CMU WALL SEISMIC BRACE CONNECTION

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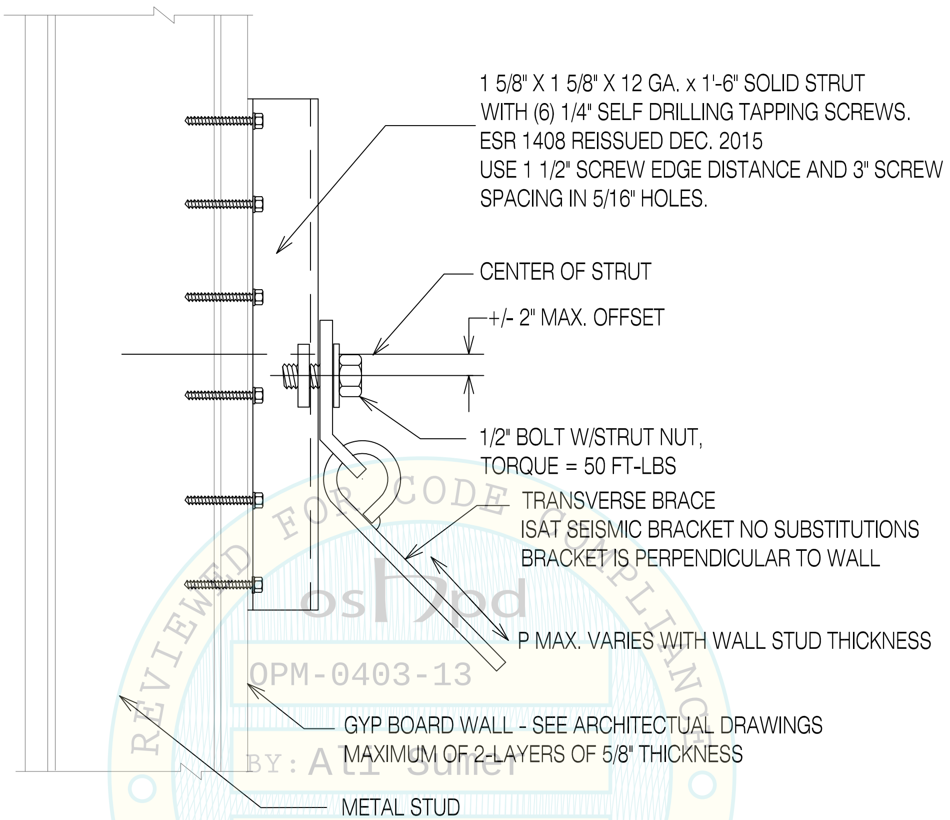

PRIOR APPROVAL FROM ENGINEER OF RECORD REQUIRED
PRIOR TO INSTALLING SEISMIC BRACE CONNECTION.

| WALL STUD THICKNESS | P MAX. - LBS. |
|---|---|
| 33 MIL STRUCT (20 GA.) | 250 |
| 43 MIL (18 GA.) | 350 |
| 54 MIL (16 GA.) | 400 |

NOTES:
1. SEOR SHALL DESIGN WALL STUDS & BACKING
2. SEOR TO PROVIDE SUPPORTING STRUCTURE TO SUPPORT FORCES SHOWN IN ADDITION TO ALL OTHER LOADS

# METAL WALL STUD
# TRANSVERSE SEISMIC BRACE CONNECTION

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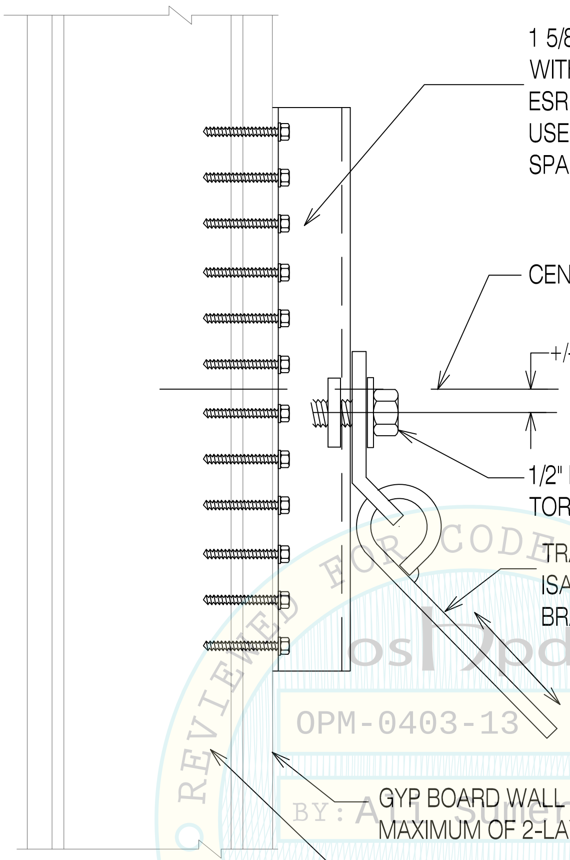

1 5/8" X 1 5/8" X 12 GA. x 2'-0" SOLID STRUT
WITH (12) 1/4 -14 SELF DRILLING TAPPING SCREWS.
ESR 1408 REISSUED DEC. 2015
USE 1 1/2" SCREW EDGE DISTANCE AND 2" SCREW
SPACING IN 5/16" HOLES.

CENTER OF STRUT

+/- 2" MAX. OFFSET

1/2" BOLT W/STRUT NUT,
TORQUE = 50 FT-LBS

TRANSVERSE BRACE
ISAT SEISMIC BRACKET NO SUBSTITUTIONS
BRACKET IS PERPENDICULAR TO WALL

P MAX. VARIES WITH WALL STUD THICKNESS

GYP BOARD WALL - SEE ARCHITECTUAL DRAWINGS
MAXIMUM OF 2-LAYERS OF 5/8" THICKNESS

BACK-TO-BACK METAL STUD

PRIOR APPROVAL FROM ENGINEER OF RECORD REQUIRED
PRIOR TO INSTALLING SEISMIC BRACE CONNECTION.

| WALL STUD THICKNESS | P MAX. - LBS. |
|---|---|
| 2 X 33 MIL STRUCT (20 GA.) | 450 |
| 2 X 43 MIL (18 GA.) | 600 |
| 2 X 54 MIL (16 GA.) | 700 |

NOTES:

1. SEOR SHALL DESIGN WALL STUDS & BACKING
2. SEOR TO PROVIDE SUPPORTING STRUCTURE TO SUPPORT FORCES SHOWN IN ADDITION TO ALL OTHER LOADS

# BACK-TO-BACK METAL WALL STUD TRANSVERSE SEISMIC BRACE CONNECTION

ANTHONY A. RUBALCAVA
S 4710

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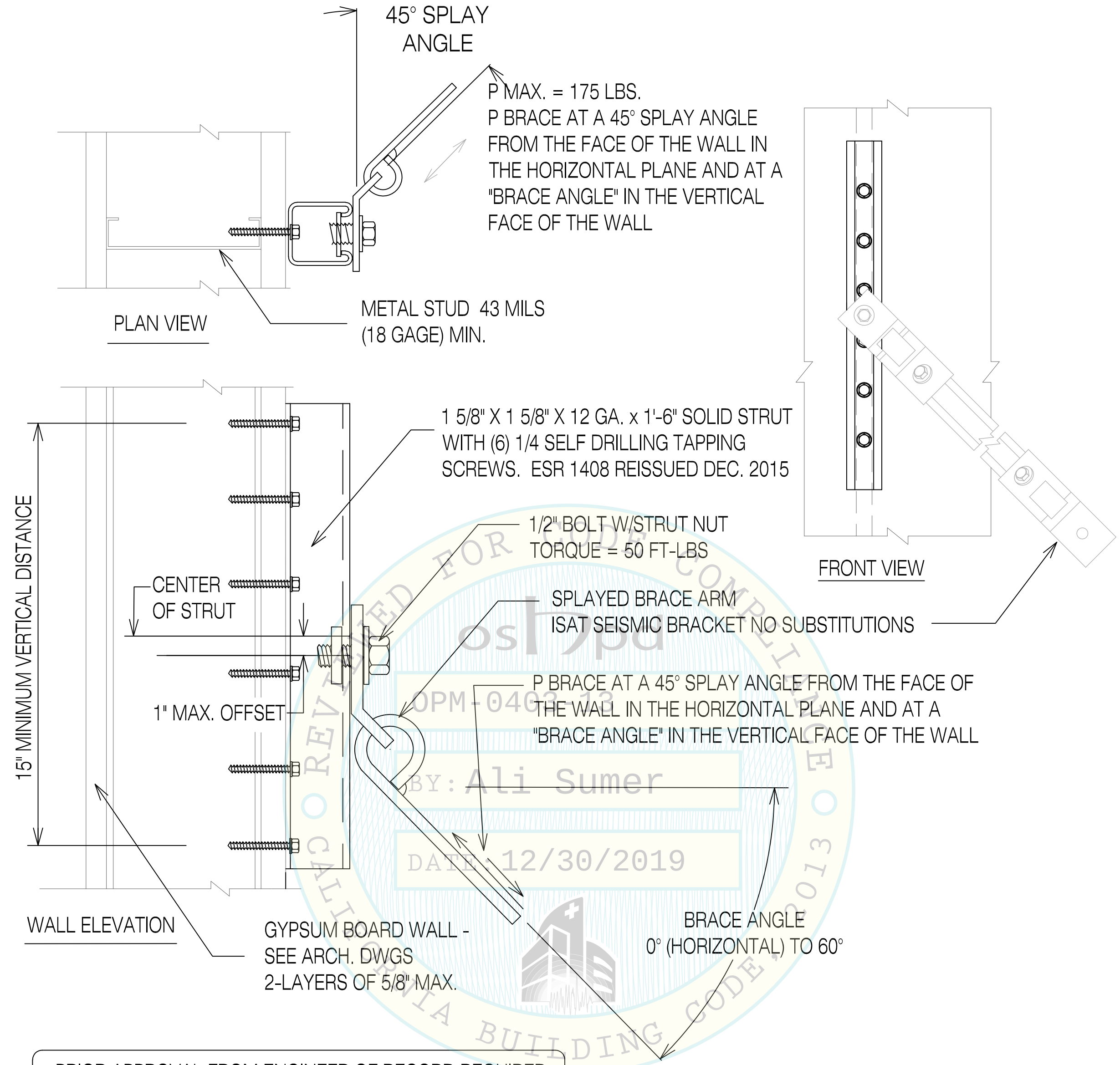

PRIOR APPROVAL FROM ENGINEER OF RECORD REQUIRED PRIOR TO INSTALLING SEISMIC BRACE CONNECTION.

| WALL STUD THICKNESS | P MAX. - LBS. |
|---|---|
| 33 MIL STRUCT (20 GA.) | 100 |
| 43 MIL (18 GA.) | 150 |
| 54 MIL (16 GA.) | 175 |

NOTES:

1. SEOR SHALL DESIGN WALL STUDS & BACKING
2. SEOR TO PROVIDE SUPPORTING STRUCTURE TO SUPPORT FORCES SHOWN IN ADDITION TO ALL OTHER LOADS

# METAL WALL STUD SPLAYED SEISMIC BRACE CONNECTION

ANTHONY A. RUBALCAVA
S 4710

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PRIOR APPROVAL FROM ENGINEER OF RECORD REQUIRED
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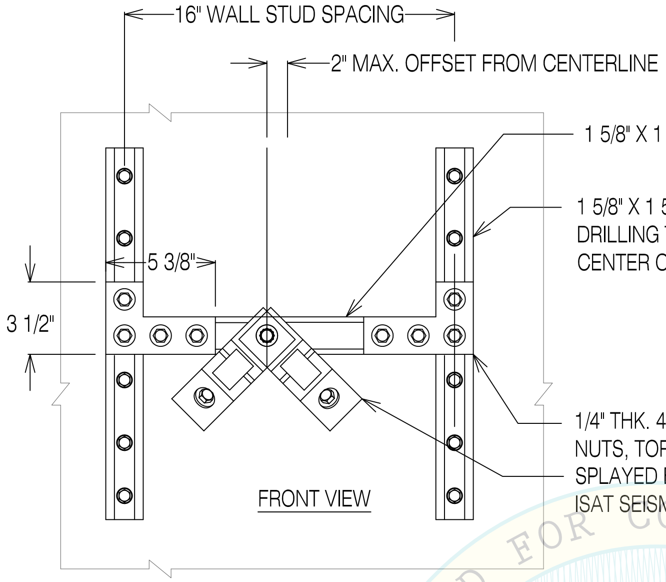

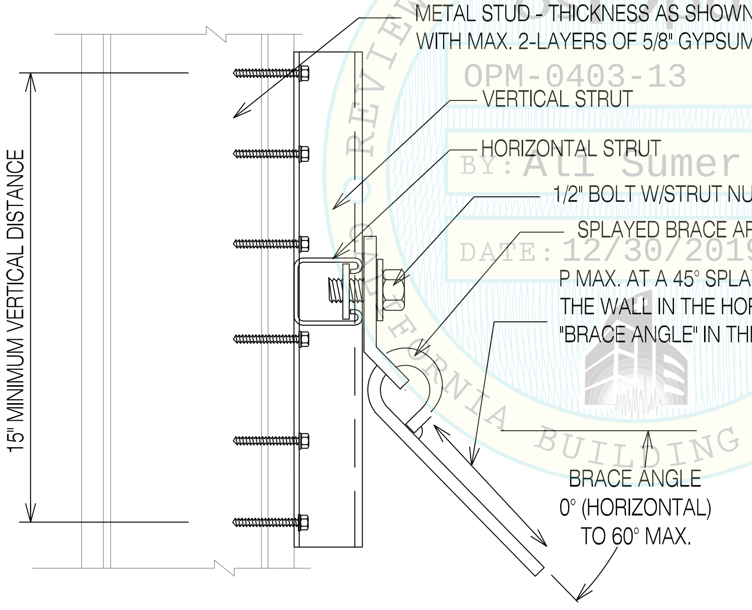

| WALL STUD THICKNESS | P MAX. - LBS. |
|---|---|
| 33 MIL STRUCT (20 GA.) | 250 |
| 43 MIL (18 GA.) | 350 |
| 54 MIL (16 GA.) | 450 |

BRACE FORCE LISTED, (P MAX), IS THE SUM OF BOTH BRACES

NOTES:

1. SEOR SHALL DESIGN WALL STUDS & BACKING
2. SEOR TO PROVIDE SUPPORTING STRUCTURE TO SUPPORT FORCES SHOWN IN ADDITION TO ALL OTHER LOADS

# DUAL METAL WALL STUD SPLAYED SEISMIC BRACE CONNECTION

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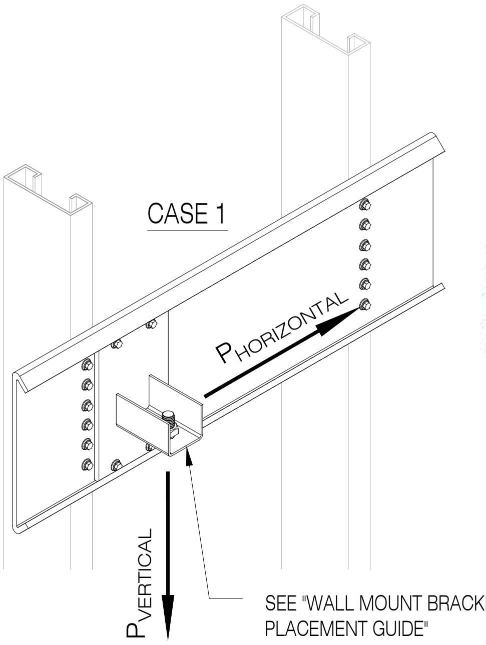
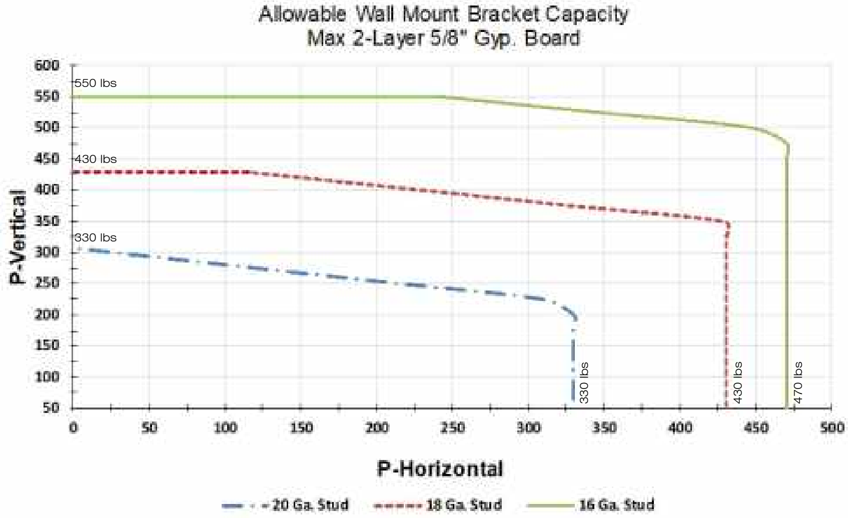
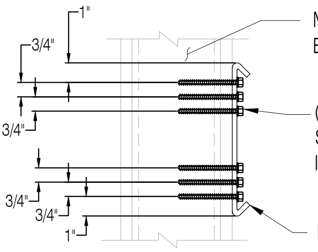
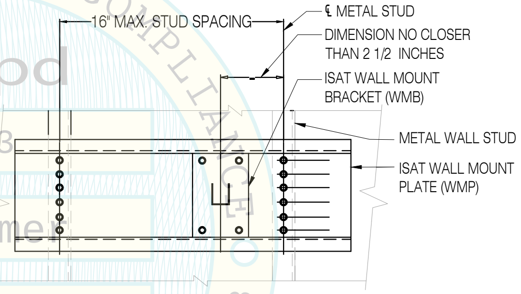






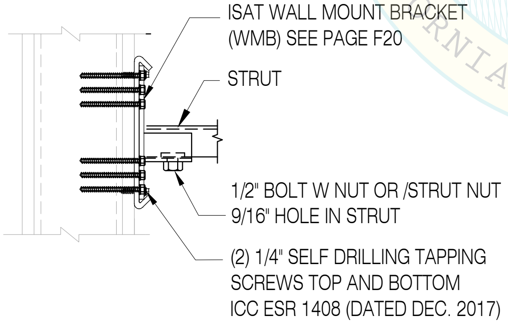
WALL MOUNT PLATE (WMP)



WALL MOUNT BRACKET PLACEMENT GUIDE

NOTES:

1. SEOR SHALL DESIGN WALL STUDS & BACKING
2. SEOR TO PROVIDE SUPPORTING STRUCTURE TO SUPPORT FORCES SHOWN IN ADDITION TO ALL OTHER LOADS
3. ATTACHMENT CAPACITY BASED ON MIN. 6" STUDS WITH 1 5/8" FLANGE
4. ATTACHMENT CAPACITY BASED ON 15 FT MAX STUD HEIGHT WITH LOAD APPLICATION AT 1/3 UPPER HEIGHT



WALL MOUNT BRACKET (WMB)

# WALL MOUNT BRACKET

CASE 1

STEEL STUDS SHALL CONFORM TO ASTM A653 MATERIAL
MINIMUM YIELD STRENGTH OF 33 KSI FOR 18 GA. AND LIGHTER
MINIMUM YIELD STRENGTH OF 50 KSI FOR 16 GA. & HEAVIER

Approval From Engineer of Record Required Prior To Installation

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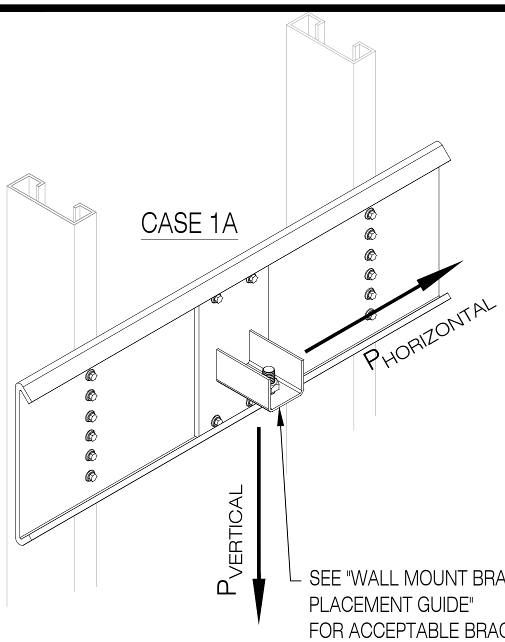
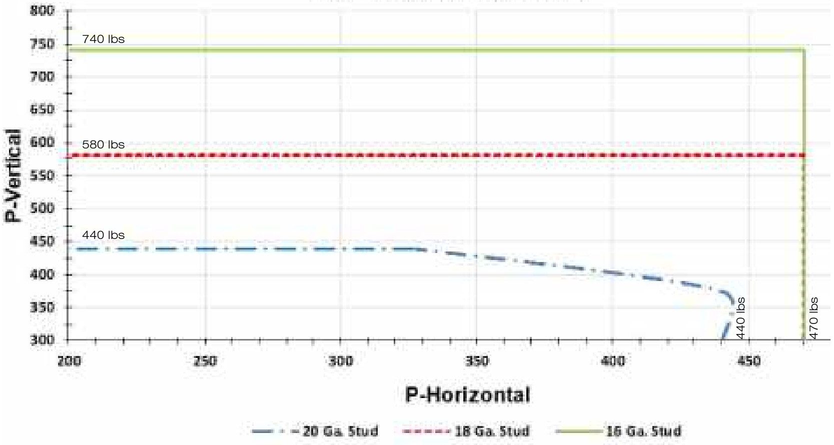
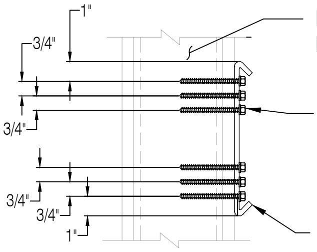


SEE "WALL MOUNT BRACKET PLACEMENT GUIDE" FOR ACCEPTABLE BRACKET (WMB) LOCATION ALONG WALL MOUNT PLATE (WMP)

Allowable Wall Mount Bracket Capacity
Max 2-Layer 5/8" Gyp. Board



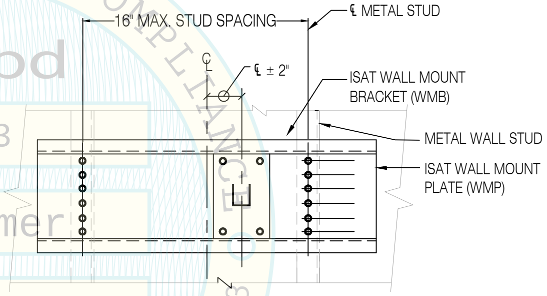


METAL STUD WITH GYPSUM WALL BOARD.

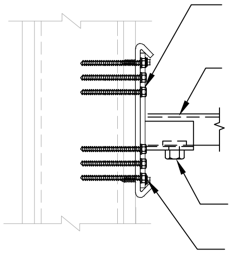
(6) 1/4" SELF DRILLING TAPPING SCREWS PER WALL STUD ICC ESR 1408 (DATED DEC. 2017)

ISAT WALL MOUNT PLATE (WMP) SEE PAGE F20 SPAN 2 STUDS MIN.

WALL MOUNT PLATE (WMP)



WALL MOUNT BRACKET PLACEMENT GUIDE



ISAT WALL MOUNT BRACKET (WMB) SEE PAGE F20

STRUT

1/2" BOLT W NUT OR /STRUT NUT
9/16" HOLE IN STRUT

(2) 1/4" SELF DRILLING TAPPING SCREWS TOP AND BOTTOM ICC ESR 1408 (DATED DEC. 2017)

WALL MOUNT BRACKET (WMB)

NOTES:

1. SEOR SHALL DESIGN WALL STUDS & BACKING
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3. ATTACHMENT CAPACITY BASED ON MIN. 6" STUDS WITH 1 5/8" FLANGE
4. ATTACHMENT CAPACITY BASED ON 15 FT MAX STUD HEIGHT WITH LOAD APPLICATION AT 1/3 UPPER HEIGHT

# WALL MOUNT BRACKET

CASE 1A
STEEL STUDS SHALL CONFORM TO ASTM A653 MATERIAL
MINIMUM YIELD STRENGTH OF 33 KSI FOR 18 GA. AND LIGHTER
MINIMUM YIELD STRENGTH OF 50 KSI FOR 16 GA. & HEAVIER

Approval From Engineer of Record Required Prior To Installation

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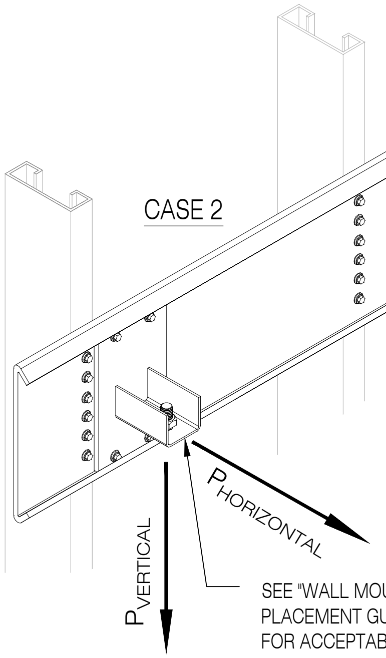
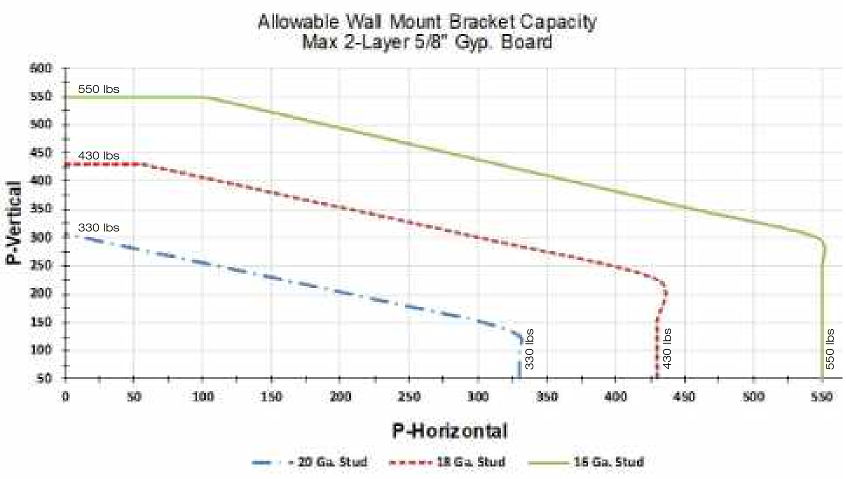
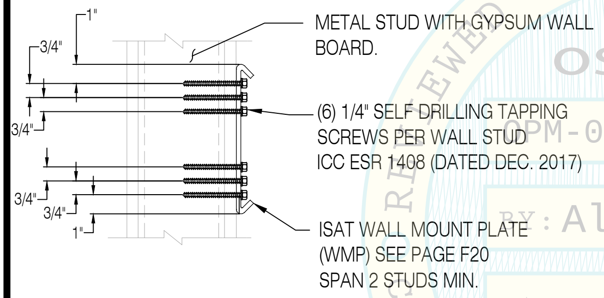
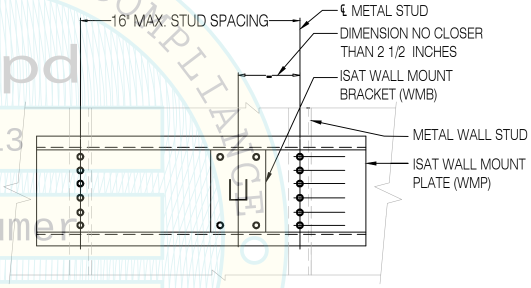


SEE "WALL MOUNT BRACKET PLACEMENT GUIDE" FOR ACCEPTABLE BRACKET (WMB) LOCATION ALONG WALL MOUNT PLATE (WMP)

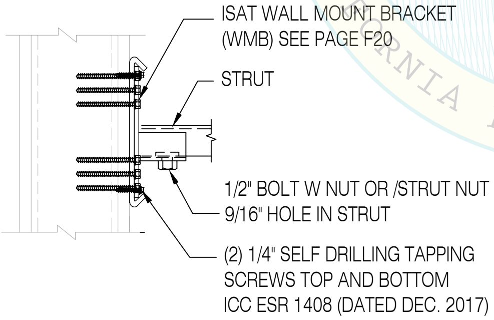




WALL MOUNT PLATE (WMP)



WALL MOUNT BRACKET PLACEMENT GUIDE



WALL MOUNT BRACKET (WMB)

NOTES:

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4. ATTACHMENT CAPACITY BASED ON 15 FT MAX STUD HEIGHT WITH LOAD APPLICATION AT 1/3 UPPER HEIGHT

# WALL MOUNT BRACKET

CASE 2

STEEL STUDS SHALL CONFORM TO ASTM A653 MATERIAL
MINIMUM YIELD STRENGTH OF 33 KSI FOR 18 GA. AND LIGHTER
MINIMUM YIELD STRENGTH OF 50 KSI FOR 16 GA. & HEAVIER

Approval From Engineer of Record Required Prior To Installation

ANTHONY A. RUBALCAVA
S 4710

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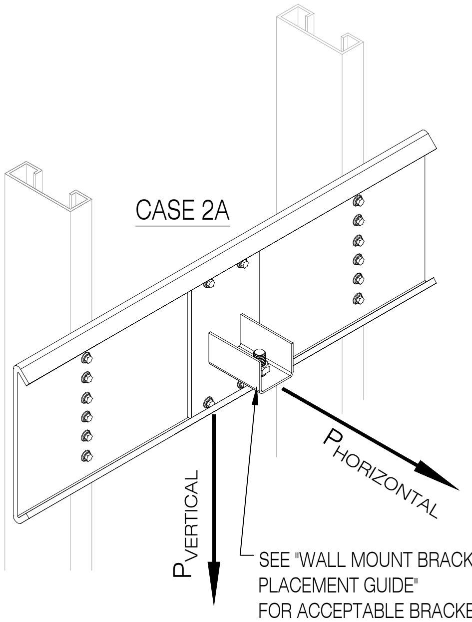
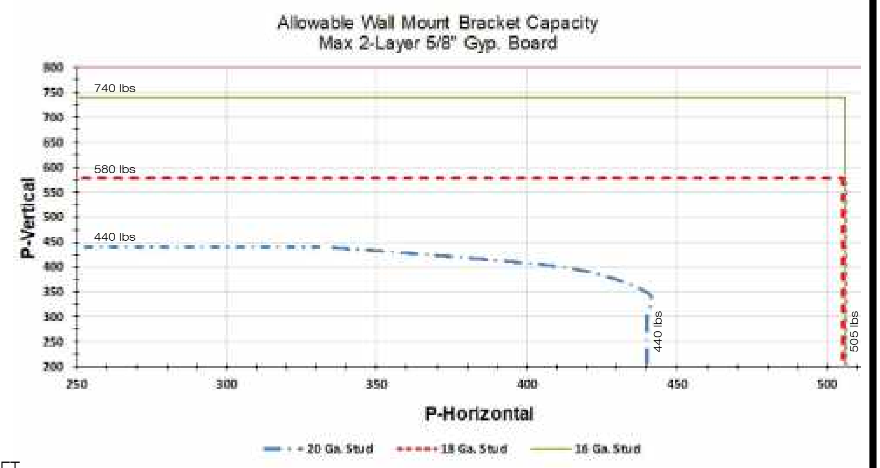
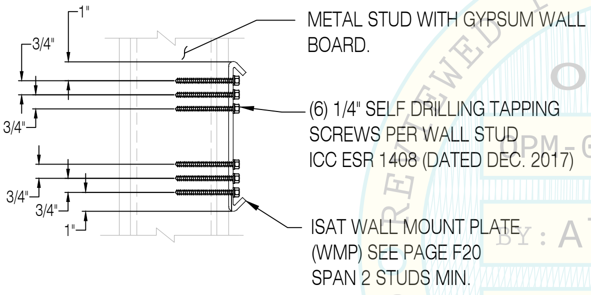
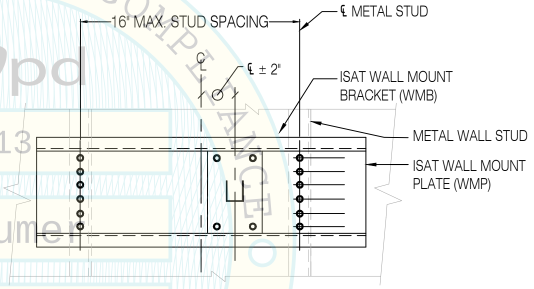






WALL MOUNT PLATE (WMP)



WALL MOUNT BRACKET PLACEMENT GUIDE

NOTES:

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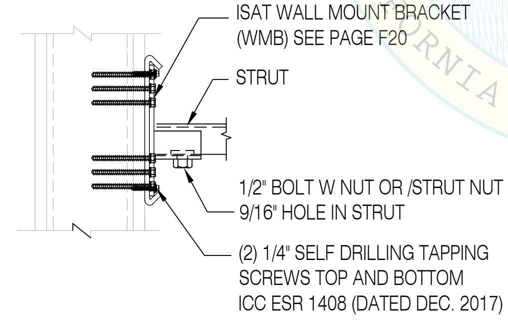

WALL MOUNT BRACKET (WMB)

# WALL MOUNT BRACKET

CASE 2A
STEEL STUDS SHALL CONFORM TO ASTM A653 MATERIAL
MINIMUM YIELD STRENGTH OF 33 KSI FOR 18 GA. AND LIGHTER
MINIMUM YIELD STRENGTH OF 50 KSI FOR 16 GA. & HEAVIER

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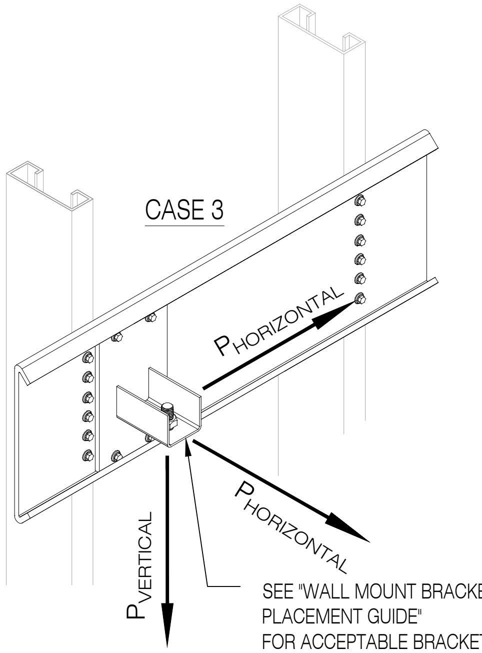
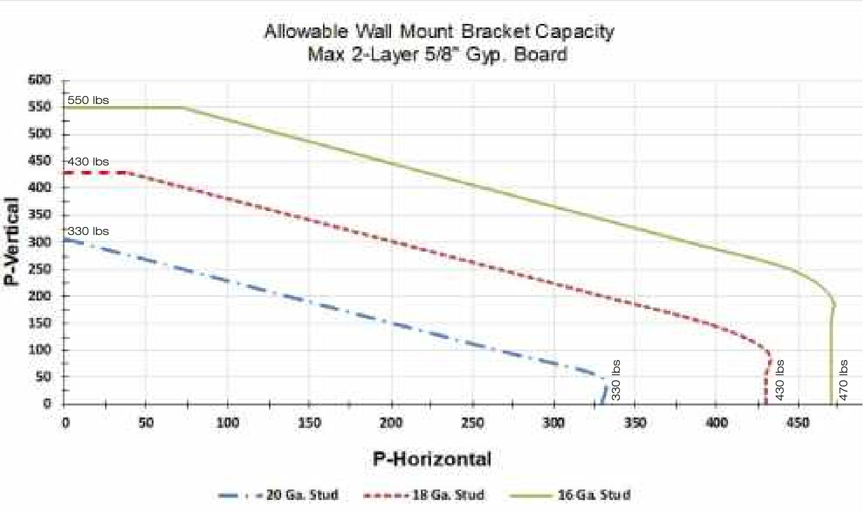
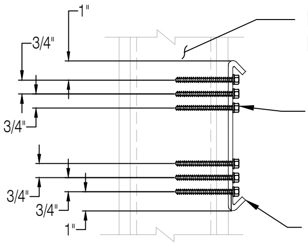


SEE "WALL MOUNT BRACKET PLACEMENT GUIDE" FOR ACCEPTABLE BRACKET (WMB) LOCATION ALONG WALL MOUNT PLATE (WMP)



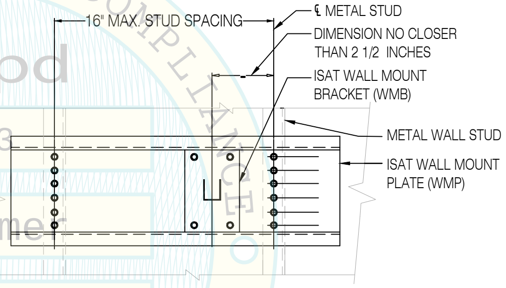


METAL STUD WITH GYPSUM WALL BOARD.

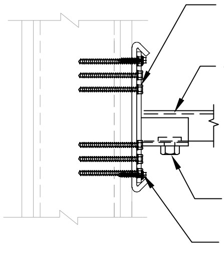
(6) 1/4" SELF DRILLING TAPPING SCREWS PER WALL STUD ICC ESR 1408 (DATED DEC. 2017)

ISAT WALL MOUNT PLATE (WMP) SEE PAGE F20 SPAN 2 STUDS MIN.

WALL MOUNT PLATE (WMP)



WALL MOUNT BRACKET PLACEMENT GUIDE



ISAT WALL MOUNT BRACKET (WMB) SEE PAGE F20

STRUT

1/2" BOLT W NUT OR /STRUT NUT 9/16" HOLE IN STRUT

(2) 1/4" SELF DRILLING TAPPING SCREWS TOP AND BOTTOM ICC ESR 1408 (DATED DEC. 2017)

WALL MOUNT BRACKET (WMB)

NOTES:

1. SEOR SHALL DESIGN WALL STUDS & BACKING
2. SEOR TO PROVIDE SUPPORTING STRUCTURE TO SUPPORT FORCES SHOWN IN ADDITION TO ALL OTHER LOADS
3. ATTACHMENT CAPACITY BASED ON MIN. 6" STUDS WITH 1 5/8" FLANGE
4. ATTACHMENT CAPACITY BASED ON 15 FT MAX STUD HEIGHT WITH LOAD APPLICATION AT 1/3 UPPER HEIGHT

# WALL MOUNT BRACKET

CASE 3

STEEL STUDS SHALL CONFORM TO ASTM A653 MATERIAL
MINIMUM YIELD STRENGTH OF 33 KSI FOR 18 GA. AND LIGHTER
MINIMUM YIELD STRENGTH OF 50 KSI FOR 16 GA. & HEAVIER

Approval From Engineer of Record Required Prior To Installation

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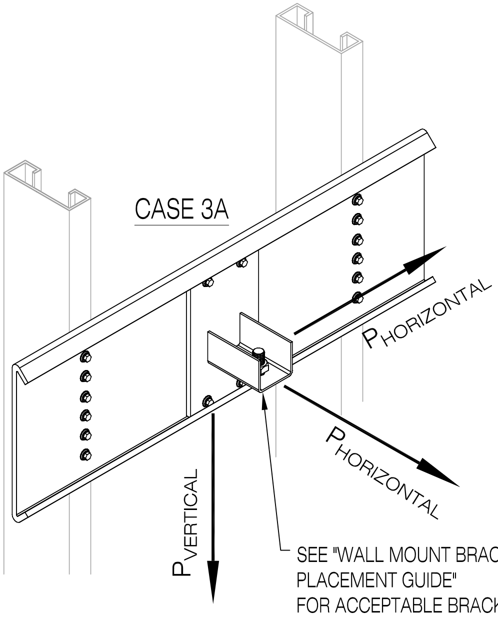
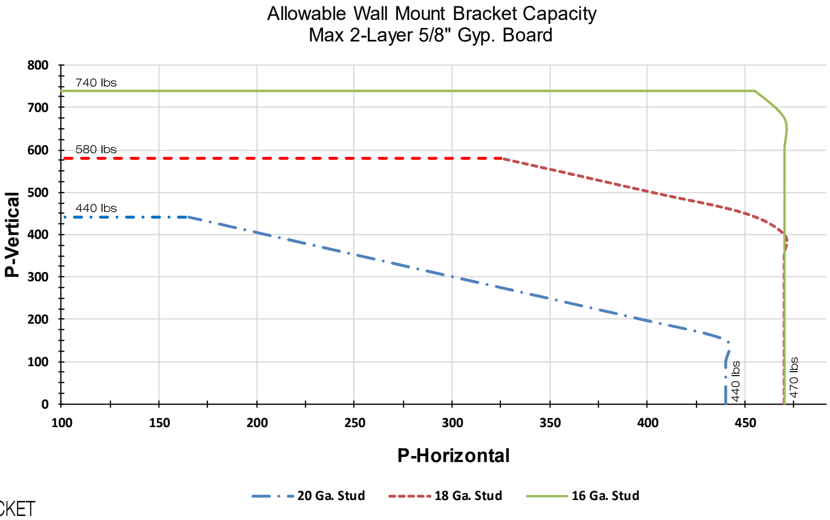
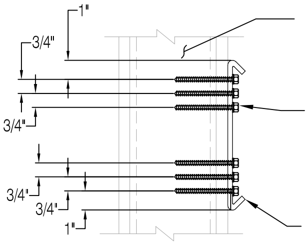
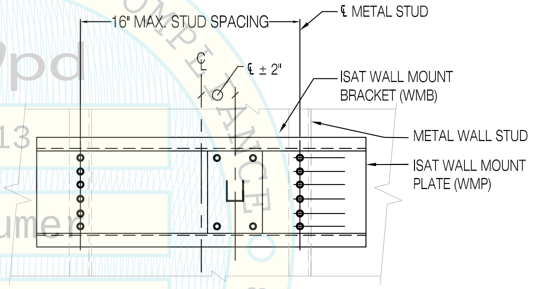


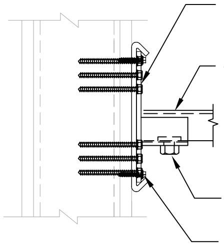




WALL MOUNT PLATE (WMP)



WALL MOUNT BRACKET PLACEMENT GUIDE



WALL MOUNT BRACKET (WMB)

NOTES:

1. SEOR SHALL DESIGN WALL STUDS & BACKING
2. SEOR TO PROVIDE SUPPORTING STRUCTURE TO SUPPORT FORCES SHOWN IN ADDITION TO ALL OTHER LOADS
3. ATTACHMENT CAPACITY BASED ON MIN. 6" STUDS WITH 1 5/8" FLANGE
4. ATTACHMENT CAPACITY BASED ON 15 FT MAX STUD HEIGHT WITH LOAD APPLICATION AT 1/3 UPPER HEIGHT

# WALL MOUNT BRACKET

CASE 3A

STEEL STUDS SHALL CONFORM TO ASTM A653 MATERIAL
MINIMUM YIELD STRENGTH OF 33 KSI FOR 18 GA. AND LIGHTER
MINIMUM YIELD STRENGTH OF 50 KSI FOR 16 GA. & HEAVIER

Approval From Engineer of Record Required Prior To Installation

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*RIGID BRACE ARMS*

ROD CAPTURE TUNING FORK (RCTFR) ASSEMBLY

ROD CAPTURE HINGED WELDED (RCHW) ASSEMBLY (3/8” to 5/8” ROD DIA.)

ROD CAPTURE HINGED WELDED (RCHW) ASSEMBLY (3/4” to 7/8” ROD DIA.)

*RIGID BRACE DETAILS*

*CABLE BRACE ARMS*

RCTFC, RCHW, WEDGY23, WEDGY45, CABLE CLIP, THRU-BOLTED, SWAGED

*CABLE BRACE DETAILS*

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S 4710

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# ISAT RIGID AND CABLE BRACING ASSEMBLIES NOMENCLATURE

**Ex: R38AAEM306**

R = RIGID BRACING
38 = ROD (ATR) DIAMETER
AA = LOWER/UPPER BRACKET - ID FROM BRACKET TABLE
EM3 = BRACE TYPE - ID FROM BRACING TABLE
06 = BRACE LENGTH (ft)

**BRACING TABLE**

| STRUT SIZE / EMT DIA | ID [1] |
|---|---|
| A1 PHD 1201 Perforated 13/16 | A1P |
| A1 PHD 1201 Solid 13/16 | A1S |
| B1 PHD 1001 Perforated 1-5/8 | B1P |
| B1 PHD 1001 Solid 1-5/8 | B1S |
| B2 PHD 1001A Perforated BB 1-5/8 | B2P |
| B2 PHD 1001A Solid BB 1-5/8 | B2S |
| EMT 3/4" | EM3 |
| EMT 1" | EM4 |
| EMT 1-1/4" | EM5 |
| EMT 1-1/2" | EM6 |
| | |

**BRACKET TABLE**

| BRACKETS | ID |
|---|---|
| RCTF | A |
| RCHW | B |
| RCHWS | C |
| RCHWX | D |
| ABHW | E |
| ABHWS | F |
| ABHWX | G |
| FIG030 | H |
| S360R | I |
| AB45 | J |
| ABF | K |
| | |
| | |
| | |

**NOTES:**

1. See Pages E1s
2. Perforated = Punched or Slotted
3. EMT In Accordance With ANSI C80.3-2005

**Ex: C58BF05TT**

C = CABLE (NON-RIGID) BRACING
58 = ROD (ATR) DIAMETER
BF = LOWER/UPPER BRACKET - ID FROM BRACKET TABLE
05 = CABLE DIAMETER
TT = LOWER/UPPER CABLE CONNECTOR FROM TABLE

**CABLE DIA. TABLE**

| CABLE DIA. | ID |
|---|---|
| 3/32 | 03 |
| 1/8 | 04 |
| 5/32 | 05 |
| 3/16 | 06 |
| 7/32 | 07 |
| 1/4 | 08 |
| 5/16 | 10 |
| | |

**CABLE FITTING/CONNECTOR TABLE**

| CABLE CONNECTION | ID |
|---|---|
| WEDGY | W |
| SWAGED | S |
| THRU-BOLTED | T |
| CABLE CLIP | C |
| | |

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**09/21/18**

***DIRECTORY - ISAT RIGID BRACE ASSEMBLIES*** [6]

| ISAT Brace Assembly [1] | Rod | ISAT Seismic Brackets @ 0 Degrees [4] | | | | Brace Arm Member [2] | | Assembly Design Value [3], P (lbs) |
|---|---|---|---|---|---|---|---|---|
| | Diameter (in) | Lower Bracket | Manual Page | Upper Bracket [5] | Manual Page | Arm ID | Max. Brace Arm Length (ft) | |
| **R38AAEM306** | 3/8-0 | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R38AAEM409** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R38AAEM406** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R38AAEM509** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R38AAEM506** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,100** |
| **R38AAEM612** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R38AAEM609** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,100** |
| **R38AAA1S06** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R38AAB1P12** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R38AAB1P09** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R38AAB1P06** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,100** |
| **R38AAB1S12** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R38AAB1S09** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R38AAB1S06** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,100** |
| **R38AAB2P12** | | RCTFR38-0 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,100** |
| **R12AAEM306** | 1/2-0 | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R12AAEM409** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R12AAEM406** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R12AAEM509** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R12AAEM506** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,450** |
| **R12AAEM612** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R12AAEM609** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,160** |
| **R12AAEM606** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | EM6 | 06 | **1,450** |
| **R12AAA1S06** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R12AAB1P12** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R12AAB1P09** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R12AAB1P06** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,250** |
| **R12AAB1S12** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R12AAB1S09** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R12AAB1S06** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,420** |
| **R12AAB2P12** | | RCTFR12-0 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,450** |
| **R58AAEM306** | 5/8-0 | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R58AAEM409** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R58AAEM406** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R58AAEM509** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R58AAEM506** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,450** |
| **R58AAEM612** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R58AAEM609** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,160** |
| **R58AAEM606** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | EM6 | 06 | **1,450** |
| **R58AAA1S06** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R58AAB1P12** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R58AAB1P09** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R58AAB1P06** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,250** |
| **R58AAB1S12** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R58AAB1S09** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R58AAB1S06** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,420** |
| **R58AAB2P12** | | RCTFR58-0 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,450** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
3. Nominal 0 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. See Page E2.3 for Rigid Brace Arm Assembly details.

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### *DIRECTORY - ISAT RIGID BRACE ASSEMBLIES* [6]

| ISAT Brace Assembly [1] | Rod Diameter (in) | ISAT Seismic Brackets @ 30 Degrees [4] Lower Bracket | Manual Page | Upper Bracket [5] | Manual Page | Brace Arm Member [2] Arm ID | Max. Brace Arm Length (ft) | Assembly Design Value [3], P (lbs) |
|---|---|---|---|---|---|---|---|---|
| **R38AAEM306** | 3/8-30 | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R38AAEM409** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R38AAEM406** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R38AAEM509** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R38AAEM506** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,320** |
| **R38AAEM612** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R38AAEM609** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,160** |
| **R38AAA1S06** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R38AAB1P12** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R38AAB1P09** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R38AAB1P06** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,250** |
| **R38AAB1S12** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R38AAB1S09** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R38AAB1S06** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,320** |
| **R38AAB2P12** | | RCTFR38-30 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,320** |
| **R12AAEM306** | 1/2-30 | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R12AAEM409** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R12AAEM406** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R12AAEM509** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R12AAEM506** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,460** |
| **R12AAEM612** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R12AAEM609** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,160** |
| **R12AAEM606** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | EM6 | 06 | **1,470** |
| **R12AAA1S06** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R12AAB1P12** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R12AAB1P09** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R12AAB1P06** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,250** |
| **R12AAB1S12** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R12AAB1S09** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R12AAB1S06** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,420** |
| **R12AAB2P12** | | RCTFR12-30 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,470** |
| **R58AAEM306** | 5/8-30 | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R58AAEM409** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R58AAEM406** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R58AAEM509** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R58AAEM506** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,460** |
| **R58AAEM612** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R58AAEM609** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,160** |
| **R58AAEM606** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | EM6 | 06 | **1,470** |
| **R58AAA1S06** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R58AAB1P12** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R58AAB1P09** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R58AAB1P06** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,250** |
| **R58AAB1S12** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R58AAB1S09** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R58AAB1S06** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,420** |
| **R58AAB2P12** | | RCTFR58-30 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,470** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
3. Nominal 30 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. See Page E2.3 for Rigid Brace Arm Assembly details.

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| DIRECTORY - ISAT RIGID BRACE ASSEMBLIES [6] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ISAT Brace Assembly [1] | Rod | ISAT Seismic Brackets @ 45 Degrees [4] | | | | Brace Arm Member [2] | | Assembly Design Value [3], P (lbs) |
| | Diameter (in) | Lower Bracket | Manual Page | Upper Bracket [5] | Manual Page | Arm ID | Max. Brace Arm Length (ft) | |
| **R38AAEM306** | 3/8 | RCTFR38 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R38AAEM409** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R38AAEM406** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R38AAEM509** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R38AAEM506** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,360** |
| **R38AAEM612** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R38AAEM609** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,160** |
| **R38AAA1S06** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R38AAB1P12** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R38AAB1P09** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R38AAB1P06** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,250** |
| **R38AAB1S12** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R38AAB1S09** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R38AAB1S06** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,360** |
| **R38AAB2P12** | | RCTFR38 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,360** |
| **R12AAEM306** | 1/2 | RCTFR12 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R12AAEM409** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R12AAEM406** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R12AAEM509** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R12AAEM506** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,460** |
| **R12AAEM612** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R12AAEM609** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,160** |
| **R12AAEM606** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | EM6 | 06 | **2,050** |
| **R12AAA1S06** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R12AAB1P12** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R12AAB1P09** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R12AAB1P06** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,250** |
| **R12AAB1S12** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R12AAB1S09** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R12AAB1S06** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,420** |
| **R12AAB2P12** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,660** |
| **R12AAB2P09** | | RCTFR12 | E2.4 | RCTFR_ | E2.4 | B2P | 09 | **2,050** |
| **R58AAEM306** | 5/8 | RCTFR58 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R58AAEM409** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R58AAEM406** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R58AAEM509** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R58AAEM506** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,460** |
| **R58AAEM612** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R58AAEM609** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,160** |
| **R58AAEM606** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | EM6 | 06 | **2,050** |
| **R58AAA1S06** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R58AAB1P12** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R58AAB1P09** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R58AAB1P06** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,250** |
| **R58AAB1S12** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R58AAB1S09** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R58AAB1S06** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,420** |
| **R58AAB2P12** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,660** |
| **R58AAB2P09** | | RCTFR58 | E2.4 | RCTFR_ | E2.4 | B2P | 09 | **2,050** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
3. Nominal 45 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. See Page E2.3 for Rigid Brace Arm Assembly details.

Anthony A. Rubalcava
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### *DIRECTORY - ISAT RIGID BRACE ASSEMBLIES* [6]

| ISAT Brace Assembly [1] | Rod | ISAT Seismic Brackets @ 60 Degrees [4] | | | | Brace Arm Member [2] | | Assembly Design Value [3], P (lbs) |
|---|---|---|---|---|---|---|---|---|
| | Diameter (in) | Lower Bracket | Manual Page | Upper Bracket [5] | Manual Page | Arm ID | Max. Brace Arm Length (ft) | |
| **R38AAEM306** | 3/8-60 | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R38AAEM409** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R38AAEM406** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R38AAEM509** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R38AAEM506** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,460** |
| **R38AAEM612** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R38AAEM609** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,160** |
| **R38AAA1S06** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R38AAB1P12** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R38AAB1P09** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R38AAB1P06** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,250** |
| **R38AAB1S12** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R38AAB1S09** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R38AAB1S06** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,420** |
| **R38AAB2P12** | | RCTFR38-60 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,510** |
| **R12AAEM306** | 1/2-60 | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R12AAEM409** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R12AAEM406** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R12AAEM509** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R12AAEM506** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,460** |
| **R12AAEM612** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R12AAEM609** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,160** |
| **R12AAEM606** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | EM6 | 06 | **2,060** |
| **R12AAA1S06** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R12AAB1P12** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R12AAB1P09** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R12AAB1P06** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,250** |
| **R12AAB1S12** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R12AAB1S09** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R12AAB1S06** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,420** |
| **R12AAB2P12** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,660** |
| **R12AAB2P09** | | RCTFR12-60 | E2.4 | RCTFR_ | E2.4 | B2P | 09 | **2,390** |
| **R58AAEM306** | 5/8-60 | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | EM3 | 06 | **300** |
| **R58AAEM409** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | EM4 | 09 | **330** |
| **R58AAEM406** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | EM4 | 06 | **660** |
| **R58AAEM509** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | EM5 | 09 | **790** |
| **R58AAEM506** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | EM5 | 06 | **1,460** |
| **R58AAEM612** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | EM6 | 12 | **720** |
| **R58AAEM609** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | EM6 | 09 | **1,160** |
| **R58AAEM606** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | EM6 | 06 | **2,060** |
| **R58AAA1S06** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | A1S | 06 | **650** |
| **R58AAB1P12** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | B1P | 12 | **680** |
| **R58AAB1P09** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | B1P | 09 | **910** |
| **R58AAB1P06** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | B1P | 06 | **1,250** |
| **R58AAB1S12** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | B1S | 12 | **780** |
| **R58AAB1S09** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | B1S | 09 | **1,040** |
| **R58AAB1S06** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | B1S | 06 | **1,420** |
| **R58AAB2P12** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | B2P | 12 | **1,660** |
| **R58AAB2P09** | | RCTFR58-60 | E2.4 | RCTFR_ | E2.4 | B2P | 09 | **2,390** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
3. Nominal 60 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. See Page E2.3 for Rigid Brace Arm Assembly details.

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***DIRECTORY - ISAT RIGID BRACE ASSEMBLIES***[6]

| ISAT Brace Assembly[1] | Rod | ISAT Seismic Brackets @ 0 Degrees[4] | | | | Brace Arm Member[2] | | Assembly Design Value[3], P (lbs) |
|---|---|---|---|---|---|---|---|---|
| | Diameter (in) | Lower Bracket | Manual Page | Upper Bracket[5] | Manual Page | Arm ID | Max. Brace Arm Length (ft) | |
| **R38CFA1P06** | 3/8-0 | RCHWS38-0 | F1.1 | ABHWS12_ | F2.1 | A1P | 06 | **550** |
| **R38CFB1P12** | | RCHWS38-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 12 | **680** |
| **R38CFB1P09** | | RCHWS38-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 09 | **780** |
| **R38CFB1P06** | | RCHWS38-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 06 | **780** |
| **R38CFB1S12** | | RCHWS38-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 12 | **780** |
| **R38CFB1S09** | | RCHWS38-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 09 | **780** |
| **R38CFB1S06** | | RCHWS38-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 06 | **780** |
| **R38CFB2P12** | | RCHWS38-0 | F1.1 | ABHWS12_ | F2.1 | B2P | 12 | **780** |
| **R12CFA1P06** | 1/2-0 | RCHWS12-0 | F1.1 | ABHWS12_ | F2.1 | A1P | 06 | **550** |
| **R12CFB1P12** | | RCHWS12-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 12 | **680** |
| **R12CFB1P09** | | RCHWS12-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 09 | **780** |
| **R12CFB1P06** | | RCHWS12-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 06 | **780** |
| **R12CFB1S12** | | RCHWS12-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 12 | **780** |
| **R12CFB1S09** | | RCHWS12-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 09 | **780** |
| **R12CFB1S06** | | RCHWS12-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 06 | **780** |
| **R12CFB2P12** | | RCHWS12-0 | F1.1 | ABHWS12_ | F2.1 | B2P | 12 | **780** |
| **R12CFB2P09** | | RCHWS12-0 | F1.1 | ABHWS12_ | F2.1 | B2P | 09 | **780** |
| **R12BGB2P09** | | RCHW12-0 | F1 | ABHWX12_ | F2 | B2P | 09 | **1,030** |
| **R12BGB2S12** | | RCHW12-0 | F1 | ABHWX12_ | F2 | B2S | 12 | **1,030** |
| **R58CFA1P06** | 5/8-0 | RCHWS58-0 | F1.1 | ABHWS12_ | F2.1 | A1P | 06 | **550** |
| **R58CFB1P12** | | RCHWS58-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 12 | **680** |
| **R58CFB1P09** | | RCHWS58-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 09 | **840** |
| **R58CFB1P06** | | RCHWS58-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 06 | **840** |
| **R58CFB1S12** | | RCHWS58-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 12 | **780** |
| **R58CFB1S09** | | RCHWS58-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 09 | **840** |
| **R58CFB1S06** | | RCHWS58-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 06 | **840** |
| **R58CFB2P12** | | RCHWS58-0 | F1.1 | ABHWS12_ | F2.1 | B2P | 12 | **840** |
| **R58DGB2P09** | | RCHWX58-0 | F1 | ABHWX12_ | F2 | B2P | 09 | **1,550** |
| **R58DGB2P06** | | RCHWX58-0 | F1 | ABHWX12_ | F2 | B2P | 06 | **1,550** |
| **R58DGB2S12** | | RCHWX58-0 | F1 | ABHWX12_ | F2 | B2S | 12 | **1,550** |
| **R58DGB2S09** | | RCHWX58-0 | F1 | ABHWX12_ | F2 | B2S | 09 | **1,550** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
3. Nominal 0 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. HSS 3X3X1/4 May Be Substituted For Any Brace Arm Where P <3,000 Lbs and Maximum Length <25 Feet .
   HSS 2X2X1/8 May Be Substituted For Any Brace Arm Where P <1,250 Lbs and Maximum Length <16 Feet .
8. See Page E2.1 for Rigid Brace Arm Assembly details.

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### *DIRECTORY - ISAT RIGID BRACE ASSEMBLIES* [6]

| ISAT Brace Assembly [1] | Rod | ISAT Seismic Brackets @ 30 Degrees [4] | | | | Brace Arm Member [2] | | Assembly Design Value [3], P (lbs) |
|---|---|---|---|---|---|---|---|---|
| | Diameter (in) | Lower Bracket | Manual Page | Upper Bracket[5] | Manual Page | Arm ID | Max. Brace Arm Length (ft) | |
| **R38CFA1P06** | 3/8-30 | RCHWS38-30 | F1.1 | ABHWS12-_ | F2.1 | A1P | 06 | **550** |
| **R38CFB1P12** | | RCHWS38-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 12 | **680** |
| **R38CFB1P09** | | RCHWS38-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 09 | **780** |
| **R38CFB1P06** | | RCHWS38-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 06 | **780** |
| **R38CFB1S12** | | RCHWS38-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 12 | **780** |
| **R38CFB1S09** | | RCHWS38-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 09 | **780** |
| **R38CFB1S06** | | RCHWS38-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 06 | **780** |
| **R38CFB2P12** | | RCHWS38-30 | F1.1 | ABHWS12-_ | F2.1 | B2P | 12 | **780** |
| **R12CFA1P06** | 1/2-30 | RCHWS12-30 | F1.1 | ABHWS12-_ | F2.1 | A1P | 06 | **550** |
| **R12CFB1P12** | | RCHWS12-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 12 | **680** |
| **R12CFB1P09** | | RCHWS12-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 09 | **780** |
| **R12CFB1P06** | | RCHWS12-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 06 | **780** |
| **R12CFB1S12** | | RCHWS12-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 12 | **780** |
| **R12CFB1S09** | | RCHWS12-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 09 | **780** |
| **R12CFB1S06** | | RCHWS12-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 06 | **780** |
| **R12CFB2P12** | | RCHWS12-30 | F1.1 | ABHWS12-_ | F2.1 | B2P | 12 | **780** |
| **R12CFB2P09** | | RCHWS12-30 | F1.1 | ABHWS12-_ | F2.1 | B2P | 09 | **780** |
| **R12BGB2P09** | | RCHW12-30 | F1 | ABHWX12-_ | F2 | B2P | 09 | **1,030** |
| **R12BGB2S12** | | RCHW12-30 | F1 | ABHWX12-_ | F2 | B2S | 12 | **1,030** |
| **R58CFA1P06** | 5/8-30 | RCHWS58-30 | F1.1 | ABHWS12-_ | F2.1 | A1P | 06 | **550** |
| **R58CFB1P12** | | RCHWS58-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 12 | **680** |
| **R58CFB1P09** | | RCHWS58-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 09 | **840** |
| **R58CFB1P06** | | RCHWS58-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 06 | **840** |
| **R58CFB1S12** | | RCHWS58-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 12 | **780** |
| **R58CFB1S09** | | RCHWS58-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 09 | **840** |
| **R58CFB1S06** | | RCHWS58-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 06 | **840** |
| **R58CFB2P12** | | RCHWS58-30 | F1.1 | ABHWS12-_ | F2.1 | B2P | 12 | **840** |
| **R58DGB2P09** | | RCHWX58-30 | F1 | ABHWX12-_ | F2 | B2P | 09 | **1,550** |
| **R58DGB2P06** | | RCHWX58-30 | F1 | ABHWX12-_ | F2 | B2P | 06 | **1,550** |
| **R58DGB2S12** | | RCHWX58-30 | F1 | ABHWX12-_ | F2 | B2S | 12 | **1,550** |
| **R58DGB2S09** | | RCHWX58-30 | F1 | ABHWX12-_ | F2 | B2S | 09 | **1,550** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
3. Nominal 30 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. HSS 3X3X1/4 May Be Substituted For Any Brace Arm Where P <3,000 Lbs and Maximum Length <25 Feet .
   HSS 2X2X1/8 May Be Substituted For Any Brace Arm Where P <1,250 Lbs and Maximum Length <16 Feet .
8. See Page E2.1 for Rigid Brace Arm Assembly details.

### *DIRECTORY - ISAT RIGID BRACE ASSEMBLIES* [6]

| ISAT Brace Assembly [1] | Rod | ISAT Seismic Brackets @ 45 Degrees [4] | | | | Brace Arm Member [2] | | Assembly Design Value [3], P (lbs) |
|---|---|---|---|---|---|---|---|---|
| | Diameter (in) | Lower Bracket | Manual Page | Upper Bracket[5] | Manual Page | Arm ID | Max. Brace Arm Length (ft) | |
| **R38CFA1P06** | 3/8 | RCHWS38 | F1.1 | ABHWS_ | F2.1 | A1P | 06 | **550** |
| **R38CFB1P12** | | RCHWS38 | F1.1 | ABHWS_ | F2.1 | B1P | 12 | **680** |
| **R38CFB1P09** | | RCHWS38 | F1.1 | ABHWS_ | F2.1 | B1P | 09 | **910** |
| **R38CFB1P06** | | RCHWS38 | F1.1 | ABHWS_ | F2.1 | B1P | 06 | **1,250** |
| **R38CFB1S12** | | RCHWS38 | F1.1 | ABHWS_ | F2.1 | B1S | 12 | **780** |
| **R38CFB1S09** | | RCHWS38 | F1.1 | ABHWS_ | F2.1 | B1S | 09 | **1,040** |
| **R38CFB1S06** | | RCHWS38 | F1.1 | ABHWS_ | F2.1 | B1S | 06 | **1,360** |
| **R38CFB2P12** | | RCHWS38 | F1.1 | ABHWS_ | F2.1 | B2P | 12 | **1,360** |
| **R12CFA1P06** | 1/2 | RCHWS12 | F1.1 | ABHWS_ | F2.1 | A1P | 06 | **550** |
| **R12CFB1P12** | | RCHWS12 | F1.1 | ABHWS_ | F2.1 | B1P | 12 | **680** |
| **R12CFB1P09** | | RCHWS12 | F1.1 | ABHWS_ | F2.1 | B1P | 09 | **910** |
| **R12CFB1P06** | | RCHWS12 | F1.1 | ABHWS_ | F2.1 | B1P | 06 | **1,250** |
| **R12CFB1S12** | | RCHWS12 | F1.1 | ABHWS_ | F2.1 | B1S | 12 | **780** |
| **R12CFB1S09** | | RCHWS12 | F1.1 | ABHWS_ | F2.1 | B1S | 09 | **1,040** |
| **R12CFB1S06** | | RCHWS12 | F1.1 | ABHWS_ | F2.1 | B1S | 06 | **1,420** |
| **R12CFB2P12** | | RCHWS12 | F1.1 | ABHWS_ | F2.1 | B2P | 12 | **1,660** |
| **R12CFB2P09** | | RCHWS12 | F1.1 | ABHWS_ | F2.1 | B2P | 09 | **1,860** |
| **R12BGB2P09** | | RCHW12 | F1 | ABHWX_ | F2 | B2P | 09 | **2,290** |
| **R12BGB2S12** | | RCHW12 | F1 | ABHWX_ | F2 | B2S | 12 | **1,910** |
| **R58CFA1P06** | 5/8 | RCHWS58 | F1.1 | ABHWS_ | F2.1 | A1P | 06 | **550** |
| **R58CFB1P12** | | RCHWS58 | F1.1 | ABHWS_ | F2.1 | B1P | 12 | **680** |
| **R58CFB1P09** | | RCHWS58 | F1.1 | ABHWS_ | F2.1 | B1P | 09 | **910** |
| **R58CFB1P06** | | RCHWS58 | F1.1 | ABHWS_ | F2.1 | B1P | 06 | **1,250** |
| **R58CFB1S12** | | RCHWS58 | F1.1 | ABHWS_ | F2.1 | B1S | 12 | **780** |
| **R58CFB1S09** | | RCHWS58 | F1.1 | ABHWS_ | F2.1 | B1S | 09 | **1,040** |
| **R58CFB1S06** | | RCHWS58 | F1.1 | ABHWS_ | F2.1 | B1S | 06 | **1,420** |
| **R58CFB2P12** | | RCHWS58 | F1.1 | ABHWS_ | F2.1 | B2P | 12 | **1,660** |
| **R58DGB2P09** | | RCHWX58 | F1 | ABHWX_ | F2 | B2P | 09 | **2,390** |
| **R58DGB2P06** | | RCHWX58 | F1 | ABHWX_ | F2 | B2P | 06 | **2,730** |
| **R58DGB2S12** | | RCHWX58 | F1 | ABHWX_ | F2 | B2S | 12 | **1,910** |
| **R58DGB2S09** | | RCHWX58 | F1 | ABHWX_ | F2 | B2S | 09 | **2,730** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
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4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. HSS 3X3X1/4 May Be Substituted For Any Brace Arm Where P <3,000 Lbs and Maximum Length <25 Feet .
   HSS 2X2X1/8 May Be Substituted For Any Brace Arm Where P <1,250 Lbs and Maximum Length <16 Feet .
8. See Page E2.1 for Rigid Brace Arm Assembly details.

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## *DIRECTORY - ISAT RIGID BRACE ASSEMBLIES* [6]

| ISAT Brace Assembly [1] | Rod Diameter (in) | ISAT Seismic Brackets @ 60 Degrees [4] Lower Bracket | Manual Page | Upper Bracket[5] | Manual Page | Brace Arm Member [2] Arm ID | Max. Brace Arm Length (ft) | Assembly Design Value [3], P (lbs) |
|---|---|---|---|---|---|---|---|---|
| **R38CFA1P06** | 3/8-60 | RCHWS38-60 | F1.1 | ABHWS12-_ | F2.1 | A1P | 06 | **550** |
| **R38CFB1P12** | | RCHWS38-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 12 | **680** |
| **R38CFB1P09** | | RCHWS38-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 09 | **760** |
| **R38CFB1P06** | | RCHWS38-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 06 | **760** |
| **R38CFB1S12** | | RCHWS38-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 12 | **760** |
| **R38CFB1S09** | | RCHWS38-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 09 | **760** |
| **R38CFB1S06** | | RCHWS38-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 06 | **760** |
| **R38CFB2P12** | | RCHWS38-60 | F1.1 | ABHWS12-_ | F2.1 | B2P | 12 | **760** |
| **R12CFA1P06** | 1/2-60 | RCHWS12-60 | F1.1 | ABHWS12-_ | F2.1 | A1P | 06 | **550** |
| **R12CFB1P12** | | RCHWS12-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 12 | **680** |
| **R12CFB1P09** | | RCHWS12-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 09 | **760** |
| **R12CFB1P06** | | RCHWS12-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 06 | **760** |
| **R12CFB1S12** | | RCHWS12-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 12 | **760** |
| **R12CFB1S09** | | RCHWS12-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 09 | **760** |
| **R12CFB1S06** | | RCHWS12-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 06 | **760** |
| **R12CFB2P12** | | RCHWS12-60 | F1.1 | ABHWS12-_ | F2.1 | B2P | 12 | **760** |
| **R12CFB2P09** | | RCHWS12-60 | F1.1 | ABHWS12-_ | F2.1 | B2P | 09 | **760** |
| **R12BGB2P09** | | RCHW12-60 | F1 | ABHWX12-_ | F2 | B2P | 09 | **800** |
| **R12BGB2S12** | | RCHW12-60 | F1 | ABHWX12-_ | F2 | B2S | 12 | **800** |
| **R58CFA1P06** | 5/8-60 | RCHWS58-60 | F1.1 | ABHWS12-_ | F2.1 | A1P | 06 | **550** |
| **R58CFB1P12** | | RCHWS58-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 12 | **680** |
| **R58CFB1P09** | | RCHWS58-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 09 | **870** |
| **R58CFB1P06** | | RCHWS58-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 06 | **870** |
| **R58CFB1S12** | | RCHWS58-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 12 | **780** |
| **R58CFB1S09** | | RCHWS58-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 09 | **870** |
| **R58CFB1S06** | | RCHWS58-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 06 | **870** |
| **R58CFB2P12** | | RCHWS58-60 | F1.1 | ABHWS12-_ | F2.1 | B2P | 12 | **870** |
| **R58DGB2P09** | | RCHWX58-60 | F1 | ABHWX12-_ | F2 | B2P | 09 | **1,390** |
| **R58DGB2P06** | | RCHWX58-60 | F1 | ABHWX12-_ | F2 | B2P | 06 | **1,390** |
| **R58DGB2S12** | | RCHWX58-60 | F1 | ABHWX12-_ | F2 | B2S | 12 | **1,390** |
| **R58DGB2S09** | | RCHWX58-60 | F1 | ABHWX12-_ | F2 | B2S | 09 | **1,390** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
3. Nominal 60 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. HSS 3X3X1/4 May Be Substituted For Any Brace Arm Where P <3,000 Lbs and Maximum Length <25 Feet .
   HSS 2X2X1/8 May Be Substituted For Any Brace Arm Where P <1,250 Lbs and Maximum Length <16 Feet .
8. See Page E2.1 for Rigid Brace Arm Assembly details.

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### ***DIRECTORY - ISAT RIGID BRACE ASSEMBLIES***[6]

| **ISAT Brace Assembly**[1] | **Rod** | **ISAT Seismic Brackets @ 0 Degrees**[4] | | | | **Brace Arm Member**[2] | | **Assembly Design Value**[3]**, P (lbs)** |
|---|---|---|---|---|---|---|---|---|
| | **Diameter (in)** | **Lower Bracket** | **Manual Page** | **Upper Bracket**[5] | **Manual Page** | **Arm ID** | **Max. Brace Arm Length (ft)** | |
| **R34CFA1P06** | 3/4-0 | RCHWS34-0 | F1.1 | ABHWS12_ | F2.1 | A1P | 06 | **550** |
| **R34CFB1P12** | | RCHWS34-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 12 | **680** |
| **R34CFB1P09** | | RCHWS34-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 09 | **840** |
| **R34CFB1P06** | | RCHWS34-0 | F1.1 | ABHWS12_ | F2.1 | B1P | 06 | **840** |
| **R34CFB1S12** | | RCHWS34-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 12 | **780** |
| **R34CFB1S09** | | RCHWS34-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 09 | **840** |
| **R34CFB1S06** | | RCHWS34-0 | F1.1 | ABHWS12_ | F2.1 | B1S | 06 | **840** |
| **R34CFB2P12** | | RCHWS34-0 | F1.1 | ABHWS12_ | F2.1 | B2P | 12 | **840** |
| **R34CFB2P09** | | RCHWS34-0 | F1.1 | ABHWS12_ | F2.1 | B2P | 09 | **840** |
| **R34DGB2P12** | | RCHWX34-0 | F1 | ABHWX12_ | F2 | B2P | 12 | **1,550** |
| **R34DGB2P09** | | RCHWX34-0 | F1 | ABHWX12_ | F2 | B2P | 09 | **1,550** |
| **R34DGB2P06** | | RCHWX34-0 | F1 | ABHWX12_ | F2 | B2P | 06 | **1,550** |
| **R34DGB2S12** | | RCHWX34-0 | F1 | ABHWX12_ | F2 | B2S | 12 | **1,550** |
| **R34DGB2S09** | | RCHWX34-0 | F1 | ABHWX12_ | F2 | B2S | 09 | **1,550** |
| **R12FFB1P09** | 1/2-0 | ABHWS12-0 | F2.1 | ABHWS12_ | F2.1 | B1P | 09 | **840** |
| **R12FFB1P06** | | ABHWS12-0 | F2.1 | ABHWS12_ | F2.1 | B1P | 06 | **840** |
| **R12FFB2P12** | | ABHWS12-0 | F2.1 | ABHWS12_ | F2.1 | B2P | 12 | **840** |
| **R12EEB2S12** | | ABHW12-0 | F2 | ABHW12_ | F2 | B2S | 12 | **1,430** |
| **R12EEB2S09** | | ABHW12-0 | F2 | ABHW12_ | F2 | B2S | 09 | **1,430** |
| **R12GGB2S06** | | ABHWX12-0 | F2 | ABHWX12_ | F2 | B2S | 06 | **1,570** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
3. Nominal 0 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. HSS 3X3X1/4 May Be Substituted For Any Brace Arm Where P <3,000 Lbs and Maximum Length <25 Feet .
   HSS 2X2X1/8 May Be Substituted For Any Brace Arm Where P <1,250 Lbs and Maximum Length <16 Feet .
8. See Page E2.1 for Rigid Brace Arm Assembly details.

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## *DIRECTORY - ISAT RIGID BRACE ASSEMBLIES* [6]

| ISAT Brace Assembly [1] | Rod | ISAT Seismic Brackets @ 30 Degrees [4] | | | | Brace Arm Member [2] | | Assembly Design Value [3], P (lbs) |
|---|---|---|---|---|---|---|---|---|
| | Diameter (in) | Lower Bracket | Manual Page | Upper Bracket[5] | Manual Page | Arm ID | Max. Brace Arm Length (ft) | |
| **R34CFA1P06** | 3/4-30 | RCHWS34-30 | F1.1 | ABHWS12-_ | F2.1 | A1P | 06 | **550** |
| **R34CFB1P12** | | RCHWS34-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 12 | **680** |
| **R34CFB1P09** | | RCHWS34-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 09 | **840** |
| **R34CFB1P06** | | RCHWS34-30 | F1.1 | ABHWS12-_ | F2.1 | B1P | 06 | **840** |
| **R34CFB1S12** | | RCHWS34-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 12 | **780** |
| **R34CFB1S09** | | RCHWS34-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 09 | **840** |
| **R34CFB1S06** | | RCHWS34-30 | F1.1 | ABHWS12-_ | F2.1 | B1S | 06 | **840** |
| **R34CFB2P12** | | RCHWS34-30 | F1.1 | ABHWS12-_ | F2.1 | B2P | 12 | **840** |
| **R34CFB2P09** | | RCHWS34-30 | F1.1 | ABHWS12-_ | F2.1 | B2P | 09 | **840** |
| **R34DGB2P12** | | RCHWX34-30 | F1 | ABHWX12-_ | F2 | B2P | 12 | **1,550** |
| **R34DGB2P09** | | RCHWX34-30 | F1 | ABHWX12-_ | F2 | B2P | 09 | **1,550** |
| **R34DGB2P06** | | RCHWX34-30 | F1 | ABHWX12-_ | F2 | B2P | 06 | **1,550** |
| **R34DGB2S12** | | RCHWX34-30 | F1 | ABHWX12-_ | F2 | B2S | 12 | **1,550** |
| **R34DGB2S09** | | RCHWX34-30 | F1 | ABHWX12-_ | F2 | B2S | 09 | **1,550** |
| **R12FFB1P09** | 1/2-30 | ABHWS12-30 | F2.1 | ABHWS12-_ | F2.1 | B1P | 09 | **840** |
| **R12FFB1P06** | | ABHWS12-30 | F2.1 | ABHWS12-_ | F2.1 | B1P | 06 | **840** |
| **R12FFB2P12** | | ABHWS12-30 | F2.1 | ABHWS12-_ | F2.1 | B2P | 12 | **840** |
| **R12EEB2S12** | | ABHW12-30 | F2 | ABHW12-_ | F2 | B2S | 12 | **1,430** |
| **R12EEB2S09** | | ABHW12-30 | F2 | ABHW12-_ | F2 | B2S | 09 | **1,430** |
| **R12GGB2S06** | | ABHWX12-30 | F2 | ABHWX12-_ | F2 | B2S | 06 | **1,570** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
3. Nominal 30 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. HSS 3X3X1/4 May Be Substituted For Any Brace Arm Where P <3,000 Lbs and Maximum Length <25 Feet .
   HSS 2X2X1/8 May Be Substituted For Any Brace Arm Where P <1,250 Lbs and Maximum Length <16 Feet .
8. See Page E2.1 for Rigid Brace Arm Assembly details.

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## *DIRECTORY - ISAT RIGID BRACE ASSEMBLIES*[6]

| ISAT Brace Assembly[1] | Rod | ISAT Seismic Brackets @ 45 Degrees[4] | | | | Brace Arm Member[2] | | Assembly Design Value[3], P (lbs) |
|---|---|---|---|---|---|---|---|---|
| | Diameter (in) | Lower Bracket | Manual Page | Upper Bracket[5] | Manual Page | Arm ID | Max. Brace Arm Length (ft) | |
| **R34CFA1P06** | 3/4 | RCHWS34 | F1.1 | ABHWS_ | F2.1 | A1P | 06 | **550** |
| **R34CFB1P12** | | RCHWS34 | F1.1 | ABHWS_ | F2.1 | B1P | 12 | **680** |
| **R34CFB1P09** | | RCHWS34 | F1.1 | ABHWS_ | F2.1 | B1P | 09 | **910** |
| **R34CFB1P06** | | RCHWS34 | F1.1 | ABHWS_ | F2.1 | B1P | 06 | **1,250** |
| **R34CFB1S12** | | RCHWS34 | F1.1 | ABHWS_ | F2.1 | B1S | 12 | **780** |
| **R34CFB1S09** | | RCHWS34 | F1.1 | ABHWS_ | F2.1 | B1S | 09 | **1,040** |
| **R34CFB1S06** | | RCHWS34 | F1.1 | ABHWS_ | F2.1 | B1S | 06 | **1,420** |
| **R34CFB2P12** | | RCHWS34 | F1.1 | ABHWS_ | F2.1 | B2P | 12 | **1,660** |
| **R34CFB2P09** | | RCHWS34 | F1.1 | ABHWS_ | F2.1 | B2P | 09 | **1,690** |
| **R34DGB2P12** | | RCHWX34 | F1 | ABHWX_ | F2 | B2P | 12 | **1,660** |
| **R34DGB2P09** | | RCHWX34 | F1 | ABHWX_ | F2 | B2P | 09 | **2,390** |
| **R34DGB2P06** | | RCHWX34 | F1 | ABHWX_ | F2 | B2P | 06 | **2,730** |
| **R34DGB2S12** | | RCHWX34 | F1 | ABHWX_ | F2 | B2S | 12 | **1,910** |
| **R34DGB2S09** | | RCHWX34 | F1 | ABHWX_ | F2 | B2S | 09 | **2,730** |
| **R12FFB1P09** | 1/2 | ABHWS12 | F2.1 | ABHWS_ | F2.1 | B1P | 09 | **910** |
| **R12FFB1P06** | | ABHWS12 | F2.1 | ABHWS_ | F2.1 | B1P | 06 | **1,250** |
| **R12FFB2P12** | | ABHWS12 | F2.1 | ABHWS_ | F2.1 | B2P | 12 | **1,660** |
| **R12EEB2S12** | | ABHW12 | F2 | ABHW_ | F2 | B2S | 12 | **1,910** |
| **R12EEB2S09** | | ABHW12 | F2 | ABHW_ | F2 | B2S | 09 | **2,220** |
| **R12GGB2S06** | | ABHWX12 | F2 | ABHWX_ | F2 | B2S | 06 | **2,900** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
3. Nominal 45 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. HSS 3X3X1/4 May Be Substituted For Any Brace Arm Where P <3,000 Lbs and Maximum Length <25 Feet .
   HSS 2X2X1/8 May Be Substituted For Any Brace Arm Where P <1,250 Lbs and Maximum Length <16 Feet .
8. See Page E2.1 for Rigid Brace Arm Assembly details.

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## *DIRECTORY - ISAT RIGID BRACE ASSEMBLIES*[6]

| ISAT Brace Assembly[1] | Rod | ISAT Seismic Brackets @ 60 Degrees[4] | | | | Brace Arm Member[2] | | Assembly Design Value[3], P (lbs) |
|---|---|---|---|---|---|---|---|---|
| | Diameter (in) | Lower Bracket | Manual Page | Upper Bracket[5] | Manual Page | Arm ID | Max. Brace Arm Length (ft) | |
| **R34CFA1P06** | 3/4-60 | RCHWS34-60 | F1.1 | ABHWS12-_ | F2.1 | A1P | 06 | **550** |
| **R34CFB1P12** | | RCHWS34-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 12 | **680** |
| **R34CFB1P09** | | RCHWS34-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 09 | **870** |
| **R34CFB1P06** | | RCHWS34-60 | F1.1 | ABHWS12-_ | F2.1 | B1P | 06 | **870** |
| **R34CFB1S12** | | RCHWS34-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 12 | **780** |
| **R34CFB1S09** | | RCHWS34-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 09 | **870** |
| **R34CFB1S06** | | RCHWS34-60 | F1.1 | ABHWS12-_ | F2.1 | B1S | 06 | **870** |
| **R34CFB2P12** | | RCHWS34-60 | F1.1 | ABHWS12-_ | F2.1 | B2P | 12 | **870** |
| **R34CFB2P09** | | RCHWS34-60 | F1.1 | ABHWS12-_ | F2.1 | B2P | 09 | **870** |
| **R34DGB2P12** | | RCHWX34-60 | F1 | ABHWX12-_ | F2 | B2P | 12 | **1,390** |
| **R34DGB2P09** | | RCHWX34-60 | F1 | ABHWX12-_ | F2 | B2P | 09 | **1,390** |
| **R34DGB2P06** | | RCHWX34-60 | F1 | ABHWX12-_ | F2 | B2P | 06 | **1,390** |
| **R34DGB2S12** | | RCHWX34-60 | F1 | ABHWX12-_ | F2 | B2S | 12 | **1,390** |
| **R34DGB2S09** | | RCHWX34-60 | F1 | ABHWX12-_ | F2 | B2S | 09 | **1,390** |
| **R12FFB1P09** | 1/2-60 | ABHWS12-60 | F2.1 | ABHWS12-_ | F2.1 | B1P | 09 | **910** |
| **R12FFB1P06** | | ABHWS12-60 | F2.1 | ABHWS12-_ | F2.1 | B1P | 06 | **1,050** |
| **R12FFB2P12** | | ABHWS12-60 | F2.1 | ABHWS12-_ | F2.1 | B2P | 12 | **1,050** |
| **R12EEB2S12** | | ABHW12-60 | F2 | ABHW12-_ | F2 | B2S | 12 | **1,070** |
| **R12EEB2S09** | | ABHW12-60 | F2 | ABHW12-_ | F2 | B2S | 09 | **1,070** |
| **R12GGB2S06** | | ABHWX12-60 | F2 | ABHWX12-_ | F2 | B2S | 06 | **1,390** |

1. See Page E0.1 for Nomenclature.
2. For Different Bracing Arm Length contact ISAT representative.
3. Nominal 60 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
4. Use of Any Non ISAT Bracket Voids Engineering.
5. Any size Upper Bracket within the same bracket family may be used. Refer to specified manual page for details.
6. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
7. HSS 3X3X1/4 May Be Substituted For Any Brace Arm Where P <3,000 Lbs and Maximum Length <25 Feet .
   HSS 2X2X1/8 May Be Substituted For Any Brace Arm Where P <1,250 Lbs and Maximum Length <16 Feet .
8. See Page E2.1 for Rigid Brace Arm Assembly details.

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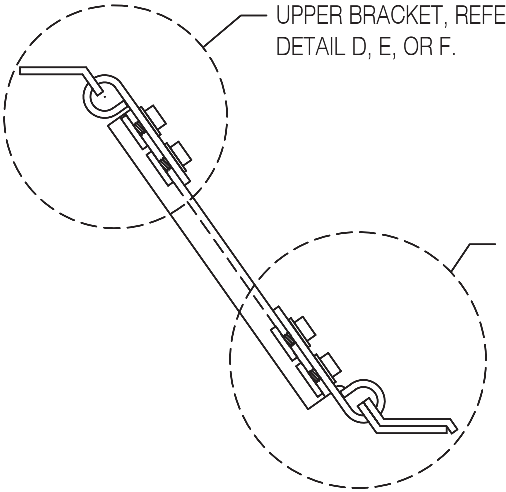

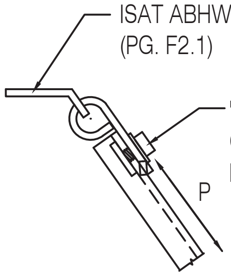

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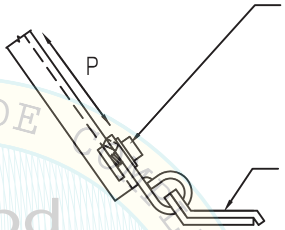

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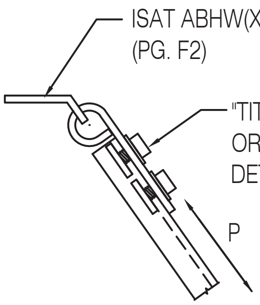

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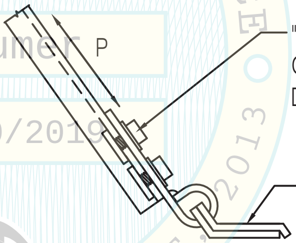

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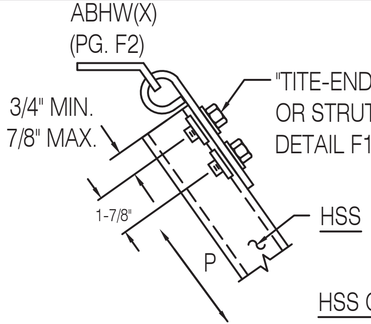
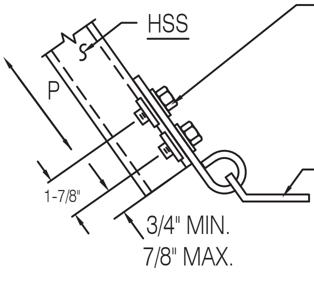


DETAIL "F"

HSS CONNECTION DETAILS
(TYP. FOR ALL BRACKETS)



DETAIL "C"

HSS CONNECTION DETAILS
(TYP. FOR ALL BRACKETS)

# RIGID BRACE ASSEMBLY DETAILS

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*06/28/18*

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***E2.1***

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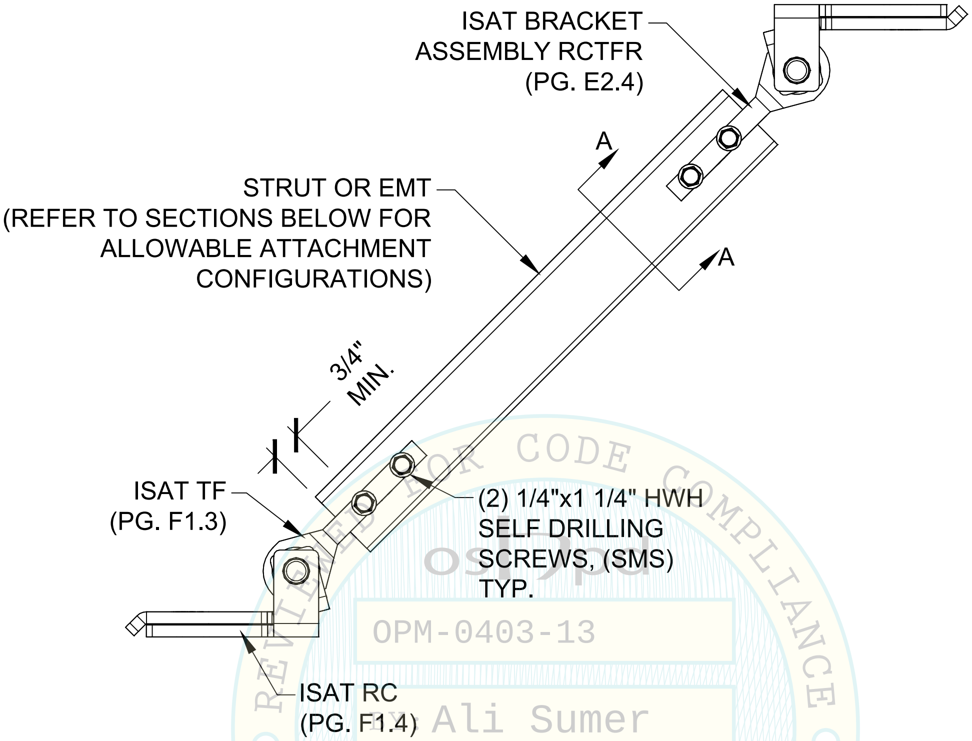
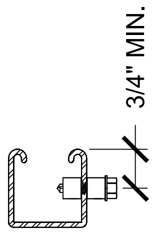


**ALLOWABLE ATTACHMENT CONFIGURATIONS PER BRACE MEMBER TYPE**



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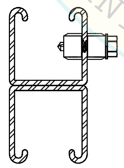

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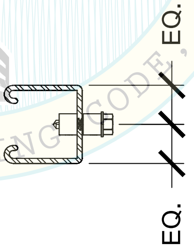

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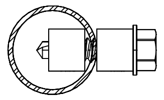

**SECTION A-A [4]**

NOTES:
1. SOLID STRUT (ALL SIZES AND PROFILES EXCEPT SHALLOW STRUT)
2. PERFORATED STRUT (ALL SIZES AND PROFILES)
3. SOLID STRUT (SHALLOW DEPTH)
4. EMT

# RIGID BRACE ARM ASSEMBLY - STF BRACKET

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07/26/18

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**E2.3**

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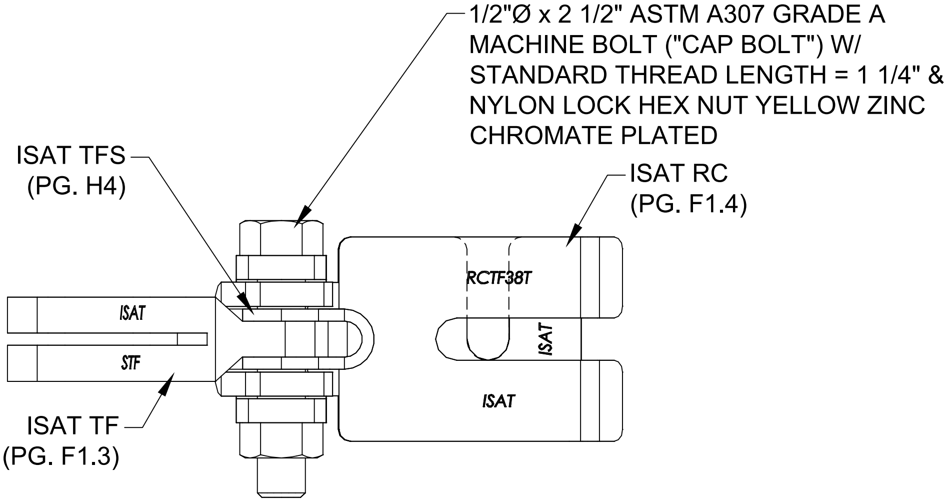
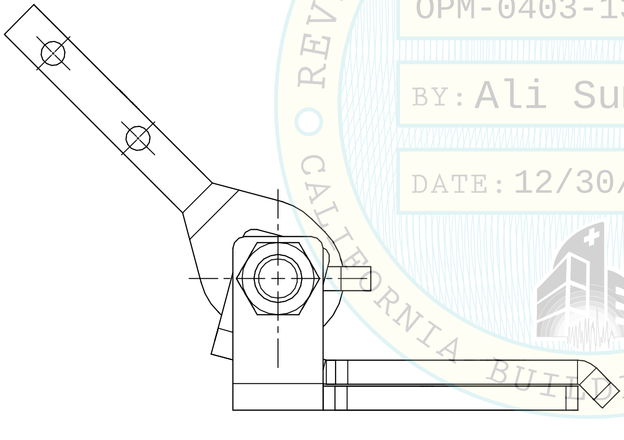
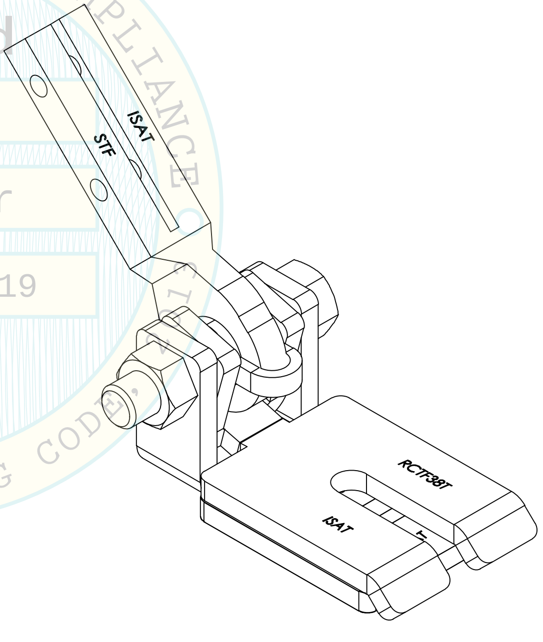


## PLAN VIEW



## SIDE VIEW



## ISOMETRIC VIEW

# ROD CAPTURE TUNING FORK (RCTFR) - RIGID ASSEMBLY

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**ISAT**
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*10/11/19*
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***E2.4***

2013 CBC OSHPD

### *DIRECTORY - ISAT CABLE BRACE ASSEMBLIES[4] - 0°*

| ISAT Brace Assembly [1] | Rod | Lower Connection[3] | | | | Upper Connection[3] | | | | Assembly Design Value [2], P (Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Diameter (in) | Lower Bracket | Manual Page | Diameter & Connection Assembly Type | Manual Page | Upper Bracket | Manual Page | Diameter & Connection Assembly Type | Manual Page | |
| **C38AA04WS** | 3/8-0 | RCTFC38-0 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12-0 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C38AA06WS** | | RCTFC38-0 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12-0 | E4.7 | 3/16 Swaged | E4.3 | **1,100** |
| **C12AA04WS** | 1/2-0 | RCTFC12-0 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12-0 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C12AA06WS** | | RCTFC12-0 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12-0 | E4.7 | 3/16 Swaged | E4.3 | **1,470** |
| **C58AA04WS** | 5/8-0 | RCTFC58-0 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12-0 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C58AA06WS** | | RCTFC58-0 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12-0 | E4.7 | 3/16 Swaged | E4.3 | **1,470** |
| **C38CF04WS** | 3/8-0 | RCHWS38-0 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-0 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C38CF06WS** | | RCHWS38-0 | F1.1 | 3/16 Wedgy45 | E4.4 | ABHWS12-0 | F2.1 | 3/16 Swaged | E4.3 | **780** |
| **C12CF04WS** | 1/2-0 | RCHWS12-0 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-0 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C12CF06WS** | | RCHWS12-0 | F1.1 | 3/16 Wedgy45 | E4.4 | ABHWS12-0 | F2.1 | 3/16 Swaged | E4.3 | **780** |
| **C58CF04WS** | 5/8-0 | RCHWS58-0 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-0 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C58DG06WS** | | RCHWX58-0 | F1 | 3/16 Wedgy45 | E4.4 | ABHWX12-0 | F2 | 3/16 Swaged | E4.3 | **1,480** |
| **C58DG06TS** | | RCHWX58-0 | F1 | 3/16 Thru-Bolted | E4.2 | ABHWX12-0 | F2 | 3/16 Swaged | E4.3 | **1,550** |
| **C34CF04WS** | 3/4-0 | RCHWS34-0 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-0 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C34DG06WS** | | RCHWX34-0 | F1 | 3/16 Wedgy45 | E4.4 | ABHWX12-0 | F2 | 3/16 Swaged | E4.3 | **1,480** |
| **C34DG06TS** | | RCHWX34-0 | F1 | 3/16 Thru-Bolted | E4.2 | ABHWX12-0 | F2 | 3/16 Swaged | E4.3 | **1,550** |
| **C12FF04WC** | 1/2-0 | ABHWS12-0 | F2.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-0 | F2.1 | 1/8 Cable Clip | E4.3 | **670** |
| **C12GG06CC** | | ABHWX12-0 | F2 | 3/16 Cable Clip | E4.3 | ABHWX12-0 | F2 | 3/16 Cable Clip | E4.3 | **1,570** |

1. See Page E0.1 for Nomenclature.
2. Nominal 0 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
3. Use of Any Non ISAT Bracket Voids Engineering.
4. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
5. See Page E4.2 for Rod Capture Cable Assembly - RCHW detail.
6. See Page E4.3 for Cable Clip Assembly detail.
7. See Page E4.4 for Wedgy Looped Assembly detail.
8. See Page E4.7 for Rod Capture Tuning Fork Cable Assembly - RCTFC detail.

### *DIRECTORY - ISAT CABLE BRACE ASSEMBLIES[4] - 30°*

| ISAT Brace Assembly[1] | Rod | Lower Connection[3] | | | | Upper Connection[3] | | | | Assembly Design Value[2], P (Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Diameter (in) | Lower Bracket | Manual Page | Diameter & Connection Assembly Type | Manual Page | Upper Bracket | Manual Page | Diameter & Connection Assembly Type | Manual Page | |
| **C38AA04WS** | 3/8-30 | RCTFC38-30 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12-30 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C38AA06WS** | | RCTFC38-30 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12-30 | E4.7 | 3/16 Swaged | E4.3 | **1,320** |
| **C12AA04WS** | 1/2-30 | RCTFC12-30 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12-30 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C12AA06WS** | | RCTFC12-30 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12-30 | E4.7 | 3/16 Swaged | E4.3 | **1,470** |
| **C58AA04WS** | 5/8-30 | RCTFC58-30 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12-30 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C58AA06WS** | | RCTFC58-30 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12-30 | E4.7 | 3/16 Swaged | E4.3 | **1,470** |
| **C38CF04WS** | 3/8-30 | RCHWS38-30 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-30 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C38CF06WS** | | RCHWS38-30 | F1.1 | 3/16 Wedgy45 | E4.4 | ABHWS12-30 | F2.1 | 3/16 Swaged | E4.3 | **780** |
| **C12CF04WS** | 1/2-30 | RCHWS12-30 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-30 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C12CF06WS** | | RCHWS12-30 | F1.1 | 3/16 Wedgy45 | E4.4 | ABHWS12-30 | F2.1 | 3/16 Swaged | E4.3 | **780** |
| **C58CF04WS** | 5/8-30 | RCHWS58-30 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-30 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C58DG06WS** | | RCHWX58-30 | F1 | 3/16 Wedgy45 | E4.4 | ABHWX12-30 | F2 | 3/16 Swaged | E4.3 | **1,480** |
| **C58DG06TS** | | RCHWX58-30 | F1 | 3/16 Thru-Bolted | E4.2 | ABHWX12-30 | F2 | 3/16 Swaged | E4.3 | **1,550** |
| **C34CF04WS** | 3/4-30 | RCHWS34-30 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-30 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C34DG06WS** | | RCHWX34-30 | F1 | 3/16 Wedgy45 | E4.4 | ABHWX12-30 | F2 | 3/16 Swaged | E4.3 | **1,480** |
| **C34DG06TS** | | RCHWX34-30 | F1 | 3/16 Thru-Bolted | E4.2 | ABHWX12-30 | F2 | 3/16 Swaged | E4.3 | **1,550** |
| **C12FF04WC** | 1/2-30 | ABHWS12-30 | F2.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-30 | F2.1 | 1/8 Cable Clip | E4.3 | **670** |
| **C12GG06CC** | | ABHWX12-30 | F2 | 3/16 Cable Clip | E4.3 | ABHWX12-30 | F2 | 3/16 Cable Clip | E4.3 | **1,570** |

1. See Page E0.1 for Nomenclature.
2. Nominal 30 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
3. Use of Any Non ISAT Bracket Voids Engineering.
4. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
5. See Page E4.2 for Rod Capture Cable Assembly - RCHW detail.
6. See Page E4.3 for Cable Clip Assembly detail.
7. See Page E4.4 for Wedgy Looped Assembly detail.
8. See Page E4.7 for Rod Capture Tuning Fork Cable Assembly - RCTFC detail.

### *DIRECTORY - ISAT CABLE BRACE ASSEMBLIES[4] - 45°*

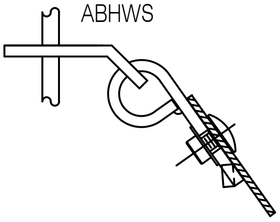
| ISAT Brace Assembly[1] | Rod | Lower Connection[3] | | | | Upper Connection[3] | | | | Assembly Design Value[2], P (Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Diameter (in) | Lower Bracket | Manual Page | Diameter & Connection Assembly Type | Manual Page | Upper Bracket | Manual Page | Diameter & Connection Assembly Type | Manual Page | |
| **C38AA04WS** | 3/8 | RCTFC38 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C38AA06WS** | | RCTFC38 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12 | E4.7 | 3/16 Swaged | E4.3 | **1,360** |
| **C12AA04WS** | 1/2 | RCTFC12 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C12AA06WS** | | RCTFC12 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12 | E4.7 | 3/16 Swaged | E4.3 | **1,480** |
| **C58AA04WS** | 5/8 | RCTFC58 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C58AA06WS** | | RCTFC58 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12 | E4.7 | 3/16 Swaged | E4.3 | **1,480** |
| **C38CF04WS** | 3/8 | RCHWS38 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C38CF06WS** | | RCHWS38 | F1.1 | 3/16 Wedgy45 | E4.4 | ABHWS12 | F2.1 | 3/16 Swaged | E4.3 | **1,360** |
| **C12CF04WS** | 1/2 | RCHWS12 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C12CF06WS** | | RCHWS12 | F1.1 | 3/16 Wedgy45 | E4.4 | ABHWS12 | F2.1 | 3/16 Swaged | E4.3 | **1,480** |
| **C58CF04WS** | 5/8 | RCHWS58 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C58DG06WS** | | RCHWX58 | F1 | 3/16 Wedgy45 | E4.4 | ABHWX12 | F2 | 3/16 Swaged | E4.3 | **1,480** |
| **C58DG06TS** | | RCHWX58 | F1 | 3/16 Thru-Bolted | E4.2 | ABHWX12 | F2 | 3/16 Swaged | E4.3 | **1,830** |
| **C34CF04WS** | 3/4 | RCHWS34 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C34DG06WS** | | RCHWX34 | F1 | 3/16 Wedgy45 | E4.4 | ABHWX12 | F2 | 3/16 Swaged | E4.3 | **1,480** |
| **C34DG06TS** | | RCHWX34 | F1 | 3/16 Thru-Bolted | E4.2 | ABHWX12 | F2 | 3/16 Swaged | E4.3 | **1,830** |
| **C12FF04WC** | 1/2 | ABHWS12 | F2.1 | 1/8 Wedgy23 | E4.4 | ABHWS12 | F2.1 | 1/8 Cable Clip | E4.3 | **670** |
| **C12GG06CC** | | ABHWX12 | F2 | 3/16 Cable Clip | E4.3 | ABHWX12 | F2 | 3/16 Cable Clip | E4.3 | **2,650** |

1. See Page E0.1 for Nomenclature.
2. Nominal 45 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
3. Use of Any Non ISAT Bracket Voids Engineering.
4. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
5. See Page E4.2 for Rod Capture Cable Assembly - RCHW detail.
6. See Page E4.3 for Cable Clip Assembly detail.
7. See Page E4.4 for Wedgy Looped Assembly detail.
8. See Page E4.7 for Rod Capture Tuning Fork Cable Assembly - RCTFC detail.

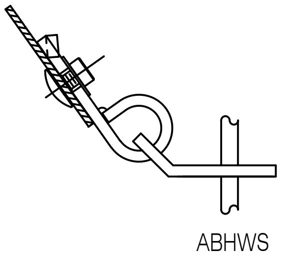
| ***DIRECTORY - ISAT CABLE BRACE ASSEMBLIES $^4$ - 60°*** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ISAT Brace Assembly $^1$** | **Rod** | **Lower Connection$^3$** | | | | **Upper Connection$^3$** | | | | **Assembly Design Value $^2$, P (Lbs)** |
| | **Diameter (in)** | **Lower Bracket** | **Manual Page** | **Diameter & Connection Assembly Type** | **Manual Page** | **Upper Bracket** | **Manual Page** | **Diameter & Connection Assembly Type** | **Manual Page** | |
| **C38AA04WS** | 3/8-60 | RCTFC38-60 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12-60 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C38AA06WS** | | RCTFC38-60 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12-60 | E4.7 | 3/16 Swaged | E4.3 | **1,480** |
| **C12AA04WS** | 1/2-60 | RCTFC12-60 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12-60 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C12AA06WS** | | RCTFC12-60 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12-60 | E4.7 | 3/16 Swaged | E4.3 | **1,480** |
| **C58AA04WS** | 5/8-60 | RCTFC58-60 | E4.7 | 1/8 Wedgy23 | E4.4 | RCTFC12-60 | E4.7 | 1/8 Swaged | E4.3 | **670** |
| **C58AA06WS** | | RCTFC58-60 | E4.7 | 3/16 Wedgy45 | E4.4 | RCTFC12-60 | E4.7 | 3/16 Swaged | E4.3 | **1,480** |
| **C38CF04WS** | 3/8-60 | RCHWS38-60 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-60 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C38CF06WS** | | RCHWS38-60 | F1.1 | 3/16 Wedgy45 | E4.4 | ABHWS12-60 | F2.1 | 3/16 Swaged | E4.3 | **760** |
| **C12CF04WS** | 1/2-60 | RCHWS12-60 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-60 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C12CF06WS** | | RCHWS12-60 | F1.1 | 3/16 Wedgy45 | E4.4 | ABHWS12-60 | F2.1 | 3/16 Swaged | E4.3 | **760** |
| **C58CF04WS** | 5/8-60 | RCHWS58-60 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-60 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C58DG06WS** | | RCHWX58-60 | F1 | 3/16 Wedgy45 | E4.4 | ABHWX12-60 | F2 | 3/16 Swaged | E4.3 | **1,390** |
| **C58DG06TS** | | RCHWX58-60 | F1 | 3/16 Thru-Bolted | E4.2 | ABHWX12-60 | F2 | 3/16 Swaged | E4.3 | **1,390** |
| **C34CF04WS** | 3/4-60 | RCHWS34-60 | F1.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-60 | F2.1 | 1/8 Swaged | E4.3 | **670** |
| **C34DG06WS** | | RCHWX34-60 | F1 | 3/16 Wedgy45 | E4.4 | ABHWX12-60 | F2 | 3/16 Swaged | E4.3 | **1,390** |
| **C34DG06TS** | | RCHWX34-60 | F1 | 3/16 Thru-Bolted | E4.2 | ABHWX12-60 | F2 | 3/16 Swaged | E4.3 | **1,390** |
| **C12FF04WC** | 1/2-60 | ABHWS12-60 | F2.1 | 1/8 Wedgy23 | E4.4 | ABHWS12-60 | F2.1 | 1/8 Cable Clip | E4.3 | **670** |
| **C12GG06CC** | | ABHWX12-60 | F2 | 3/16 Cable Clip | E4.3 | ABHWX12-60 | F2 | 3/16 Cable Clip | E4.3 | **1,390** |

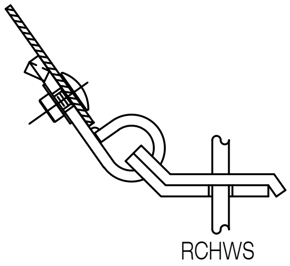
1. See Page E0.1 for Nomenclature.
2. Nominal 60 +/- 5 Degrees Brace Angle Measured From Horizontal. Brace Force (P) Along Brace Arm.
3. Use of Any Non ISAT Bracket Voids Engineering.
4. The table above represents typical assemblies. Consult ISAT Engineering if alternate options are required.
5. See Page E4.2 for Rod Capture Cable Assembly - RCHW detail.
6. See Page E4.3 for Cable Clip Assembly detail.
7. See Page E4.4 for Wedgy Looped Assembly detail.
8. See Page E4.7 for Rod Capture Tuning Fork Cable Assembly - RCTFC detail.

UPPER CONNECTION OPTIONS
"DETAIL B"

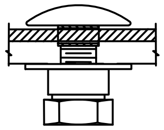


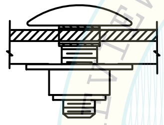
LOWER CONNECTION OPTIONS
"DETAIL A"



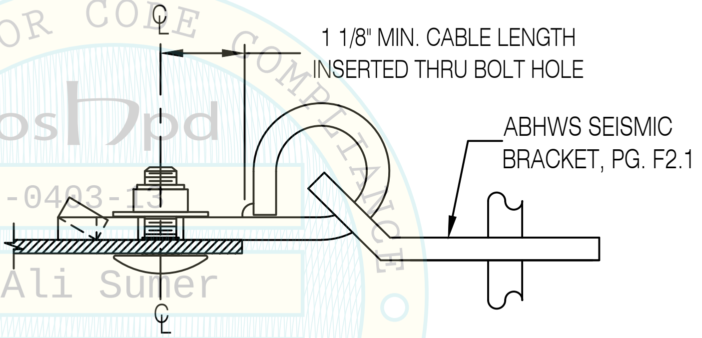


REFER TO NOTE 19, PAGE 4.2 FOR CABLE TENSIONING ON NON-VIBRATION ISOLATED INSTALLATIONS.

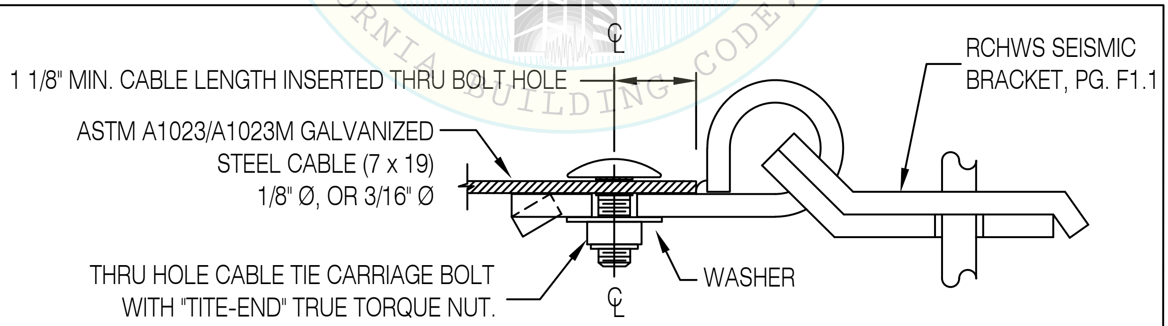

PRIOR TO REQ'D
HEX NUT SHEAR


FINAL AFTER REQ'D
HEX NUT SHEAR

"TITE-END" TRUE TORQUE NUT
HEX NUT (NON-THREADED)
SHEARS OFF @ MINIMUM 55-FT-LBS.
NO TORQUE WRENCH REQ'D.



THRU BOLT CABLE TIE ASSEMBLY
DETAIL "B"



THRU BOLT CABLE TIE ASSEMBLY
DETAIL "A"

CABLE BRACING TO BE INSTALLED IN A SYMETRICAL PATTERN PER B-SERIES INSTALLATION DETAILS.

## THRU BOLT CABLE TIE ASSEMBLY DETAILS

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*07/26/18*

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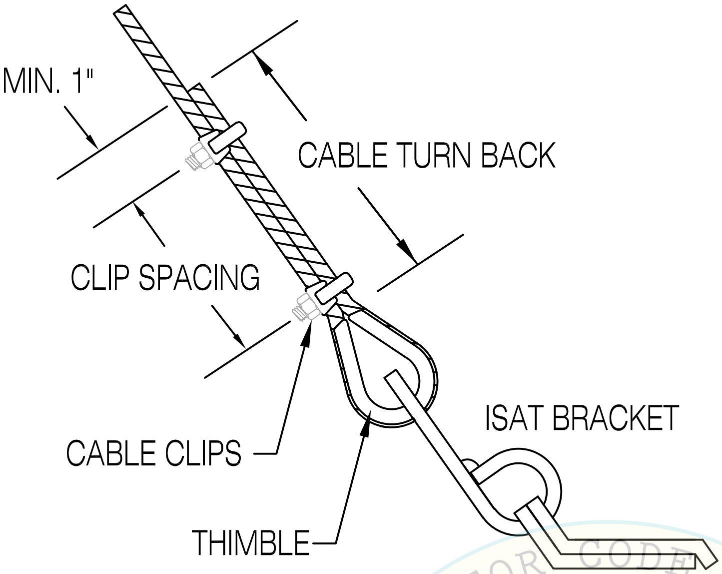
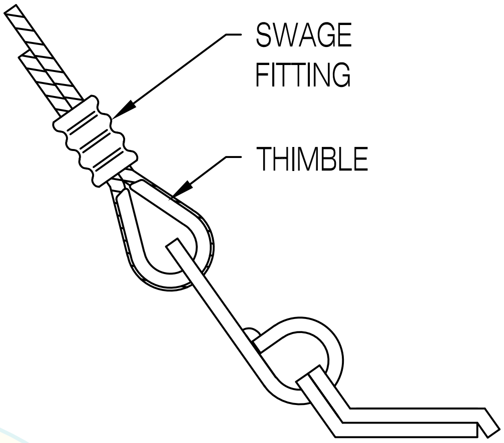
***E4.2***

2013 CBC OSHPD





| Cable Diameter (in) | Cable Maximum Design Value (lbs) | Cable Clip Parameters | | |
|---|---|---|---|---|
| | | Minimum Turn Back (in) | Norminal Clip Spacing (in) | Cable Clip Nut Torque (ft - lbs) |
| 1/8 | 667[1] | 3 1/4 | 2 1/4 | 4.5 |
| 3/16 | 2650[2] | 3 3/4 | 2 3/4 | 7.5 |
| 1/4 | 3170[2] | 4 3/4 | 3 1/2 | 15 |
| 5/16 | 4000[2] | 5 1/4 | 3 7/8 | 30 |

1. FACTOR OF SAFETY: 3.0
2. FACTOR OF SAFETY: 1.5
3. CABLE BRACING TO BE INSTALLED IN A SYMMETRICAL PATTERN PER B-SERIES INSTALLATION DETAILS.
4. EXCEPT FOR SYSTEMS SUSPENDED FROM SPRING HANGERS OR SYSTEMS WITH THERMAL EXPANSION OR CONTRACTION, TENSION CABLE TO REMOVE SLACK WITHOUT INDUCING UPLIFT OF THE COMPONENT.

## CABLE CLIP ASSEMBLY

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***E4.3***

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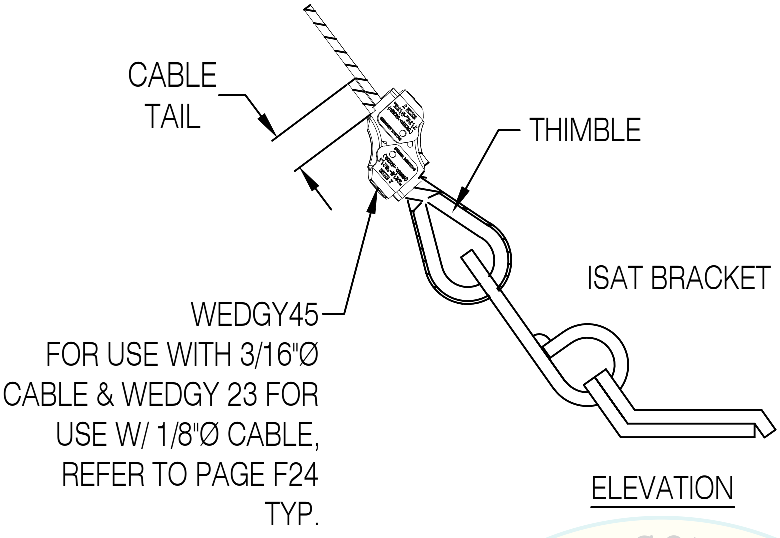
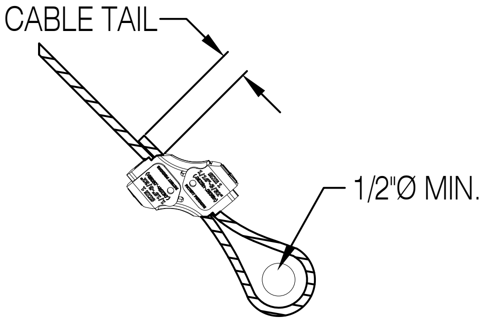


ELEVATION



ELEVATION

| CABLE DIAMETER (in) | LOOP VALUES (in) | MINIMUM TAIL LENGTH (in) |
|---|---|---|
| 1/8 | 770 | 3 |
| 3/16 | 1485 | 3 |

1. CABLE BRACING TO BE INSTALLED IN A SYMMETRICAL PATTERN PER B-SERIES INSTALLATION DETAILS
2. EXCEPT FOR SYSTEMS SUSPENDED FROM SPRING HANGERS OR SYSTEMS WITH THERMAL EXPANSION OR CONTRACTION, TENSION CABLE TO REMOVE SLACK WITHOUT INDUCING UPLIFT OF THE COMPONENT
3. FACTOR OF SAFETY: 1.5

# WEDGY LOOPED ASSEMBLY

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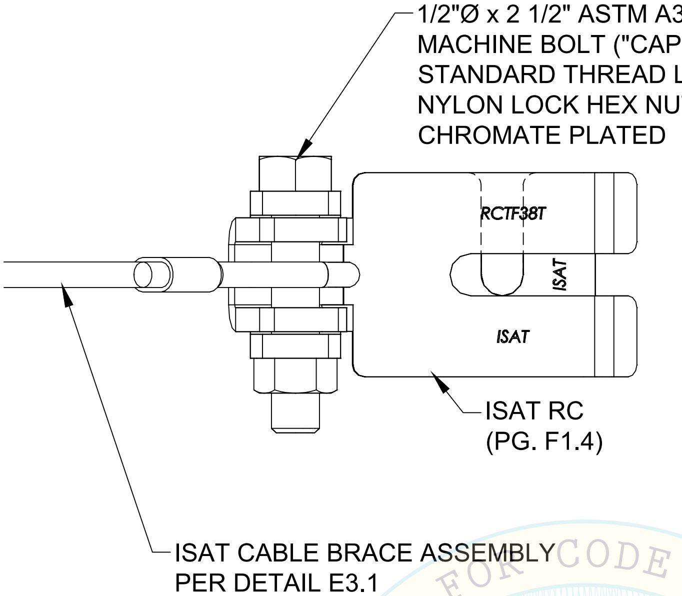
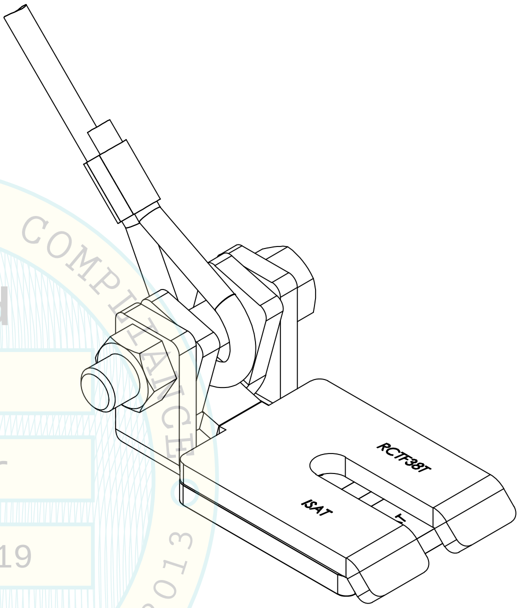
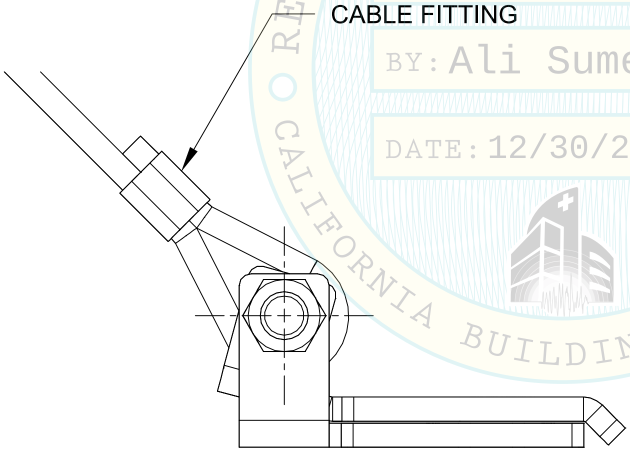


**PLAN VIEW**



**ISOMETRIC VIEW**



**SIDE VIEW**

## ROD CAPTURE TUNING FORK (RCTFC) - CABLE ASSEMBLY

ANTHONY A. RUBALCAVA
S 4710

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A Division of Tomarco Contractor Specialties

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# INDEX - ISAT SEISMIC RESTRAINT HARDWARE

PAGE DESCRIPTION

## 1. SEISMIC BRACKETS

## 2. LONGITUDINAL RESTRAINT DEVICES (LRD)

## 3. PIPE/CONDUIT HANGER ACCESSORIES

## 4. SEISMIC POURED-IN-PLACE "PIP" INSERT SERIES

## 5. SEISMIC STEEL DECK INSERT "SDI" SERIES

## 6 GENERAL ISAT HARDWARE

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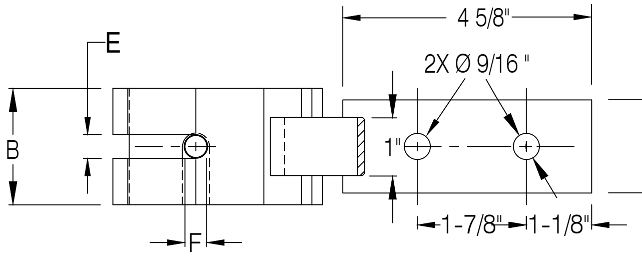

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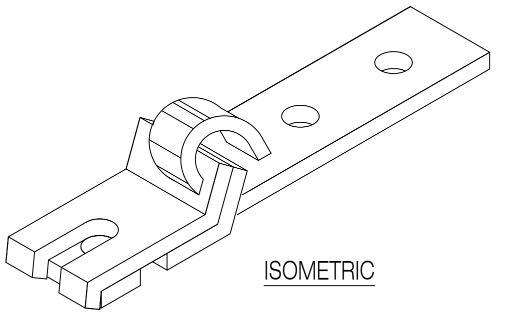

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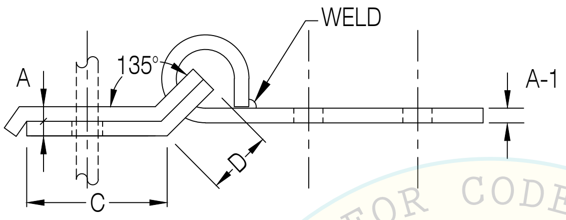

SIDE VIEW

| BRACKET ALLOWABLE CAPACITY (LBS) FOR RIGID AND CABLE BRACING | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of Bracket | Rod Diameter (in) | Installation Angle From Horizontal | | | Wall Connection[3] | Dimensions (in) | | | | | | |
| | | 0° - 30° | 31° - 45° | 46° - 60° | 90° | A | A-1 | B | C | D | E | F |
| RCHW12 | 1/2 | 1,025 | 2,290 | 800 | 695 | 3/16 | 1/4 | 2 | 2 5/16 | 1 1/16 | 9/16 | 17/32 |
| RCHWX58 | 5/8 | 1,545 | 2,730 | 1,825 | 1,580 | 1/4 | 5/16 | 2 1/2 | 2 5/16 | 1 5/16 | 21/32 | 25/32 |
| RCHWX34 | 3/4 | 1,545 | 2,730 | 1,825 | 1,580 | 1/4 | 5/16 | 2 1/2 | 2 5/16 | 1 5/16 | 25/32 | 25/32 |

1. Capacity of bracket based on seismic testing considering both tension and compression.
2. Factor of Safety = 2.0
3. At wall applications where the seismic load is parallel to the brace.

PATENT NO. 6,050,035

# SEISMIC ROD CAPTURE BRACKETS, HINGED, WELDED (RCHW)

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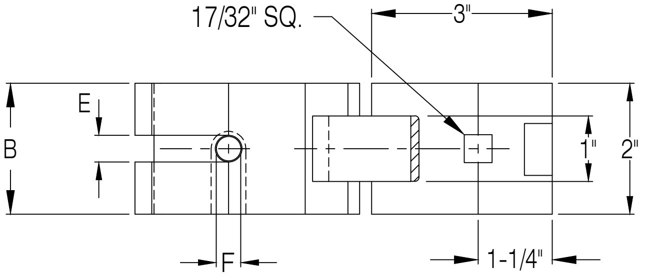

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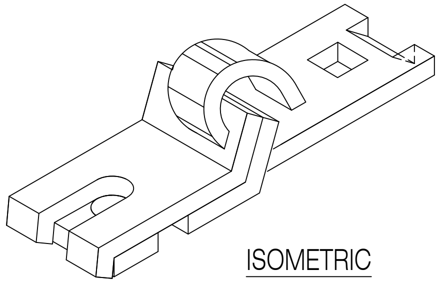

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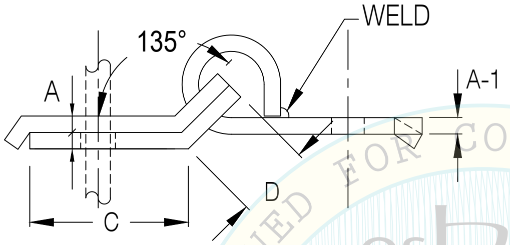

SIDE VIEW

| BRACKET ALLOWABLE CAPACITY (LBS) FOR RIGID AND CABLE BRACING | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of Bracket | Rod Diameter (in) | Installation Angle From Horizontal | | | Wall Connection³ | Dimensions (in) | | | | | | |
| | | 0° - 30° | 31° - 45° | 46° - 60° | 90° | A | A-1 | B | C | D | E | F |
| RCHWS38 | 3/8 | 775 | 2,085 | 760 | 660 | 3/16 | 1/4 | 2 | 2 5/16 | 1 1/16 | 7/16 | 17/32 |
| RCHWS12 | 1/2 | 775 | 2,085 | 760 | 660 | 3/16 | 1/4 | 2 | 2 5/16 | 1 1/16 | 9/16 | 17/32 |
| RCHWS58 | 5/8 | 895 | 1,685 | 870 | 755 | 1/4 | 1/4 | 2 1/2 | 2 5/16 | 1 5/16 | 21/32 | 25/32 |
| RCHWS34 | 3/4 | 895 | 1,685 | 870 | 755 | 1/4 | 1/4 | 2 1/2 | 2 5/16 | 1 5/16 | 25/32 | 25/32 |

1. Capacity of bracket based on seismic testing considering both tension and compression.
2. Factor of Safety = 2.0
3. At wall applications where the seismic load is parallel to the brace.

PATENT NO. 6,050,035

# ROD CAPTURE BRACKETS, HINGED, WELDED SHORT (RCHWS)

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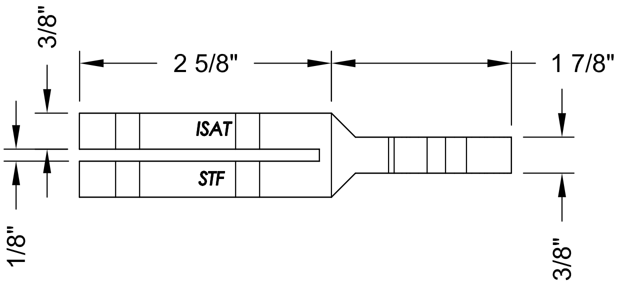

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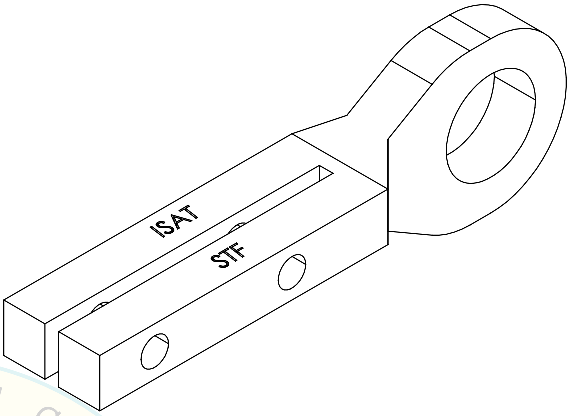

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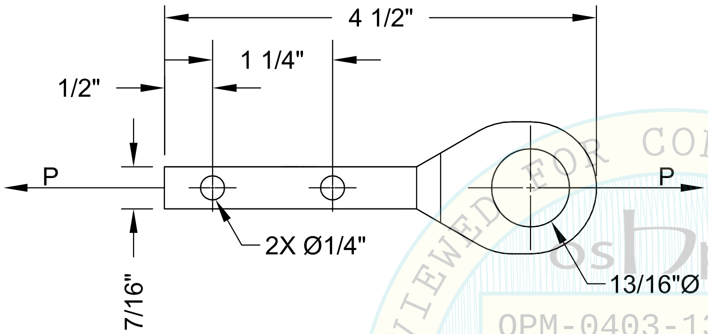

## SIDE VIEW

| Part Number | Tuning Fork Bracket Max. Axial Load, P (lbs) |
|---|---|
| STF | 3,770 |

1. Factor of Safety: 1.5

MATERIAL: STEEL ASTM A-36

FINISH: ELECTRO-GALVANIZED

**SEE H4 FOR SPACER**

## SEISMIC TUNING FORK (STF) BRACKET

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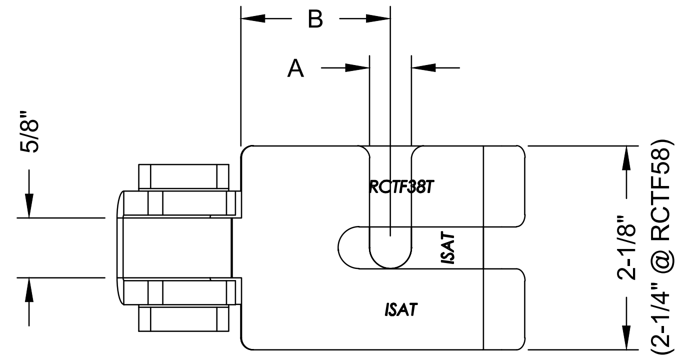

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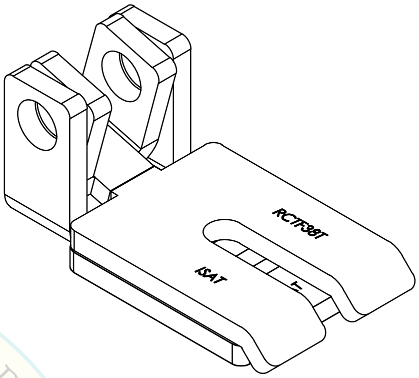
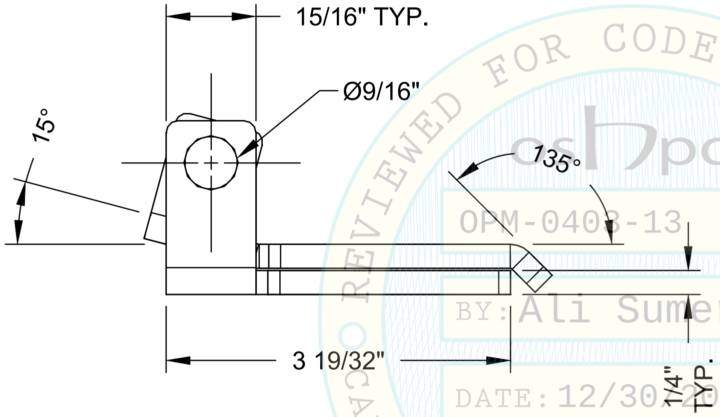


## ISOMETRIC VIEW



## SIDE VIEW

**BRACKET ALLOWABLE CAPACITY (LBS) FOR RIGID AND CABLE BRACING**

| Type of Bracket | Rod Diameter (in) | Installation Angle From Horizontal | | | Wall Connection[3] | Dimensions (in) | |
|---|---|---|---|---|---|---|---|
| | | 0°-30° | 31°-45° | 46°-60° | 90° | A | B |
| RCTF38 | 3/8 | 1,465 | 2,045 | 2,480 | 1,445 | 7/16 | 1 1/2 |
| RCTF12 | 1/2 | 1,465 | 2,045 | 2,480 | 1,445 | 9/16 | 1 1/2 |
| RCTF58 | 5/8 | 1,465 | 2,045 | 2,480 | 1,445 | 11/16 | 1 1/2 |

1. Capacity of bracket based on seismic testing considering both tension and compression.
2. Factor of Safety: 1.5
3. At wall applications where the seismic load is parallel to the brace.
4. Material: ASTM A36 Steel or Carbon Steel Gr. Q235, Finish: .0002" Min. Zinc Yellow Chromate, Type 2 Plating Per ASTM B633-85.

# ROD CAPTURE TUNING FORK (RCTF) BRACKET

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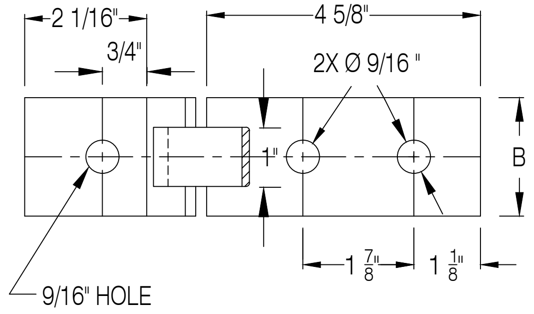
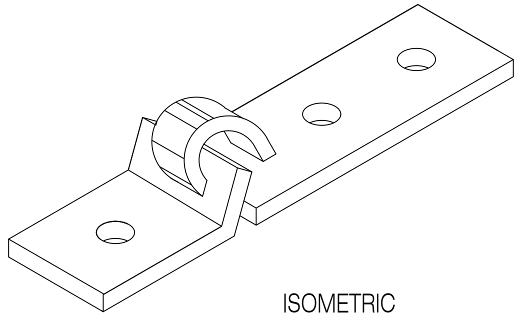


PLAN VIEW



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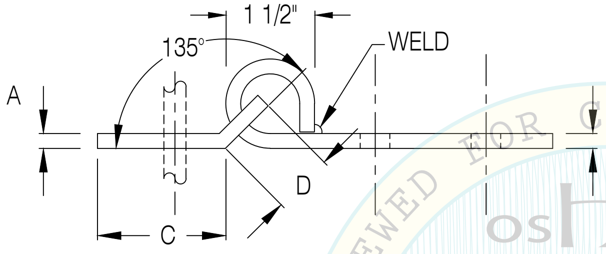

SIDE VIEW

**BRACKET ALLOWABLE CAPACITY (LBS) FOR RIGID AND CABLE BRACING**

| Type of Bracket | Rod Diameter (in) | Installation Angle From Horizontal | | | Wall Connection[3] | Dimensions (in) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 0° - 30° | 31° - 45° | 46° - 60° | 90° | A | A-1 | B | C | D |
| ABHW12 | 1/2 | 1,430 | 2,220 | 1,065 | 920 | 5/16 | 1/4 | 2 | 2 5/16 | 1 1/16 |
| ABHWX12 | 1/2 | 1,570 | 3,750 | 1,385 | 1,200 | 5/16 | 5/16 | 2 | 2 5/16 | 1 1/16 |

1. Capacity of bracket based on seismic testing considering both tension and compression.
2. Factor of Safety = 2.0
3. At wall applications where the seismic load is parallel to the brace.

PATENT NO. 6,050,035

# ANCHOR BRACKETS, HINGED, WELDED (ABHW)

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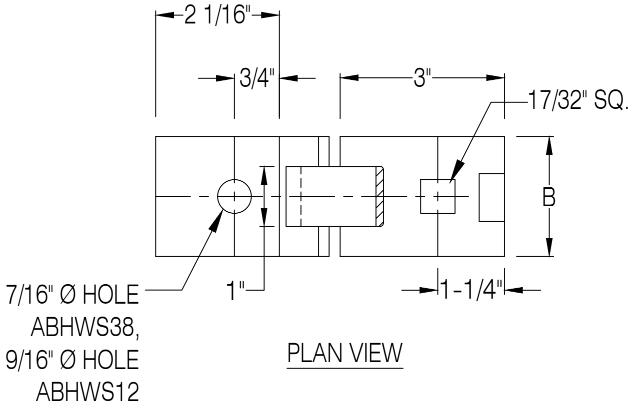

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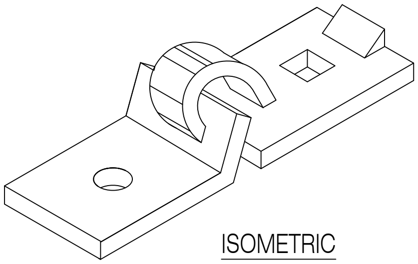

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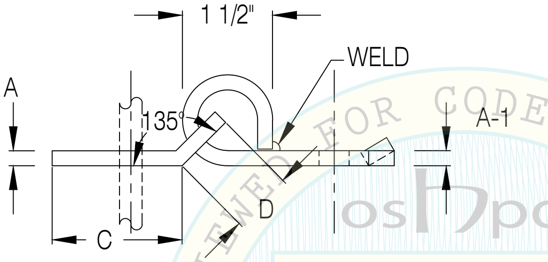

SIDE VIEW

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BY: Ali Sumer
DATE: 12/30/2019
CALIFORNIA BUILDING CODE, 2013

| BRACKET ALLOWABLE CAPACITY (LBS) FOR RIGID AND CABLE BRACING | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of Bracket | Rod Diameter (in) | Installation Angle From Horizontal | | | Wall Connection[3] | Dimensions (in) | | | | |
| | | 0° - 30° | 31° - 45° | 46° - 60° | 90° | A | A-1 | B | C | D |
| ABHWS12 | 1/2 | 840 | 2,030 | 1,045 | 905 | 5/16 | 1/4 | 2 | 2 5/16 | 1 1/16 |
| ABHWS38 | 3/8 | 840 | 2,030 | 1,045 | 905 | 5/16 | 1/4 | 2 | 2 5/16 | 1 1/16 |

1. Capacity of bracket based on seismic testing considering both tension and compression.
2. Factor of Safety = 2.0
3. At wall applications where the seismic load is parallel to the brace.

PATENT NO. 6,050,035

## ANCHOR BRACKETS, HINGED, WELDED SHORT (ABHWS)

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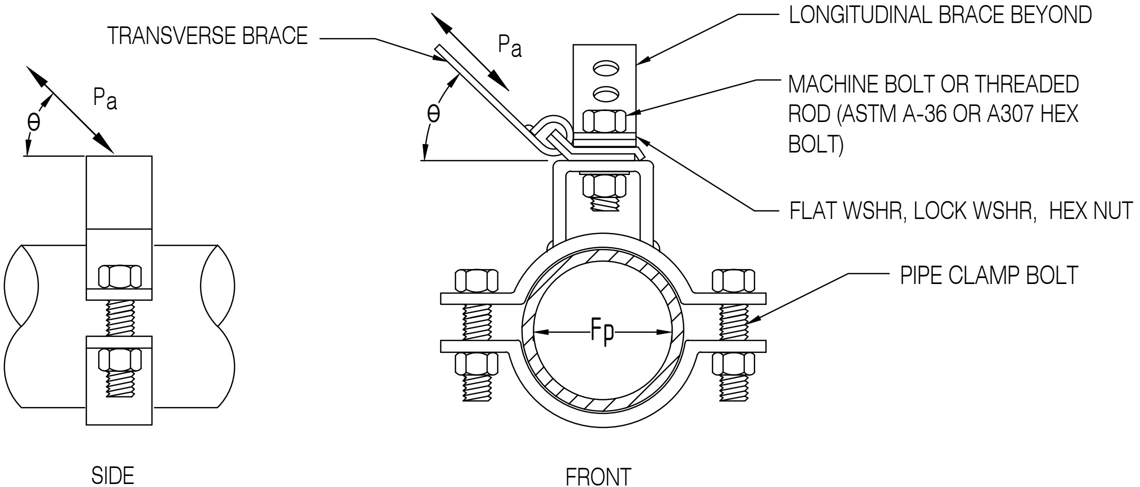
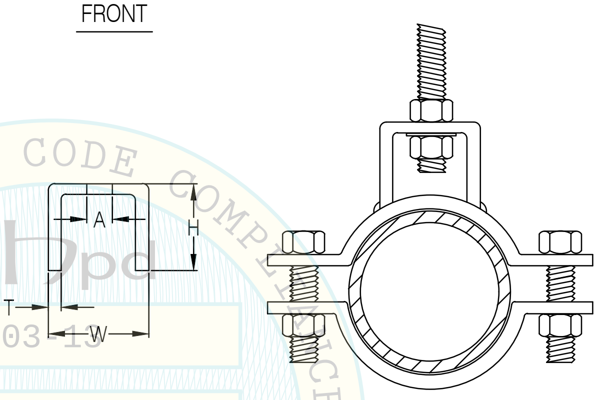


SIDE

FRONT



ALT. VERTICAL SUPPORT ONLY

| Part Number | W (in) | H (in) | T (in) |
|---|---|---|---|
| LRD1.25~LRD5 | 1 3/4 | 2 7/8 | 0.22 |
| LRD6 | 3 | 3 1/4 | 0.38 |
| LRD8 | 3 | 4 1/4 | 0.38 |

| Part Number | Pipe Dia. Inch | Pipe Clamp |  | "A" |  | Maximum Design Load (ASD) |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  | θ = 0° - 41° [3] |  | θ = 42° - 48° [3] |  | θ = 49° - 60° [3] |  |
|  |  | Bolt Size (in) | Bolt Torque (ft-lbs) | Top Mounting Bolt Diameter (in) | Alternate Vertical Support Rod Dia. (in) | Transverse Pa (lbs) | Longitudinal Pa (lbs) | Transverse Pa (lbs) | Longitudinal Pa (lbs) | Transverse Pa (lbs) | Longitudinal Pa (lbs) |
| LRD1.25 | 1 1/4 | 3/8 | 19 | 3/8 | 3/8 | 305 | 270 | 410 | 365 | 465 | 410 |
| LDR1.5 | 1 1/2 | 3/8 | 19 | 3/8 | 3/8 | 325 | 310 | 435 | 415 | 495 | 475 |
| LRD2 | 2 | 1/2 | 50 | 3/8 | 3/8 | 400 | 480 | 540 | 645 | 610 | 730 |
| LRD2.5 | 2 1/2 | 1/2 | 50 | 1/2 | 1/2 | 555 | 655 | 745 | 880 | 845 | 1,000 |
| LRD3 | 3 | 3/4 | 65 | 1/2 | 1/2 | 650 | 1,070 | 875 | 1,440 | 990 | 1,630 |
| LRD4 | 4 | 7/8 | 65 | 5/8 | 5/8 | 880 | 1,255 | 1,155 | 1,690 | 1,310 | 1,915 |
| LRD5 | 5 | 7/8 | 65 | 5/8 | 5/8 | 1,035 | 1,185 | 1,395 | 1,595 | 1,580 | 1,805 |
| LRD6 | 6 | 1 | 75 | 5/8 | 5/8 | 1,215 | 1,380 | 1,635 | 1,855 | 1,850 | 2,105 |
| LRD8 | 8 | 1 | 75 | 5/8 | 5/8 | 1,055 | 540 | 1,420 | 725 | 1,610 | 825 |

1. CONFORMS TO FEDERAL SPECIFICATION WW-H-171E, TYPE 1 AND MSS SP-58 TYPE 4.
2. FOR USE WITH STEEL PIPE ≥ SCHD 10. ALSO FOR USE WITH RMC CONDUIT.
3. INSTALLATION ANGLE FROM HORIZONTAL.
4. FACTOR OF SAFETY = 2.0

# LONGITUDINAL RESTRAINT DEVICE (LRD) - FOR USE WITH STEEL PIPE ≥ SCH 10 OR RMC CONDUIT

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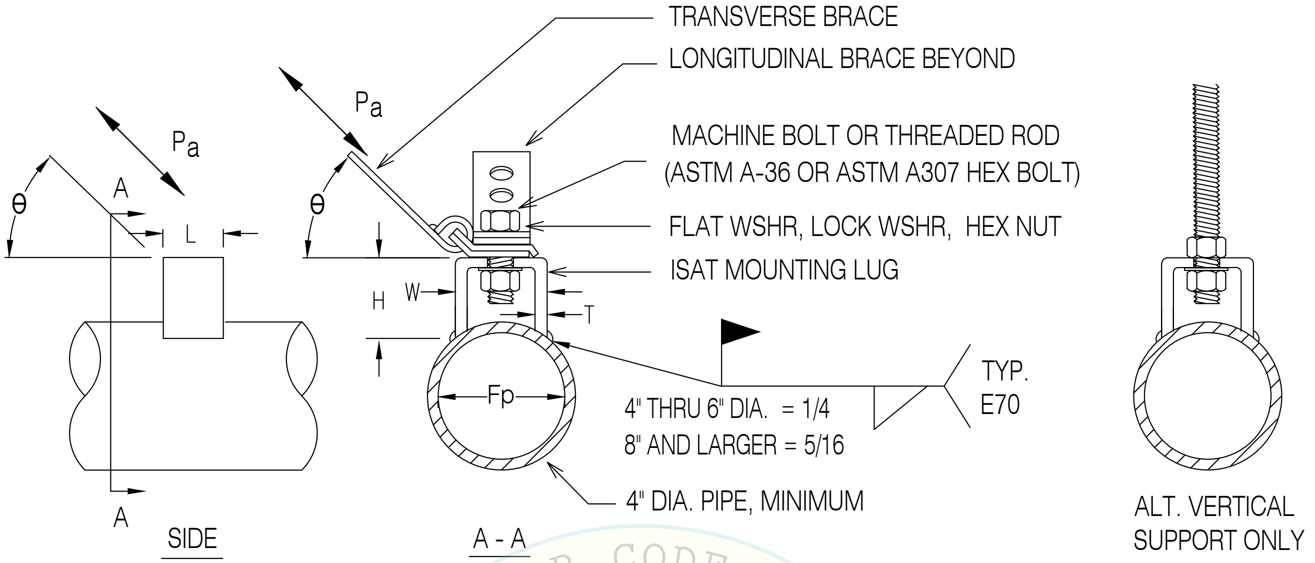

| Pipe [1] Diameter | Top Mounting Bolt Diameter (in) | Alt. [2, 3] Vertical Support Rod Dia. (in) | Mounting Lug Part Number | Maximum Brace Reaction (ASD) | | | | | | Height "H" (in) | Length "L" (in) | Thickness "T" (in) | Width "W" (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | θ = 0° - 30° [4] | | θ = 31° - 45° [4] | | θ = 46° - 60° [4] | | | | | |
| | | | | Transverse Pa (lbs) | Longitudinal Pa (lbs) | Transverse Pa (lbs) | Longitudinal Pa (lbs) | Transverse Pa (lbs) | Longitudinal Pa (lbs) | | | | |
| 4 and 5" | 5/8 | 5/8 | LUGS | 1,190 | 2,540 | 1,345 | 2,605 | 1,660 | 2,870 | 3 | 2 1/2 | 0.364 | 3 |
| 6 and 8" | 5/8 | 3/4 | LUGL | 1,795 | 3,360 | 2,100 | 3,600 | 2,640 | 4,185 | 4 1/2 | 3 | 1/2 | 3 3/4 |
| 10 and 12" | 5/8 | 7/8 | | | | | | | | | | | |
| 14 and 16" | 5/8 | 1 | | | | | | | | | | | |
| 18 thru 24" | 5/8 | 1 1/4" | | | | | | | | | | | |

1. Minimum Sched. 40 steel.
2. Field drill-out to Vertical Support Rod Diameter +1/16" (except 5/8")
3. For vertical support connections, pipe sizes larger than 8" require either 1) a separate vertical support Mounting Lug or 2) a separate bolt-on LRD (F7) in addition to the Mounting Lug above utilized for brace arm connections to the pipe.
4. Installation Angle from Horizontal.

# LONGITUDINAL RESTRAINT DEVICE (LRD) & VERTICAL SUPPORT ALTERNATE WELDED LUG CONNECTION

ANTHONY A. RUBALCAVA
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ISAT
A Division of Tomarco Contractor Specialties

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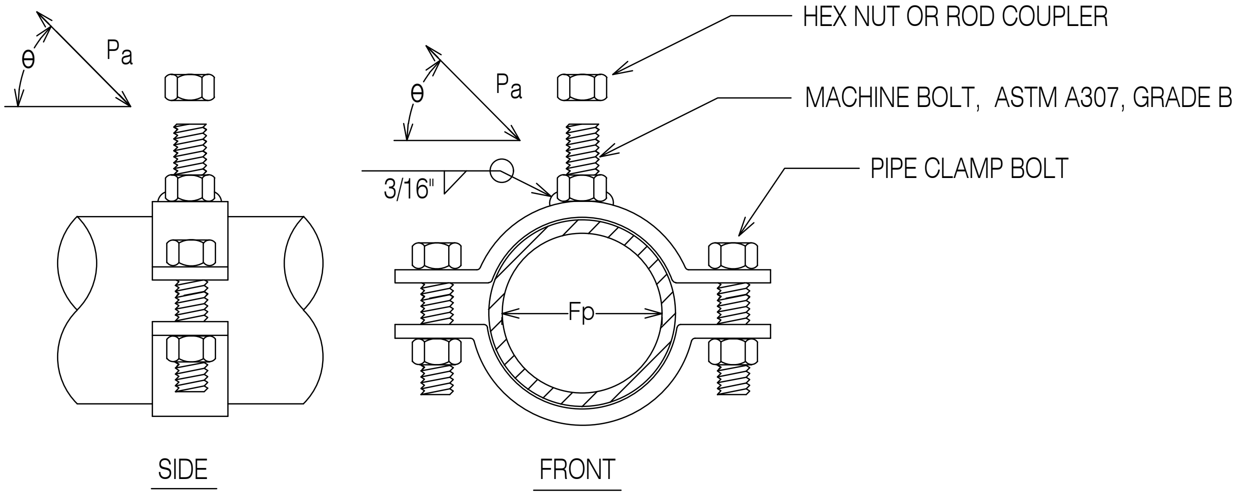

| Part Number | Pipe Diameter (in) | Pipe Clamp | | Machine Bolt Diameter (in) | Maximum Design Load (ASD) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $\theta = 0° - 41°$ [3] | | $\theta = 42° - 48°$ [3] | | $\theta = 49° - 60°$ [3] | |
| | | Bolt Size (in) | Bolt Torque (ft-lbs) | | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) |
| LRDWB1.25 | 1 1/4 | 3/8 | 19 | 3/8 | 485 | 480 | 655 | 645 | 740 | 730 |
| LDRWB1.5 | 1 1/2 | 3/8 | 19 | 3/8 | 520 | 515 | 700 | 695 | 795 | 785 |
| LRDWB2 | 2 | 1/2 | 50 | 3/8 | 555 | 930 | 745 | 1,250 | 845 | 1,420 |
| LRDWB2.5 | 2 1/2 | 1/2 | 50 | 1/2 | 1,030 | 790 | 1,385 | 1,065 | 1,570 | 1,205 |
| LRDWB3 | 3 | 1/2 | 50 | 1/2 | 1,230 | 1,120 | 1,655 | 1,505 | 1,875 | 1,705 |
| LRDWB4 | 4 | 5/8 | 65 | 5/8 | 1,215 | 1,280 | 1,635 | 1,720 | 1,850 | 1,950 |
| LRDWB5 | 5 | 5/8 | 65 | 5/8 | 1,210 | 1,505 | 1,630 | 2,025 | 1,845 | 2,295 |
| LRDWB6 | 6 | 3/4 | 65 | 5/8 | 1,545 | 1,365 | 2,080 | 1,835 | 2,355 | 2,080 |
| LRDWB8 | 8 | 3/4 | 65 | 5/8 | 1,545 | 1,015 | 2,080 | 1,365 | 2,355 | 1,545 |

1. CONFORMS TO FEDERAL SPECIFICATION WWH-171E, TYPE 1 AND MSS SP-58 TYPE 4.
2. FOR USE WITH STEEL PIPE ≥ SCHD 10. ALSO FOR USE WITH RMC CONDUIT.
3. INSTALLATION ANGLE FROM HORIZONTAL.
4. FACTOR OF SAFETY = 2.0

# LONGITUDINAL RESTRAINT DEVICE WELDED BOLT (LRDWB) - FOR USE WITH STEEL PIPE ≥ SCH 10 OR RMC CONDUIT

ANTHONY A. RUBALCAVA
S 4710

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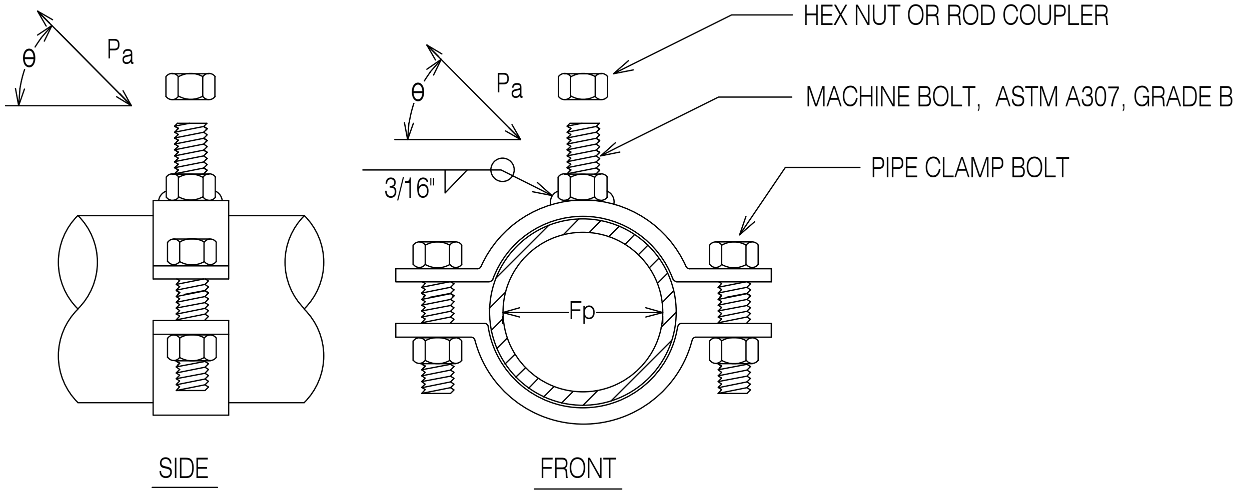
**F7.6**



| Part Number | Pipe Diameter (in) | Pipe Clamp |  | Machine Bolt Diameter (in) | Maximum Design Load (ASD) |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  | θ = 0° - 41° 3 |  | θ = 42° - 48° 3 |  | θ = 49° - 60° 3 |  |
|  |  | Bolt Size (in) | Bolt Torque (ft-lbs) |  | Transverse $P_y$ (lbs) | Longitudinal $P_x$ (lbs) | Transverse $P_y$ (lbs) | Longitudinal $P_x$ (lbs) | Transverse $P_y$ (lbs) | Longitudinal $P_x$ (lbs) |
| LRDWB3 | 3 | 1/2 | 50 | 1/2 | 910 | 910 | 1,225 | 1,225 | 1,385 | 1,385 |
| LRDWB4 | 4 | 5/8 | 65 | 5/8 | 1,295 | 855 | 1,745 | 1,285 | 1,975 | 1,455 |

1. CONFORMS TO FEDERAL SPECIFICATION WWH-171E, TYPE 1 AND MSS SP-58 TYPE 4
2 FOR USE WITH EMT
3. INSTALLATION ANGLE FROM HORIZONTAL.
4. FACTOR OF SAFETY = 2.0

# LONGITUDINAL RESTRAINT DEVICE WELDED BOLT (LRDWB) - FOR USE WITH EMT

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*11/30/18*

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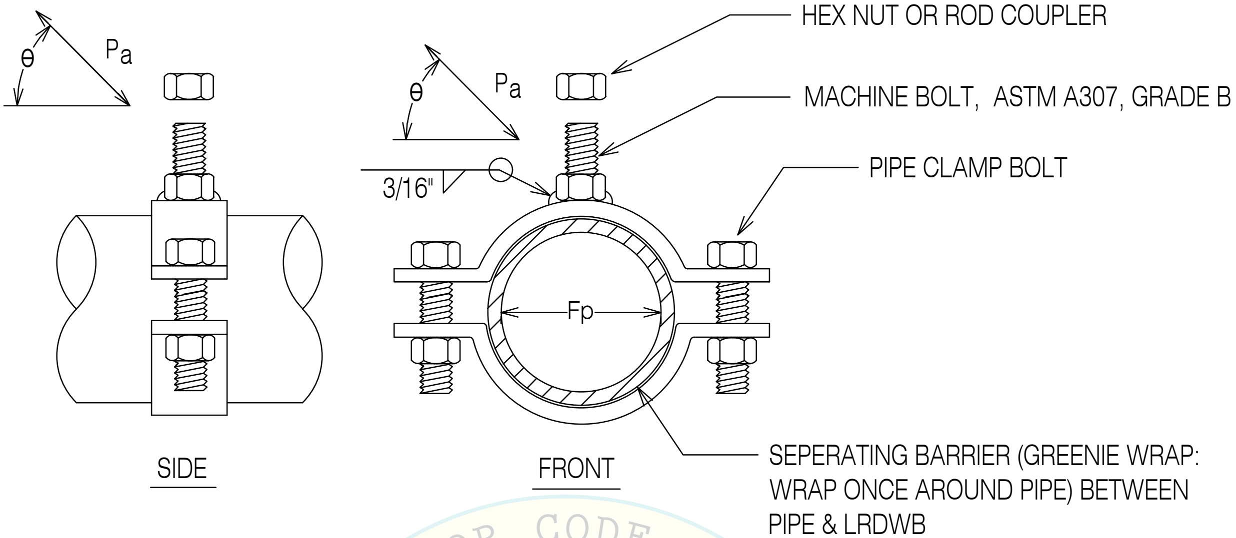

| Part Number | Pipe Diameter (in) | Pipe Clamp | | Machine Bolt Diameter (in) | Maximum Design Load (ASD) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $\theta = 0° - 41°$ [3] | | $\theta = 42° - 48°$ [3] | | $\theta = 49° - 60°$ [3] | |
| | | Bolt Size (in) | Bolt Torque (ft-lbs) | | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) |
| LRDWB1.25 | 1 1/4 | 3/8 | 19 | 3/8 | 445 | 50 | 600 | 65 | 680 | 75 |
| LDRWB1.5 | 1 1/2 | 3/8 | 19 | 3/8 | 310 | 100 | 415 | 135 | 475 | 150 |
| LRDWB2 | 2 | 1/2 | 19 | 3/8 | 330 | 565 | 445 | 745 | 505 | 845 |
| LRDWB2.5 | 2 1/2 | 1/2 | 50 | 1/2 | 665 | 655 | 895 | 880 | 1,015 | 1,000 |
| LRDWB3 | 3 | 1/2 | 50 | 1/2 | 625 | 375 | 840 | 505 | 955 | 570 |
| LRDWB3.5 | 3 1/2 | 1/2 | 50 | 1/2 | 625 | 375 | 840 | 505 | 955 | 570 |
| LRDWB4 | 4 | 5/8 | 55 | 5/8 | 1,030 | 685 | 1,385 | 920 | 1,570 | 1,045 |
| LRDWB5 | 5 | 5/8 | 55 | 5/8 | 720 | 565 | 970 | 760 | 1,095 | 860 |
| LRDWB6 | 6 | 3/4 | 55 | 5/8 | 570 | 325 | 765 | 435 | 870 | 495 |

1. CONFORMS TO FEDERAL SPECIFICATION WWH-171E, TYPE 1 AND MSS SP-58 TYPE 4.
2. FOR USE WITH COPPER; SEPERATING BARRIER (GREENIE WRAP) BETWEEN PIPE & LRDWB.
3. INSTALLATION ANGLE FROM HORIZONTAL.
4. FACTOR OF SAFETY = 2.0

# LONGITUDINAL RESTRAINT DEVICE WELDED BOLT (LRDWB) - FOR USE WITH COPPER WITH GREENIE WRAP

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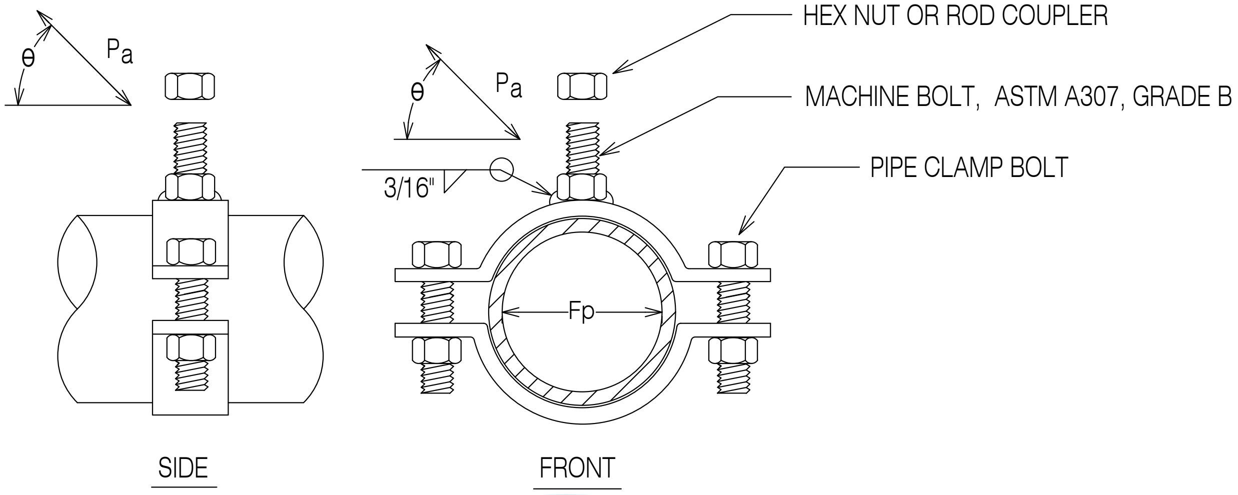

| Part Number | Pipe Diameter (in) | Pipe Clamp | | Machine Bolt Diameter (in) | Maximum Design Load (ASD) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | θ = 0° - 41° [3] | | θ = 42° - 48° [3] | | θ = 49° - 60° [3] | |
| | | Bolt Size (in) | Bolt Torque (ft-lbs) | | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) |
| LRDWB2 | 2 | 1/2 | 50 | 3/8 | 285 | 1,025 | 385 | 1,380 | 435 | 1,560 |
| LRDWB3 | 3 | 1/2 | 50 | 1/2 | 545 | 1,235 | 735 | 1,660 | 830 | 1,880 |
| LRDWB4 | 4 | 5/8 | 65 | 5/8 | 760 | 1,310 | 1,025 | 1,765 | 1,160 | 1,995 |
| LRDWB5 | 5 | 5/8 | 65 | 5/8 | 780 | 1,570 | 1,050 | 2,115 | 1,190 | 2,395 |
| LRDWB6 | 6 | 3/4 | 65 | 5/8 | 660 | 1,510 | 890 | 2,030 | 1,005 | 2,300 |
| LRDWB8[5] | 8 | 3/4 | 75 | 5/8 | 1,125 | 1,292 | 1,515 | 1,740 | 1,715 | 1,970 |
| LRDWB10[5] | 10 | 7/8 | 95 | 5/8 | 1,247 | 1,083 | 1,680 | 1,455 | 1,900 | 1,650 |
| LRDWB12[5] | 12 | 7/8 | 95 | 5/8 | 695 | 943 | 935 | 1,270 | 1,060 | 1,435 |

1. CONFORMS TO FEDERAL SPECIFICATION WWH-171E, TYPE 1 AND MSS SP-58 TYPE 4.
2. FOR USE WITH CAST IRON.
3. INSTALLATION ANGLE FROM HORIZONTAL.
4. FACTOR OF SAFETY = 2.0
5. FACTOR OF SAFETY = 1.5

# LONGITUDINAL RESTRAINT DEVICE WELDED BOLT (LRDWB) - FOR USE WITH CAST IRON PIPING

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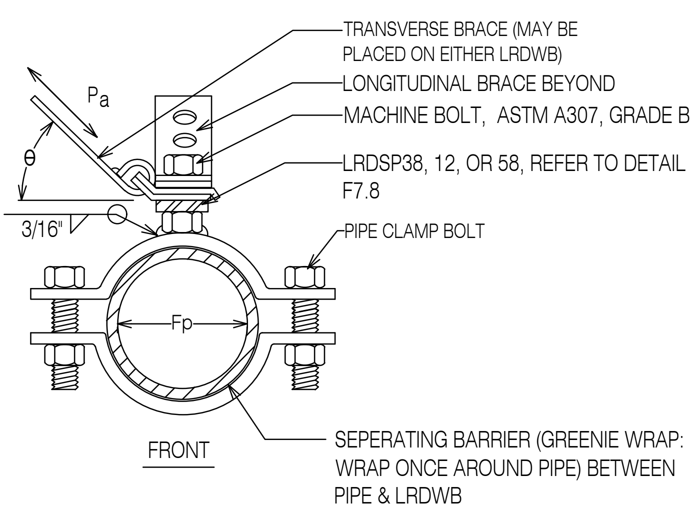
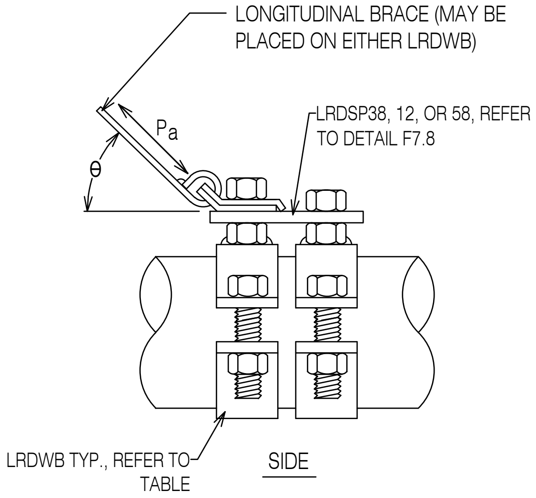


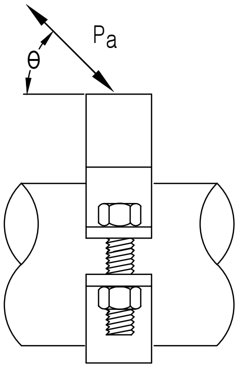


| LRDWB Part Number | Splice Plate Part Number | Pipe Diameter (in) | Pipe Clamp | | Machine Bolt Diameter (in) | Maximum Design Load (ASD) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | θ = 0° - 41° [3] | | θ = 42° - 48° [3] | | θ = 49° - 60° [3] | |
| | | | Bolt Size (in) | Bolt Torque (ft-lbs) | | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) | Transverse $P_a$ (lbs) | Longitudinal $P_a$ (lbs) |
| 2LRDWB1.25 | LRDSP38 | 1 1/4 | 3/8 | 19 | 3/8 | 445 | 100 | 600 | 130 | 680 | 150 |
| 2LDRWB1.5 | LRDSP38 | 1 1/2 | 3/8 | 19 | 3/8 | 310 | 200 | 415 | 270 | 475 | 300 |
| 2LRDWB2 | LRDSP12 | 2 | 1/2 | 19 | 3/8 | 330 | 1,110 | 445 | 1,490 | 505 | 1,690 |
| 2LRDWB2.5 | LRDSP12 | 2 1/2 | 1/2 | 50 | 1/2 | 685 | 1,310 | 895 | 1,760 | 1,015 | 2,000 |
| 2LRDWB3 | LRDSP12 | 3 | 1/2 | 50 | 1/2 | 625 | 750 | 840 | 1,010 | 955 | 1,140 |
| 2LRDWB3.5 | LRDSP12 | 3 1/2 | 1/2 | 50 | 1/2 | 625 | 750 | 840 | 1,010 | 955 | 1,140 |
| 2LRDWB4 | LRDSP58 | 4 | 5/8 | 55 | 5/8 | 1,030 | 1,370 | 1,385 | 1,840 | 1,570 | 2,090 |
| 2LRDWB5 | LRDSP58 | 5 | 5/8 | 55 | 5/8 | 720 | 1,130 | 970 | 1,520 | 1,095 | 1,720 |
| 2LRDWB6 | LRDSP34 | 6 | 3/4 | 55 | 5/8 | 570 | 650 | 765 | 870 | 870 | 990 |

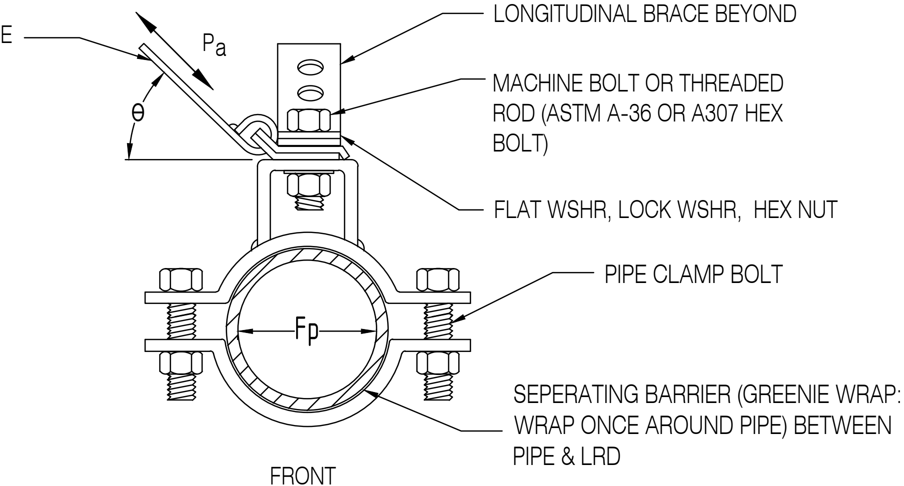
1. CONFORMS TO FEDERAL SPECIFICATION WWH-171E, TYPE 1 AND MSS SP-58 TYPE 4.
2. FOR USE WITH COPPER; SEPERATING BARRIER (GREENIE WRAP) BETWEEN PIPE & LRDWB.
3. INSTALLATION ANGLE FROM HORIZONTAL.
4. FACTOR OF SAFETY = 2.0

# DUAL LONGITUDINAL RESTRAINT DEVICE WELDED BOLT (LRDWB) FOR USE WITH COPPER WITH GREENIE WRAP

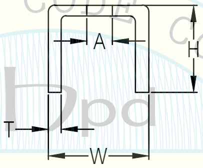
ANTHONY A. RUBALCAVA
S 4710

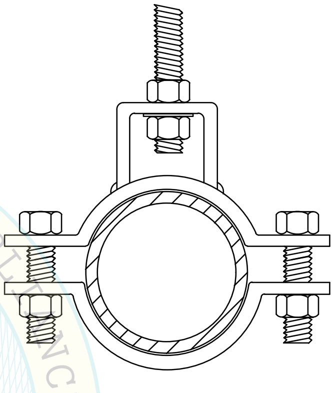


SIDE



FRONT





ALT. VERTICAL SUPPORT ONLY

| Part Number | W (in) | H (in) | T (in) |
|---|---|---|---|
| LRD1 25~LRD5 | 1 3/4 | 2 7/8 | 0.22 |
| LRD6 | 3 | 3 1/4 | 0.38 |
| LRD8 | 3 | 4 1/4 | 0.38 |

| Part Number | Pipe Dia. Inch | Pipe Clamp | | "A" | | Maximum Design Load (ASD) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | θ = 0° - 41° 3 | | θ = 42° - 48° 3 | | θ = 49° - 60° 3 | |
| | | Bolt Size (in) | Bolt Torque (ft-lbs) | Top Mounting Bolt Diameter (in) | Alternate Vertical Support Rod Dia. (in) | Transverse Pa (lbs) | Longitudinal Pa (lbs) | Transverse Pa (lbs) | Longitudinal Pa (lbs) | Transverse Pa (lbs) | Longitudinal Pa (lbs) |
| LRD1 25 | 1 1/4 | 3/8 | 19 | 3/8 | 3/8 | 205 | 120 | 275 | 160 | 310 | 155 |
| LDR1 5 | 1 1/2 | 3/8 | 19 | 3/8 | 3/8 | 205 | 150 | 275 | 200 | 310 | 230 |
| LRD2 | 2 | 1/2 | 19 | 3/8 | 3/8 | 205 | 585 | 275 | 785 | 310 | 890 |
| LRD2 5 | 2 1/2 | 1/2 | 19 | 1/2 | 1/2 | 205 | 590 | 275 | 795 | 310 | 900 |
| LRD3 | 3 | 3/4 | 19 | 1/2 | 1/2 | 260 | 670 | 350 | 900 | 395 | 1,020 |
| LRD3.5 | 3 1/2 | 3/4 | 19 | 1/2 | 1/2 | 260 | 670 | 350 | 900 | 395 | 1,020 |
| LRD4 | 4 | 7/8 | 35 | 5/8 | 5/8 | 260 | 580 | 350 | 780 | 395 | 555 |
| LRD5 | 5 | 7/8 | 75 | 5/8 | 5/8 | 260 | 775 | 350 | 1,045 | 395 | 1,190 |
| LRD6 | 6 | 1 | 75 | 5/8 | 5/8 | 435 | 660 | 585 | 890 | 665 | 1,005 |

1. CONFORMS TO FEDERAL SPECIFICATION WWH-171E, TYPE 1 AND MSS SP-58 TYPE 4.
2 FOR USE WITH COPPER; SEPERATING BARRIER (GREENIE WRAP) BETWEEN PIPE & LRD
3. INSTALLATION ANGLE FROM HORIZONTAL.
4 FACTOR OF SAFETY = 2 0

# LONGITUDINAL RESTRAINT DEVICE (LRD) - FOR USE WITH COPPER WITH GREENIE WRAP

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***F7.7.2***

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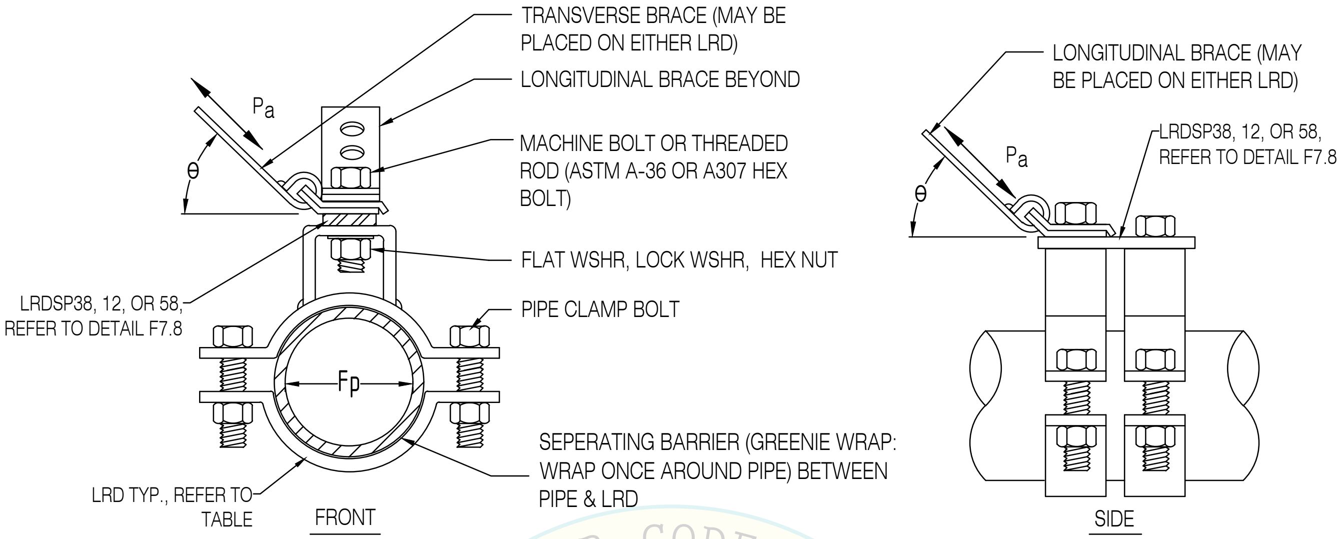

| LRD Part Number | Splice Plate Part Number | Pipe Dia. Inch | Pipe Clamp | | "A" | | Maximum Design Load (ASD) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | θ = 0° - 41° ³ | | θ = 42° - 48° ³ | | θ = 49° - 60° ³ | |
| | | | Bolt Size (in) | Bolt Torque (ft-lbs) | Top Mounting Bolt Diameter (in) | Alternate Vertical Support Rod Dia. (in) | Transverse Pa (lbs) | Longitudinal Pa (lbs) | Transverse Pa (lbs) | Longitudinal Pa (lbs) | Transverse Pa (lbs) | Longitudinal Pa (lbs) |
| LRD1.25 | LRDSP38 | 1 1/4 | 3/8 | 19 | 3/8 | 3/8 | 205 | 240 | 275 | 320 | 310 | 370 |
| LDR1.5 | LRDSP38 | 1 1/2 | 3/8 | 19 | 3/8 | 3/8 | 205 | 300 | 275 | 400 | 310 | 460 |
| LRD2 | LRDSP12 | 2 | 1/2 | 19 | 3/8 | 3/8 | 205 | 1,170 | 275 | 1,570 | 310 | 1,780 |
| LRD2.5 | LRDSP12 | 2 1/2 | 1/2 | 19 | 1/2 | 1/2 | 205 | 1,180 | 275 | 1,590 | 310 | 1,800 |
| LRD3 | LRDSP12 | 3 | 3/4 | 19 | 1/2 | 1/2 | 260 | 1,340 | 350 | 1,800 | 395 | 2,040 |
| LRD3.5 | LRDSP12 | 3 1/2 | 3/4 | 19 | 1/2 | 1/2 | 260 | 1,340 | 350 | 1,800 | 395 | 2,040 |
| LRD4 | LRDSP58 | 4 | 7/8 | 35 | 5/8 | 5/8 | 260 | 1,160 | 350 | 1,560 | 395 | 1,770 |
| LRD5 | LRDSP58 | 5 | 7/8 | 75 | 5/8 | 5/8 | 260 | 1,550 | 350 | 2,090 | 395 | 2,360 |
| LRD6 | LRDSP34 | 6 | 1 | 75 | 5/8 | 5/8 | 435 | 1,320 | 565 | 1,760 | 565 | 2,010 |

1. CONFORMS TO FEDERAL SPECIFICATION WWH-171E, TYPE 1 AND MSS SP-58 TYPE 4.
2. FOR USE WITH COPPER; SEPERATING BARRIER (GREENIE WRAP) BETWEEN PIPE & LRD.
3. INSTALLATION ANGLE FROM HORIZONTAL.
4. FACTOR OF SAFETY = 2.0

# DUAL LONGITUDINAL RESTRAINT DEVICE (LRD) - FOR USE WITH COPPER WITH GREENIE WRAP

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*12/04/18*

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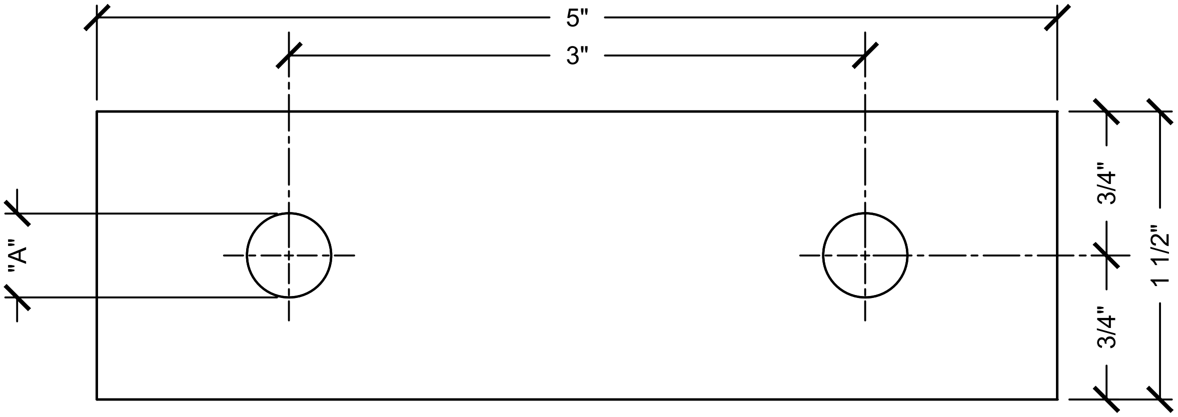
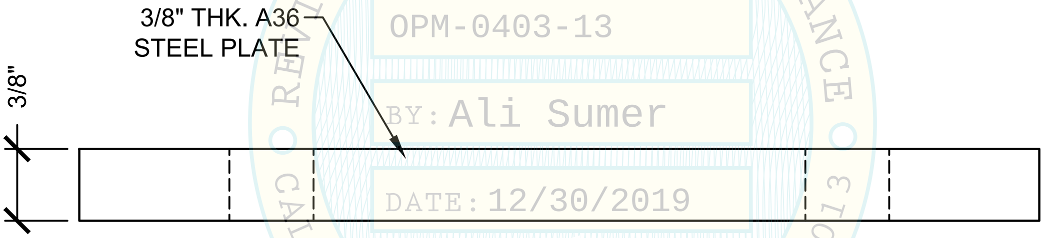
***F7.7.4***



TOP VIEW



FRONT VIEW

| LRD SPLICE PLATE | |
|---|---|
| MODEL # | A<br>(in) |
| LRDSP38 | 7/16" |
| LRDSP12 | 9/16" |
| LRDSP58 | 11/16" |

## LRD SPLICE PLATE

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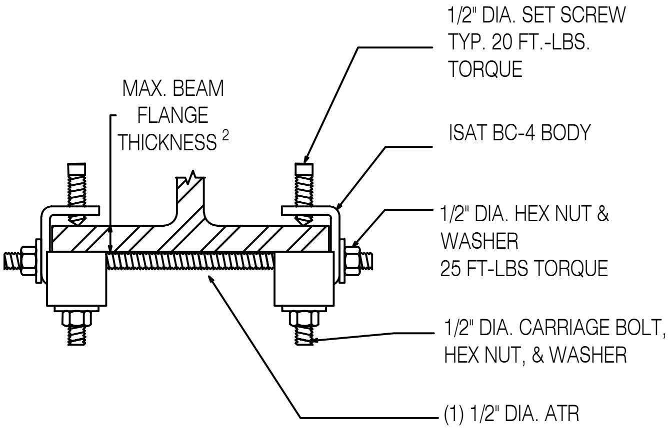
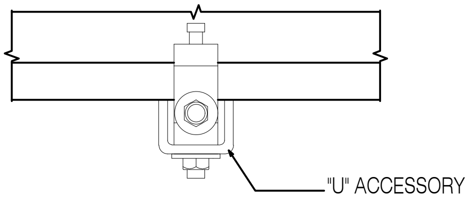
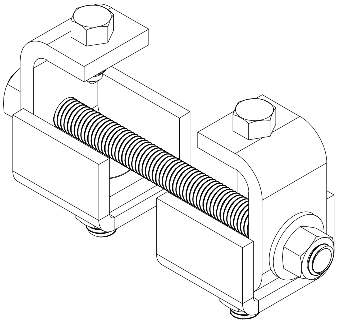


FRONT VIEW

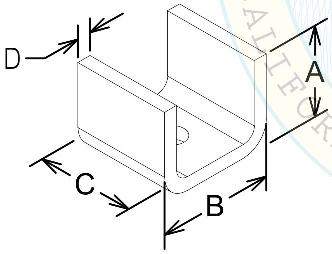


SIDE VIEW

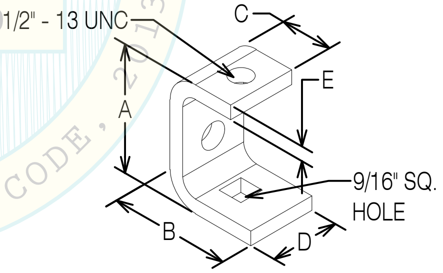


ISOMETRIC VIEW

NOTES
1. FOR ALLOWABLE LOADS, REFER TO PAGE D4._ SERIES DETAILS
2. MAX. ROD LENGTH = 12 INCHES
3. BC-4U MAX. FLANGE THICKNESS = 1 1/8"
4. ALL PARTS ASTM A-36 STEEL



| "U" ACCESSORY DIMENSIONS (in) | | | |
|---|---|---|---|
| A | B | C | D |
| 1 1/2" | 2 1/8" | 2" | 1/4" |



| BC-4 BODY DIMENSIONS (in) | | | | |
|---|---|---|---|---|
| A | B | C | D | E |
| 2 7/8" | 2" | 1 1/2" | 1 1/4" | 3/8" |

# BC-4U BEAM CLAMP ASSEMBLY

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***F8.1***

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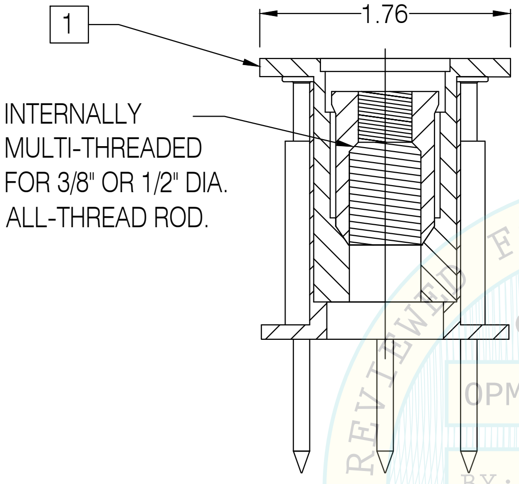
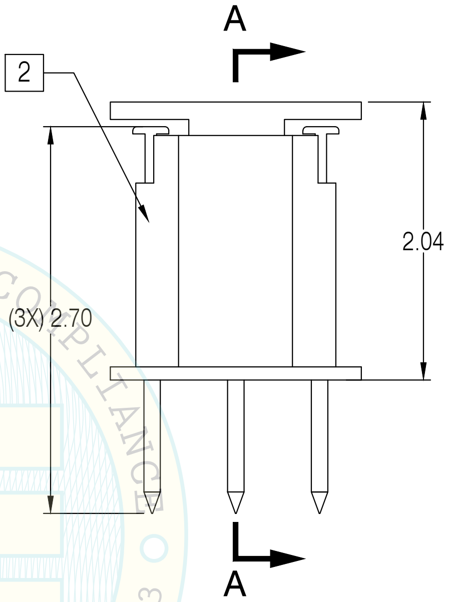
1 MATERIAL: CARBON STEEL.

2 MATERIAL: PLASTIC, COLOR - GRAY.



SECTION A - A



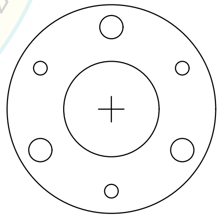
OPM-0403-13

BY: Ali Sumer

DATE: 12/30/2019

**APPROVALS**

**ESR-3599**



## PUSH ROD POURED-IN-PLACE "PRPIP3812"
## SEISMICALLY QUALIFIED DECK INSERT
## FOR FORM POUR SLABS AND WALLS

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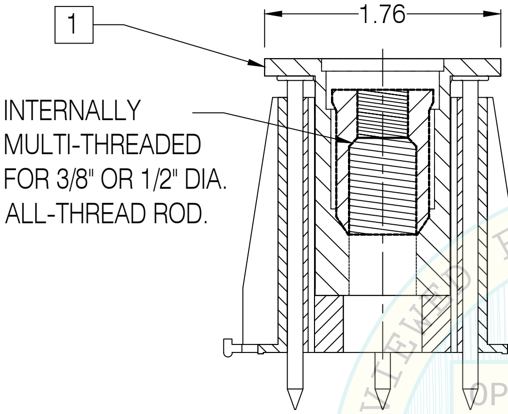
***F10.0***

2013 CBC OSHPD

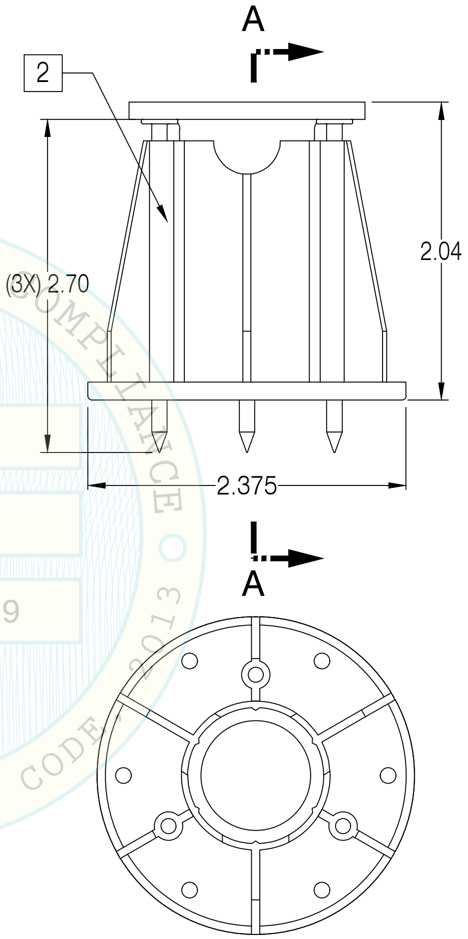
1 MATERIAL: CARBON STEEL.

2 MATERIAL: PLASTIC, COLOR - GRAY.

ISAT
Just Push It!
PUSH ROD
HANGERS
ISAT-PRPIP3812
U.S. PATENT #9,181,691 B2



SECTION A - A



***APPROVALS***

ICC ES **ESR-3599**

## PUSH ROD POURED-IN-PLACE "PRPIP3812" SEISMICALLY QUALIFIED DECK INSERT FOR FORM POUR SLABS AND WALLS

ANTHONY A. RUBALCAVA
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*09/13/19*

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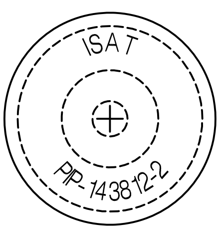
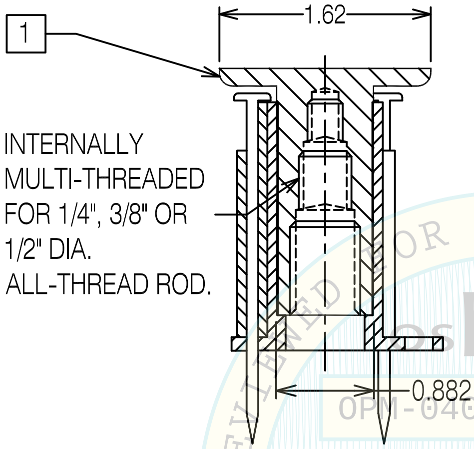
***F10.0.1***

2013 CBC OSHPD

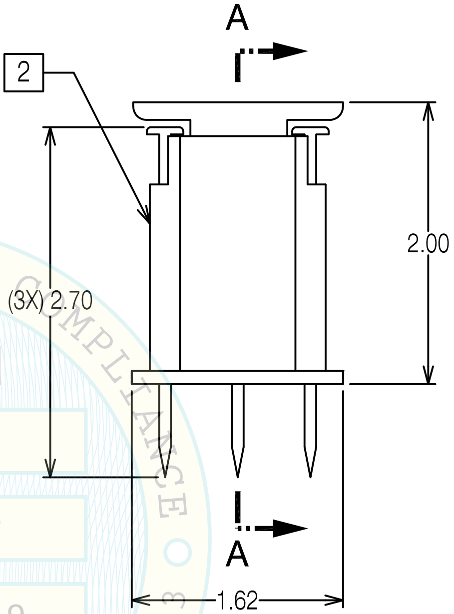
1 MATERIAL: CARBON STEEL.

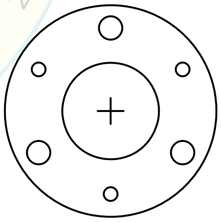
2 MATERIAL: PLASTIC, COLOR - BLUE.





SECTION A - A





***APPROVALS***

ICC ES ***ESR-3599***

## BLUE BANGER HANGER (BBH) POURED-IN-PLACE "PIP143812-2" SEISMICALLY QUALIFIED DECK INSERT FOR FORM POUR SLABS AND WALLS

ANTHONY A. RUBALCAVA
S 4710

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*05/17/17*

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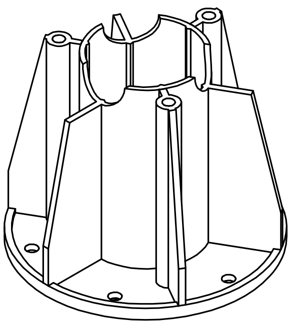
2013 CBC OSHPD



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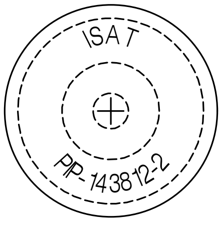

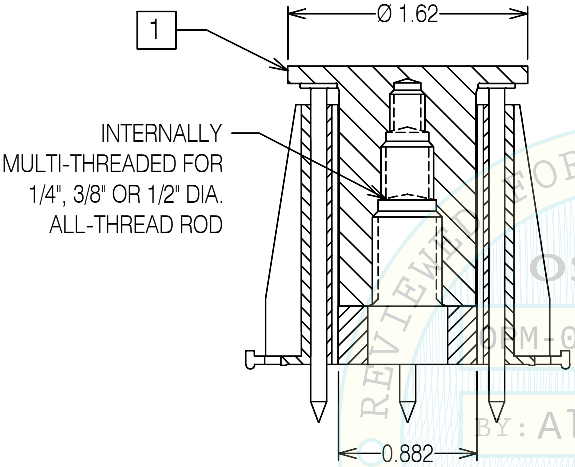

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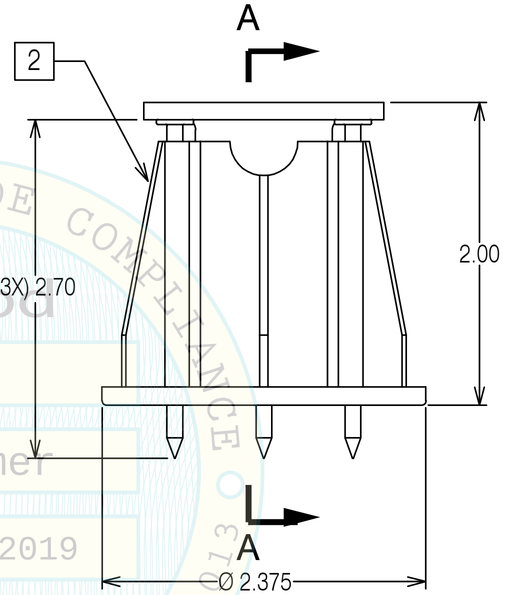
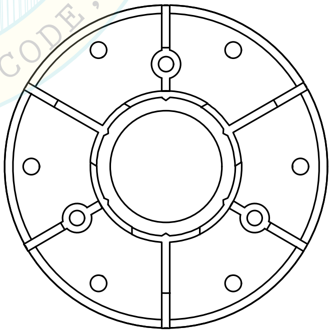


## APPROVALS

ICC ES **ESR-3599**



| | |
|---|---|
| 1 | MATERIAL: CARBON STEEL. |
| 2 | MATERIAL: PLASTIC, COLOR - BLUE. |

# BLUE BANGER HANGER (BBH) POURED-IN-PLACE "PIP143812-2" SEISMICALLY QUALIFIED DECK INSERT FOR FORM POUR SLABS AND WALLS

ANTHONY A. RUBALCAVA
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*09/13/19*

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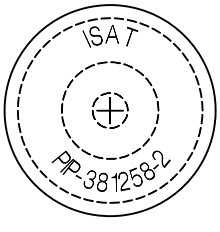
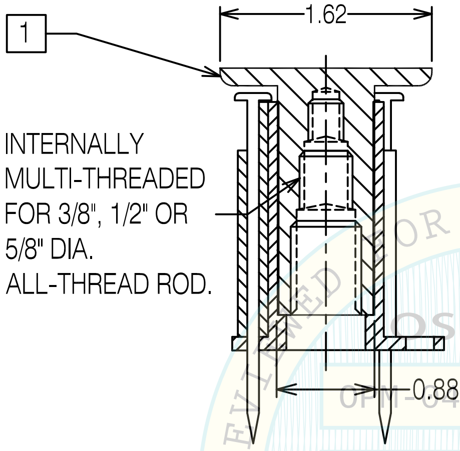
***F10.1.1***

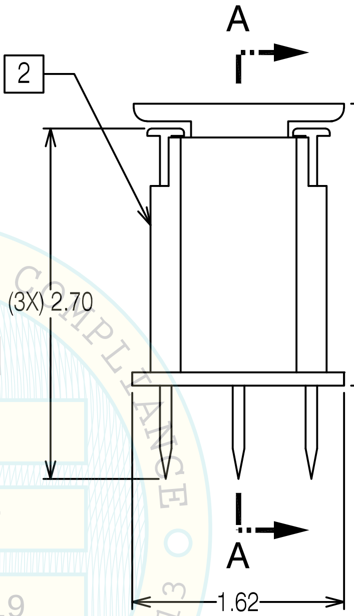
1 MATERIAL: CARBON STEEL.

2 MATERIAL: PLASTIC, COLOR - BLUE.



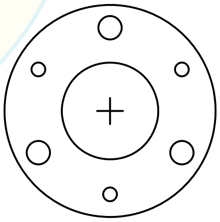


SECTION A - A



***APPROVALS***

ICC ES **ESR-3599**



## BLUE BANGER HANGER (BBH) POURED-IN-PLACE "PIP381258-2"
## SEISMICALLY QUALIFIED DECK INSERT
## FOR FORM POUR SLABS AND WALLS

S 4710
ANTHONY A. RUBALCAVA

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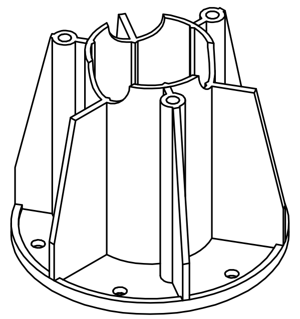
2013 CBC OSHPD



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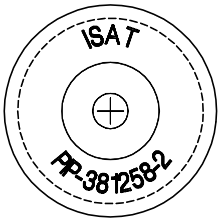
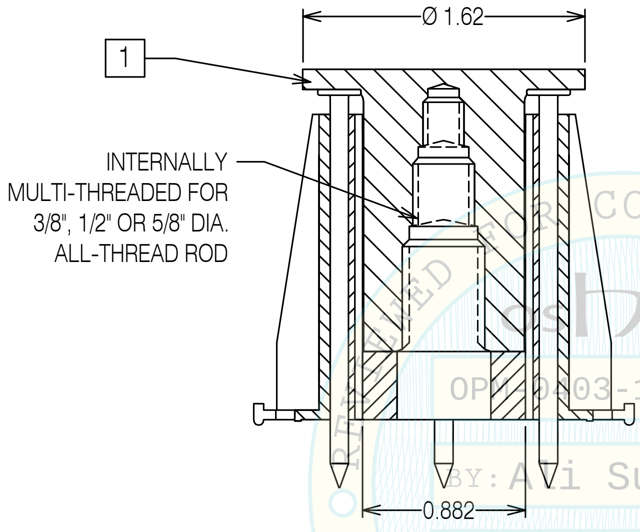
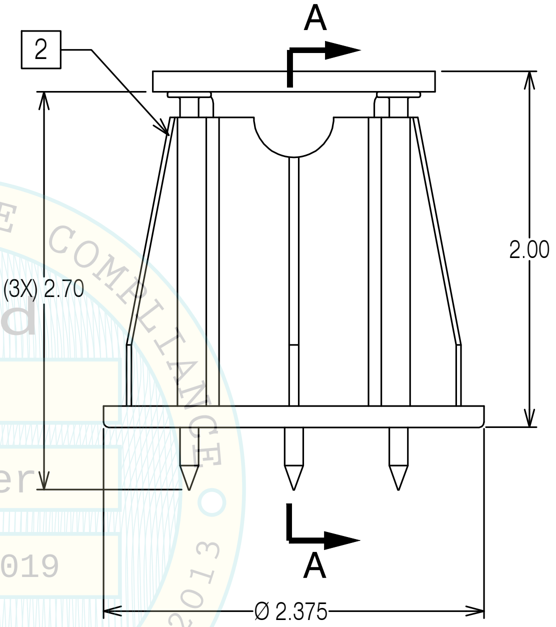
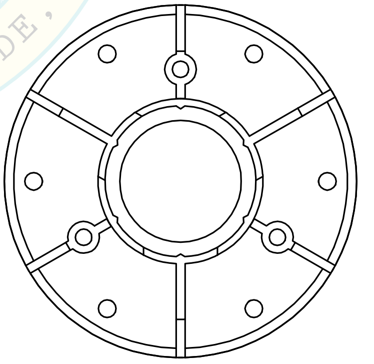




SECTION A-A





***APPROVALS***

ICC ES **ESR-3599**

1 MATERIAL: CARBON STEEL

2 MATERIAL: PLASTIC, COLOR - BLUE

# BLUE BANGER HANGER (BBH) POURED-IN-PLACE "PIP381258-2" SEISMICALLY QUALIFIED DECK INSERT FOR FORM POUR SLABS AND WALLS

ANTHONY A. RUBALCAVA
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*09/13/19*

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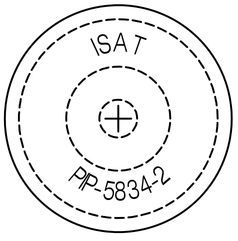
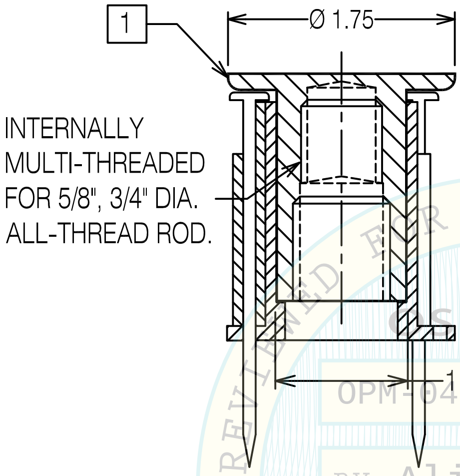
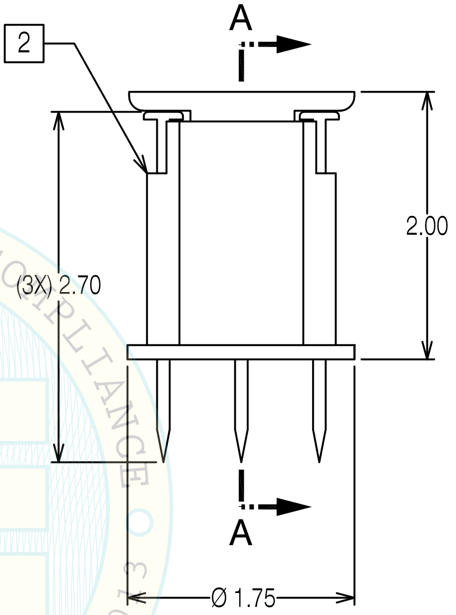
2013 CBC OSHPD

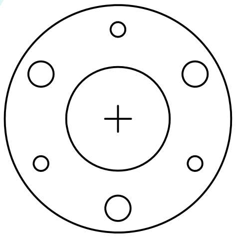
1 MATERIAL: CARBON STEEL.
2 MATERIAL: PLASTIC, COLOR - BLUE.





SECTION A - A





**APPROVALS**

ICC ES **ESR-3599**

## BLUE BANGER HANGER (BBH) POURED-IN-PLACE "PIP5834-2" SEISMICALLY QUALIFIED DECK INSERT FOR FORM POUR SLABS AND WALLS

ANTHONY A. RUBALCAVA
S 4710

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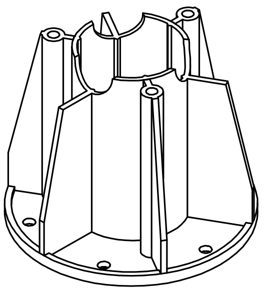
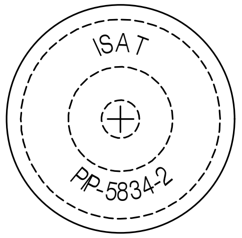
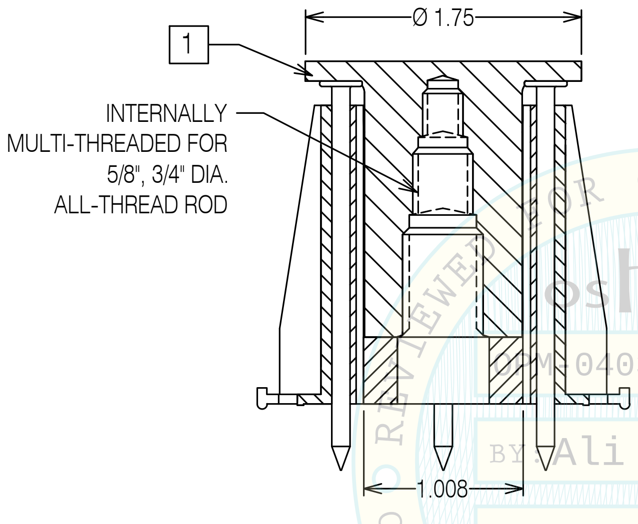
2013 CBC OSHPD

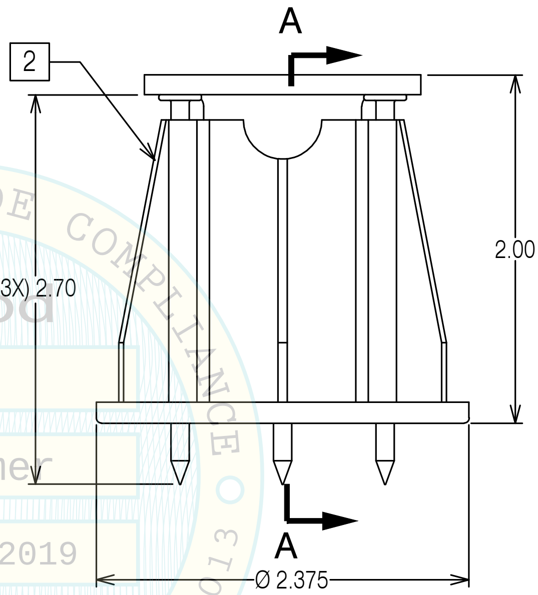


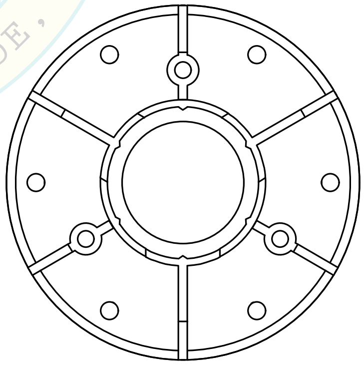
ISOMETRIC - WIDE BASE





SECTION A-A





## APPROVALS

ICC ES **ESR-3599**

1 MATERIAL: CARBON STEEL

2 MATERIAL: PLASTIC, COLOR - BLUE

# BLUE BANGER HANGER (BBH) POURED-IN-PLACE "PIP5834-2"
# SEISMICALLY QUALIFIED DECK INSERT
# FOR FORM POUR SLABS AND WALLS

ANTHONY A. RUBALCAVA
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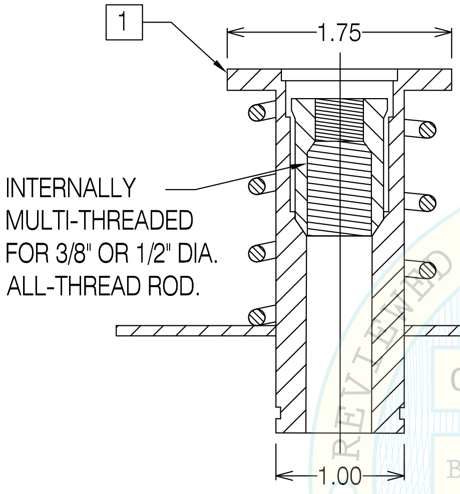
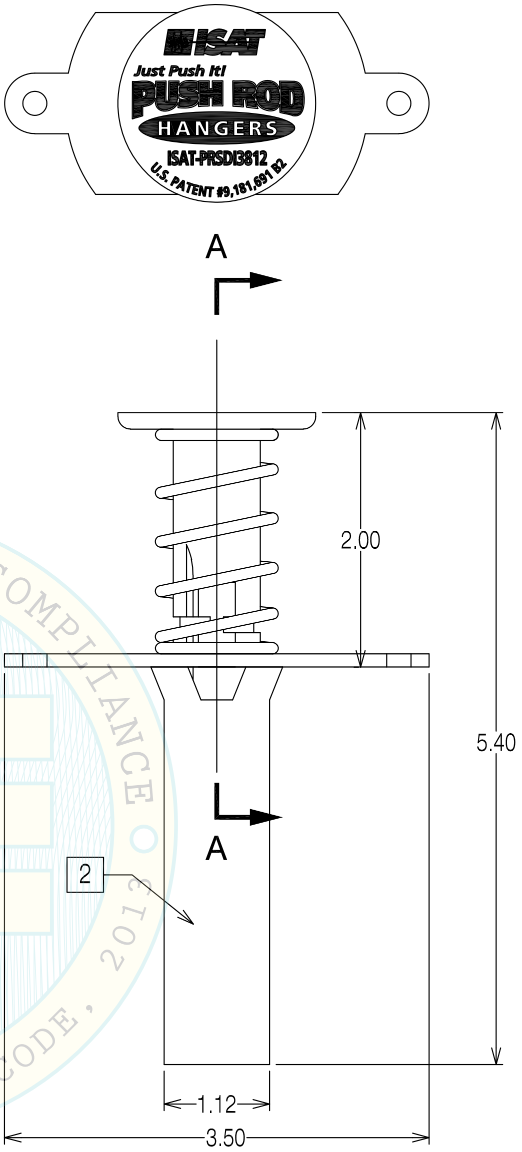
***F10.3.1***

1 MATERIAL: CARBON STEEL.
2 MATERIAL: PLASTIC, COLOR - GRAY.



SECTION A - A



**APPROVALS**

ICC ES

**ESR-3599**

REVIEWED FOR CODE COMPLIANCE
oshpd
OPM-0403-13
BY: Ali Sumer
DATE: 12/30/2019
CALIFORNIA BUILDING CODE, 2013

## PUSH ROD STEEL DECK INSERT "PRSDI3812"
## SEISMICALLY QUALIFIED DECK INSERT
## FOR METAL DECKS

ANTHONY A. RUBALCAVA
S 4710

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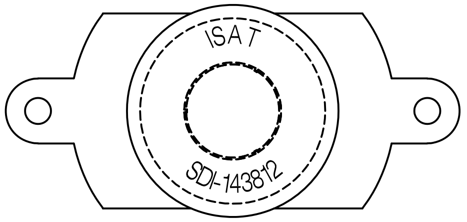
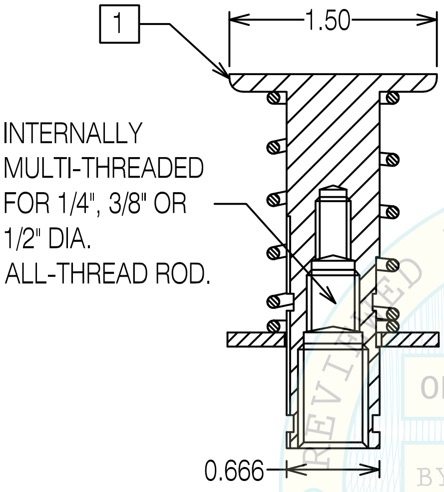
**F11.0**

2013 CBC OSHPD

1 MATERIAL: CARBON STEEL.

2 MATERIAL: PLASTIC, COLOR - BLUE.





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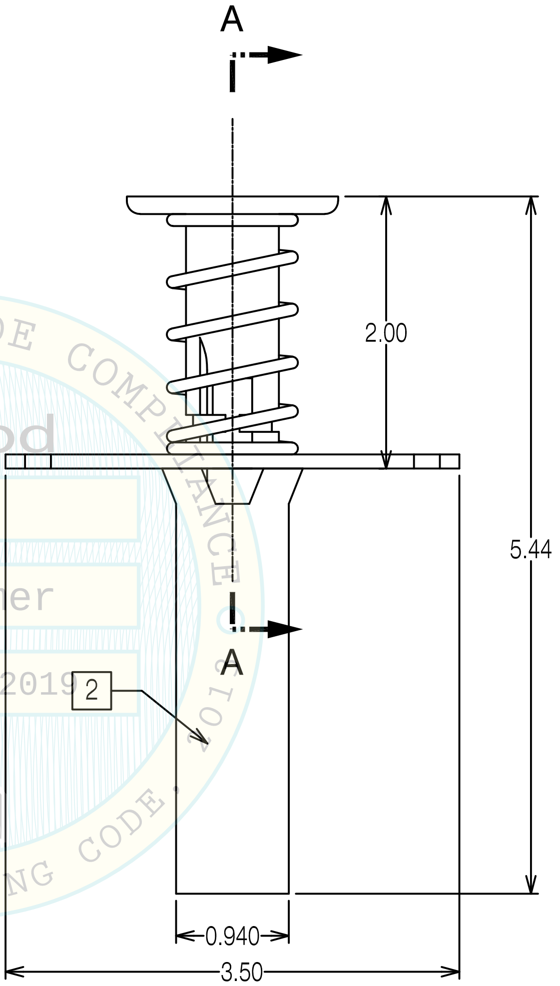

REVIEWED FOR CODE COMPLIANCE
oshpd
OPM-0403-13
BY: Ali Sumer
DATE: 12/30/2019
CALIFORNIA BUILDING CODE, 2016

***APPROVALS***

ICC ES ***ESR-3599***

## STEEL DECK INSERT "SDI143812"
## SEISMICALLY QUALIFIED DECK INSERT
## FOR METAL DECKS WITH CONCRETE

ANTHONY A. RUBALCAVA
S 4710

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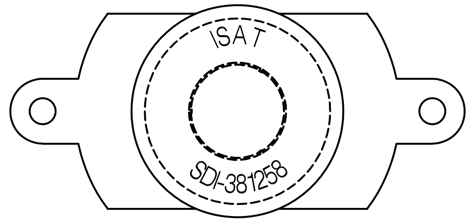
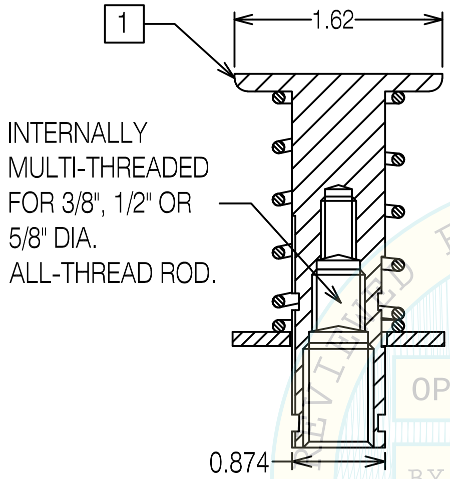
2013 CBC OSHPD

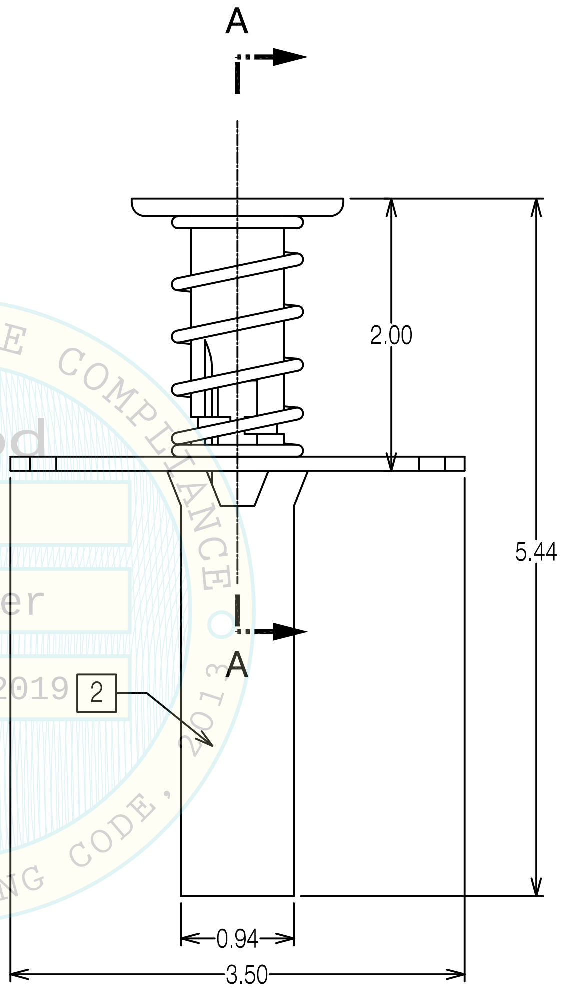
1 MATERIAL: CARBON STEEL.

2 MATERIAL: PLASTIC, COLOR - BLUE.





SECTION A - A



***APPROVALS***

ICC ES **ESR-3599**

# STEEL DECK INSERT "SDI381258"
# SEISMICALLY QUALIFIED DECK INSERT
# FOR METAL DECKS WITH CONCRETE

ANTHONY A. RUBALCAVA
S 4710
STRUCTURAL

ISAT
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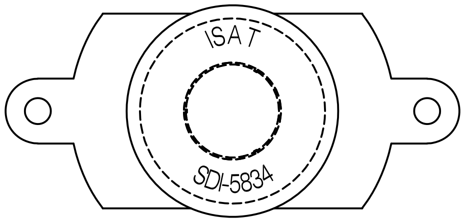
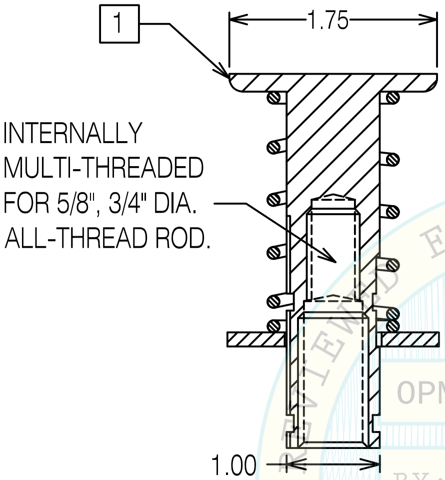
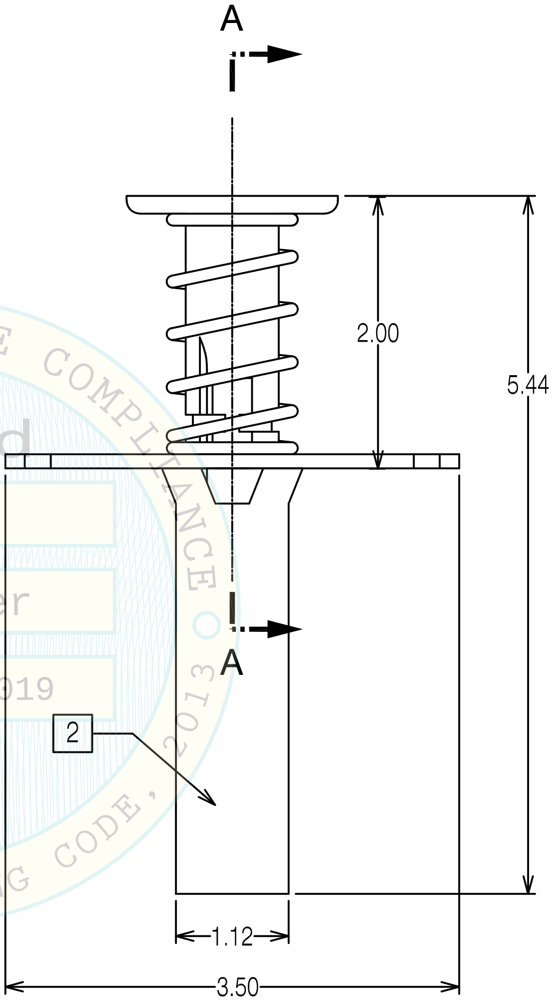
***F11.2***

1 MATERIAL: CARBON STEEL.
2 MATERIAL: PLASTIC, COLOR - BLUE.





SECTION A - A



***APPROVALS***

ICC ES **ESR-3599**

## STEEL DECK INSERT "SDI5834"
## SEISMICALLY QUALIFIED DECK INSERT
## FOR METAL DECKS WITH CONCRETE

S 4710

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A Division of Tomarco Contractor Specialties

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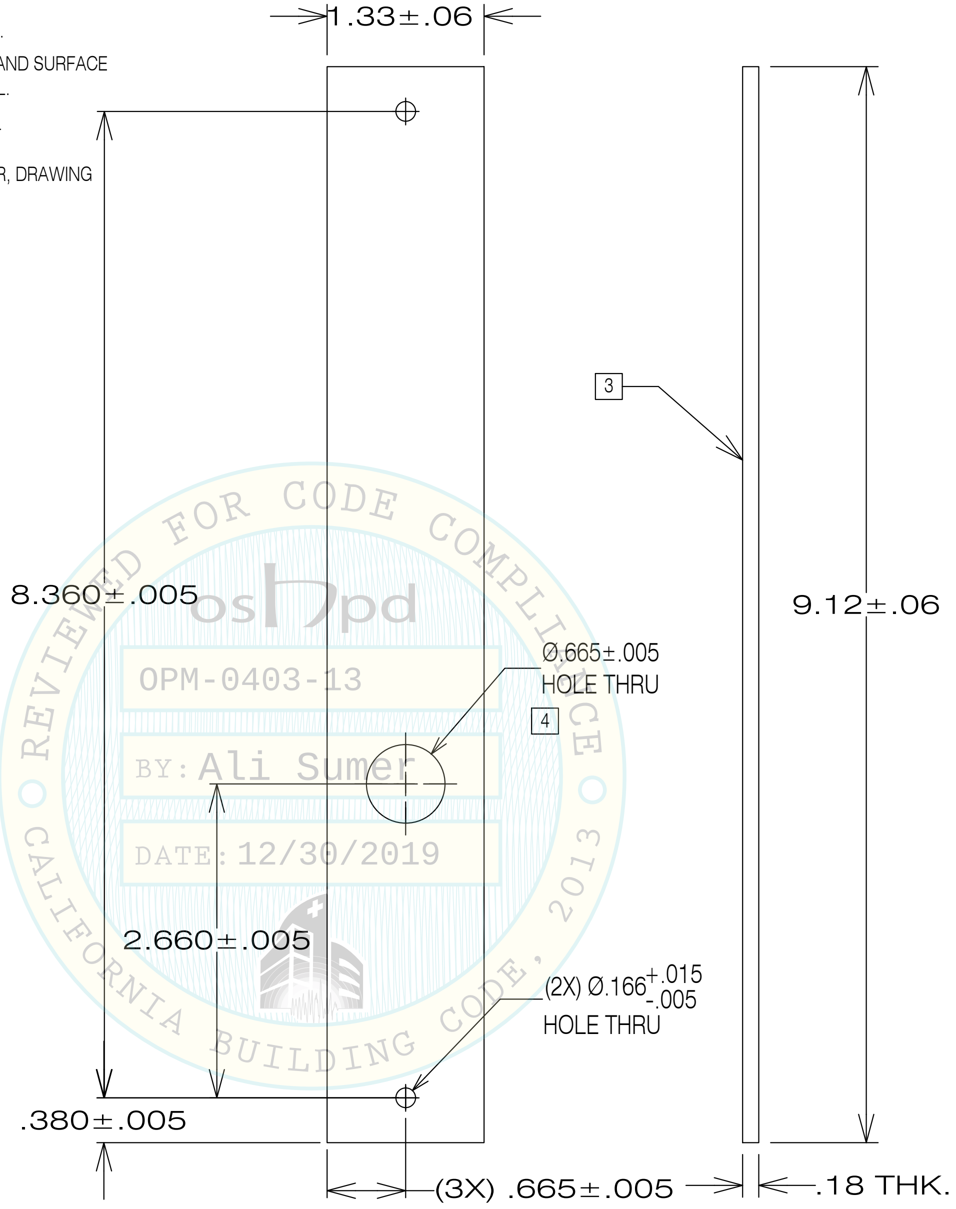
2013 CBC OSHPD

NOTES - UNLESSWISE SPECIFIED.

1. WORKMANSHIP IAW ANSI B94.9-2008.
2. REMOVE ALL BURRS, SHARP EDGES, AND SURFACE IMPERFECTIONS - PROCESS OPTIONAL.
3. MATERIAL: ASTM A36 CARBON STEEL
4. USE WITH "SDI" BLUE BANGER HANGER, DRAWING PG NO: F11.1



## "FSB-1" SDI FLUTE SPAN BRACKET
## FOR METAL DECKS WITH CONCRETE

ANTHONY A. RUBALCAVA
S 4710

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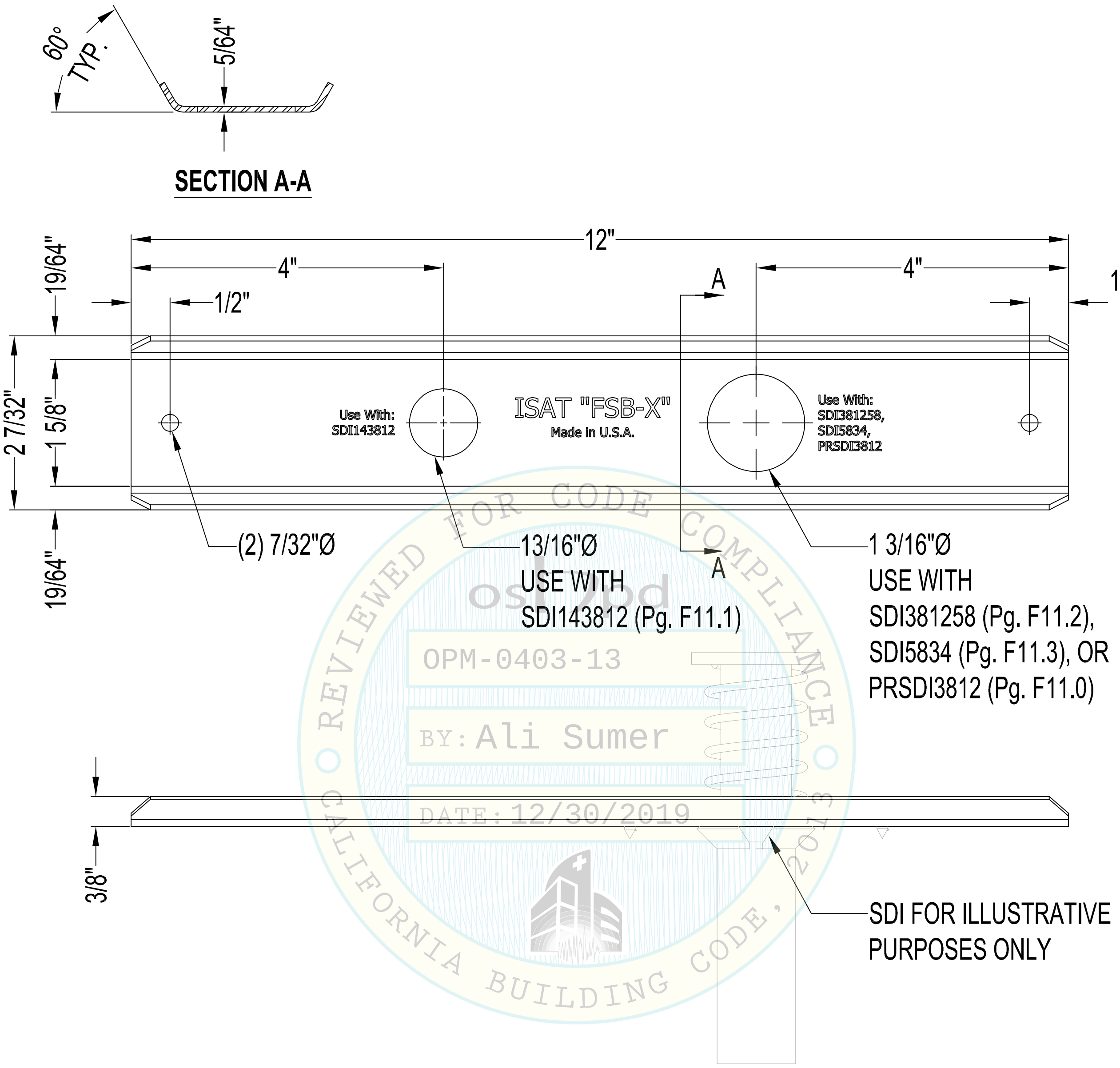

REVIEWED FOR CODE COMPLIANCE
oshpd
OPM-0403-13
BY: Ali Sumer
DATE: 12/30/2019
CALIFORNIA BUILDING CODE, 2013

NOTES - UNLESS OTHERWISE SPECIFIED.

1. MATERIAL: 14 GA. ASTM A1008/1010 CS TYPE B. FINISH: ASTM A653-G30
2. USE WITH ISAT "SDI" BLUE BANGER HANGER OR ISAT "PRSDI" PUSH ROD STEEL DECK INSERT.
3. MAY BE USED WITH OTHER SIMILAR TYPE CONCRETE INSERT PRODUCTS. USER TO VERIFY SUITABILITY.

# "FSB-X" SDI FLUTE SPAN BRACKET FOR METAL DECKS WITH CONCRETE

S 4710

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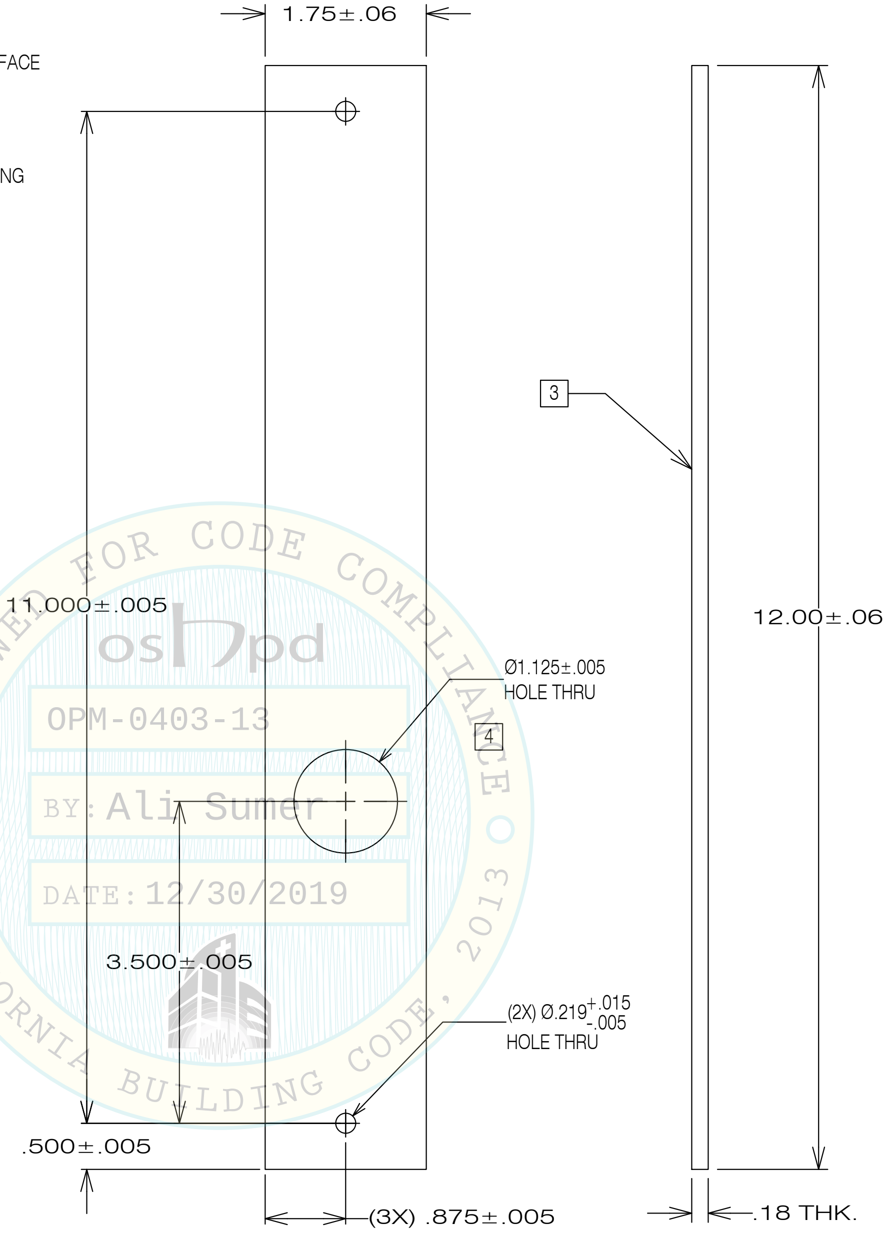
***F12.1.1***

NOTES - UNLESSWISE SPECIFIED.

1. WORKMANSHIP IAW ANSI B94.9-2008.
2. REMOVE ALL BURRS, SHARP EDGES, AND SURFACE IMPERFECTIONS - PROCESS OPTIONAL.
3. MATERIAL: ASTM A36 CARBON STEEL
4. USE WITH "SDI" BLUE BANGER HANGER, DRAWING PG NO: F11.2 OR F11.3.



# "FSB-2" SDI FLUTE SPAN BRACKET FOR METAL DECKS WITH CONCRETE

ANTHONY A. RUBALCAVA
S 4710

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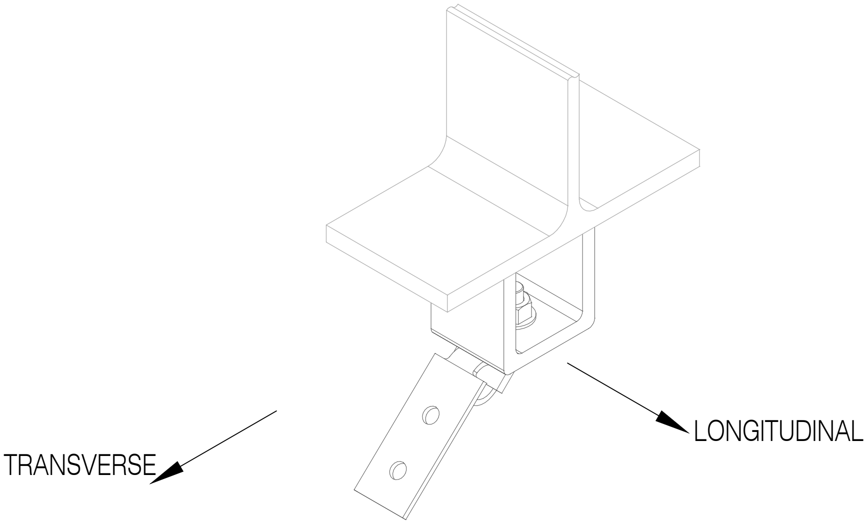
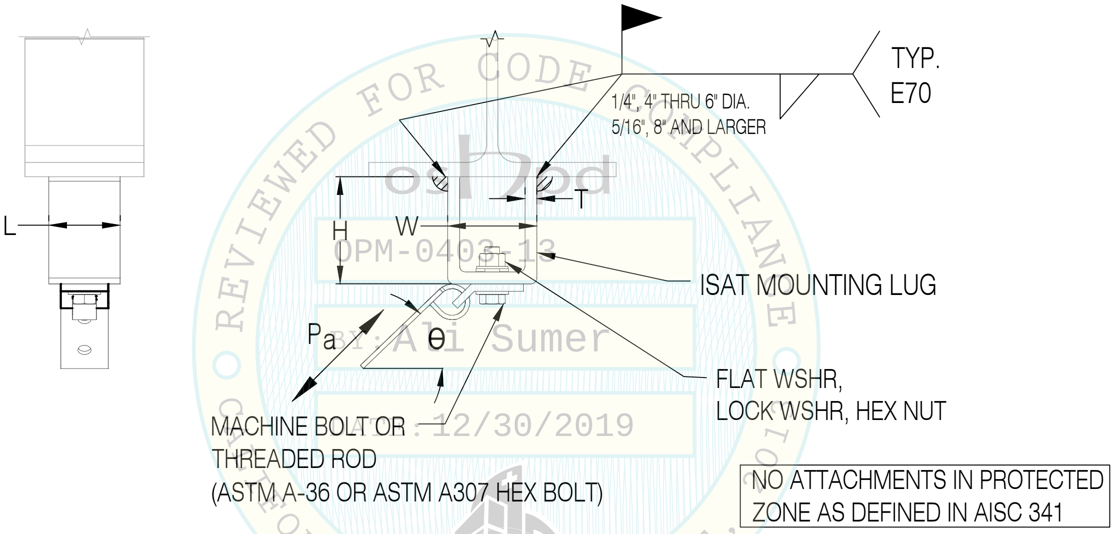
***F12.2***

2013 CBC OSHPD





| Mounting Lug Part Number | Maximum Brace Reaction (ASD) | | | | Height "H" (in) | Length "L" (in) | Thickness "T" (in) | Width "W" (in) | Top Mounting Bolt Diameter (in) |
|---|---|---|---|---|---|---|---|---|---|
| | θ = 30° - 45° 2 | | θ = 46° - 60° 2 | | | | | | |
| | Transverse Pa (lbs) | Longitudinal Pa (lbs) | Transverse Pa (lbs) | Longitudinal Pa (lbs) | | | | | |
| LUGS | 1,345 | 2,605 | 1,660 | 2,870 | 3 | 2 1/2 | 0.364 | 3 | 5/8 |
| LUGL | 2,100 | 3,600 | 2,640 | 4,185 | 4 1/2 | 3 | 0.500 | 3 3/4 | 5/8 |

1. Field drill-out to Vertical Support Rod Diameter +1/16" (except 5/8")
2. Installation Angle from Horizontal.

# BEAM WELDED LUG

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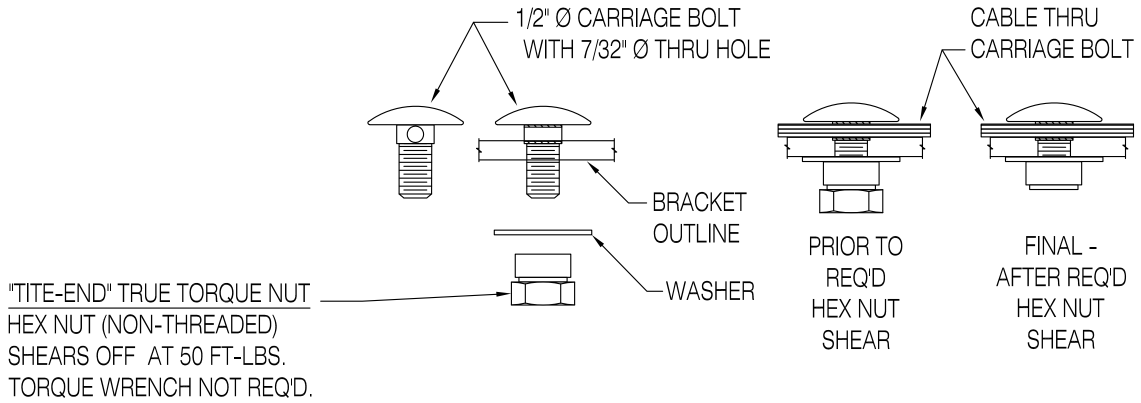
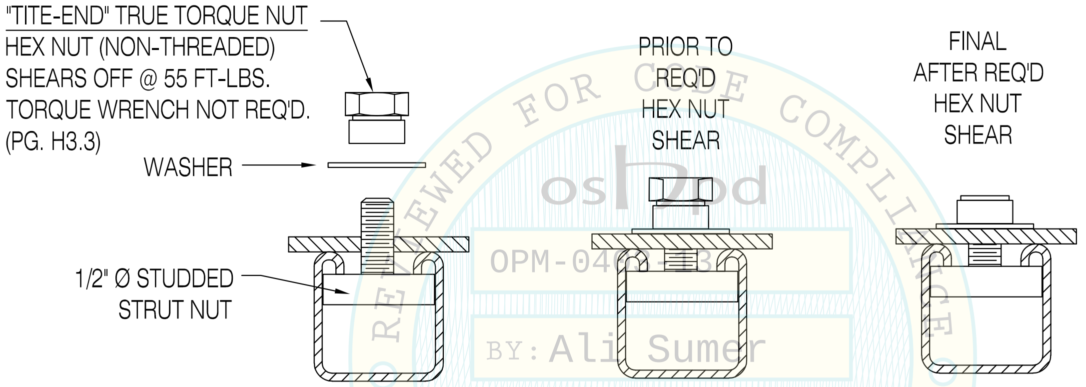
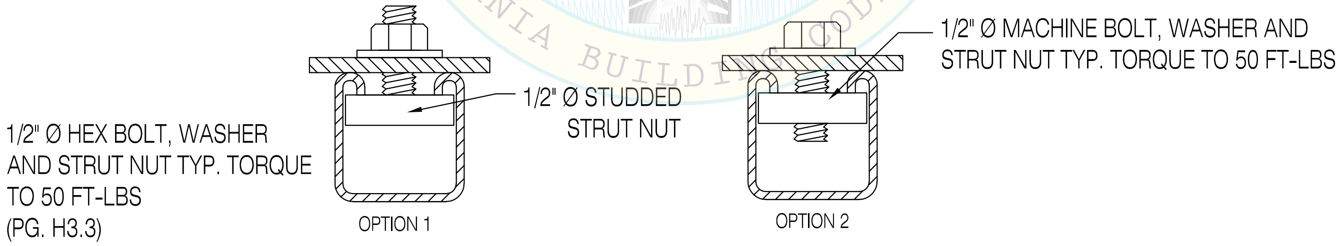


## THRU HOLE CABLE TIE CARRIAGE BOLT WITH "TITE-END" TRUE TORQUE NUT



## RIGID BRACE ARM ASSEMBLY WITH STUDDED STRUT NUT AND "TITE-END" TRUE TORQUE NUT



**FOR USE WITH PAGE E1**

## STRUT NUT RIGID BRACE ASSEMBLY DETAILS

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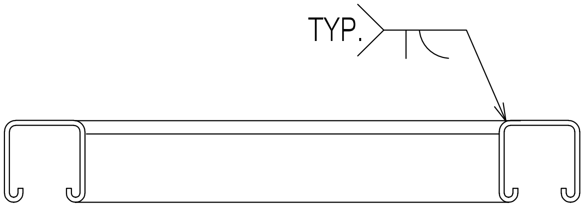
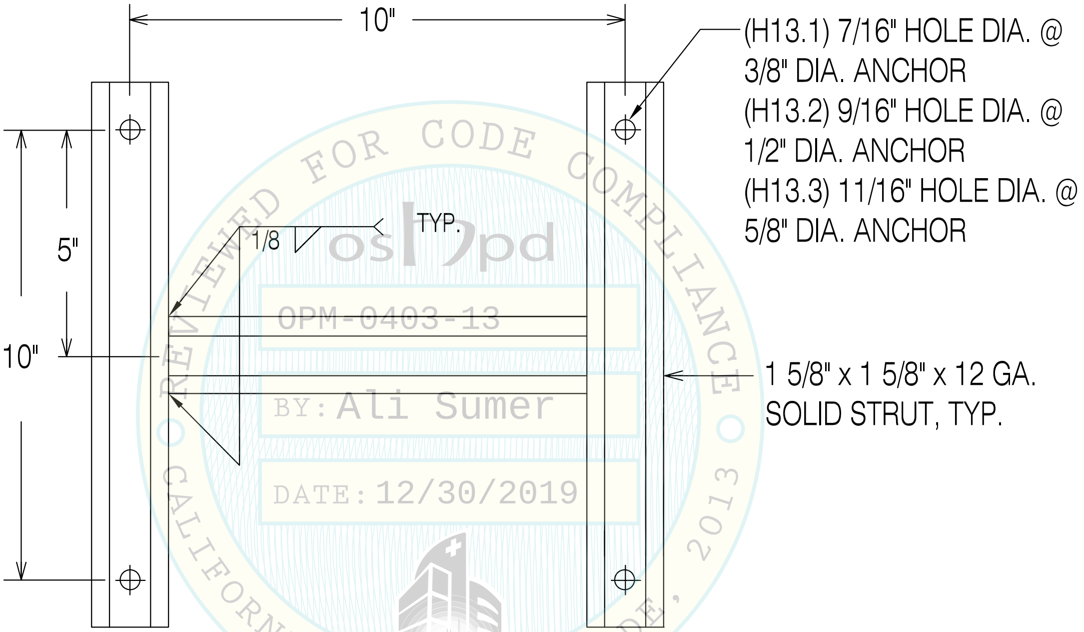


ELEVATION

TYP. USE ON:

D-SERIES
REFERENCES:
D1.4.1TZ
D1.4.1SD



PLAN VIEW

## 4 BOLT H-BRACKET (HBRKT)

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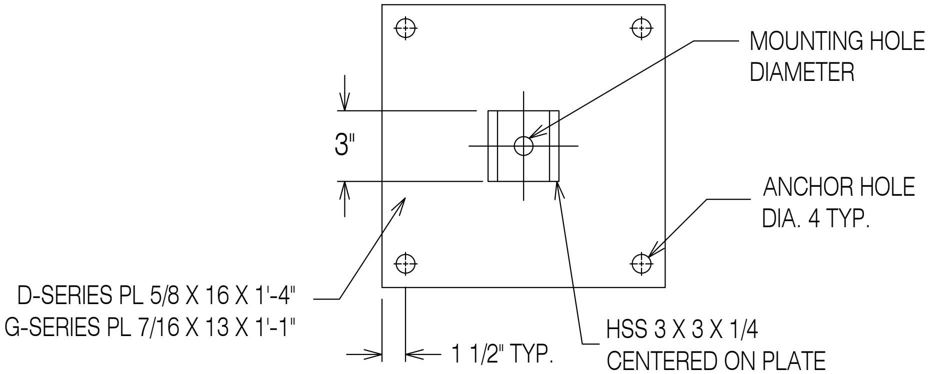
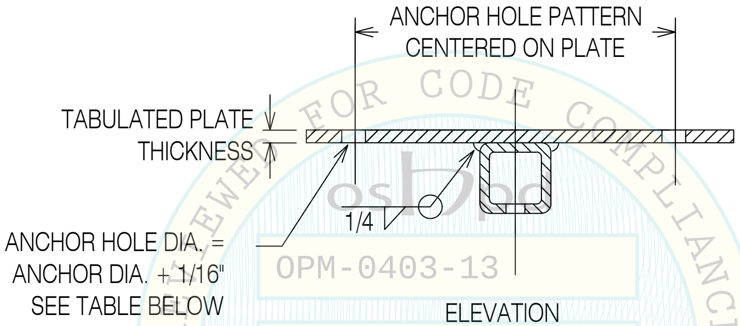
TYP. USE ON:

D-SERIES
REFERENCES:
D1.4TZ
D1.4SD2

G-SERIES
REFERENCES:
G5.4TZ
G5.4SD2



PLAN



ELEVATION

## PLATE DETAILS FOR FORM POUR SLAB

| Plate Number | Plate Thickness Inch | Anchor Diameter Inch | Anchor Hole Diameter Inch | Anchor Hole Pattern Inch | Mounting Hole Diameter Inch | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|
| **D-Series Seismic Brace Connections** | | | | | | |
| D134 | 5/8 | 3/8 | 7/16 | 13 x 13 | 9/16 | 1/2 |
| D145 | 5/8 | 1/2 | 9/16 | 13 x 13 | 11/16 | 5/8 |
| D155 | 5/8 | 5/8 | 11/16 | 13 x 13 | 11/16 | 5/8 |
| **G-Series Vertical Support Connections** | | | | | | |
| G535 | 7/16 | 3/8 | 7/16 | 10 x 10 | 11/16 | 5/8 |
| G545 | 7/16 | 1/2 | 9/16 | 10 x 10 | 11/16 | 5/8 |
| G546 | 7/16 | 1/2 | 9/16 | 10 x 10 | 13/16 | 3/4 |
| G547 | 7/16 | 1/2 | 9/16 | 10 x 10 | 15/16 | 7/8 |
| G557 | 7/16 | 5/8 | 11/16 | 10 x 10 | 15/16 | 7/8 |

# 4-BOLT ANCHOR PLATE, FORM POUR SLAB

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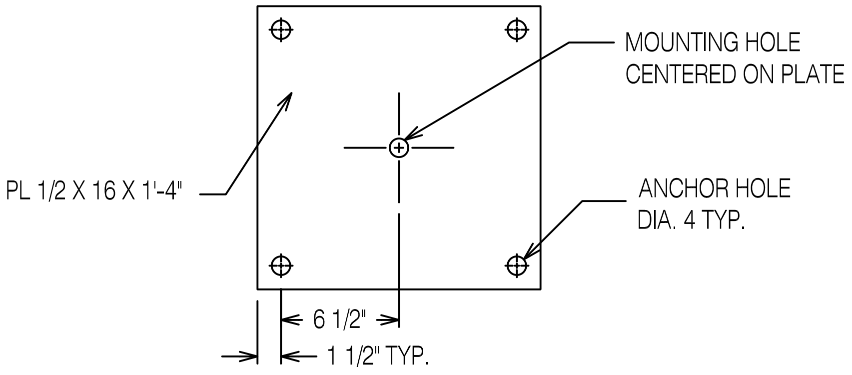
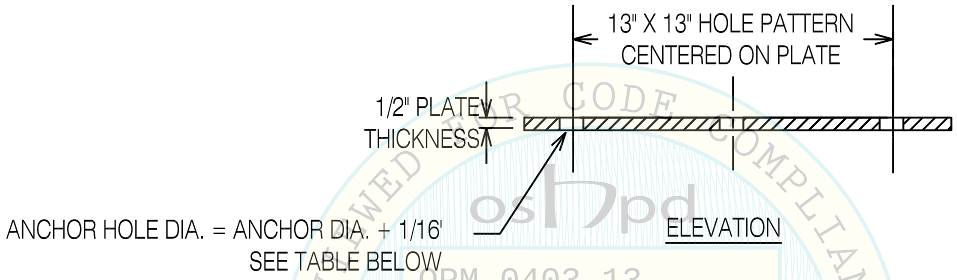


PLAN



ELEVATION

## PLATE DETAILS FOR METAL DECK SLAB

| Plate Number | Plate Thickness Inch | Anchor Diameter Inch | Anchor Hole Diameter Inch | Anchor Hole Pattern Inch | Mounting Hole Diameter Inch | Mounting Bolt Diameter Inch |
|---|---|---|---|---|---|---|
| **D-Series Seismic Brace Connections** | | | | | | |
| D243 | 1/2 | 3/8 | 7/16 | 13 x 13 | 9/16 | 1/2 |
| D244 | 1/2 | 1/2 | 9/16 | 13 x 13 | 9/16 | 1/2 |
| D245 | 1/2 | 1/2 | 9/16 | 13 x 13 | 11/16 | 5/8 |
| D255 | 1/2 | 5/8 | 11/16 | 13 x 13 | 11/16 | 5/8 |
| **G-Series Vertical Support Connections** | | | | | | |
| G634 | 1/2 | 3/8 | 7/16 | 13 x 13 | 9/16 | 1/2 |
| G644 | 1/2 | 1/2 | 9/16 | 13 x 13 | 9/16 | 1/2 |
| G645 | 1/2 | 1/2 | 9/16 | 13 x 13 | 11/16 | 5/8 |
| G646 | 1/2 | 1/2 | 9/16 | 13 x 13 | 13/16 | 3/4 |
| G656 | 1/2 | 5/8 | 11/16 | 13 x 13 | 13/16 | 3/4 |
| G657 | 1/2 | 5/8 | 11/16 | 13 x 13 | 15/16 | 7/8 |

# 4-BOLT ANCHOR PLATE, METAL DECK SLAB

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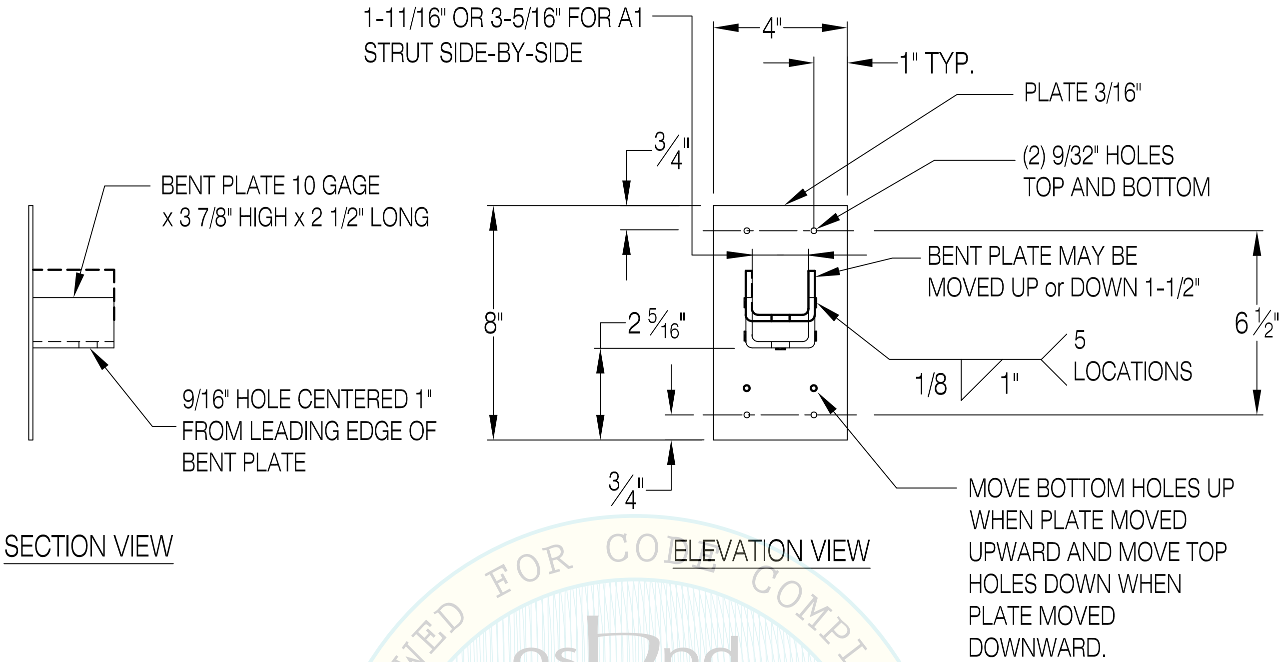
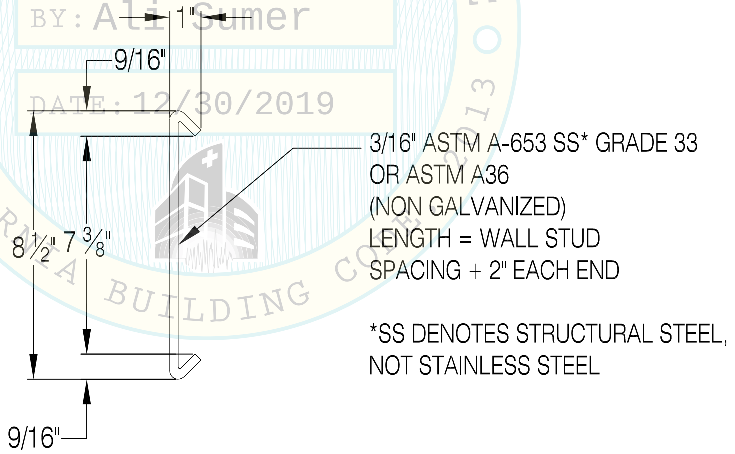


SECTION VIEW

ELEVATION VIEW

WALL MOUNT BRACKET (WMB)



WALL MOUNTING PLATE (WMP)

# WALL MOUNT BRACKET (WMB)
# AND WALL MOUNTING PLATE (WMP) DETAILS

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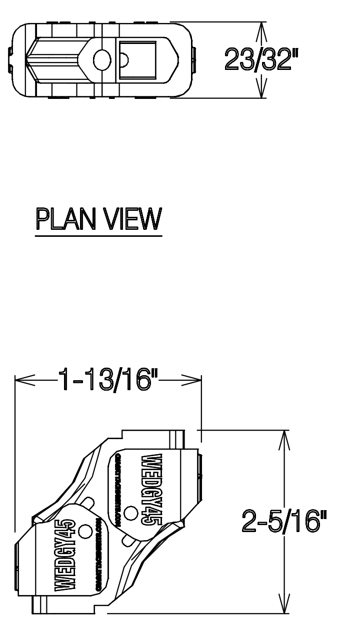
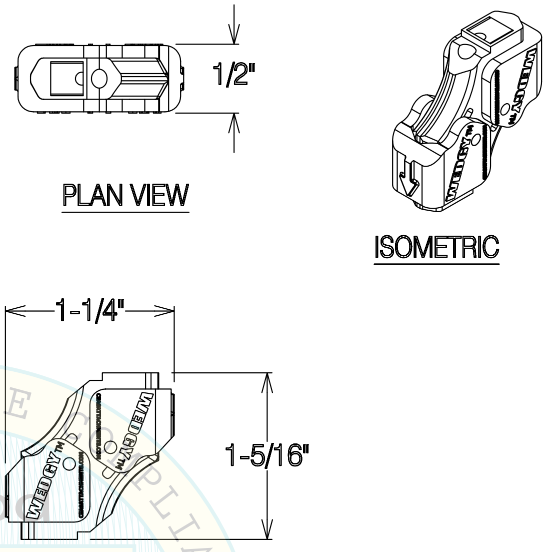


**WEDGY45**



**WEDGY23**

| TYPE OF WEDGY | ALLOWABLE CAPACITY (ASD) |
|---|---|
| WEDGY 45[1] | 1485 LBS |
| WEDGY 23[2] | 773 LBS |

1. FOR USE WITH 3/16"Ø ASTM A1023 GALVANIZED STEEL CABLE (7x19)
2. FOR USE WITH 1/8"Ø ASTM A1023 GALVANIZED STEEL CABLE (7x19)
3. FACTOR OF SAFETY: 1.5

PATENT PENDING

## WEDGY23 & WEDGY45

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## *INDEX - VERTICAL SUPPORT SYSTEM DETAILS*

*PAGE* *DESCRIPTION*

1. *ROD STIFFENING, TRAPEZE LOADS & SPRING HANGERS*

2. *CONNECTIONS TO FORM POUR*

2.1 *POURED-IN-PLACE INSERTS*

*BLUE BANGER HANGER POURED-IN PLACE (PIP) DECK INSERTS*

*PUSH ROD POURED-IN PLACE "PRPIP" DECK INSERTS*

2.2 *POST INSTALLED CONCRETE ANCHORS*

*HILTI KWIK BOLT TZ EXPANSION ANCHOR*

*HILTI KWIK HUS-EZ CONCRETE SCREW ANCHOR*

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## *INDEX - VERTICAL SUPPORT SYSTEM DETAILS (CONTINUED)*

| *PAGE* | *DESCRIPTION* |
|---|---|
| | *CONNECTIONS TO FORM POUR (CONTINUED)* |
| | *POWERS POWER-STUD+ SD2 WEDGE EXPANSION ANCHOR* |
| G5.1SD23 | SINGLE ANCHOR - 3,000 PSI NWC |
| G5.1SD24 | SINGLE ANCHOR - 4,000 PSI NWC |
| G5.2SD2 | DUAL ANCHOR, B1 STRUT CONNECTOR |
| G5.3SD2 | DUAL ANCHOR, B2 STRUT CONNECTOR |
| G5.4SD2 | 4-BOLT ANCHOR |
| | *POWERS SNAKE IN FORM POUR SLABS* |
| G5.1SN | SINGLE ANCHOR - 3,000 PSI NWC |
| G5.2SN | SINGLE ANCHOR - 4,000 PSI NWC |
| | *POWERS VERTIGO CONCRETE SCREW ANCHOR* |
| G5.1VRT3 | SINGLE ANCHOR - 3,000 PSI NWC |
| G5.1VRT4 | SINGLE ANCHOR - 4,000 PSI NWC |
| | *POWERS WEDGE-BOLT+ CONCRETE SCREW ANCHOR* |
| G5.2WB3 | DUAL ANCHOR, B1 STRUT CONNECTOR; 3,000 PSI CONCRETE |
| G5.2WB4 | DUAL ANCHOR, B1 STRUT CONNECTOR; 4,000 PSI CONCRETE |
| | *3. CONNECTIONS TO METAL PAN DECKS, NORMAL OR LIGHT WEIGHT CONCRETE* |
| | *3.1 POURED-IN PLACE STEEL DECK INSERTS (SDI)* |
| | *BLUE BANGER HANGER STEEL DECK INSERT "SDI" CAST-IN PLACE DECK INSERT* |
| G6.1B | SINGLE "SDI" ANCHOR, 3,000 THRU 4,000 PSI CONCRETE |
| G6.2B | SINGLE "SDI" ANCHOR, EXTENDED BASE PLATE |
| G6.3B | DUAL "SDI" ANCHOR, B1 STRUT CONNECTOR |
| G6.4B | DUAL "SDI" ANCHOR, B2 STRUT CONNECTOR |
| | *HEADED BOLT "SDI-HB"* |
| G6.1HB3 | SINGLE "SDI-HB", 3,000 PSI LW CONCRETE |
| G6.1HB4 | SINGLE "SDI-HB", 4,000 PSI LW CONCRETE |
| G6.2HB | DUAL "SDI-HB", 3,000 PSI LW CONCRETE |
| | *PUSH ROD "PRSDI" DECK INSERTS* |
| G6.1PR | SINGLE "PRSDI" ANCHOR, 3,000 THRU 4,000 PSI CONCRETE |
| G6.3PR | DUAL "PRSDI" ANCHOR, B1 STRUT CONNECTOR |
| G6.4PR | DUAL "PRSDI" ANCHOR, B2 STRUT CONNECTOR |

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## *INDEX - VERTICAL SUPPORT SYSTEM DETAILS (CONTINUED)*

### *3.2 POST INSTALLED CONCRETE ANCHORS*

*HILTI KWIK BOLT TZ EXPANSION ANCHOR*

*HILTI KWIK HUS-EZ CONCRETE SCREW ANCHOR*

*POWERS POWER-STUD+ SD2 WEDGE EXPANSION ANCHOR*

*POWERS SNAKE IN FORM POUR SLABS*

*POWERS VERTIGO CONCRETE SCREW ANCHOR*

## INDEX - VERTICAL SUPPORT SYSTEM DETAILS (CONTINUED)

*PAGE* *DESCRIPTION*

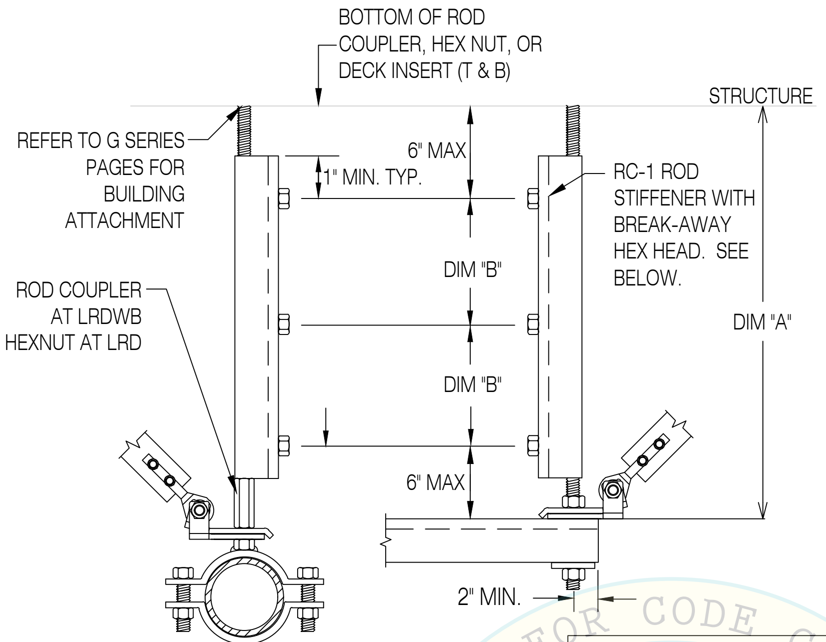
*POST INSTALLED CONCRETE ANCHORS (CONTINUED)*

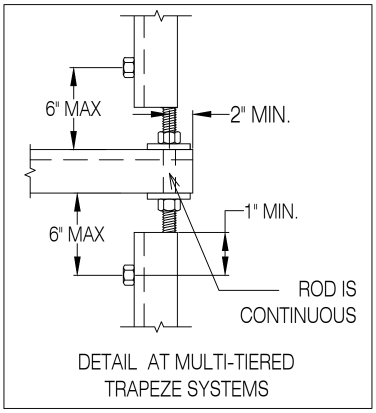
*POWERS WEDGE-BOLT+ CONCRETE SCREW ANCHOR*

*4. CONNECTIONS TO STRUCTURAL STEEL*

*6. WOOD CONNECTIONS*

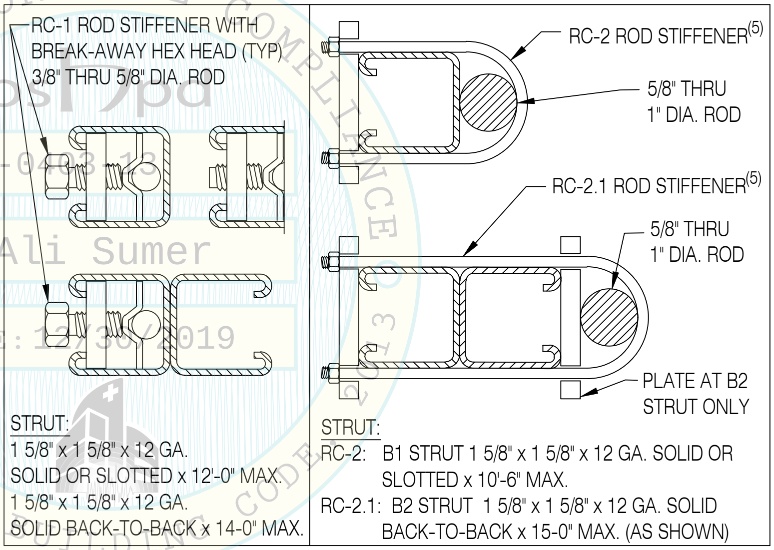
*7. MISCELLANEOUS CONNECTIONS*





DETAIL AT MULTI-TIERED TRAPEZE SYSTEMS

| Rod Stiffener Chart | | | |
|---|---|---|---|
| Threaded Rod Diameter (in.) | Dim. A Maximum Rod Length Without Stiffener (in.) | Dim. B Maximum Spacing Between Rod Stiffeners (in.) | Maximum Compressive Force (lbs) |
| 3/8 | 16 | 28 | 380 |
| 1/2 | 18 | 38 | 985 |
| 5/8 | 24 | 48 | 1,385 |
| 3/4 | 30 | 57 | 1,895 |
| 7/8 | 40 | 40 | 2,010 |
| 1 | 46 | 46 | 2,605 |
| 1 1/8 | 54 | N/A | 3,015 |
| 1 1/4 | 58 | N/A | 4,110 |
| 1 3/8 | 66 | N/A | 4,565 |
| 1 1/2 | 72 | N/A | 5,585 |



STRUT:
1 5/8" x 1 5/8" x 12 GA.
SOLID OR SLOTTED x 12'-0" MAX.
1 5/8" x 1 5/8" x 12 GA.
SOLID BACK-TO-BACK x 14-0" MAX.

STRUT:
RC-2: B1 STRUT 1 5/8" x 1 5/8" x 12 GA. SOLID OR SLOTTED x 10'-6" MAX.
RC-2.1: B2 STRUT 1 5/8" x 1 5/8" x 12 GA. SOLID BACK-TO-BACK x 15-0" MAX. (AS SHOWN)

1. ROD STIFFENING REQUIRED ONLY FOR HANGER RODS TO WHICH SEISMIC BRACING HAS BEEN INSTALLED OR WITHIN 12" OF DIAGONAL COMPONENT OF THE BRACING SYSTEM.
2. TIGHTEN RC-1 STIFFENER NUT TO FINGER TIGHT THEN WRENCH TIGHT TILL HEX HEAD BREAKS OFF (2 FULL TURNS, 35 FT-LBS APPROXIMATE).
3. ROD STIFFENERS MAY BE ELIMINATED WHERE TWO RIGID BRACES ARE ATTACHED TO THE SAME ROD AND ARE 180 DEGREES OPPOSED TO ONE ANOTHER.
4. NO STIFFENING ON RODS GREATER THAN 1" IN DIAMETER.
5. MINIMUM OF (3) STIFFENER CLIPS REQUIRED PER ASSEMBLY AS DEPICTED IN DETAIL ABOVE. STIFFENER CLIPS TO BE EQUALLY SPACED (±1").

# ROD STIFFENING REQUIREMENTS

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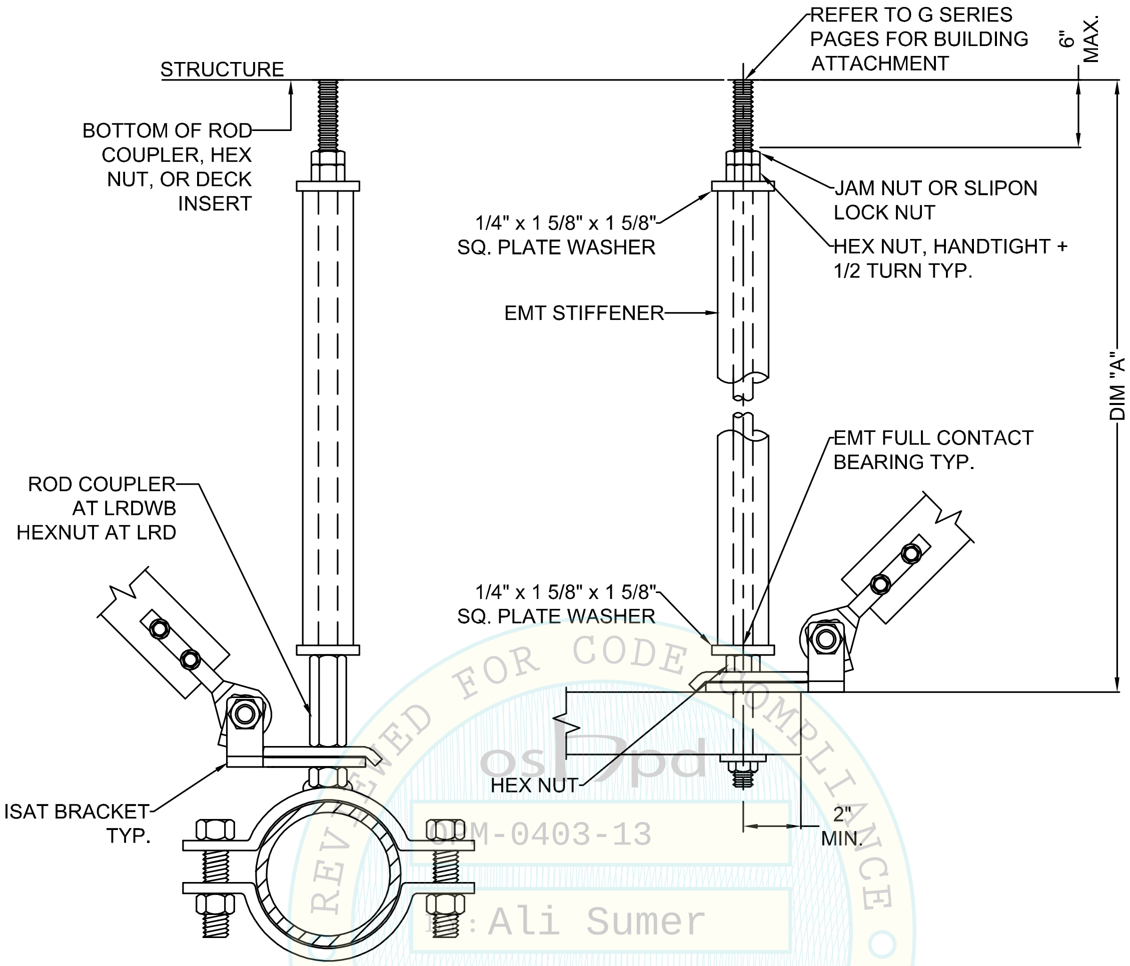

| ROD STIFFENING EXCLUSION REQUIREMENTS | | |
|---|---|---|
| THREADED ROD DIAMETER (in) | DIM. "A" MAXIMUM ROD LENGTH WITHOUT STIFFENER (in) | MAXIMUM COMPRESSIVE FORCE (lbs) |
| 3/8" | 16 | 380 |
| 1/2" | 18 | 985 |
| 5/8" | 24 | 1385 |
| 3/4" | 30 | 1895 |
| 7/8" | 40 | 2010 |
| 1" | 46 | 2605 |
| 1 1/8" | 54 | 3015 |
| 1 1/4" | 58 | 4110 |
| 1 3/8" | 66 | 4565 |
| 1 1/2" | 72 | 5585 |

| EMT SIZE (in) | DIM. "A" MAXIMUM LENGTH (in) | MAXIMUM COMPRESSIVE FORCE (lbs) |
|---|---|---|
| 1/2" | 18 | 1505 |
| | 30 | 775 |
| | 42 | 395 |
| 3/4" | 36 | 1415 |
| | 48 | 805 |
| | 60 | 515 |
| 1" | 54 | 1500 |
| | 72 | 845 |
| | 90 | 540 |
| 1 1/4" | 78 | 1830 |
| | 108 | 955 |
| | 144 | 535 |

1. ROD STIFFENING REQUIRED ONLY FOR HANGER RODS TO WHICH SEISMIC BRACING HAS BEEN INSTALLED.
2. ROD STIFFENERS MAY BE ELIMINATED WHERE TWO RIGID BRACES ARE ATTACHED TO THE SAME ROD AND ARE 180 DEGREES OPPOSED TO ONE ANOTHER.

# EMT ROD STIFFENING REQUIREMENTS

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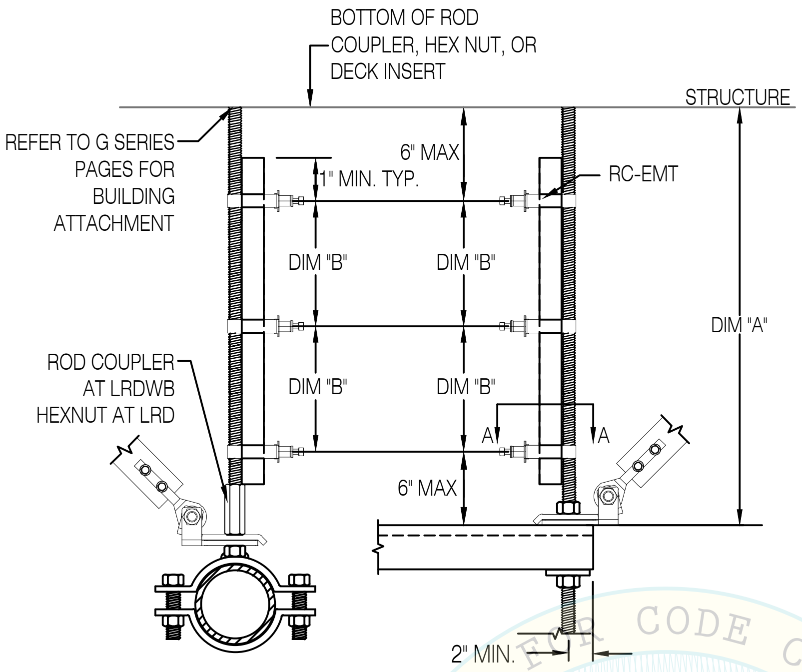
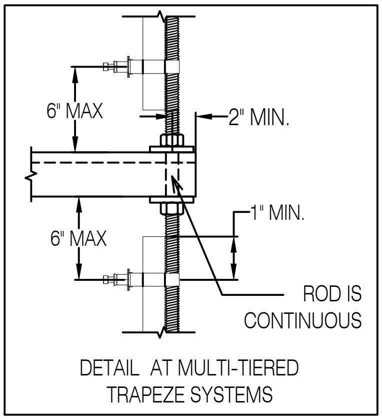
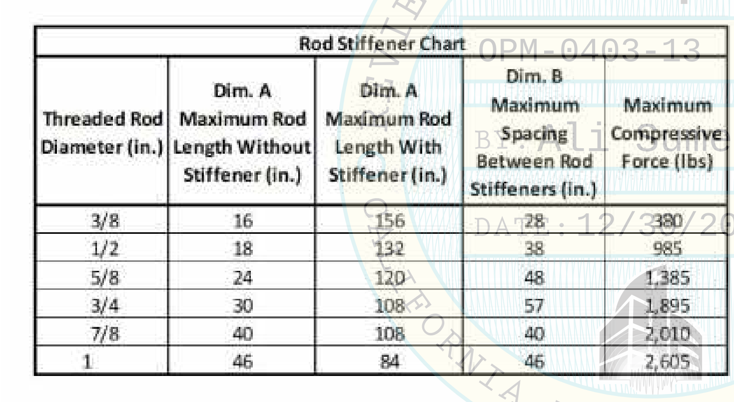
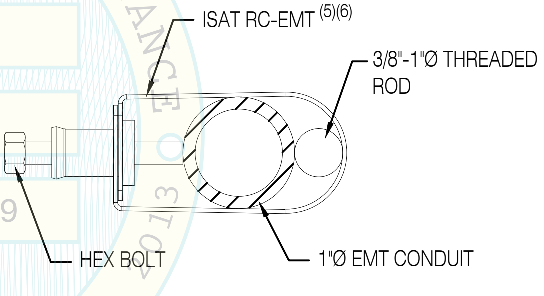




DETAIL AT MULTI-TIERED TRAPEZE SYSTEMS



| Rod Stiffener Chart | | | | |
|---|---|---|---|---|
| Threaded Rod Diameter (in.) | Dim. A Maximum Rod Length Without Stiffener (in.) | Dim. A Maximum Rod Length With Stiffener (in.) | Dim. B Maximum Spacing Between Rod Stiffeners (in.) | Maximum Compressive Force (lbs) |
| 3/8 | 16 | 156 | 28 | 380 |
| 1/2 | 18 | 132 | 38 | 985 |
| 5/8 | 24 | 120 | 48 | 1,385 |
| 3/4 | 30 | 108 | 57 | 1,895 |
| 7/8 | 40 | 108 | 40 | 2,010 |
| 1 | 46 | 84 | 46 | 2,605 |



SECTION A-A

1. ROD STIFFENING REQUIRED ONLY FOR HANGER RODS TO WHICH SEISMIC BRACING HAS BEEN INSTALLED OR WITHIN 12" OF DIAGONAL COMPONENT OF THE BRACING SYSTEM.
2. TIGHTEN HEX BOLT FINGER TIGHT PLUS ONE FULL TURN.
3. ROD STIFFENERS MAY BE ELIMINATED WHERE TWO RIGID BRACES ARE ATTACHED TO THE SAME ROD AND ARE 180 DEGREES OPPOSED TO ONE ANOTHER.
4. NO STIFFENING ON RODS GREATER THAN 1" IN DIAMETER.
5. MINIMUM OF (3) STIFFENER CLIPS REQUIRED PER ASSEMBLY AS DEPICTED IN DETAIL ABOVE. STIFFENER CLIPS TO BE EQUALLY SPACED (±1").
6. MATERIAL: ASTM A1008 CS, FINISH: ELECTROGALVANIZED ZINC COATING.

# EMT ROD STIFFENING REQUIREMENTS

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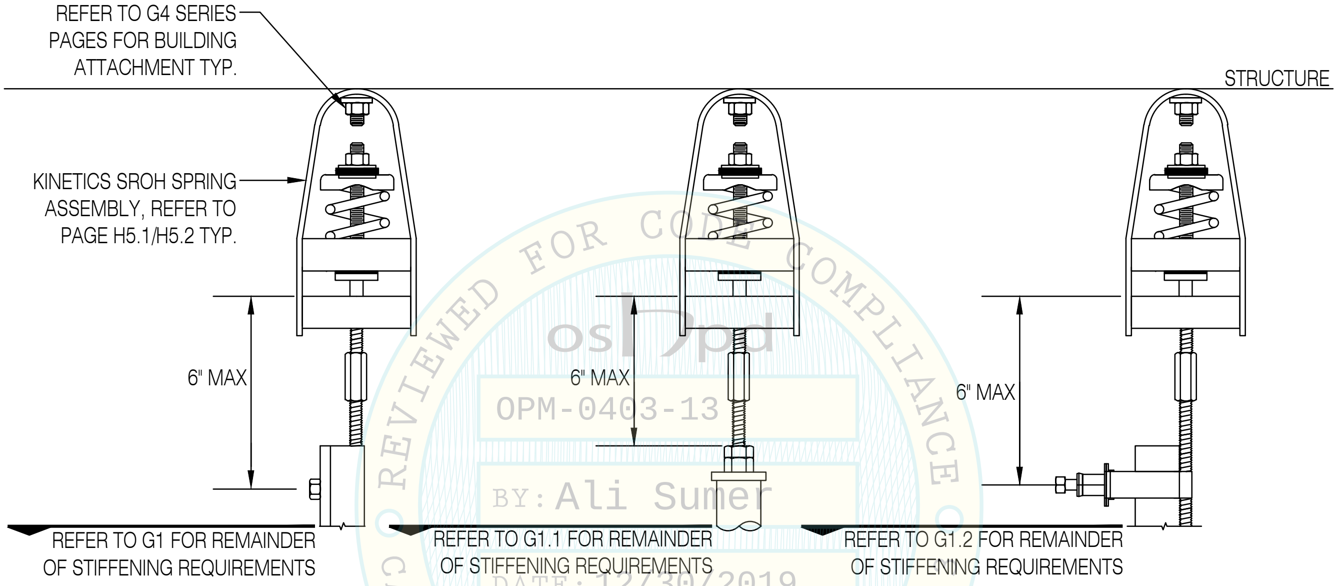

NOTES:

1. REFER TO G4.1K, G4.2K OR G4.3K FOR SPRING INSTALLATION GUIDELINES.

# ROD STIFFENING REQUIREMENTS @ ISOLATOR

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## STRUT CHANNEL
## MAXIMUM TRAPEZE VERTICAL LOADS [1, 5]

**"A1" SINGLE CHANNEL (1 5/8" X 13/16" X 12 GA)**

| MAXIMUM TOTAL UNIFORM LOAD | | | | |
|---|---|---|---|---|
| MAXIMUM SPAN Inch | SOLID CHANNEL Lbs | PUNCHED HOLES Lbs | SHORT SLOTS CHANNEL Lbs | DEFLECTION Inch |
| 18 | 560 | 510 | 480 | 0.05 |
| 24 | 420 | 380 | 360 | 0.09 |
| 36 | 280 | 250 | 240 | 0.19 |
| 48 | 210 | 190 | 180 | 0.34 |

**"A2" BACK TO BACK CHANNEL [3] (1 5/8" X 13/16" X 12 GA)**

| MAXIMUM TOTAL UNIFORM LOAD | | | | |
|---|---|---|---|---|
| MAXIMUM SPAN Inch | SOLID CHANNEL Lbs | PUNCHED HOLES Lbs | SHORT SLOTS CHANNEL Lbs | DEFLECTION Inch |
| 18 | 1,270 | 1,140 | 1,080 | 0.03 |
| 24 | 1,170 | 1,050 | 990 | 0.05 |
| 36 | 780 | 700 | 660 | 0.12 |
| 48 | 580 | 530 | 500 | 0.21 |
| 60 | 470 | 420 | 400 | 0.33 |
| 72 | 390 | 350 | 330 | 0.47 |
| 96 | 280 | 250 | 240 | 0.80 |

**"B1" SINGLE CHANNEL (1 5/8" X 1 5/8" X 12 GA)**

| MAXIMUM TOTAL UNIFORM LOAD | | | | |
|---|---|---|---|---|
| MAXIMUM SPAN Inch | SOLID CHANNEL Lbs | PUNCHED HOLES Lbs | SHORT SLOTS CHANNEL Lbs | DEFLECTION Inch |
| 18 | 1,870 | 1,680 | 1,590 | 0.03 |
| 24 | 1,400 | 1,260 | 1,190 | 0.05 |
| 36 | 940 | 840 | 790 | 0.10 |
| 48 | 700 | 630 | 600 | 0.18 |
| 60 | 560 | 510 | 480 | 0.29 |
| 72 | 470 | 420 | 400 | 0.42 |
| 84 | 400 | 380 | 340 | 0.57 |
| 96 | 350 | 320 | 300 | 0.74 |
| 108 | 300 | 270 | 250 | 0.90 |
| 120 | 240 | 220 | 210 | 0.99 |

**"B2" BACK TO BACK CHANNEL [3] (1 5/8" X 1 5/8" X 12 GA)**

| MAXIMUM TOTAL UNIFORM LOAD | | | | |
|---|---|---|---|---|
| MAXIMUM SPAN Inch | SOLID CHANNEL Lbs | PUNCHED HOLES Lbs | SHORT SLOTS CHANNEL Lbs | DEFLECTION Inch |
| 18 | 2,610 | 2,350 | 2,220 | 0.01 |
| 24 | 2,610 | 2,350 | 2,220 | 0.02 |
| 36 | 2,610 | 2,350 | 2,220 | 0.06 |
| 48 | 1,990 | 1,790 | 1,690 | 0.10 |
| 60 | 1,590 | 1,430 | 1,350 | 0.16 |
| 72 | 1,320 | 1,190 | 1,130 | 0.23 |
| 84 | 1,130 | 1,020 | 960 | 0.32 |
| 96 | 990 | 890 | 840 | 0.42 |
| 108 | 880 | 790 | 750 | 0.53 |
| 120 | 790 | 710 | 670 | 0.65 |

**"C1" SINGLE CHANNEL (1 5/8" X 3 1/4" X 12 GA)**

| MAXIMUM TOTAL UNIFORM LOAD | | | | |
|---|---|---|---|---|
| MAXIMUM SPAN Inch | SOLID CHANNEL Lbs | PUNCHED HOLES Lbs | SHORT SLOTS CHANNEL Lbs | DEFLECTION Inch |
| 18 | 5,810 | 5,230 | 4,930 | 0.01 |
| 24 | 4,350 | 3,920 | 3,700 | 0.02 |
| 36 | 2,900 | 2,610 | 2,470 | 0.05 |
| 48 | 2,180 | 1,960 | 1,850 | 0.10 |
| 60 | 1,740 | 1,570 | 1,480 | 0.15 |
| 72 | 1,450 | 1,310 | 1,230 | 0.22 |
| 84 | 1,250 | 1,120 | 1,060 | 0.30 |
| 96 | 1,090 | 980 | 930 | 0.39 |
| 108 | 970 | 870 | 820 | 0.49 |
| 120 | 870 | 790 | 740 | 0.60 |

**"C2" BACK TO BACK CHANNEL [3] (1 5/8" X 3 1/4" X 12 GA)**

| MAXIMUM TOTAL UNIFORM LOAD | | | | |
|---|---|---|---|---|
| MAXIMUM SPAN Inch | SOLID CHANNEL Lbs | PUNCHED HOLES Lbs | SHORT SLOTS CHANNEL Lbs | DEFLECTION Inch |
| 18 | 5,130 | 4,620 | 4,360 | 0.00 |
| 24 | 5,130 | 4,620 | 4,360 | 0.01 |
| 36 | 5,130 | 4,620 | 4,360 | 0.02 |
| 48 | 5,130 | 4,620 | 4,360 | 0.04 |
| 60 | 5,130 | 4,620 | 4,360 | 0.08 |
| 72 | 4,440 | 3,990 | 3,770 | 0.12 |
| 84 | 3,800 | 3,420 | 3,230 | 0.16 |
| 96 | 3,330 | 2,990 | 2,830 | 0.21 |
| 108 | 2,960 | 2,660 | 2,510 | 0.26 |
| 120 | 2,660 | 2,400 | 2,260 | 0.33 |

1. ALLOWANCE INCLUDED FOR CONCURRENT VERTICAL SEISMIC FORCE 0.14 $S_{DS}$ $W_P$ PER ASCE 7-10 SEC. 13.3.1.
2. STRUT SPAN IS THE DISTANCE BETWEEN THE VERTICAL HANGER RODS.
3. REFER TO "G" SERIES PAGES FOR VERTICAL SUPPORT CONNECTIONS.
4. FOR CONCENTRATED LOAD AT CENTER OF SPAN, DIVIDE UNIFORM LOAD BY 2 AND MULTIPLY DEFLECTION BY 0.8.

# STRUT CHANNEL TRAPEZE MAXIMUM VERTICAL LOADS

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*02/23/18*

*Page*
***G2***

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**STRUCTURAL ANGLE [4]**
**L3x3x1/4**

| MAXIMUM TOTAL UNIFORM LOAD | | |
|---|---|---|
| **MAXIMUM SPAN INCH** | **MAX. TOTAL UNIFORM LOAD [2, 3] LBS** | **DEFLECTION INCH** |
| 18 | 4,540 | 0.01 |
| 24 | 3,410 | 0.02 |
| 36 | 2,270 | 0.04 |
| 48 | 1,700 | 0.07 |
| 60 | 1,360 | 0.11 |
| 72 | 1,140 | 0.16 |
| 84 | 970 | 0.21 |
| 96 | 850 | 0.27 |
| 108 | 760 | 0.35 |
| 120 | 680 | 0.43 |

**STRUCTURAL TUBE [4]**
**HSS 3x3x1/4**

| MAXIMUM TOTAL UNIFORM LOAD | | |
|---|---|---|
| **MAXIMUM SPAN INCH** | **MAX. TOTAL UNIFORM LOAD [3] LBS** | **DEFLECTION INCH** |
| 48 | 9,490 | 0.16 |
| 60 | 7,590 | 0.24 |
| 72 | 6,330 | 0.35 |
| 84 | 5,420 | 0.48 |
| 96 | 4,740 | 0.62 |
| 108 | 4,220 | 0.79 |
| 120 | 3,800 | 0.98 |

1. ALLOWANCE INCLUDED FOR CONCURRENT VERTICAL SEISMIC FORCE 0.14 $S_{DS}$ WP PER ASCE 7-10 SEC. 13.3.1.
2. CONTINUOUS LATERAL TORSIONAL RESTRAINT IS PROVIDED BY THE ATTACHMENT OF THE UTILITY TO THE ANGLE.
3. FOR CONCENTRATED LOAD AT CENTER OF SPAN, DIVIDE UNIFORM LOAD BY 2 AND MULTIPLY DEFLECTION BY 0.8.
4. REFER TO "G" SERIES PAGES FOR VERTICAL SUPPORT CONNECTIONS.

## STRUCTURAL STEEL TRAPEZE MAXIMUM VERTICAL LOADS

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## GENERAL TRAPEZE BIAXIAL BENDING NOTES

1. ASCE 7-10, Section 13.6.5.5.3 requires that supports shall be specifically evaluated if weak-axis bending of light-gauge support steel is relied on for the seismic load path.

2. Biaxial bending of trapeze beams only occurs at locations with longitudinal braces. For locations without seismic bracing or with transverse seismic bracing the trapeze members may be chosen from Pages G2 and G2.1.

3. Strut span listed in the G3_Series Pages is the distance between the longitudinal braces. Strut span for the G2_Series Pages is the distance between the vertical hanger rods.

4. Tabulated load values are for the total gravity load on the trapeze beam. For a given lateral force factor, G, the longitudinal brace spacing is given in terms of multiples of the vertical hanger spacing.
   For example, with a 10' trapeze spacing, for the gravity loads and a 4X longitudinal brace spacing the trapeze member is designed for a tributary gravity load of 10' and a tributary lateral load of 40'.

5. Design for multiple struts not factory welded is based on the sum of the individual elements and not a combined section.

6. Design capacity for B1 struts (1 5/8" x 1 5/8" x 12 gage) used for top restraints for equipment and HVAC duct may be derived from Page G2 "B1 Single Channel". Divide the tabulated total uniform load from Page G2 by the project specific "G-Force".
   The gravity load of the utility is to be less than this value.

7. For those cases where the project specific trapeze loading exceeds the tabulated values, the designer or contractor may choose one of the following options:
   a. Add more trapeze members such as a Triple B1 with 12 Gage Connector (Page G3.3) or a Triple B1 with C6X8.2 (Page G3.4).
   b. Add a vertical support rod and longitudinal braces at the midspan of the trapeze beam. This reduces the span for gravity loads and longitudinal seismic loads.
   c. Reduce the longitudinal brace spacing.

## BIAXIAL BENDING OF TRAPEZE BEAMS AT LONGITUDINAL BRACE LOCATIONS

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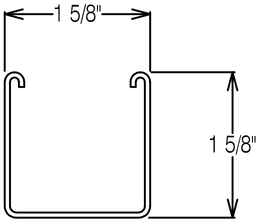
## B1 - TOTAL UNIFORM GRAVITY LOAD IN POUNDS WITH BIAXIAL BENDING

TABULATED LOADS ARE TOTAL VERTICAL LOADS.
LONGITUDINAL BRACE SPACING IS A MULTIPLIER OF THE VERTICAL HANGER SPACING.
STRUT SPAN IS DEFINED AS THE DISTANCE BETWEEN LONGITUDINAL BRACES.
SLOTTED STRUT IS USED FOR DESIGN.



B1

**G = 0.20**

| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
|---|---|---|---|---|
| 18 | 600 | 800 | 850 | 950 |
| 24 | 450 | 600 | 650 | 700 |
| 36 | 300 | 400 | 420 | 450 |
| 48 | 200 | 300 | 320 | 350 |
| 60 | 180 | 230 | 250 | 275 |
| 72 | 150 | 200 | 210 | 230 |
| 84 | 130 | 160 | 175 | 200 |
| 96 | 110 | 140 | 150 | 170 |

**G = 0.40**

| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
|---|---|---|---|---|
| 18 | 400 | 600 | 680 | 800 |
| 24 | 300 | 450 | 500 | 580 |
| 36 | 200 | 300 | 340 | 400 |
| 48 | 150 | 230 | 250 | 300 |
| 60 | 120 | 180 | 200 | 230 |
| 72 | 100 | 150 | 170 | 200 |
| 84 | 85 | 130 | 140 | 170 |
| 96 | 75 | 110 | 120 | 150 |

**G = 0.60**

| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
|---|---|---|---|---|
| 18 | 300 | 475 | 550 | 650 |
| 24 | 225 | 360 | 420 | 500 |
| 36 | 150 | 240 | 280 | 340 |
| 48 | 110 | 180 | 210 | 250 |
| 60 | 90 | 140 | 170 | 200 |
| 72 | 75 | 120 | 140 | 160 |
| 84 | 65 | 100 | 120 | 140 |
| 96 | 50 | 90 | 100 | 120 |

**G = 0.80**

| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
|---|---|---|---|---|
| 18 | 250 | 400 | 480 | 600 |
| 24 | 180 | 300 | 360 | 450 |
| 36 | 120 | 200 | 240 | 300 |
| 48 | 90 | 150 | 180 | 220 |
| 60 | 75 | 120 | 140 | 180 |
| 72 | 60 | 100 | 120 | 150 |
| 84 | 50 | 80 | 100 | 130 |
| 96 | 40 | 70 | 80 | 110 |

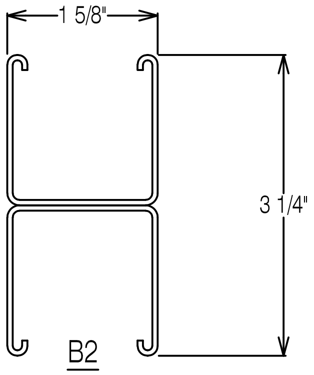
**G = 1.00**

| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
|---|---|---|---|---|
| 18 | 200 | 350 | 420 | 540 |
| 24 | 150 | 250 | 300 | 400 |
| 36 | 90 | 170 | 200 | 260 |
| 48 | 75 | 130 | 150 | 200 |
| 60 | 60 | 100 | 125 | 160 |
| 72 | 50 | 80 | 100 | 130 |
| 84 | 40 | 70 | 80 | 110 |
| 96 | 35 | 60 | 70 | 100 |

## STRUT TOTAL UNIFORM GRAVITY LOAD WITH BIAXIAL BENDING

## B2 - TOTAL UNIFORM LOAD IN POUNDS

TABULATED LOADS ARE TOTAL VERTICAL LOADS.
LONGITUDINAL BRACE SPACING IS A MULTIPLIER OF THE VERTICAL HANGER SPACING.
STRUT SPAN IS DEFINED AS THE DISTANCE BETWEEN LONGITUDINAL BRACES.
SLOTTED STRUT IS USED FOR DESIGN.



| G = 0.20 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 1400 | 2000 | 2200 | 2400 |
| 24 | 1000 | 1500 | 1600 | 1800 |
| 36 | 700 | 1000 | 1100 | 1200 |
| 48 | 500 | 750 | 800 | 900 |
| 60 | 400 | 600 | 650 | 700 |
| 72 | 350 | 500 | 550 | 600 |
| 84 | 300 | 400 | 450 | 500 |
| 96 | 250 | 350 | 400 | 400 |

| G = 0.40 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 900 | 1400 | 1600 | 2000 |
| 24 | 680 | 1000 | 1200 | 1500 |
| 36 | 450 | 700 | 800 | 1000 |
| 48 | 300 | 500 | 600 | 700 |
| 60 | 260 | 400 | 500 | 600 |
| 72 | 220 | 350 | 400 | 500 |
| 84 | 180 | 300 | 350 | 400 |
| 96 | 160 | 250 | 300 | 350 |

| G = 0.60 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 650 | 1100 | 1300 | 1600 |
| 24 | 500 | 800 | 1000 | 1200 |
| 36 | 330 | 550 | 650 | 800 |
| 48 | 250 | 400 | 500 | 600 |
| 60 | 200 | 320 | 400 | 500 |
| 72 | 170 | 260 | 320 | 400 |
| 84 | 140 | 220 | 280 | 350 |
| 96 | 120 | 200 | 240 | 300 |

| G = 0.80 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 520 | 900 | 1100 | 1400 |
| 24 | 400 | 680 | 800 | 1000 |
| 36 | 260 | 450 | 550 | 700 |
| 48 | 200 | 340 | 400 | 500 |
| 60 | 160 | 270 | 320 | 400 |
| 72 | 130 | 220 | 280 | 350 |
| 84 | 110 | 190 | 240 | 300 |
| 96 | 100 | 170 | 200 | 250 |

| G = 1.00 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 440 | 760 | 950 | 1200 |
| 24 | 320 | 550 | 700 | 900 |
| 36 | 220 | 350 | 460 | 600 |
| 48 | 160 | 280 | 350 | 450 |
| 60 | 120 | 220 | 280 | 350 |
| 72 | 100 | 180 | 230 | 300 |
| 84 | 90 | 160 | 200 | 250 |
| 96 | 80 | 140 | 170 | 200 |

## B2 TOTAL UNIFORM LOAD

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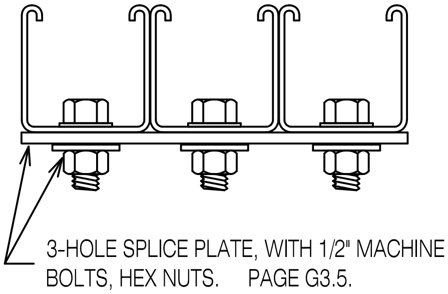
## TRIPLE CHANNEL 1 5/8" x 1 5/8" x 12 GA w/ CONNECTOR

TABULATED LOADS ARE TOTAL VERTICAL LOADS.
LONGITUDINAL BRACE SPACING IS A MULTIPLIER OF THE VERTICAL HANGER SPACING.
STRUT SPAN IS DEFINED AS THE DISTANCE BETWEEN LONGITUDINAL BRACES.
SLOTTED STRUT IS USED FOR DESIGN.



3-HOLE SPLICE PLATE, WITH 1/2" MACHINE BOLTS, HEX NUTS. PAGE G3.5.

### SPLICE PLATE CONNECTION

| G = 0.20 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 1800 | 2300 | 2500 | 2800 |
| 24 | 1300 | 1800 | 1900 | 2100 |
| 36 | 900 | 1200 | 1300 | 1400 |
| 48 | 650 | 900 | 950 | 1000 |
| 60 | 550 | 700 | 750 | 800 |
| 72 | 450 | 600 | 650 | 700 |
| 84 | 380 | 500 | 550 | 600 |
| 96 | 340 | 450 | 450 | 500 |

| G = 0.40 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 1200 | 1800 | 2000 | 2300 |
| 24 | 900 | 1300 | 1500 | 1800 |
| 36 | 600 | 900 | 1000 | 1200 |
| 48 | 450 | 660 | 750 | 900 |
| 60 | 350 | 540 | 600 | 700 |
| 72 | 300 | 450 | 500 | 600 |
| 84 | 250 | 380 | 440 | 500 |
| 96 | 220 | 340 | 380 | 450 |

| G = 0.60 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 900 | 1400 | 1600 | 2000 |
| 24 | 680 | 1100 | 1200 | 1500 |
| 36 | 450 | 700 | 850 | 1000 |
| 48 | 340 | 550 | 650 | 750 |
| 60 | 270 | 440 | 500 | 600 |
| 72 | 220 | 360 | 400 | 500 |
| 84 | 190 | 300 | 350 | 440 |
| 96 | 170 | 260 | 300 | 380 |

| G = 0.80 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 740 | 1200 | 1400 | 1800 |
| 24 | 550 | 900 | 1100 | 1300 |
| 36 | 360 | 600 | 700 | 900 |
| 48 | 270 | 450 | 550 | 650 |
| 60 | 220 | 350 | 400 | 550 |
| 72 | 180 | 300 | 350 | 450 |
| 84 | 150 | 260 | 300 | 380 |
| 96 | 130 | 230 | 250 | 340 |

| G = 1.00 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 600 | 1000 | 1250 | 1600 |
| 24 | 450 | 800 | 950 | 1200 |
| 36 | 300 | 500 | 650 | 800 |
| 48 | 220 | 400 | 460 | 600 |
| 60 | 180 | 300 | 380 | 480 |
| 72 | 150 | 250 | 320 | 400 |
| 84 | 130 | 220 | 260 | 340 |
| 96 | 110 | 190 | 240 | 300 |

# TRIPLE CHANNEL LONGITUDINAL TRAPEZE STIFFENER

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*Page*
***G3.3***

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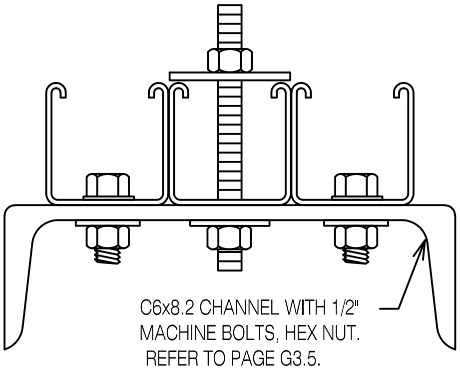
## TRIPLE CHANNEL 1 5/8" x 1 5/8" x 12 GA w/ C6x8.2

TABULATED LOADS ARE TOTAL VERTICAL LOADS IN POUNDS.
LONGITUDINAL BRACE SPACING IS A MULTIPLIER OF THE VERTICAL HANGER SPACING.
STRUT SPAN IS DEFINED AS THE DISTANCE BETWEEN LONGITUDINAL BRACES.
SLOTTED STRUT IS USED FOR DESIGN.


C6x8.2 CHANNEL WITH 1/2" MACHINE BOLTS, HEX NUT. REFER TO PAGE G3.5.

| G = 0.20 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 5500 | 6000 | 6200 | 6500 |
| 24 | 4000 | 4500 | 4600 | 4800 |
| 36 | 2700 | 3000 | 3100 | 3200 |
| 48 | 2000 | 2200 | 2300 | 2400 |
| 60 | 1600 | 1800 | 1850 | 1900 |
| 72 | 1300 | 1500 | 1550 | 1600 |
| 84 | 1100 | 1250 | 1300 | 1400 |
| 96 | 1000 | 1100 | 1150 | 1200 |
| 108 | 900 | 1000 | 1000 | 1000 |
| 120 | 800 | 900 | 900 | 900 |

| G = 0.40 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 4400 | 5400 | 5600 | 6000 |
| 24 | 3200 | 4000 | 4200 | 4500 |
| 36 | 2200 | 2500 | 2800 | 3000 |
| 48 | 1600 | 2000 | 2100 | 2200 |
| 60 | 1300 | 1600 | 1700 | 1800 |
| 72 | 1100 | 1300 | 1400 | 1500 |
| 84 | 900 | 1200 | 1200 | 1250 |
| 96 | 850 | 1000 | 1050 | 1100 |
| 108 | 750 | 900 | 950 | 1000 |
| 120 | 650 | 800 | 850 | 900 |

| G = 0.60 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 3800 | 4800 | 5200 | 5600 |
| 24 | 2800 | 3600 | 3800 | 4200 |
| 36 | 1800 | 2400 | 2600 | 2800 |
| 48 | 1400 | 1800 | 2000 | 2100 |
| 60 | 1100 | 1400 | 1600 | 1700 |
| 72 | 900 | 1200 | 1300 | 1400 |
| 84 | 800 | 1000 | 1100 | 1200 |
| 96 | 700 | 900 | 1000 | 1050 |
| 108 | 600 | 800 | 850 | 900 |
| 120 | 550 | 700 | 800 | 850 |

| G = 0.80 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 3200 | 4400 | 4800 | 5300 |
| 24 | 2400 | 3400 | 3600 | 4000 |
| 36 | 1600 | 2200 | 2400 | 2500 |
| 48 | 1250 | 1700 | 1800 | 2000 |
| 60 | 1000 | 1300 | 1400 | 1500 |
| 72 | 850 | 1100 | 1200 | 1250 |
| 84 | 700 | 900 | 1000 | 1100 |
| 96 | 600 | 800 | 900 | 1000 |
| 108 | 550 | 700 | 800 | 900 |
| 120 | 500 | 650 | 700 | 800 |

| G = 1.00 | | | | |
|---|---|---|---|---|
| STRUT SPAN Inch | LONGITUDINAL BRACE SPACING | | | |
| | 8X Lbs | 4X Lbs | 3X Lbs | 2X Lbs |
| 18 | 3000 | 4000 | 4600 | 5000 |
| 24 | 2200 | 3000 | 3400 | 3800 |
| 36 | 1500 | 2000 | 2200 | 2500 |
| 48 | 1100 | 1500 | 1700 | 1800 |
| 60 | 900 | 1250 | 1400 | 1500 |
| 72 | 750 | 1000 | 1100 | 1250 |
| 84 | 650 | 900 | 1000 | 1100 |
| 96 | 550 | 800 | 850 | 900 |
| 108 | 500 | 700 | 750 | 800 |
| 120 | 450 | 600 | 650 | 700 |

# TRIPLE CHANNEL LONGITUDINAL TRAPEZE STIFFENER

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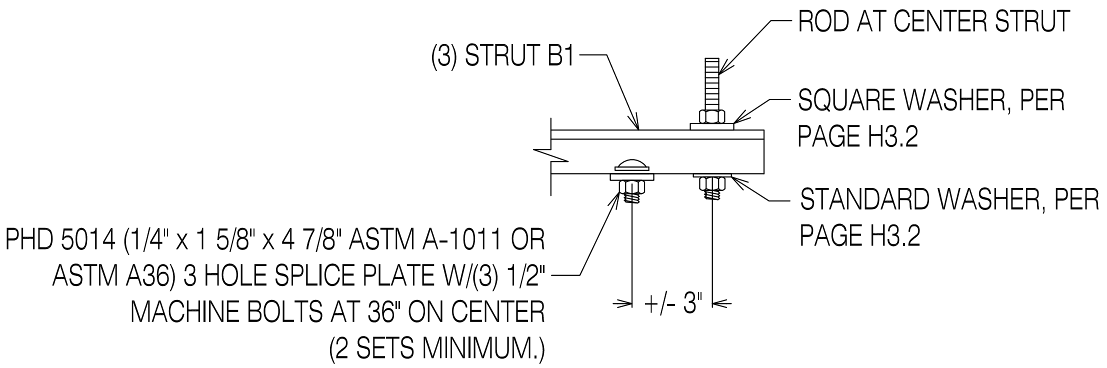
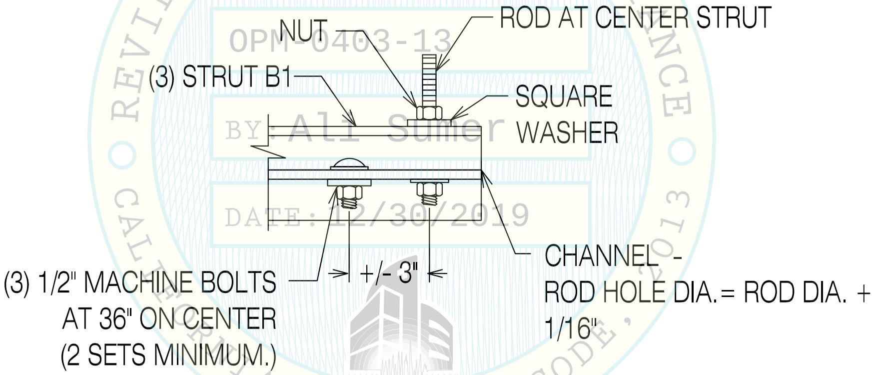


TRIPLE B1 WITH SPLICE PLATE CONNECTOR
FOR USE WITH PAGE G3.3



TRIPLE B1 WITH CHANNEL REINFORCEMENT
FOR USE WITH PAGE G3.4

# TRAPEZE LONGITUDINAL REINFORCEMENT OPTIONS

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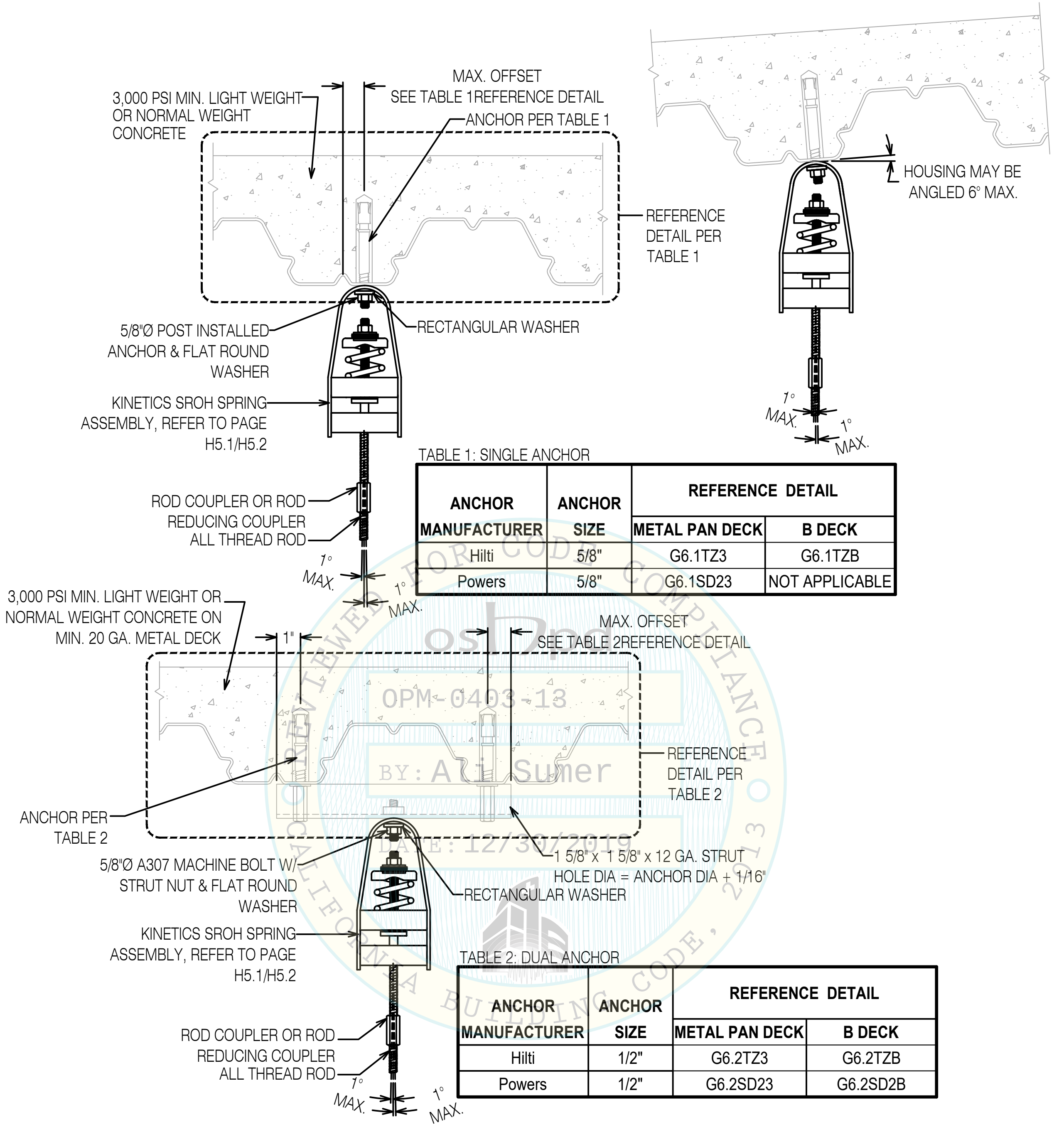

TABLE 1: SINGLE ANCHOR

| ANCHOR MANUFACTURER | ANCHOR SIZE | REFERENCE DETAIL | |
|---|---|---|---|
| | | METAL PAN DECK | B DECK |
| Hilti | 5/8" | G6.1TZ3 | G6.1TZB |
| Powers | 5/8" | G6.1SD23 | NOT APPLICABLE |

TABLE 2: DUAL ANCHOR

| ANCHOR MANUFACTURER | ANCHOR SIZE | REFERENCE DETAIL | |
|---|---|---|---|
| | | METAL PAN DECK | B DECK |
| Hilti | 1/2" | G6.2TZ3 | G6.2TZB |
| Powers | 1/2" | G6.2SD23 | G6.2SD2B |

1. OVER STRENGTH FACTOR Ω = 2.0 PER ASCE 7-10, TABLE 13.6-1 IS INCLUDED FOR ANCHORAGE TO CONCRETE. WHEN DESIGNING ANCHOR AS SHOWN Ω MUST BE TAKEN INTO ACCOUNT IN DETERMINING THE FINAL DESIGN SPRING HANGER AND/OR ROD TENSION (TYPICAL FOR OVERTURNING ACTION OF SUSPENDED EQUIPMENT OR DUCT.)
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-1917 OR ESR-2502.
3. MAX. DESIGN RATING IS THE LESSER OF THE LOAD CAPACITY BASED ON REFERENCE DETAIL PER TABLE OR THE SEISMIC LOAD RATING OF HANGER BOX (PAGE H5.1/H5.2).
4. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
5. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
6. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.
7. SEE PAGE H5.1 & H5.2 FOR HANGER BOX DETAILS.

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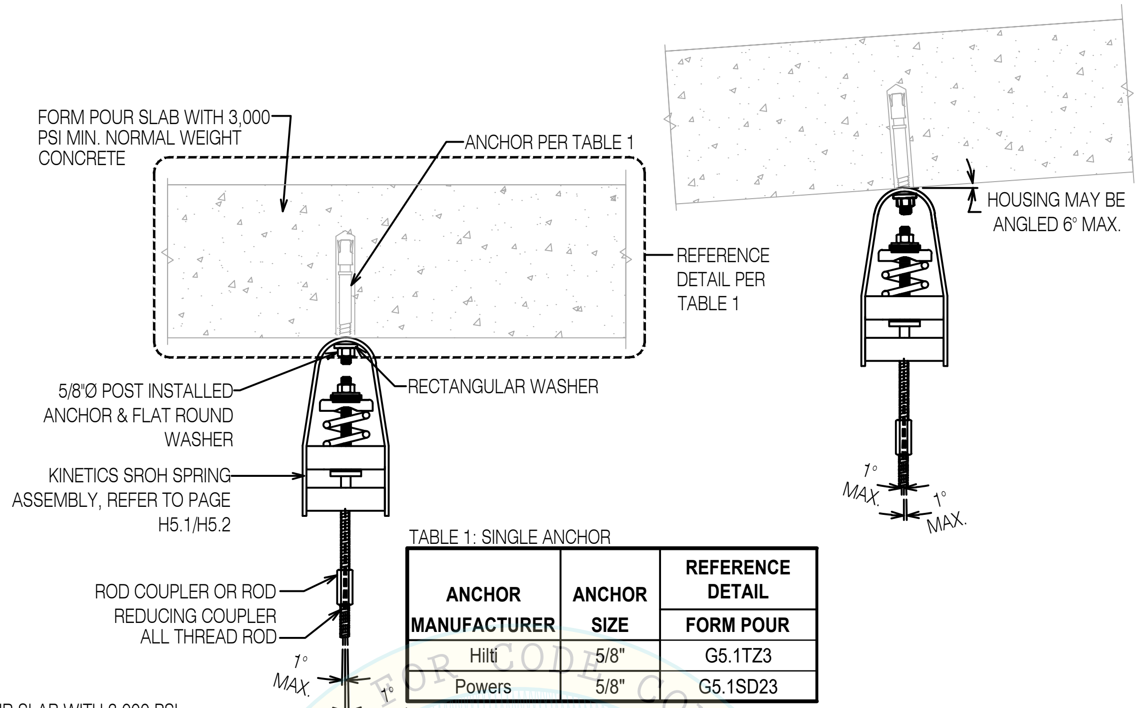

TABLE 1: SINGLE ANCHOR

| ANCHOR MANUFACTURER | ANCHOR SIZE | REFERENCE DETAIL<br>FORM POUR |
|---|---|---|
| Hilti | 5/8" | G5.1TZ3 |
| Powers | 5/8" | G5.1SD23 |

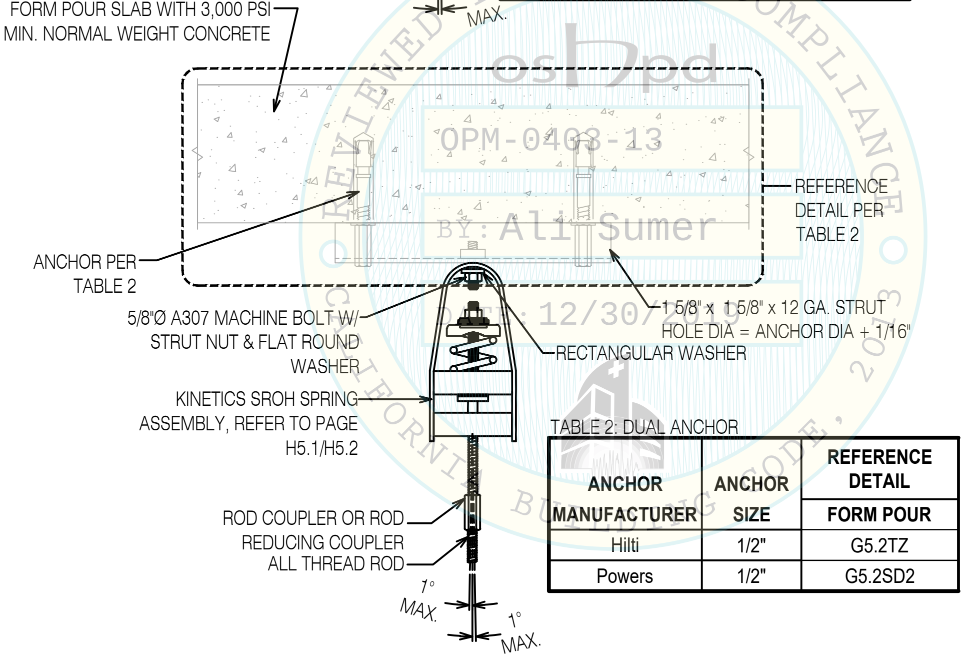

TABLE 2: DUAL ANCHOR

| ANCHOR MANUFACTURER | ANCHOR SIZE | REFERENCE DETAIL<br>FORM POUR |
|---|---|---|
| Hilti | 1/2" | G5.2TZ |
| Powers | 1/2" | G5.2SD2 |

1. OVER STRENGTH FACTOR Ω = 2.0 PER ASCE 7-10, TABLE 13.6-1 IS INCLUDED FOR ANCHORAGE TO CONCRETE. WHEN DESIGNING ANCHOR AS SHOWN Ω MUST BE TAKEN INTO ACCOUNT IN DETERMINING THE FINAL DESIGN SPRING HANGER AND/OR ROD TENSION (TYPICAL FOR OVERTURNING ACTION OF SUSPENDED EQUIPMENT OR DUCT.)
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-1917 OR ESR-2502.
3. MAX. DESIGN RATING IS THE LESSER OF THE LOAD CAPACITY BASED ON REFERENCE DETAIL PER TABLE OR THE SEISMIC LOAD RATING OF HANGER BOX (PAGE H5.1/H5.2).
4. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
5. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
6. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.
7. SEE PAGE H5.1 & H5.2 FOR HANGER BOX DETAILS.

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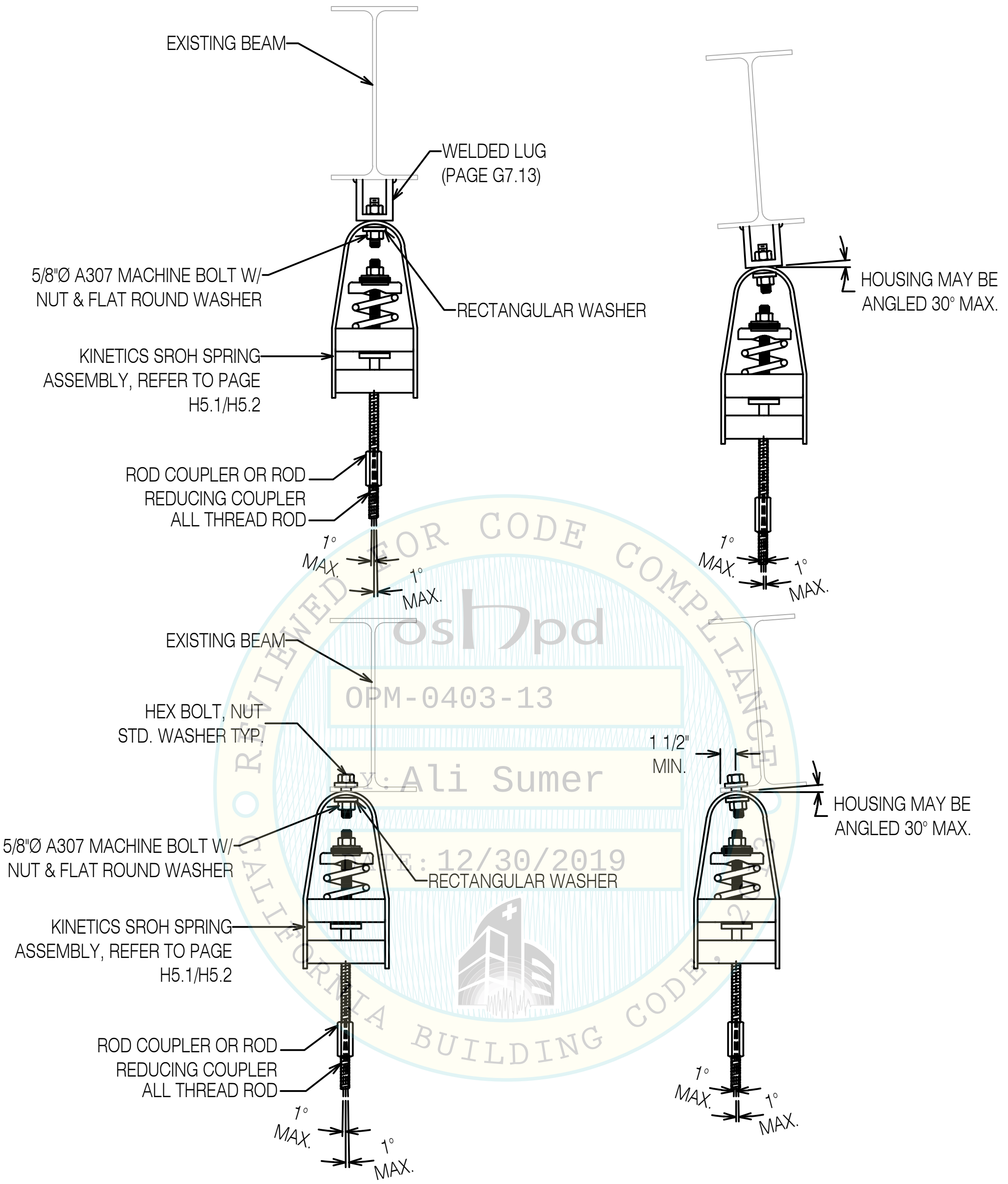

1. MAX. DESIGN RATING IS THE LESSER OF THE LOAD CAPACITY BASED ON REFERENCE DETAIL PER TABLE OR THE SEISMIC LOAD RATING OF HANGER BOX (PAGE H5.1/H5.2).
2. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
3. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.
4. SEE PAGE H5.1 & H5.2 FOR HANGER BOX DETAILS.

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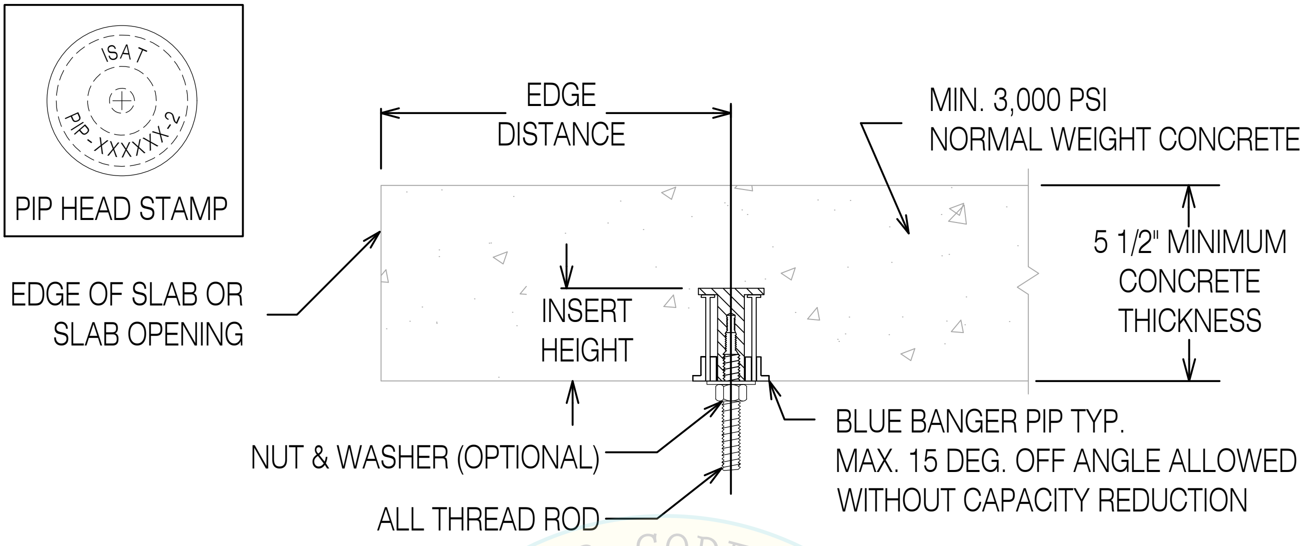

**Blue Banger Hanger Poured-In-Place (PIP) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table 1**

| Deck Insert Part No. 4 | All Thread Rod Dia. See Page H1 or H1.1 For Design Values Inch | Maximum Tension Value At Minimum Concrete Strength | | | | Nominal Insert Height Inch | Minimum Edge Distance Inch | Minimum Spacing Inch |
|---|---|---|---|---|---|---|---|---|
| | | 3,000 psi Lbs | 4,000 psi Lbs | 5,000 psi Lbs | 6,000 psi Lbs | | | |
| PIP143812-2 | 1/4, 3/8, 1/2 | 1,380 | 1,594 | 1,782 | 1,952 | 2 | 6 | 6 |
| PIP381258-2 | 3/8, 1/2, 5/8 | 1,468 | 1,695 | 1,895 | 2,076 | | | |
| PIP5834-2 | 5/8, 3/4 | 1,380 | 1,594 | 1,782 | 1,952 | | | |
| | 7/8, 1 w/ Rod Coupler | | | | | | | |

1. VALUES SHOWN ARE EXCLUSIVE OF THREADED ROD CAPACITY.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
4. SEE PAGES F10.1 THROUGH F10.3.

# SINGLE BLUE BANGER HANGER PIP INSERT VERTICAL SUPPORT CONNECTION

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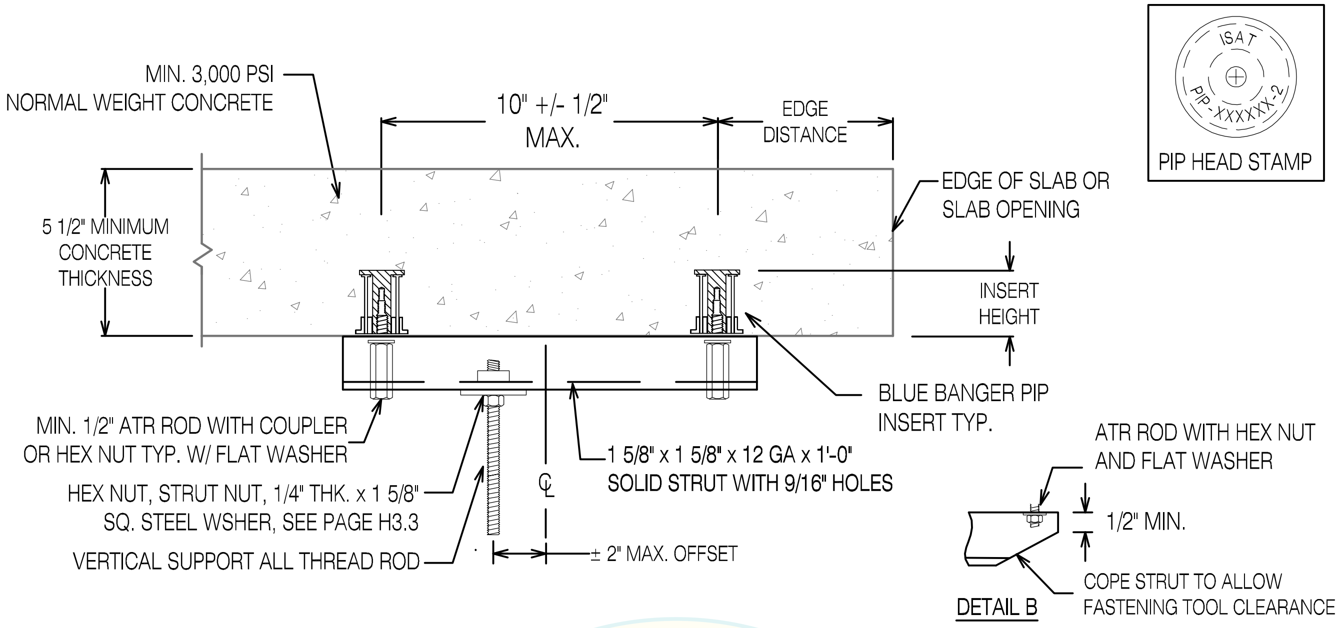

**Blue Banger Hanger Poured-In-Place (PIP) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table 1**

| Deck Insert Part No. 7 | Two Anchor Connection Tension Design Value Lbs. 1, 2, 3 Vertical Support Rod Max. Offset From C. L. | | | Nominal Insert Height | Minimum Edge Distance |
|---|---|---|---|---|---|
| | C.L. ± 0" | C.L. ± 1" | C.L. ± 2" | Inch | Inch |
| PIP143812-2 | 1,901 | 1,973 | 1,834 | 2 | 6 |
| PIP381258-2 | | | | | |
| PIP5834-2 [4] | | | | | |

1. VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD) AND ARE EXCLUSIVE OF THREADED ROD CAPACITY.
2. CAPACITIES ARE THE SAME FOR ALL CONCRETE STRENGTHS > 3,000 PSI.
3. MAINTAIN 6" MINIMUM SPACING BETWEEN ADJACENT PAIRS OF INSERTS
4. USE DETAIL "B".
5. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
6. SEE PAGES F10.1 THROUGH F10.3.
7. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL BLUE BANGER HANGER PIP INSERT VERTICAL SUPPORT CONNECTION

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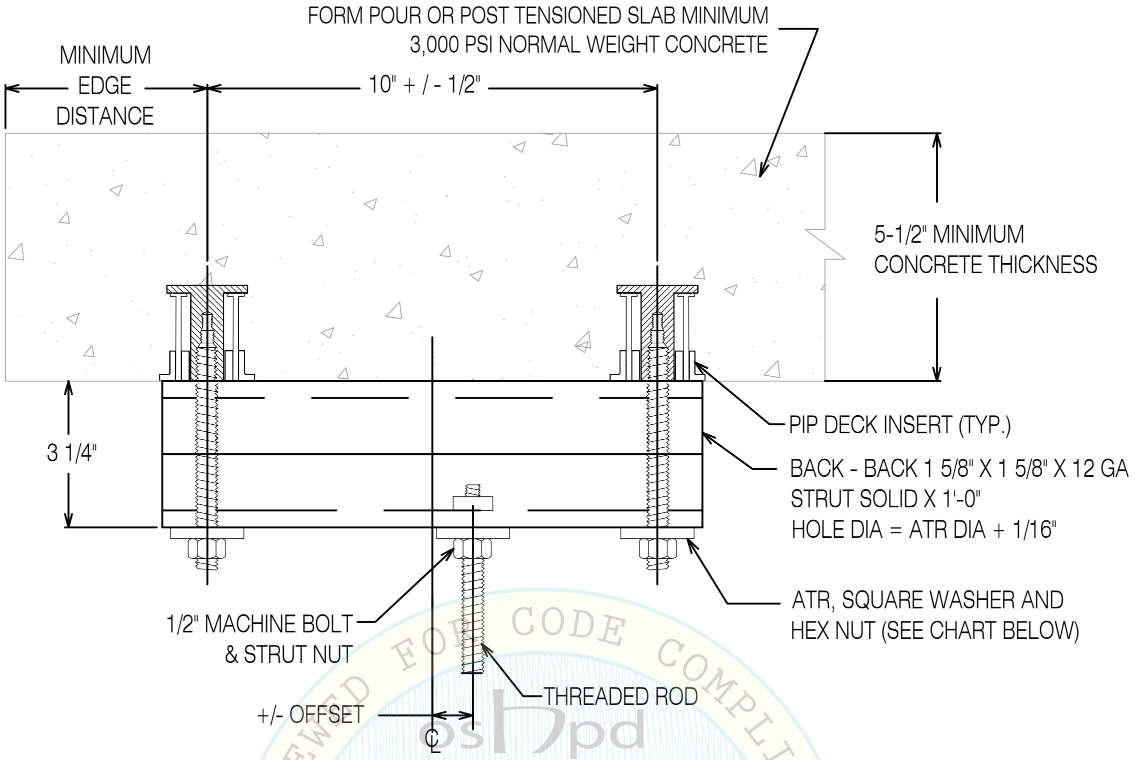

**Blue Banger Hanger Poured-In-Place (PIP) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table 1**

| | | | | Vertical Support Rod Max. Offset From C.L. | | | | |
|---|---|---|---|---|---|---|---|---|
| **Deck Insert Part No.** [7] | **All Thread Rod Diameter (ATR) Inch** | **Minimum Edge Distance Inch** | **Minimum Distance Between Inserts Inch** | **C.L.+/-0" Tension Design Value Lbs** | **C.L.+/-1" Tension Design Value Lbs** [5] | **C.L.+/-2" Tension Design Value Lbs** [5] | **C.L.+/-3" Tension Design Value Lbs** [5] | **C.L.+/- 4" Tension Design Value Lbs** [5] |
| PIP 143812 | 1/2 | 6 | 9 | 2,607 | 2,153 | 1,834 | 1,598 | 1,415 |
| PIP 381258 | 1/2 | 6 | 9 | 2,720 | 2,247 | 1,914 | 1,667 | 1,477 |

1. VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD) AND ARE EXCLUSIVE OF THREADED ROD CAPACITY.
2. CAPACITIES ARE THE SAME FOR ALL CONCRETE STRENGTHS > 3,000 PSI.
3. MAY BE LIMITED BY ROD STRENGTH, PAGE H1 OR STRUT NUT PULL-OUT STRENGTH, PAGE H3.2.
4. MAINTAIN 6" MINIMUM SPACING BETWEEN ADJACENT PAIRS OF INSERTS
5. SEE PAGES F10.1 THROUGH F10.3.
6. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING
7. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL BLUE BANGER HANGER PIP INSERT VERTICAL SUPPORT CONNECTION

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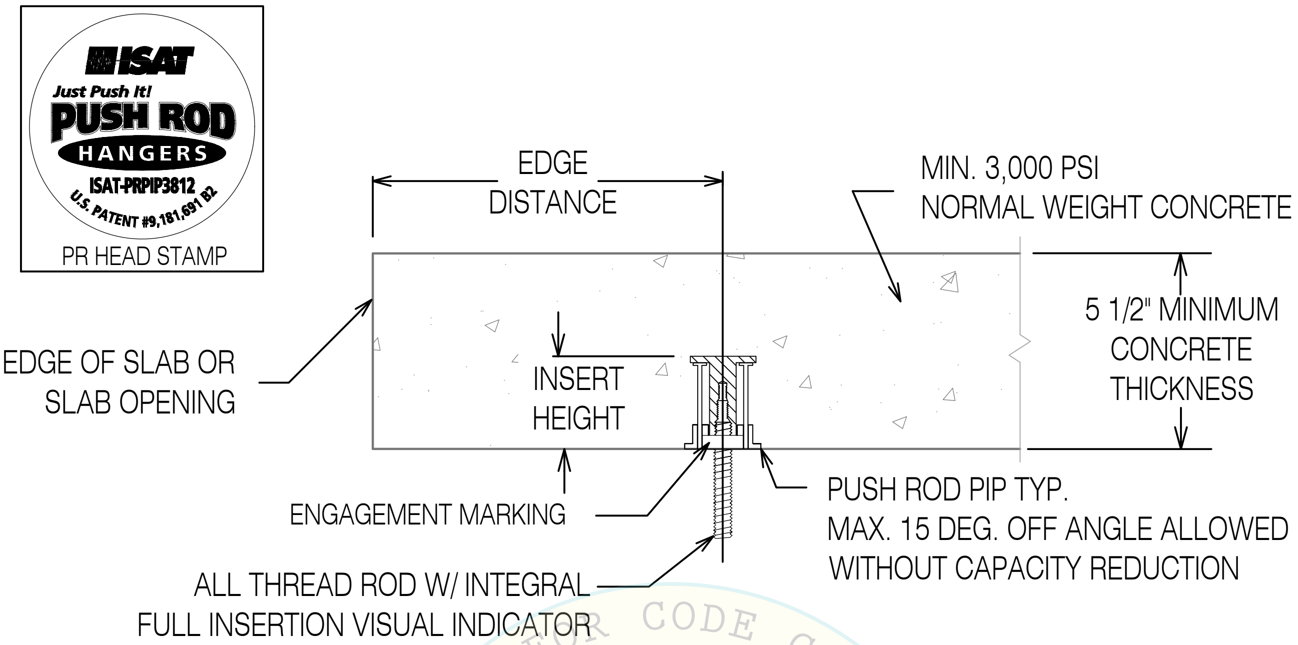

**Push Rod Poured-In-Place (PRPIP) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November 2017), Table 2A**

| Deck Insert Part No. [5] | All Thread Rod Dia. (ATR) [1] Inch | Maximum Tension Value At Minimum Concrete Strength [4] | | | | Nominal Insert Height Inch | Minimum Edge Distance Inch | Minimum Spacing Inch |
|---|---|---|---|---|---|---|---|---|
| | | 3,000 psi Lbs | 4,000 psi Lbs | 5,000 psi Lbs | 6,000 psi Lbs | | | |
| PRPIP3812 | 3/8 | 1,468 | 1,695 | 1,895 | 1,979 | 2 | 6 | 6 |
| PRPIP3812 | 1/2 | | | | | | | |

1. ISAT SUPPLIED ALL THREAD ROD REQUIRED WITH INTEGRAL "FULL INSERTION VISUAL INDICATOR".
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
4. ALL THREAD ROD CAPACITY INDEPENDENT OF INSERT VALUE. DESIGNER SHALL CHECK ATR CAPACITIES.
5. SEE PAGE F10.0

# SINGLE BLUE BANGER HANGER PIP INSERT VERTICAL SUPPORT CONNECTION

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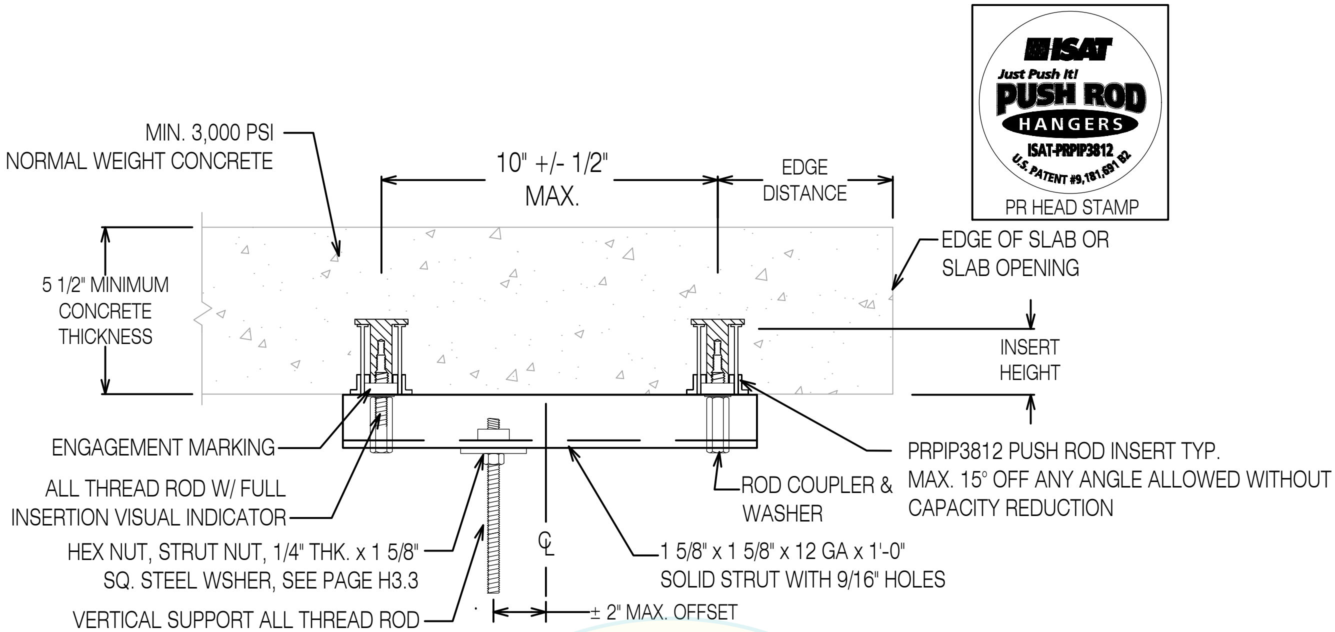

**Push Rod Poured-In-Place (PRPIP) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November 2017), Table 2A**

| Deck Insert Part No. [6] | All Thread Rod Dia (ATR) Inch [5] | Two Anchor Connection Tension Design Value Lbs.[1, 2, 3] Vertical Support Rod Max. Offset From C. L. | | | Nominal Insert Height Inch | Minimum Edge Distance Inch |
|---|---|---|---|---|---|---|
| | | C.L. ± 0" | C.L. ± 1" | C.L. ± 2" | | |
| PRPIP3812 | 3/8 | 1,901 | 1,973 | 1,914 | 2 | 6 |
| PRPIP3812 | 1/2 | | | | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
2. CAPACITIES ARE THE SAME FOR ALL CONCRETE STRENGTHS ≥ 3,000 PSI.
3. MAINTAIN 6" MINIMUM SPACING BETWEEN ADJACENT PAIRS OF INSERTS
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. ISAT SUPPLIED ALL THREAD ROD REQUIRED WITH INTEGRAL "FULL INSERTION VISUAL INDICATOR".
6. SEE PAGE F10.0

# DUAL PUSH ROD (PRPIP) INSERT VERTICAL SUPPORT CONNECTION

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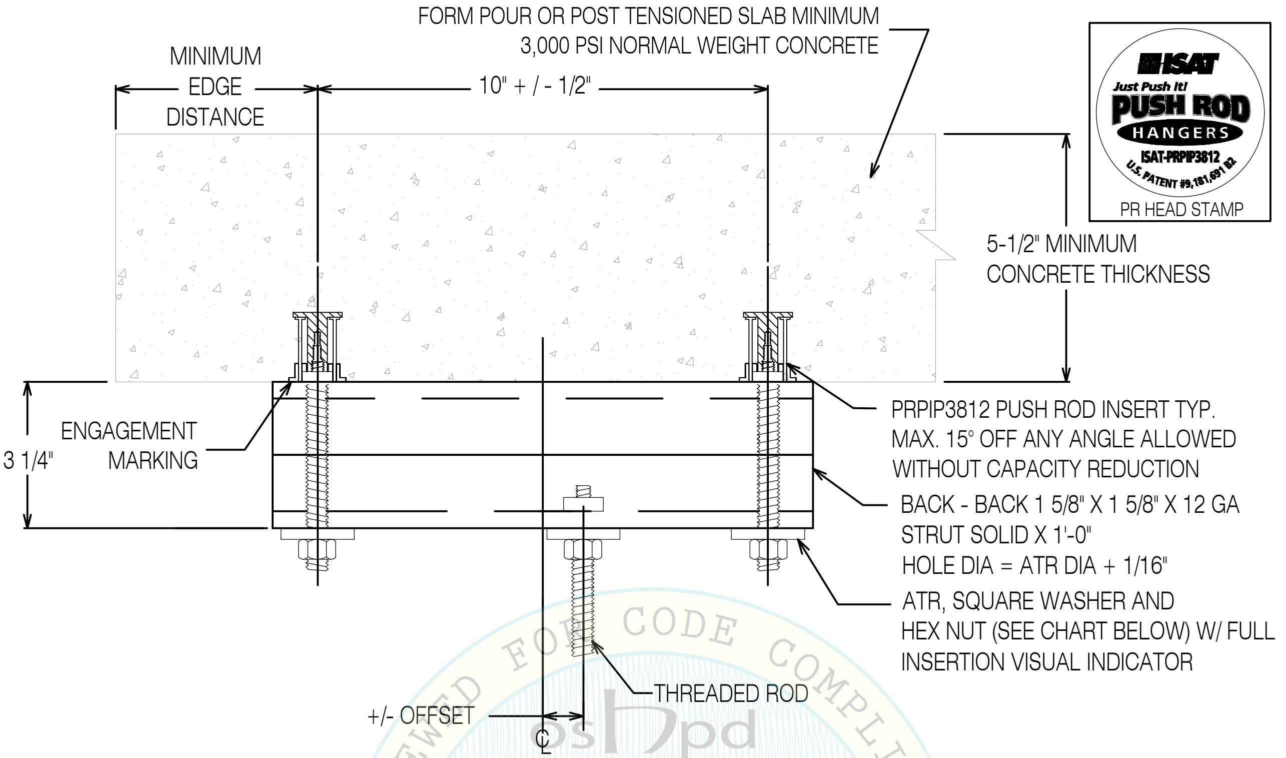

**Push Rod Poured-In-Place (PRPIP) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November 2017), Table 2A**

| Deck Insert Part No.[7] | All Thread Rod Dia (ATR) Inch[6] | Minimum Edge Distance Inch | Minimum Distance Between Inserts Inch | Vertical Support Rod Max. Offset From C.L. | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | C.L.+/-0" Tension Design Value Lbs | C.L.+/-1" Tension Design Value Lbs | C.L.+/-2" Tension Design Value Lbs | C.L.+/-3" Tension Design Value Lbs | C.L.+/- 4" Tension Design Value Lbs |
| PRPIP3812 | 3/8 | 6 | 9 | 2,720 | 2,247 | 1,914 | 1,667 | 1,477 |
| PRPIP3812 | 1/2 | 6 | 9 | | | | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
2. CAPACITIES ARE THE SAME FOR ALL CONCRETE STRENGTHS ≥ 3,000 PSI.
3. MAY BE LIMITED BY ROD STRENGTH, PAGE H1 OR STRUT NUT PULL-OUT STRENGTH, PAGE H3.3.
4. MAINTAIN 6" MINIMUM SPACING BETWEEN ADJACENT PAIRS OF INSERTS
5. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
6. ISAT SUPPLIED ALL THREAD ROD REQUIRED WITH INTEGRAL "FULL INSERTION VISUAL INDICATOR".
7. SEE PAGE F10.0

# DUAL PUSH ROD (PRPIP) INSERT VERTICAL SUPPORT CONNECTION

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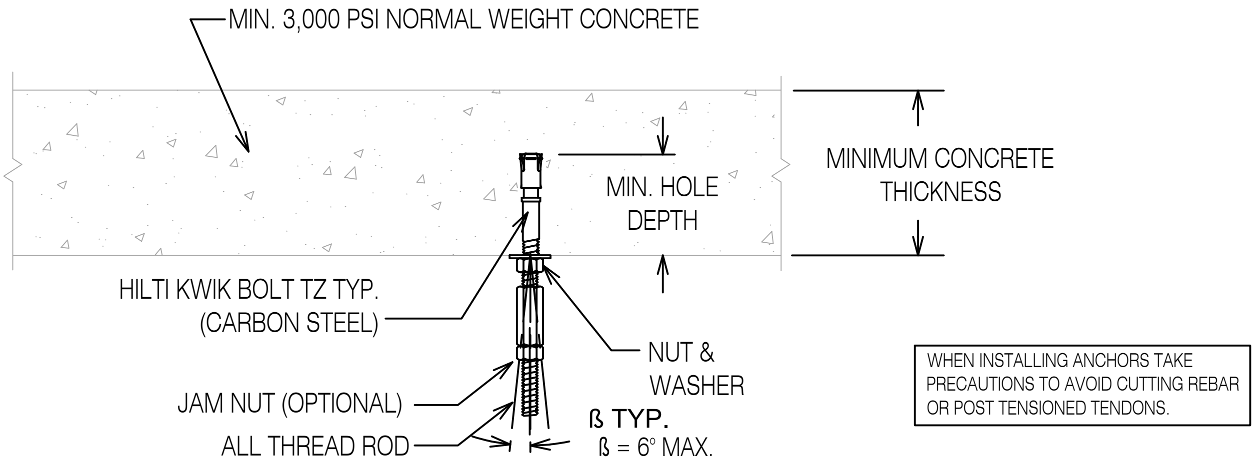

WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Anchor Diameter Inch | Tension Value 3 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|
| 3/8 | 944 | 2 5/8 | 2 | 4 | 25 | 4 1/2 | 6 |
| 1/2 | 1,000 | 2 5/8 | 2 | 4 | 40 | 4 1/2 | 6 |
| 1/2 | 2,044 | 4 | 3 1/4 | 6 | 40 | 6 1/2 | 9 3/4 |
| 5/8 | 1,953 | 3 3/4 | 3 1/8 | 5 | 60 | 6 1/2 | 9 3/8 |
| 5/8 | 2,828 | 4 3/4 | 4 | 6 | 60 | 8 3/4 | 12 |
| 3/4 | 2,567 | 4 1/2 | 3 3/4 | 6 | 110 | 12 | 11 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE HILTI KWIK BOLT TZ ANCHOR VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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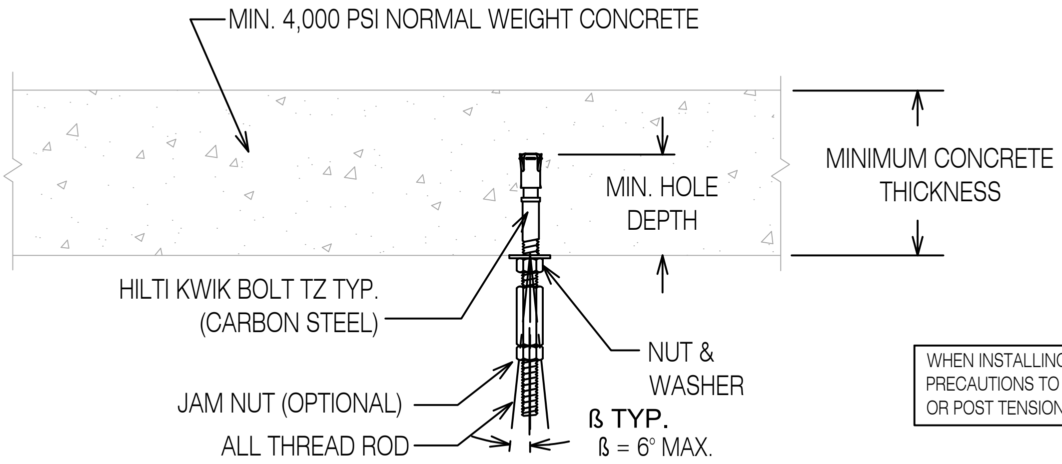

WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Anchor Diameter Inch | Tension Value 4 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|
| 3/8 | 1,090 | 2 5/8 | 2 | 4 | 25 | 4 1/2 | 6 |
| 1/2 | 1,155 | 2 5/8 | 2 | 4 | 40 | 4 1/2 | 6 |
| 1/2 | 2,361 | 4 | 3 1/4 | 6 | 40 | 6 1/2 | 9 3/4 |
| 5/8 | 2,255 | 3 3/4 | 3 1/8 | 5 | 60 | 6 1/2 | 9 3/8 |
| 5/8 | 3,266 | 4 3/4 | 4 | 6 | 60 | 8 3/4 | 12 |
| 3/4 | 2,965 | 4 1/2 | 3 3/4 | 6 | 110 | 12 | 11 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE HILTI KWIK BOLT TZ ANCHOR
# VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

ANTHONY A. RUBALCAVA
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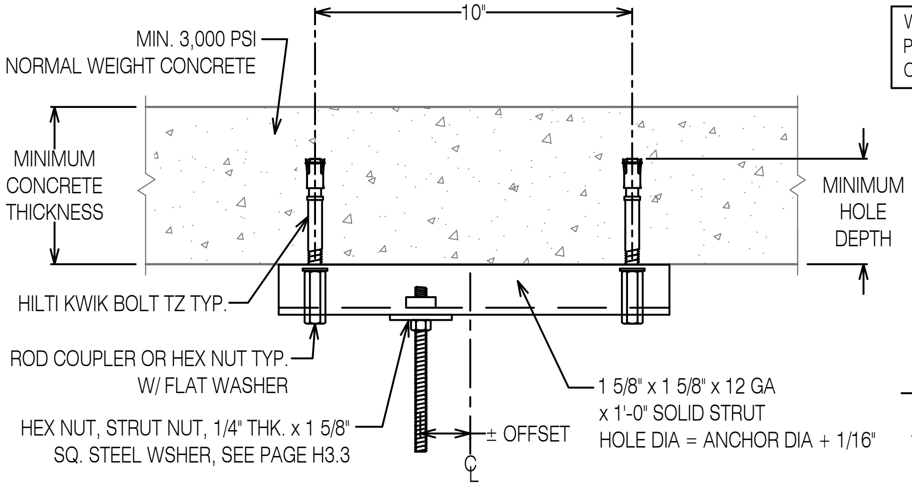
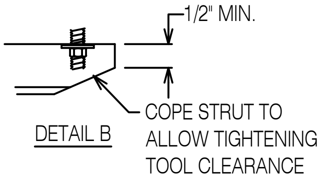
WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.





DETAIL B

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Anchor Diameter | Two Anchor Connection Tension Design Value Lbs. [2, 4, 5] Vertical Support Rod Max. Offset From C.L. | | | | | Minimum Hole Depth | Minimum Effective Embed.[1] | Minimum Concrete Thickness | Installation Torque | Minimum Edge Distance | Minimum Anchor Spacing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inch | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | Inch | Inch | Inch | Ft-Lbs. | Inch | Inch |
| 3/8 | 1,888 | 1,574 | 1,349 | 1,180 | 1,049 | 2 5/8 | 2 | 4 | 25 | 4 1/2 | 6 |
| 1/2 | 1,996 | 1,667 | 1,429 | 1,250 | 1,111 | 2 5/8 | 2 | 4 | 40 | 4 1/2 | 6 |
| 1/2 | 1,996 | 2,079 | 2,376 | 2,555 | 2,271 | 4 | 3 1/4 | 6 | 40 | 6 1/2 | 9 3/4 |
| 5/8 [3] | 1,996 | 2,079 | 2,376 | 3,119 | 2,881 | 4 3/4 | 4 | 6 | 60 | 8 3/4 | 12 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
3. USE DETAIL B.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL ANCHOR HILTI KWIK BOLT TZ
# VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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S 4710

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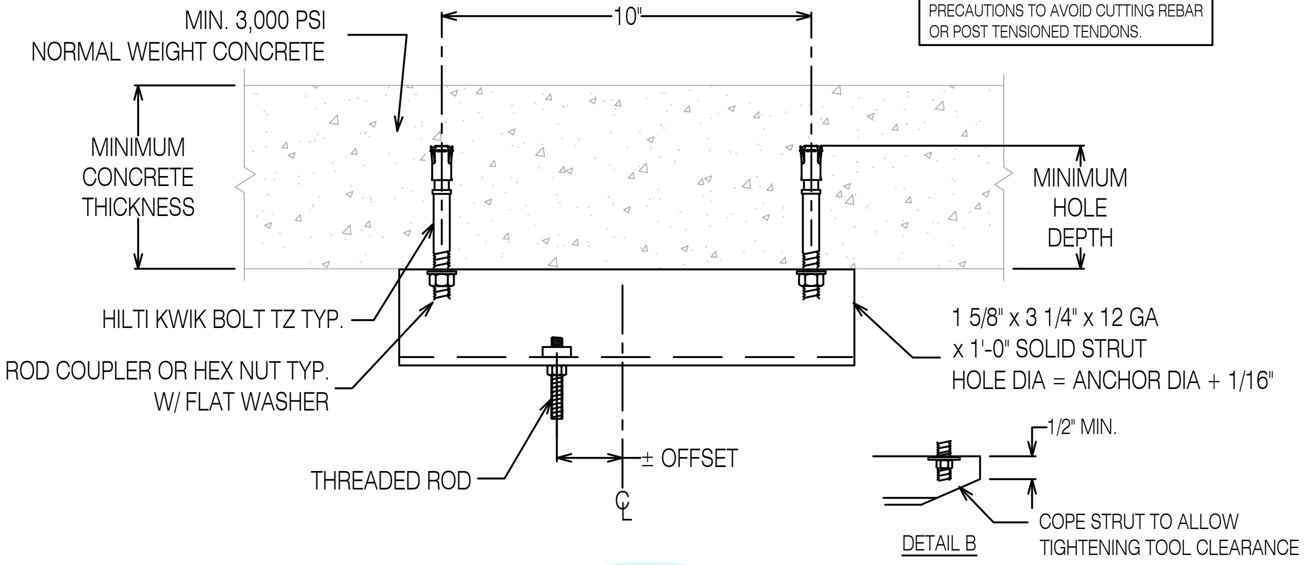
WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.



**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Anchor Diameter Inch | Two Anchor Connection | | | | | Minimum Hole Depth | Minimum Effective Embed.[1] | Minimum Concrete Thickness | Installation Torque | Minimum Edge Distance | Minimum Anchor Spacing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tension Design Value Lbs.[2, 4, 5] Vertical Support Rod Max. Offset From C.L. | | | | | | | | | | |
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | Inch | Inch | Inch | Ft-Lbs. | Inch | Inch |
| 1/2 | 3,250 | 3,250 | 2,920 | 2,555 | 2,271 | 4 | 3 1/4 | 6 | 40 | 6 1/2 | 9 3/4 |
| 5/8[3] | 3,250 | 3,250 | 3,250 | 3,241 | 2,881 | 4 3/4 | 4 | 6 | 60 | 8 3/4 | 12 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
3. USE DETAIL B.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL ANCHOR HILTI KWIK BOLT TZ WITH 1 5/8" x 3 1/4" STRUT VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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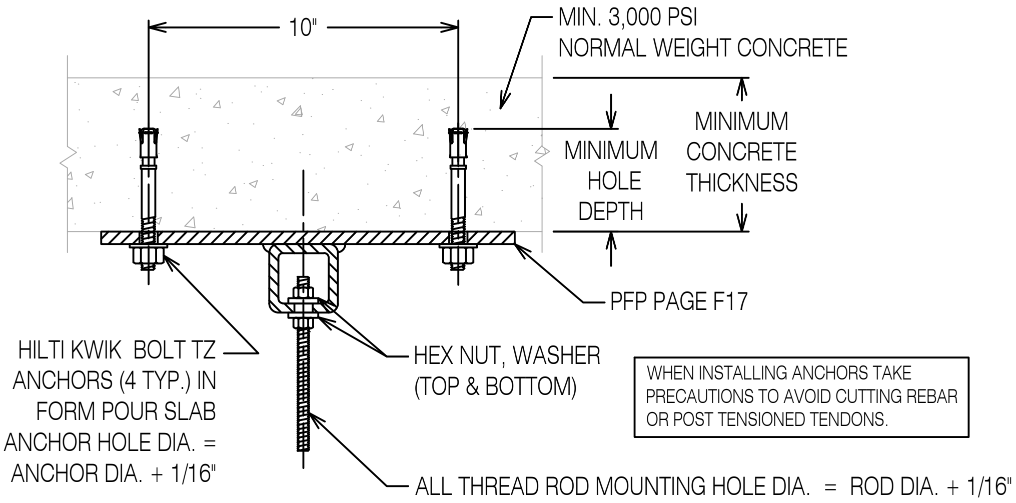

WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 3**

| Anchor Diameter Inch | Maximum Vertical Load Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Plate Number Page F17 | Maximum Rod Diameter Inch |
|---|---|---|---|---|---|---|---|---|
| 3/8 | 2,340 | 2 5/8 | 2 | 4 | 25 | 4 1/2 | G535 | 5/8 |
| 1/2 | 3,500 | 2 5/8 | 2 | 4 | 40 | 4 1/2 | G545 | 3/4 |
| 1/2 | 4,860 | 4 | 3 1/4 | 6 | 40 | 6 1/2 | G546 | 7/8 |
| 5/8 | 5,536 | 4 3/4 | 4 | 6 | 60 | 8 3/4 | G547 | 1 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# 4 - ANCHOR HILTI KWIK BOLT TZ VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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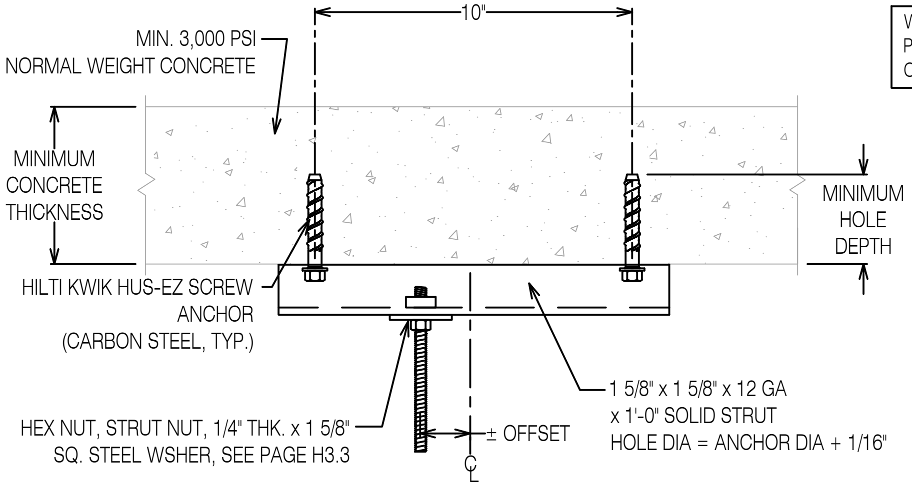
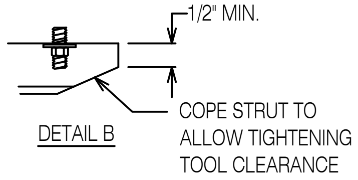
WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.





DETAIL B

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 2, 3 and 4**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs. [2, 4, 5] Vertical Support Rod Max. Offset From C.L. | | | | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Max. Impact Wrench Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | | | | | | |
| 1/4 | 445 | 371 | 318 | 278 | 247 | 2 | 1.18 | 3 1/4 | 114 | 4.00 | 6.75 |
| 3/8 | 603 | 503 | 431 | 377 | 335 | 1 7/8 | 1.11 | 3 1/4 | 114 | 4.00 | 6.75 |
| 1/2 | 1,325 | 1,104 | 946 | 828 | 736 | 2 5/8 | 1.52 | 4 1/2 | 137 | 2.75 | 6.75 |
| 1/2 | 1,996 | 2,079 | 2,376 | 2,553 | 2,270 | 4 5/8 | 3.22 | 6 3/4 | 450 | 5.25 | 9.66 |
| 5/8 [3] | 1,996 | 2,079 | 2,376 | 3,119 | 2,791 | 5 3/8 | 3.88 | 7 | 450 | 5.82 | 11.64 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
3. USE DETAIL B.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL ANCHOR HILTI HUS-EZ SCREW ANCHOR VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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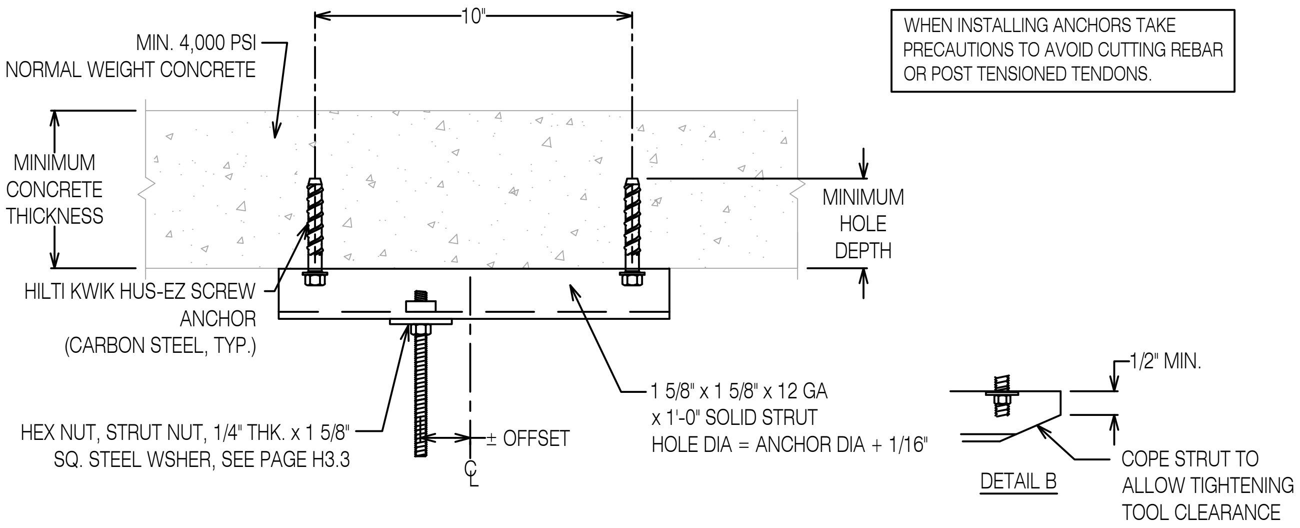

WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 2, 3 and 4**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs. [2, 4, 5] Vertical Support Rod Max. Offset From C.L. CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Max. Impact Wrench Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/4 | 514 | 428 | 367 | 321 | 285 | 2 | 1.18 | 3 1/4 | 114 | 4.00 | 6.75 |
| 3/8 | 696 | 580 | 497 | 435 | 387 | 1 7/8 | 1.11 | 3 1/4 | 114 | 4.00 | 6.75 |
| 1/2 | 1,530 | 1,275 | 1,093 | 956 | 850 | 2 5/8 | 1.52 | 4 1/2 | 137 | 2.75 | 6.75 |
| 1/2 | 1,996 | 2,079 | 2,376 | 2,948 | 2,621 | 4 5/8 | 3.22 | 6 3/4 | 450 | 5.25 | 9.66 |
| 5/8 [3] | 1,996 | 2,079 | 2,376 | 3,119 | 3,222 | 5 3/8 | 3.88 | 7 | 450 | 5.82 | 11.64 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
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5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL ANCHOR HILTI HUS-EZ SCREW ANCHOR VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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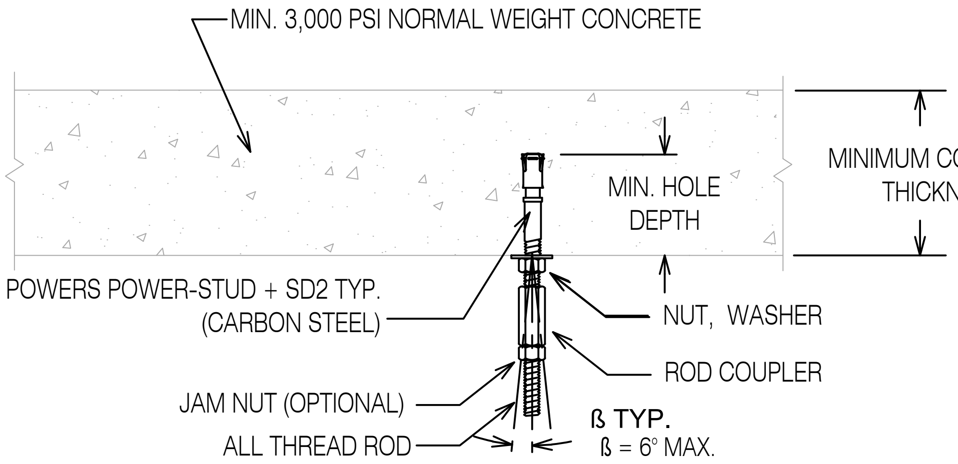

WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Anchor Diameter Inch | Tension Value 3 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|
| 3/8 | 874 | 2 5/8 | 2 | 4 | 20 | 4 1/2 | 6 |
| 1/2 | 1,000 | 2 3/4 | 2 | 4 1/2 | 40 | 4 1/2 | 6 |
| 1/2 | 1,820 | 4 | 3 1/4 | 5 3/4 | 40 | 6 1/2 | 9 3/4 |
| 5/8 | 2,071 | 4 1/4 | 3 1/4 | 5 3/4 | 60 | 6 1/2 | 9 3/4 |
| 5/8 | 3,098 | 5 1/4 | 4 1/4 | 6 1/2 | 60 | 8 3/4 | 12 3/4 |
| 3/4 | 2,567 | 5 | 3 3/4 | 7 | 110 | 12 | 11 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE POWERS POWER-STUD+ SD2 ANCHOR VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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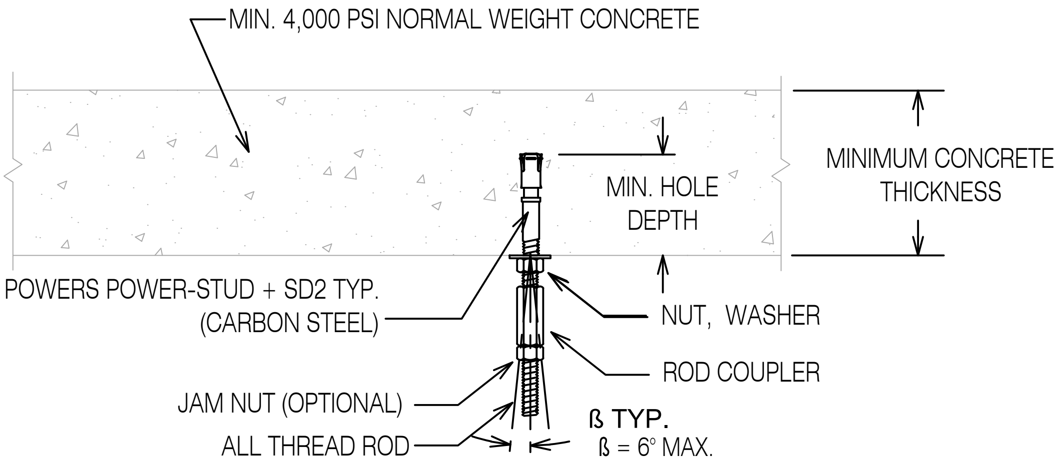

WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Anchor Diameter Inch | Tension Value 4 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|
| 3/8 | 961 | 2 5/8 | 2 | 4 | 20 | 4 1/2 | 6 |
| 1/2 | 1,155 | 2 3/4 | 2 | 4 1/2 | 40 | 4 1/2 | 6 |
| 1/2 | 2,101 | 4 | 3 1/4 | 5 3/4 | 40 | 6 1/2 | 9 3/4 |
| 5/8 | 2,392 | 4 1/4 | 3 1/4 | 5 3/4 | 60 | 6 1/2 | 9 3/4 |
| 5/8 | 3,577 | 5 1/4 | 4 1/4 | 6 1/2 | 60 | 8 3/4 | 12 3/4 |
| 3/4 | 2,965 | 5 | 3 3/4 | 7 | 110 | 12 | 11 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
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# SINGLE POWERS POWER-STUD+ SD2 ANCHOR VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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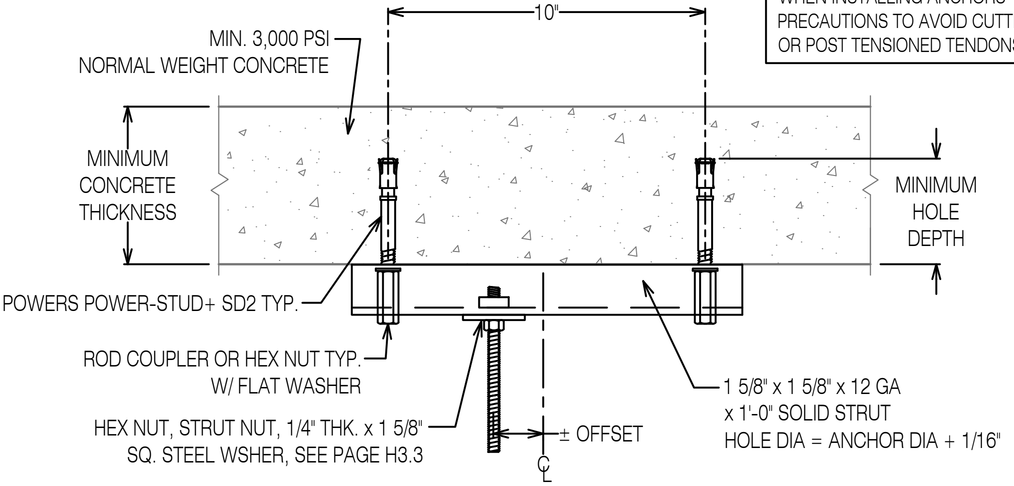
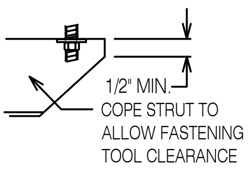
WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.





DETAIL B

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2018), Table 1, Table 3 and Table 4**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs.[2, 4, 5] Vertical Support Rod Max. Offset From C.L. | | | | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | | | | | | |
| 3/8 | 1,747 | 1,456 | 1,248 | 1,092 | 971 | 2 5/8 | 2 | 4 | 20 | 4 1/2 | 6 |
| 1/2 | 1,996 | 1,667 | 1,429 | 1,250 | 1,111 | 2 3/4 | 2 | 4 1/2 | 40 | 4 1/2 | 6 |
| 1/2 | 1,996 | 2,079 | 2,376 | 2,275 | 2,022 | 4 | 3 1/4 | 5 3/4 | 40 | 6 1/2 | 9 3/4 |
| 5/8[3] | 1,996 | 2,079 | 2,376 | 3,119 | 3,071 | 5 1/4 | 4 1/4 | 6 1/2 | 60 | 8 3/4 | 12 3/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
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5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL ANCHOR POWERS POWER-STUD+ SD2 VERTICAL SUPPORT CONNECTIONTO FORM POUR SLAB

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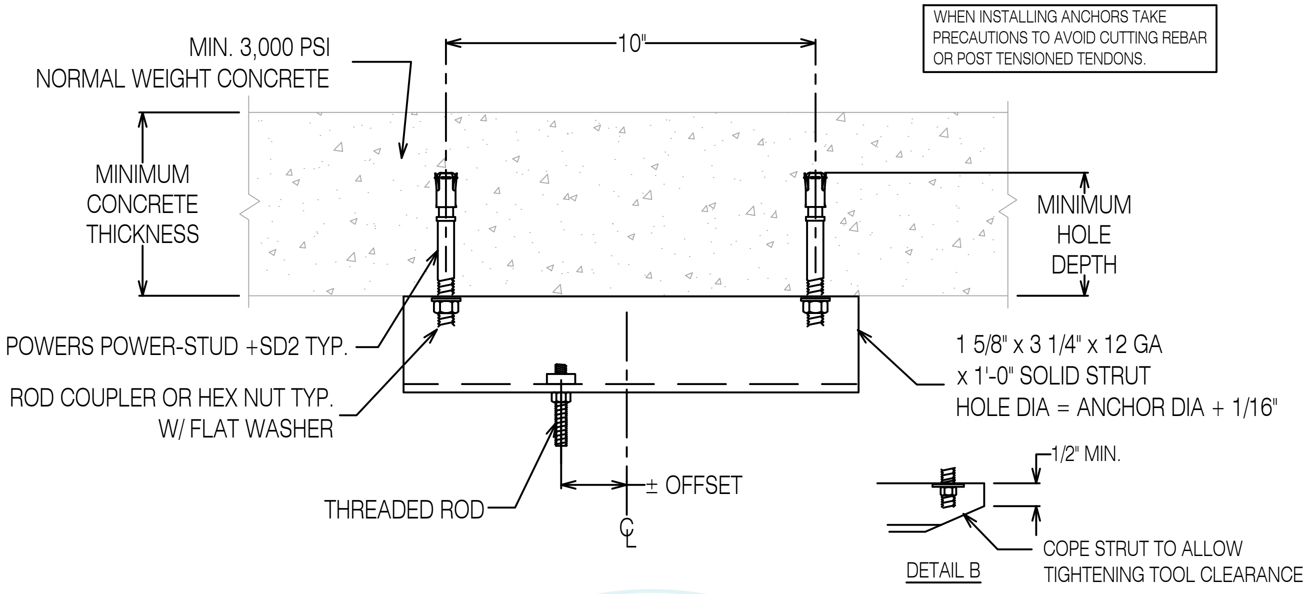

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2018), Table 1, Table 3 and Table 4**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs. [2, 4, 5] Vertical Support Rod Max. Offset From C.L. | | | | | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | | | | | | |
| 1/2 | 3,250 | 3,033 | 2,600 | 2,275 | 2,022 | 4 | 3 1/4 | 5 3/4 | 40 | 6 1/2 | 9 3/4 |
| 5/8 [3] | 3,250 | 3,250 | 3,250 | 3,250 | 3,071 | 5 1/4 | 4 1/4 | 6 1/2 | 60 | 8 3/4 | 12 3/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
3. USE DETAIL B.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL ANCHOR POWERS POWER-STUD +SD2
# WITH 1 5/8" x 3 1/4" STRUT
# VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

ANTHONY A. RUBALCAVA
S 4710

ISAT
A Division of Tomarco Contractor Specialties

**International Seismic Application Technology**
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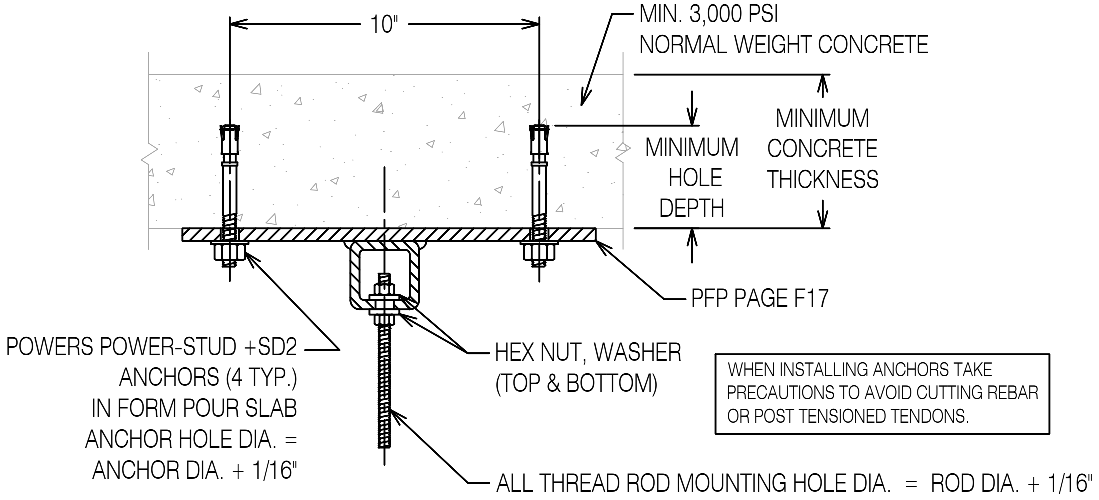

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 3 and Table 4**

| Anchor Diameter Inch | Maximum Vertical Load Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Minimum Concrete Thickness Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Plate Number Page F17 | Maximum Rod Diameter Inch |
|---|---|---|---|---|---|---|---|---|
| 3/8 | 2,340 | 2 5/8 | 2 | 4 | 20 | 4 1/2 | G535 | 5/8 |
| 1/2 | 3,500 | 2 3/4 | 2 | 4 1/2 | 40 | 4 1/2 | G545 | 3/4 |
| 1/2 | 4,860 | 4 | 3 1/4 | 5 3/4 | 40 | 6 1/2 | G546 | 7/8 |
| 5/8 | 5,536 | 5 1/4 | 4 1/4 | 6 1/2 | 60 | 8 3/4 | G547 | 1 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# 4 - ANCHOR POWERS POWER-STUD +SD2 VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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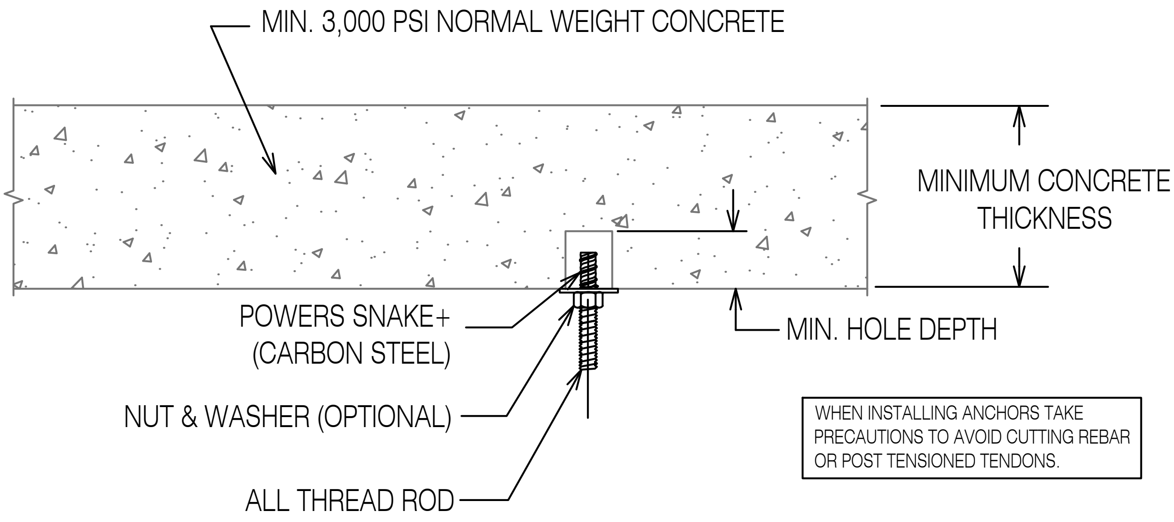

WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.

## SINGLE ANCHOR VERTICAL SUPPORT CONNECTION DETAILS

**Normal Weight Concrete (Minimum 3,000 psi)**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Powers Snake+ Concrete Screw Anchor**
**ICC Report No. ESR-2272 (Dated Dec. 2016), Table 1.**
**Special Inspection Required By Manufacturer's ICC Report**

| Anchor Diameter Inch | Tension Design Value Lbs. | Minimum Hole Depth [1] Inch | Minimum Effective Embedment [2] Inch | Minimum Concrete Thickness Inch | Minimum Anchor Spacing Inch | Edge Distance Inch | Screwdriver Installation Max. Torque Ft-Lbs. | Rod or Bolt Installation Max. Torque Ft-Lbs. |
|---|---|---|---|---|---|---|---|---|
| 3/8 | 408 | 2 | 1 1/8 | 4 | 3 | 3 | 345 | 8 |

1. MINIMUM HOLE DEPTH IS TO BE VERIFIED BY THE INSPECTOR.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND.
THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.

# SINGLE POWERS SNAKE+
# VERTICAL SUPPORT CONNECTION

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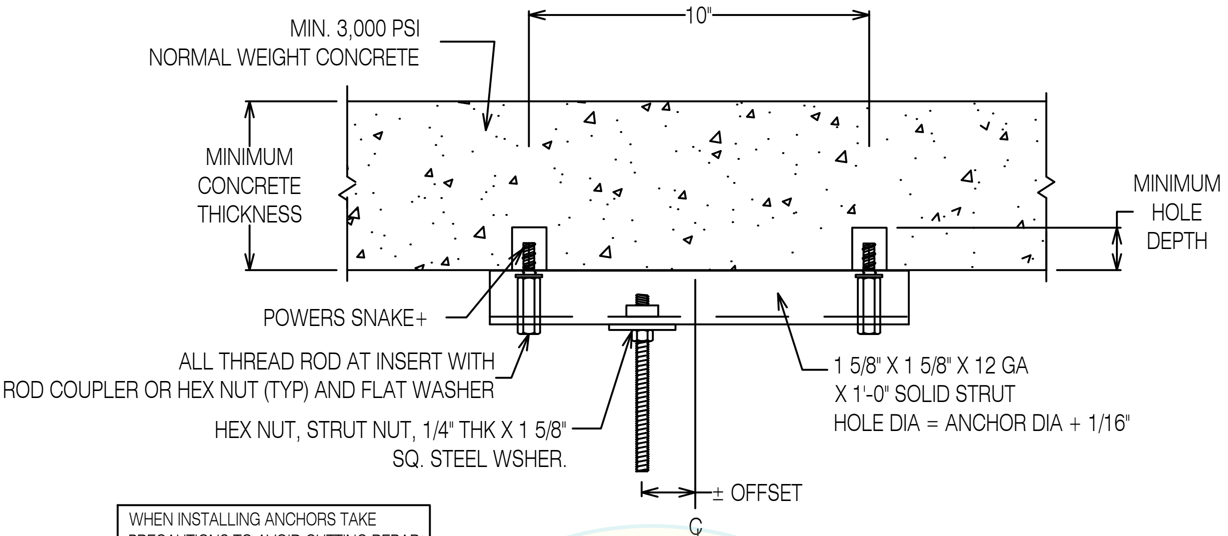

WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.

ALL COMPONENTRY FROM ISAT APPROVED MANUFACTURERS. SEE PAGE H3.3.

**DUAL ANCHOR VERTICAL SUPPORT CONNECTION DETAILS**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Powers Snake+ Concrete Screw Anchor**
**ICC Report No. ESR-2272 (Dated Dec. 2016), Table 1**
**Special Inspection Required by Manufacturer's ICC Report**

| Anchor Diameter Inch | Minimum Hole Depth [1] Inch | Minimum Effective Embedment [2] Inch | Minimum Concrete Thickness Inch | Screwdriver Installation Max. Torque Ft-Lbs. | Rod or Bolt Installation Max. Torque Ft-Lbs. | Minimum Anchor Spacing Inch | Edge Distance Inch | Two Anchor Connection Tension Design Value Lbs. Vertical Support Rod Max. Offset From C.L. CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 2 | 1 1/8 | 4 | 345 | 8 | 3 | 3 | 816 | 680 | 583 | 510 | 453 |

1. MINIMUM HOLE DEPTH IS TO BE VERIFIED BY THE INSPECTOR.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND.
THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.

# DUAL ANCHOR POWERS SNAKE+ VERTICAL SUPPORT CONNECTION

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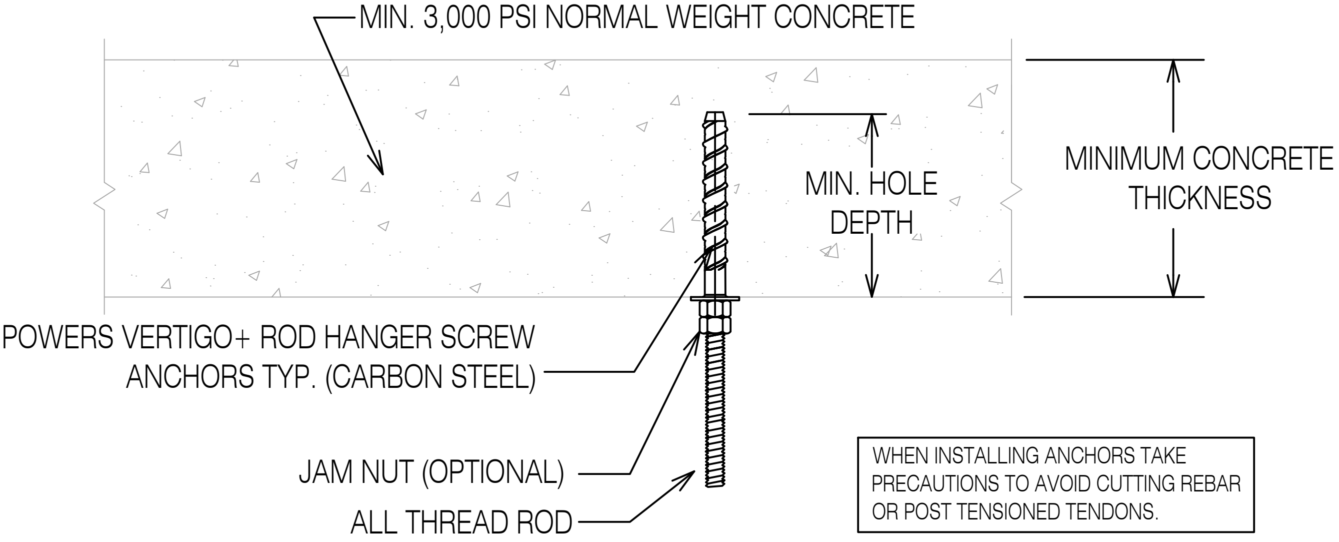

WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.

**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Vertigo+ Screw Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2526 (Dated June 2016), Table 4, 5 and 6**

| Anchor Diameter Inch | Tension Value 3 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Minimum Concrete Thickness Inch | Max. Impact Wrench Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|
| 1/4 | 451 | 2 1/2 | 1.425 | 3 1/2 | 185 | 4 | 6 3/4 |
| 3/8 | 451 | 2 1/2 | 1.425 | 3 1/2 | 185 | 2 3/4 | 6 3/4 |
| 1/2 | 451 | 2 1/2 | 1.425 | 3 1/2 | 185 | 5 1/4 | 6 3/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE POWERS VERTIGO+ ROD HANGER SCREW ANCHOR VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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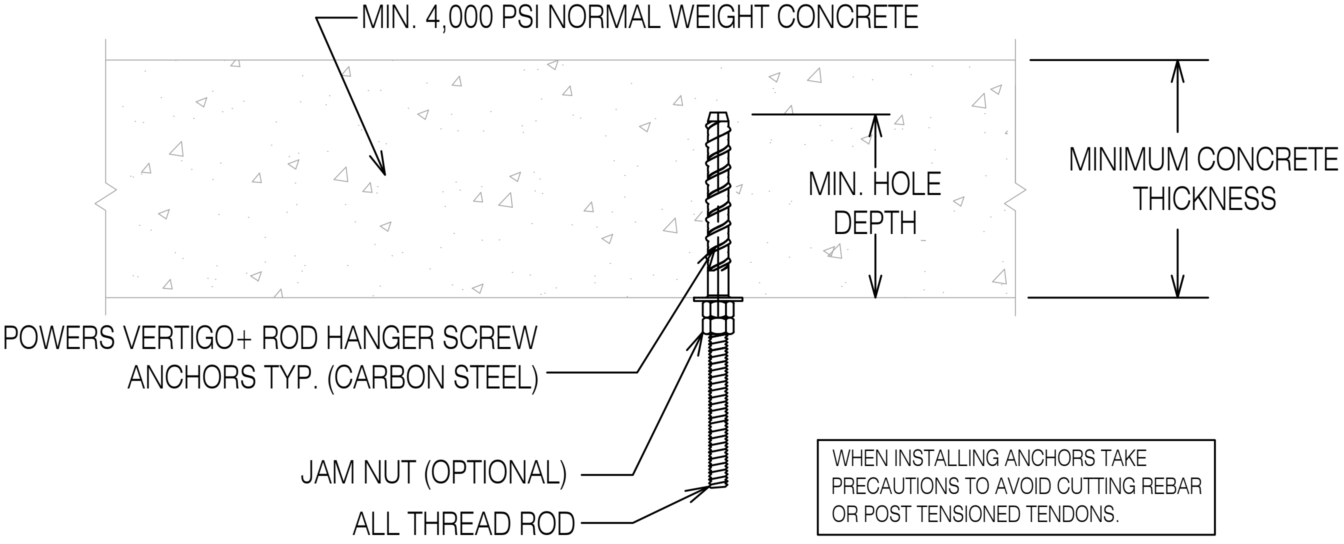

WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.

**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Vertigo+ Screw Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-2526 (Dated June 2016), Table 4, 5 and 6**

| Anchor Diameter Inch | Tension Value 4 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Minimum Concrete Thickness Inch | Max. Impact Wrench Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|
| 1/4 | 521 | 2 1/2 | 1.425 | 3 1/2 | 185 | 4 | 6 3/4 |
| 3/8 | 521 | 2 1/2 | 1.425 | 3 1/2 | 185 | 2 3/4 | 6 3/4 |
| 1/2 | 521 | 2 1/2 | 1.425 | 3 1/2 | 185 | 5 1/4 | 6 3/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE POWERS VERTIGO+ ROD HANGER SCREW ANCHOR VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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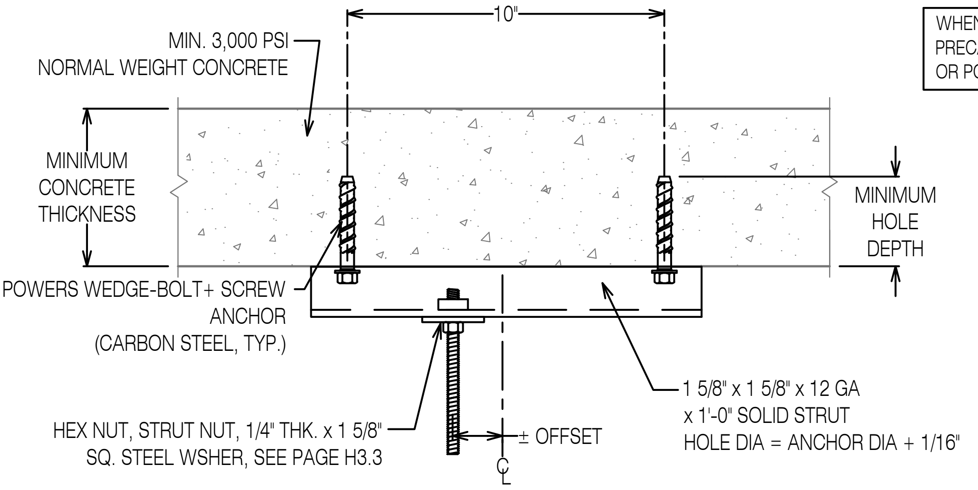
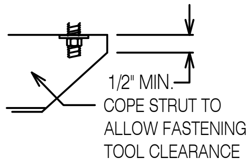
WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.





DETAIL B

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 3000 psi NWC**
**ICC Report No. ESR-2526 (Dated June 2018), Table 1, 2 and 3**

| Anchor Diameter | Two Anchor Connection Tension Design Value Lbs. [2, 4, 5] Vertical Support Rod Max. Offset From C.L. | | | | | Minimum Hole Depth | Minimum Effective Embed.[1] | Minimum Concrete Thickness | Max. Impact Wrench Torque | Minimum Edge Distance | Minimum Anchor Spacing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inch | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | Inch | Inch | Inch | Ft-Lbs. | Inch | Inch |
| 3/8 | 903 | 752 | 645 | 564 | 501 | 2 1/4 | 1.43 | 3 1/2 | 245 | 4.00 | 6.75 |
| 1/2 | 1,123 | 936 | 802 | 702 | 624 | 2 3/4 | 1.65 | 4 | 300 | 2.75 | 6.75 |
| 1/2 | 1,996 | 1,747 | 1,497 | 1,310 | 1,165 | 4 | 2.50 | 6 | 300 | 5.25 | 7.50 |
| 5/8 [3] | 1,996 | 2,079 | 2,376 | 2,230 | 1,983 | 5 | 3.10 | 7 | 350 | 5.82 | 9.30 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
3. USE DETAIL B.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL ANCHOR POWERS WEDGE-BOLT+ SCREW ANCHOR VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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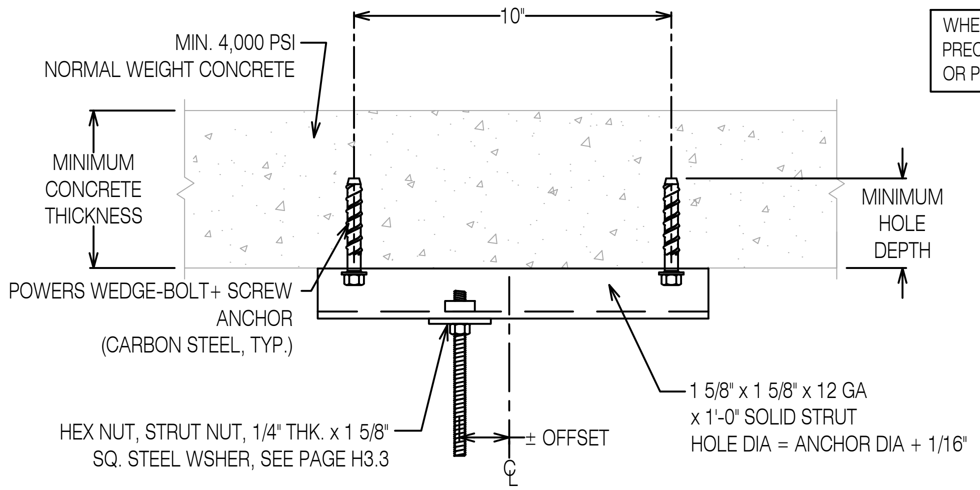
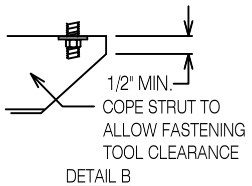
WHEN INSTALLING ANCHORS TAKE PRECAUTIONS TO AVOID CUTTING REBAR OR POST TENSIONED TENDONS.





DETAIL B

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 4000 psi NWC**
**ICC Report No. ESR-2526 (Dated June 2018), Table 1, 2 and 3**

| Anchor Diameter | Two Anchor Connection Tension Design Value Lbs. [2, 4, 5] Vertical Support Rod Max. Offset From C.L. | | | | | Minimum Hole Depth | Minimum Effective Embed.[1] | Minimum Concrete Thickness | Max. Impact Wrench Torque | Minimum Edge Distance | Minimum Anchor Spacing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inch | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | Inch | Inch | Inch | Ft-Lbs. | Inch | Inch |
| 3/8 | 1,042 | 868 | 744 | 651 | 579 | 2 1/4 | 1.43 | 3 1/2 | 245 | 4.00 | 6.75 |
| 1/2 | 1,297 | 1,081 | 926 | 810 | 720 | 2 3/4 | 1.65 | 4 | 300 | 2.75 | 6.75 |
| 1/2 | 1,996 | 2,017 | 1,729 | 1,513 | 1,345 | 4 | 2.50 | 6 | 300 | 5.25 | 7.50 |
| 5/8 [3] | 1,996 | 2,079 | 2,376 | 2,575 | 2,289 | 5 | 3.10 | 7 | 350 | 5.82 | 9.30 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
3. USE DETAIL B.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL ANCHOR POWERS WEDGE-BOLT+ SCREW ANCHOR VERTICAL SUPPORT CONNECTION TO FORM POUR SLAB

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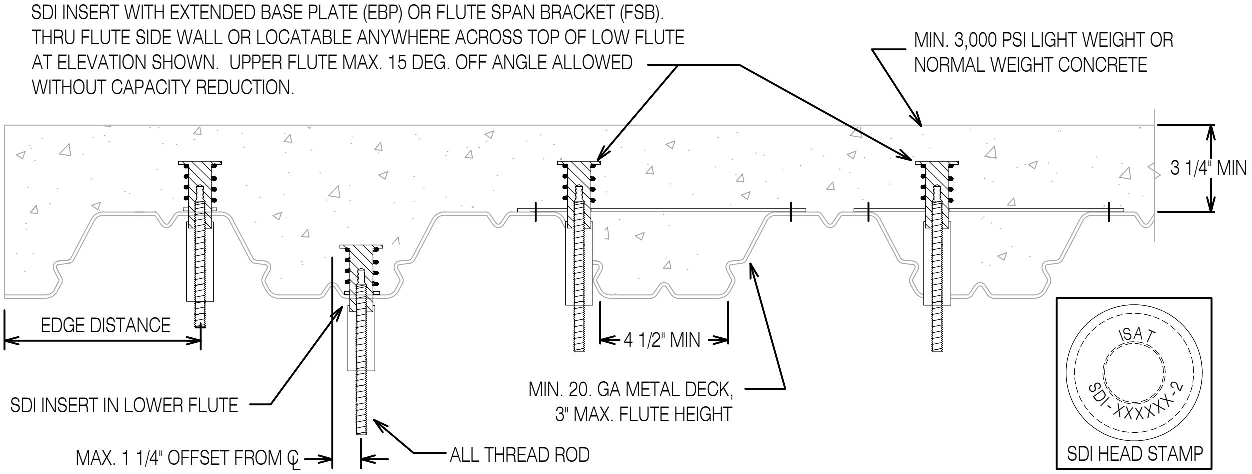

**Blue Banger Hanger Steel Deck Insert (SDI) And SDI With Extended Base Plate (EBP)**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Form Pour Slab, Minimum 3,000 psi NWC**
**ICC Report No. ESR-3599 (November, 2017), Table 2**

| Deck Insert Part No. | All Thread Rod Dia. See Page H1 or H1.1 For Design Values Inch | Maximum Tension Value (Lbs) At Minimum Concrete Strength | | | | Nominal Insert Height Inch | Minimum Edge Distance Inch | Minimum Spacing Inch |
|---|---|---|---|---|---|---|---|---|
| | | 3,000 psi | | 4,000 psi | | | | |
| | | Lower Flute | Upper Flute | Lower Flute | Upper Flute | | | |
| SDI143812 | 1/4, 3/8, 1/2 | 802 | 1,498 | 926 | 1,729 | 2 | 6 | 6 |
| SDI381258 | 3/8, 1/2, 5/8 | | | | | | | |
| SDI5834 | 5/8, 3/4 | | | | | | | |
| | 7/8, 1 w/ Rod Coupler | | | | | | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
2. SPACING MEASURED ALONG LENGTH OF FLUTE. EDGE DISTANCE PERPENDICULAR TO DIRECTION SHOWN (END DISTANCE) SHALL BE 6 INCHES.
3. MAXIMUM ALL THREAD ROD AT THE INSERT IS 3/4". USE REDUCING ROD COUPLING FOR LARGER VERTICAL SUPPORT ROD DIAMETERS
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. FOR BOTTOM FLUTE WIDTHS < 4-1/2", CONTACT ISAT TECHNICAL SERVICE.

# SINGLE BLUE BANGER HANGER SDI INSERT VERTICAL SUPPORT CONNECTION

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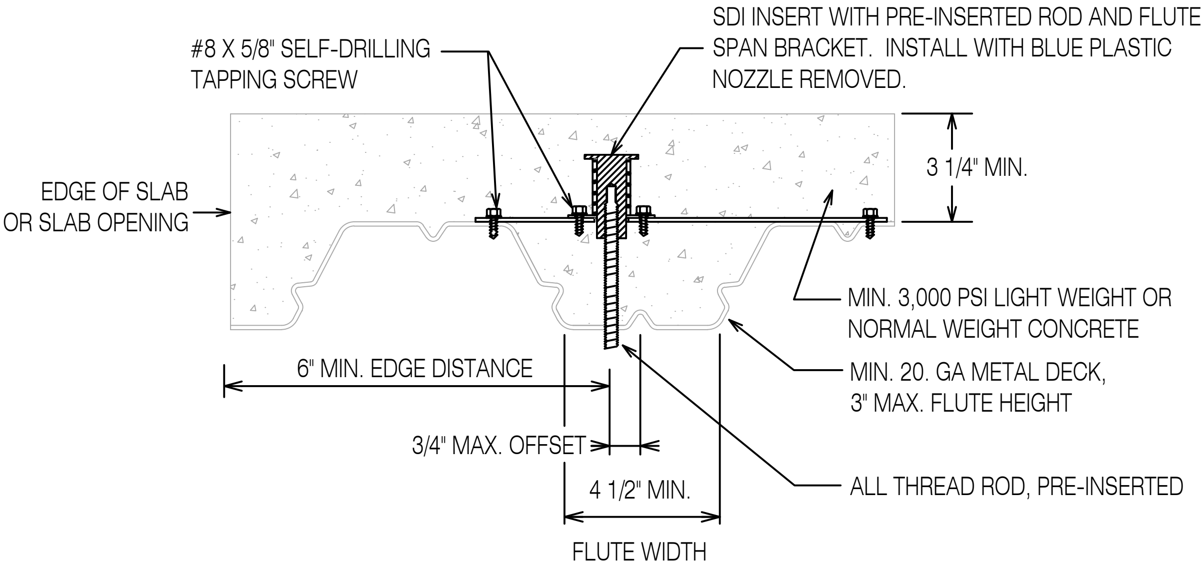

**Blue Banger Hanger Steel Deck Insert (SDI) And SDI With Flute Span Bracket (FSB)**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**

| Deck Insert Part No. | All Thread Rod Dia. See Page H1 or H1.1 For Design Values Inch | 12" Spacing Lbs. | 10" Spacing Lbs. | 9" Spacing Lbs. | 8" Spacing Lbs. | 7" Spacing Lbs. | 6" Spacing Lbs. | 5" Spacing Lbs. |
|---|---|---|---|---|---|---|---|---|
| SDI143812 | 1/4, 3/8, 1/2 | 3,812 | 3,298 | 3,041 | 2,784 | 2,527 | 2,270 | 2,014 |
| SDI381258 | 3/8, 1/2, 5/8 | | | | | | | |
| SDI5834 | 5/8, 3/4 | | | | | | | |
| | 7/8, 1 w/ Rod Coupler | | | | | | | |

1. VALUES SHOWN ARE EXCLUSIVE OF THREADED ROD CAPACITY.
2. SPACING MEASURED ALONG LENGTH OF FLUTE. EDGE DISTANCE PERPENDICULAR TO DIRECTION SHOWN (END DISTANCE) SHALL BE 6 INCHES.
3. MAXIMUM ATR AT THE INSERT IS 3/4". USE A REDUCING ROD COUPLING FOR LARGER VERTICAL SUPPORT ROD DIAMETERS.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE BLUE BANGER HANGER SDI INSERT WITH EXTENDED BASE PLATE (EBP) VERTICAL SUPPORT CONNECTION

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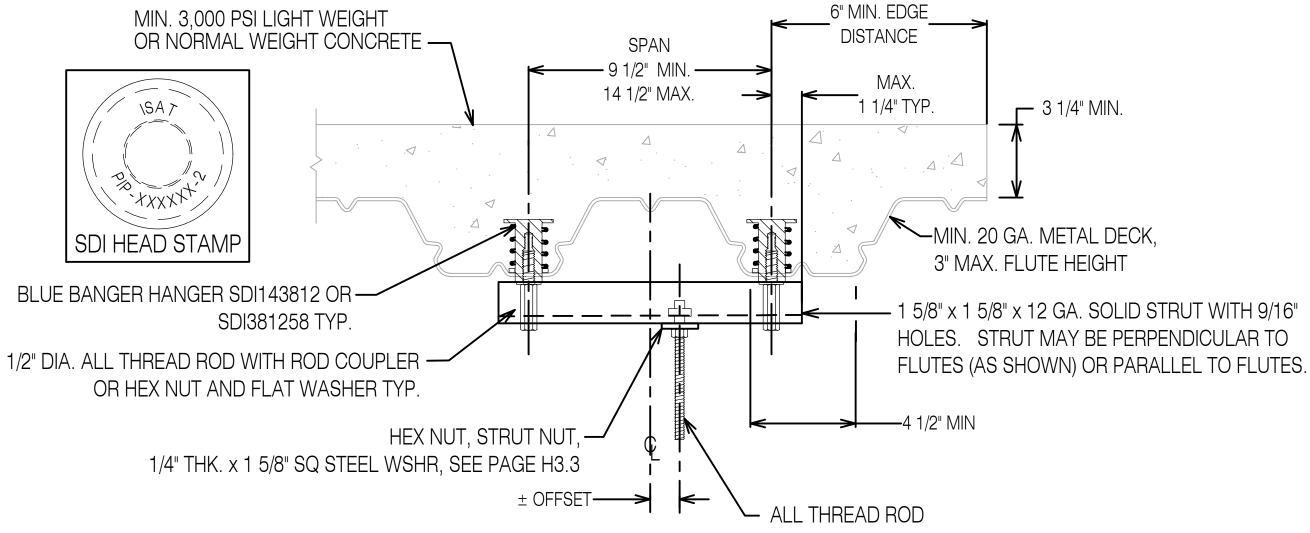

**Blue Banger Hanger Steel Deck Insert (SDI)**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table 2**

| Deck Insert Part No. | Nominal Insert Height Inch | Minimum Edge Distance Inch | Two Anchor Connection Tension Design Value Lbs. $^{1, 2}$ Vertical Support Rod Max. Offset From C. L. | | | | |
|---|---|---|---|---|---|---|---|
| | | | C.L. ± 0" | C.L. ± 1" | C.L. ± 2" | C.L. ± 3" | C.L. ± 4" |
| SDI143812<br>SDI381258 | 2 | 6 | 1,342 | 1,108 | 944 | 822 | 728 |

1. MINIMUM 3,000 PSI LWC
2. VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD) AND ARE EXCLUSIVE OF THREADED ROD CAPACITY.
3. MAINTAIN 6" MINIMUM SPACING BETWEEN PAIRS OF INSERTS
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL BLUE BANGER HANGER SDI INSERT VERTICAL SUPPORT CONNECTION

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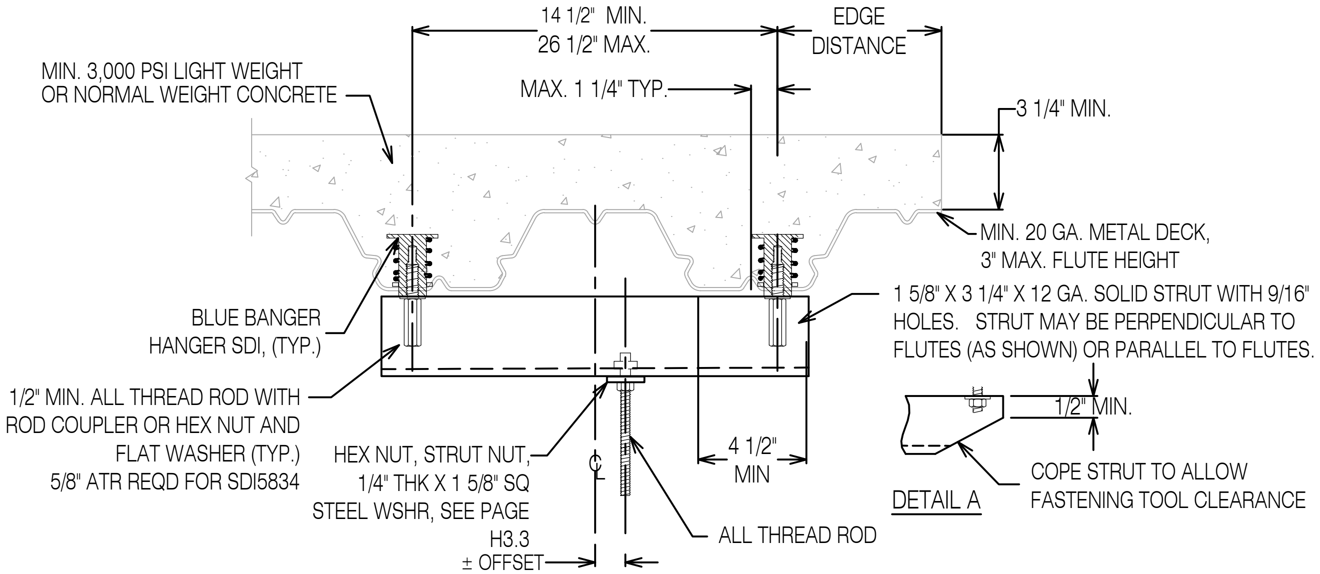

**Blue Banger Hanger Steel Deck Insert (SDI)**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November, 2017), Table 2**

| Deck Insert Part No. [4] | Minimum Edge Distance Inch | Two Anchor Connection Tension Design Value Lbs. [1, 2, 4] Vertical Support Rod Max. Offset From C. L. | | | | |
|---|---|---|---|---|---|---|
| **Insert Spacing = 26 1/2" [3]** | | **C.L. ± 0"** | **C.L. ± 2"** | **C.L. ± 4"** | **C.L. ± 6"** | **C.L. ± 8"** |
| SDI143812<br>SDI381258 [5]<br>SDI5834 [5] | 6 | 1,393 | 1,232 | 1,104 | 1000 | 914 |
| **Insert Spacing = 14 1/2" [3]** | | **C.L. ± 0"** | **C.L. ± 1"** | **C.L. ± 2"** | **C.L. ± 3"** | **C.L. ± 4"** |
| SDI143812<br>SDI381258 [5]<br>SDI5834 [5] | 6 | 1,603 | 1,409 | 1,257 | 1,134 | 1,033 |

1. MINIMUM 3,000 PSI LWC
2. VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD) AND ARE EXCLUSIVE OF THREADED ROD CAPACITY.
3. MAINTAIN 6" MINIMUM SPACING BETWEEN PAIRS OF INSERTS
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES
5. USE DETAIL A.
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL BLUE BANGER HANGER SDI INSERT WITH DEEP STRUT VERTICAL SUPPORT CONNECTION

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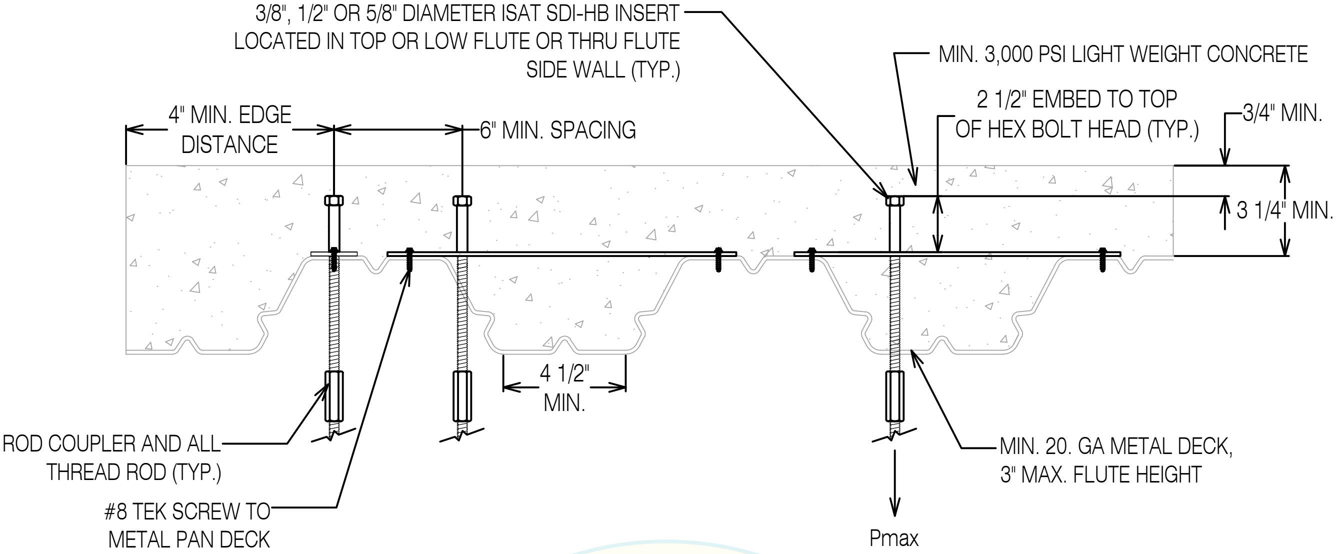

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ISAT SDI-HB, Minimum 3000 psi LWC**

| Anchor Diameter Inch | Max. Vert. Load Lbs. | Min. Anchor Embed. Inch |
|---|---|---|
| 3/8 | 1542 | 2 1/2 |
| 1/2 | 1415 | 2 1/2 |
| 5/8 | 1353 | 2 1/2 |

1. ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3000 PSI LIGHTWEIGHT CONCRETE.
2. CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE." FASTENER OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.
3. MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS, A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.
4. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE BUILDING STRUCTURE FOR ACTUAL IMPOSED LOADS AS PROVIDED IN THE COMBINED TRADES POINT LOAD DRAWINGS.
5. MINIMUM SPACING BETWEEN INSERTS SHALL BE THE GREATER OF 3 TIMES THE EMBEDMENT DEPTH, OR 6".
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE ISAT SDI-HB INSERT VERTICAL SUPPORT CONNECTION

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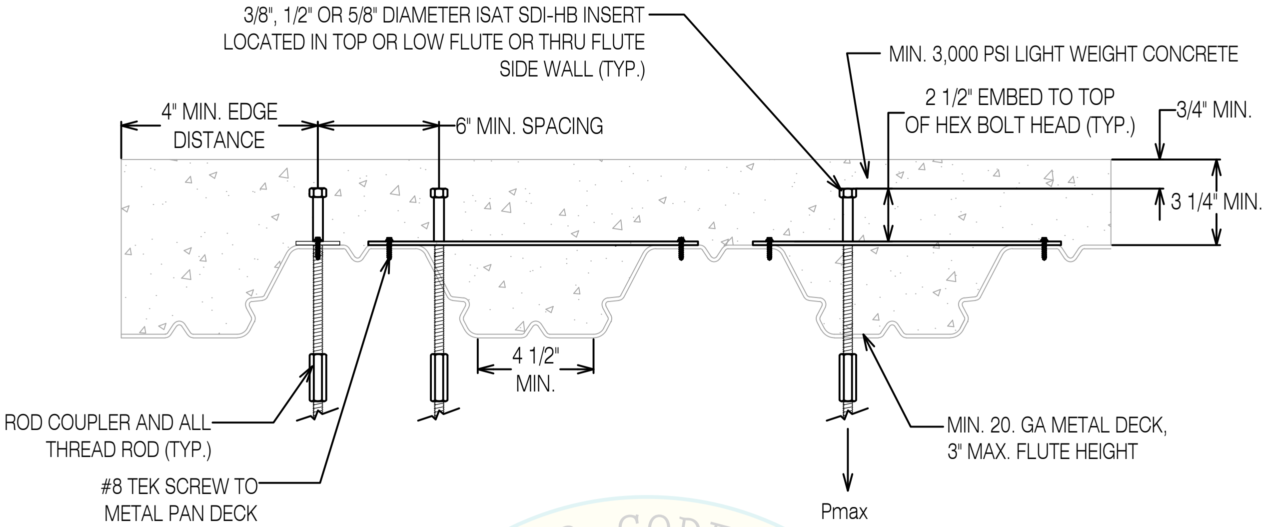

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ISAT SDI-HB, Minimum 4000 psi LWC**

| Anchor Diameter Inch | Max. Vert. Load Lbs. | Min. Anchor Embed. Inch |
|---|---|---|
| 3/8 | 1781 | 2 1/2 |
| 1/2 | 1634 | 2 1/2 |
| 5/8 | 1563 | 2 1/2 |

1. ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3000 PSI LIGHTWEIGHT CONCRETE.
2. CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE." FASTENER OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.
3. MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS, A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.
4. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE BUILDING STRUCTURE FOR ACTUAL IMPOSED LOADS AS PROVIDED IN THE COMBINED TRADES POINT LOAD DRAWINGS.
5. MINIMUM SPACING BETWEEN INSERTS SHALL BE THE GREATER OF 3 TIMES THE EMBEDMENT DEPTH, OR 6".
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

## SINGLE ISAT SDI-HB INSERT VERTICAL SUPPORT CONNECTION

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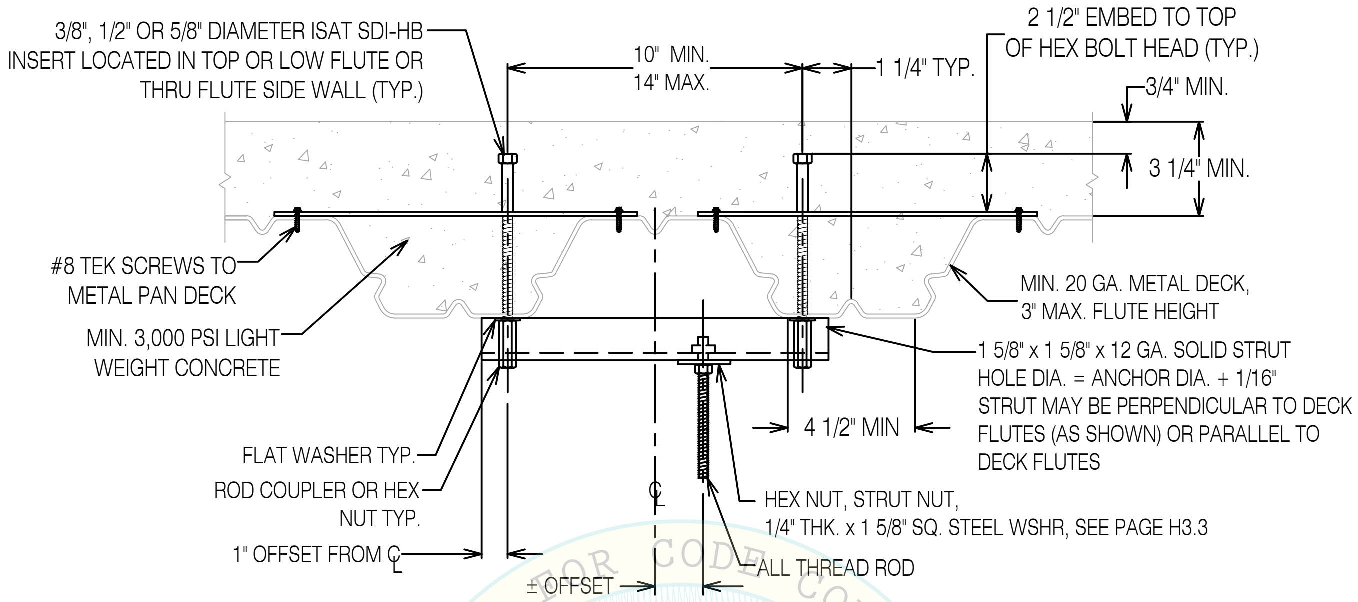

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ISAT SDI-HB, Minimum 3000 psi LWC**

| Anchor Diameter Inch | Min. Anchor Embed. Inch | Tension Design Value (Lbs.) Vertical Support Rod Maximum Offset from C.L. | | | | |
|---|---|---|---|---|---|---|
| | | C.L. ± 0" | C.L. ± 1" | C.L. ± 2" | C.L. ± 3" | C.L. ± 4" |
| 3/8 | 2 1/2 | 1,426 | 1,455 | 1,552 | 1,747 | 1,618 |
| 1/2 | 2 1/2 | 1,426 | 1,455 | 1,552 | 1,718 | 1,527 |
| 5/8 | 2 1/2 | 1,426 | 1,455 | 1,552 | 1,666 | 1,481 |

1. ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3000 PSI LIGHTWEIGHT CONCRETE.
2. CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE." FASTENER OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.
3. MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS, A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.
4. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE BUILDING STRUCTURE FOR ACTUAL IMPOSED LOADS AS PROVIDED IN THE COMBINED TRADES POINT LOAD DRAWINGS.
5. MINIMUM SPACING BETWEEN INSERTS SHALL BE THE GREATER OF 3 TIMES THE EMBEDMENT DEPTH, OR 6".
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL ISAT SDI-HB INSERT VERTICAL SUPPORT CONNECTION

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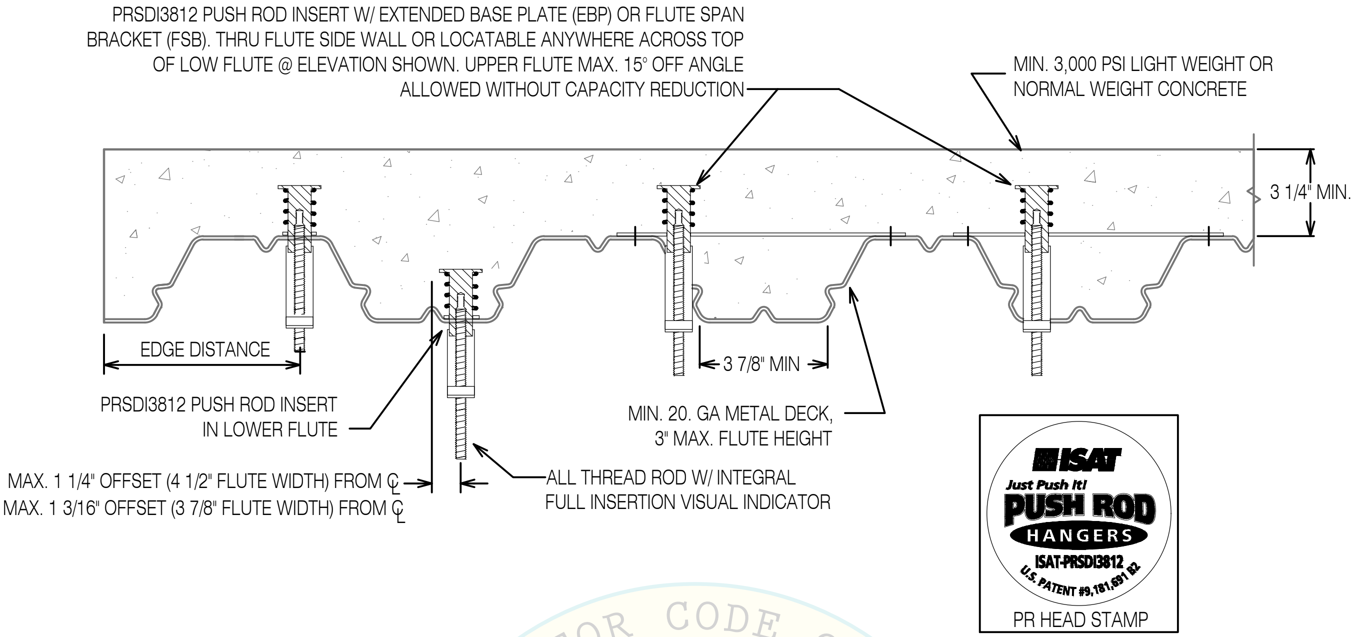

**Push Rod Steel Deck (PRSDI) Insert And PRSDI With Extended Base Plate (EBP)**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November 2017), Table 3A**

| Deck Insert Part No. [7] | All Thread Rod Dia. (ATR) Inch [5] | Maximum Tension Value (Lbs) At Minimum Concrete Strength [6] | | | | Nominal Insert Height Inch | Minimum Edge Distance Inch | Minimum Spacing Inch |
|---|---|---|---|---|---|---|---|---|
| | | 3,000 psi | | 4,000 psi | | | | |
| | | Lower Flute | Upper Flute | Lower Flute | Upper Flute | | | |
| PRSDI3812 | 3/8 | 728 | 1,152 | 840 | 1,152 | 2 | 6 | 6 |
| PRSDI3812 | 1/2 | 728 | 1,498 | 840 | 1,729 | | | |

1. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
2. SPACING MEASURED ALONG LENGTH OF FLUTE. EDGE DISTANCE PERPENDICULAR TO DIRECTION SHOWN (END DISTANCE) SHALL BE 6 INCHES.
3. MAXIMUM ALL THREAD ROD AT THE INSERT IS 1/2". USE REDUCING ROD COUPLING FOR LARGER VERTICAL SUPPORT ROD DIAMETERS
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. ISAT SUPPLIED ALL THREAD ROD REQUIRED WITH INTEGRAL "FULL INSERTION VISUAL INDICATOR".
6. ALL THREAD ROD CAPACITY INDEPENDENT OF INSERT VALUE. DESIGNER SHALL CHECK ATR CAPACITIES.
7. SEE PAGE F11.0

## SINGLE PUSH ROD (PRSDI) INSERT
## VERTICAL SUPPORT CONNECTION

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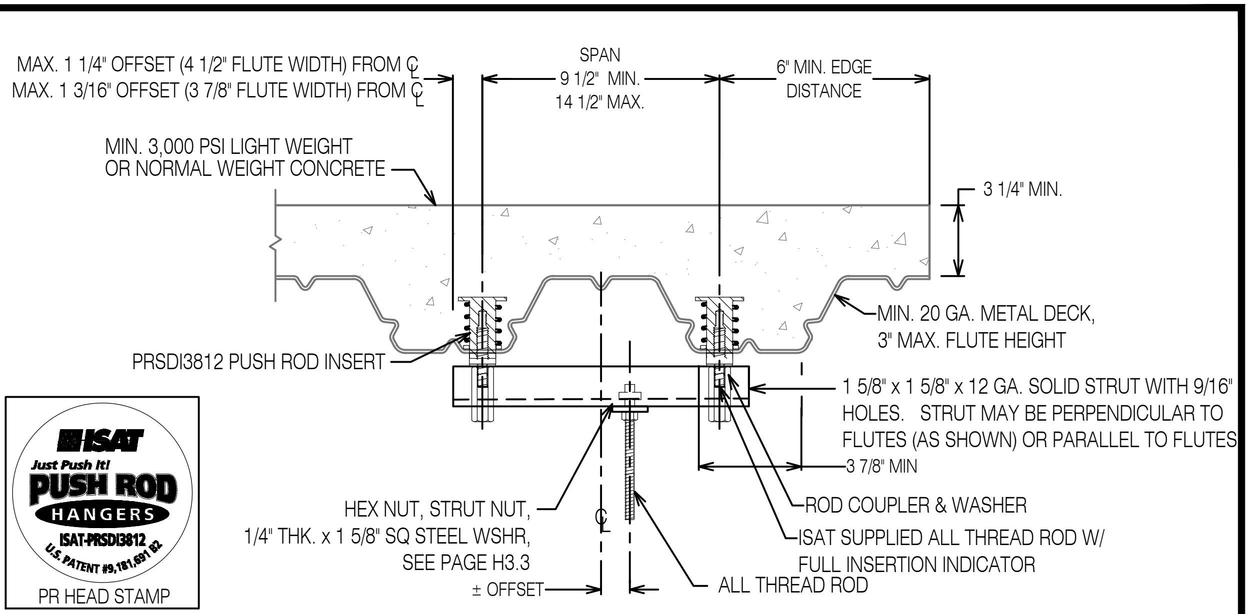

### Push Rod Steel Deck (PRSDI) Insert
### Seismically Qualified for Anchorage In Cracked Concrete
### Seismic Design Categories D, E and F
### ICC Report No. ESR-3599 (November 2017), Table 3A

| Deck Insert Part No. 6 | All Thread Rod Dia. (ATR) Inch 5 | Nominal Insert Height Inch | Minimum Edge Distance Inch | Two Anchor Connection Tension Design Value Lbs. 1, 2 Vertical Support Rod Max. Offset From C. L. | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | C.L. ± 0" | C.L. ± 1" | C.L. ± 2" | C.L. ± 3" | C.L. ± 4" |
| PRSDI3812 | 3/8 | 2 | 6 | 1,095 | 905 | 771 | 671 | 594 |
| PRSDI3812 | 1/2 | | | | | | | |

1. MINIMUM 3,000 PSI LWC
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
3. MAINTAIN 6" MINIMUM SPACING BETWEEN PAIRS OF INSERTS
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES
5. ISAT SUPPLIED ALL THREAD ROD REQUIRED WITH INTEGRAL "FULL INSERTION VISUAL INDICATOR".
6. SEE PAGE F11.0

# DUAL PUSH ROD (PRSDI) INSERT
# VERTICAL SUPPORT CONNECTION

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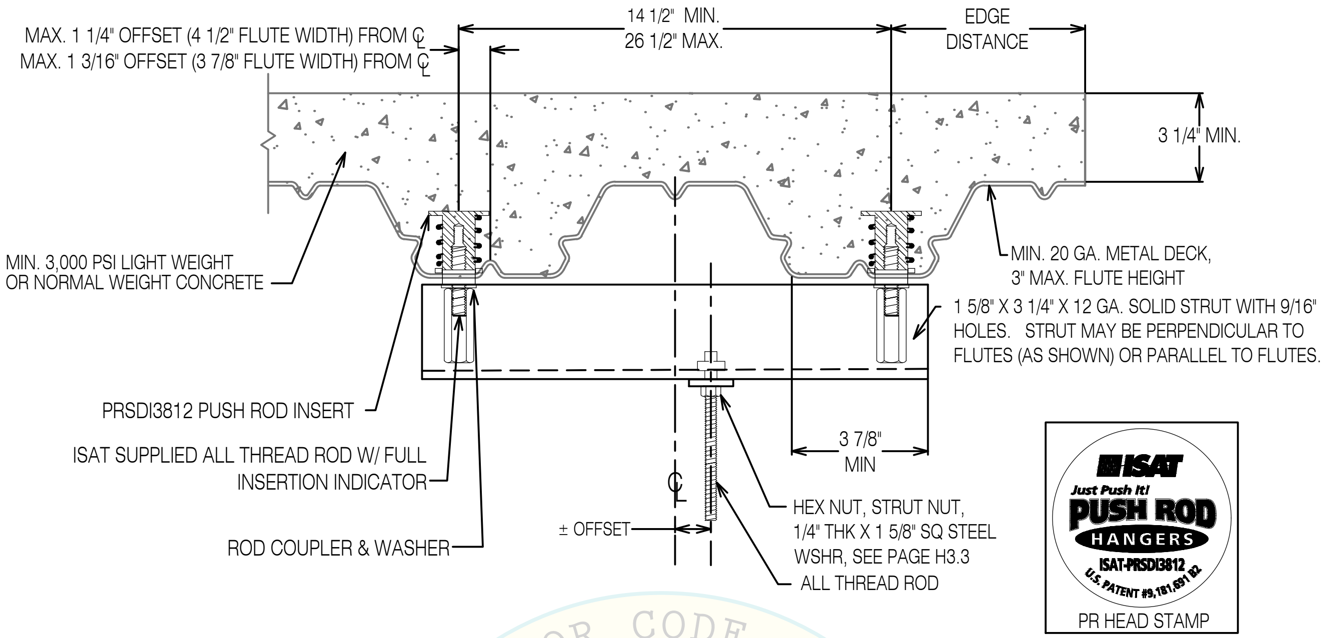

**Push Rod Steel Deck (PRSDI) Insert**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**ICC Report No. ESR-3599 (November 2017), Table 3A**

| Deck Insert Part No. 4[6] | All Thread Rod Dia. (ATR) Inch[5] | Minimum Edge Distance Inch | Two Anchor Connection Tension Design Value Lbs.[1, 2, 4] Vertical Support Rod Max. Offset From C. L. | | | | |
|---|---|---|---|---|---|---|---|
| **Insert Spacing = 26 1/2"[3]** | | | **C.L. ± 0"** | **C.L. ± 2"** | **C.L. ± 4"** | **C.L. ± 6"** | **C.L. ± 8"** |
| PRSDI3812 | 3/8 | 6 | 1,264 | 1,118 | 1,002 | 907 | 829 |
| PRSDI3812 | 1/2 | | | | | | |
| **Insert Spacing = 14 1/2"[3]** | | | **C.L. ± 0"** | **C.L. ± 1"** | **C.L. ± 2"** | **C.L. ± 3"** | **C.L. ± 4"** |
| PRSDI3812 | 3/8 | 6 | 1,455 | 1,279 | 1,140 | 1,029 | 938 |
| PRSDI3812 | 1/2 | | | | | | |

1. MINIMUM 3,000 PSI LWC
2. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
3. MAINTAIN 6" MINIMUM SPACING BETWEEN PAIRS OF INSERTS
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES
5. ISAT SUPPLIED ALL THREAD ROD REQUIRED WITH INTEGRAL "FULL INSERTION VISUAL INDICATOR".
6. SEE PAGE F11.0

# DUAL PUSH ROD (PRSDI) INSERT WITH DEEP STRUT VERTICAL SUPPORT CONNECTION

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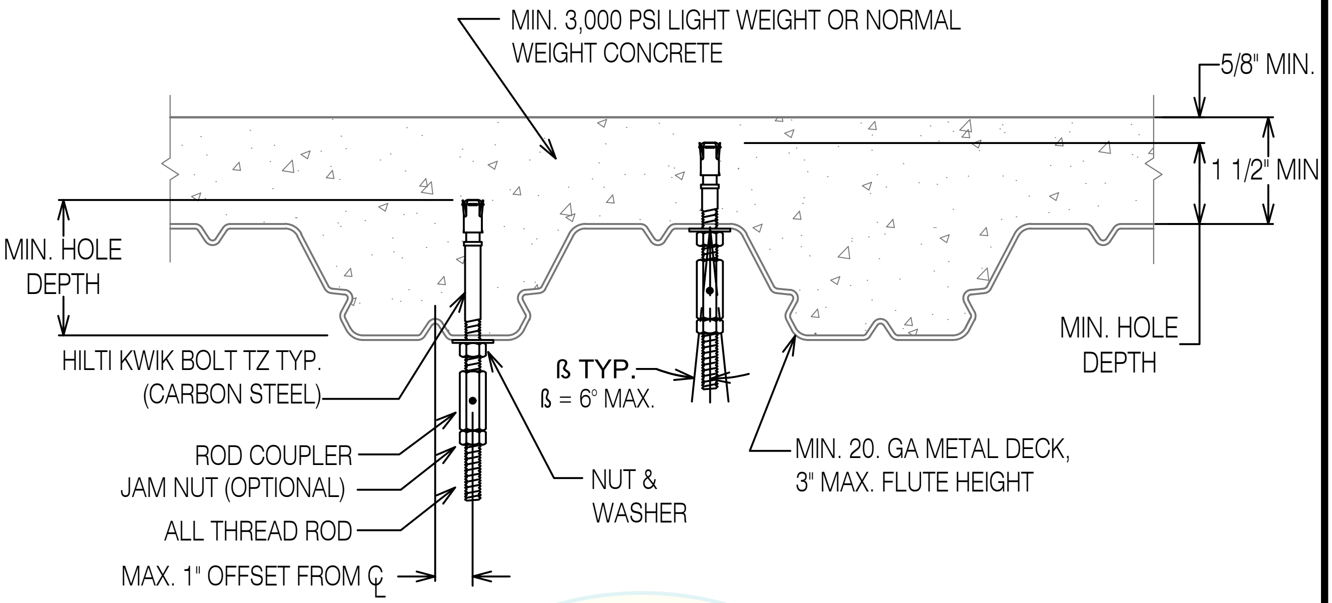

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Anchor Diameter Inch | Design Tension 3 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch)$^3$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Metal Deck Flute Height | | |
| | | | | | | | 1 1/2" | 2" | 3" |
| 3/8 | 554 | 2 5/8 | 2 | 25 | 4 1/2 | 6 3/4 | 1 3/4 | 1 1/2 | 1 1/2 |
| 1/2 | 554 | 2 5/8 | 2 | 40 | 4 1/2 | 6 3/4 | 1 3/4 | 1 1/2 | 1 1/2 |
| 1/2 | 995 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 | 3 1/8 | 2 5/8 | 1 5/8 |
| 5/8 | 1,764 | 4 3/4 | 4 | 60 | 8 3/4 | 12 | 3 7/8 | 3 3/8 | 2 3/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE HILTI KWIK BOLT TZ ANCHOR TO METAL DECK W/CONC. VERTICAL SUPPORT CONNECTION

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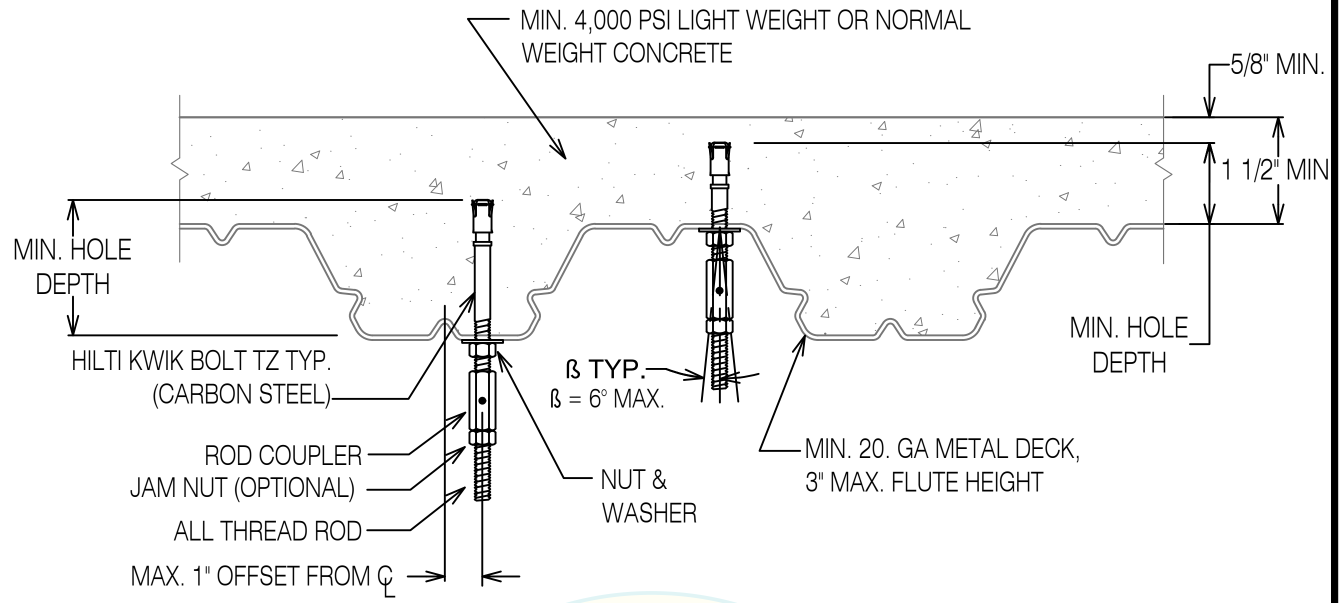

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Anchor Diameter Inch | Design Tension 4 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch)$^3$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Metal Deck Flute Height | | |
| | | | | | | | 1 1/2" | 2" | 3" |
| 3/8 | 640 | 2 5/8 | 2 | 25 | 4 1/2 | 6 3/4 | 1 3/4 | 1 1/2 | 1 1/2 |
| 1/2 | 640 | 2 5/8 | 2 | 40 | 4 1/2 | 6 3/4 | 1 3/4 | 1 1/2 | 1 1/2 |
| 1/2 | 1,149 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 | 3 1/8 | 2 5/8 | 1 5/8 |
| 5/8 | 2,036 | 4 3/4 | 4 | 60 | 8 3/4 | 12 | 3 7/8 | 3 3/8 | 2 3/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE HILTI KWIK BOLT TZ ANCHOR TO METAL DECK W/CONC. VERTICAL SUPPORT CONNECTION

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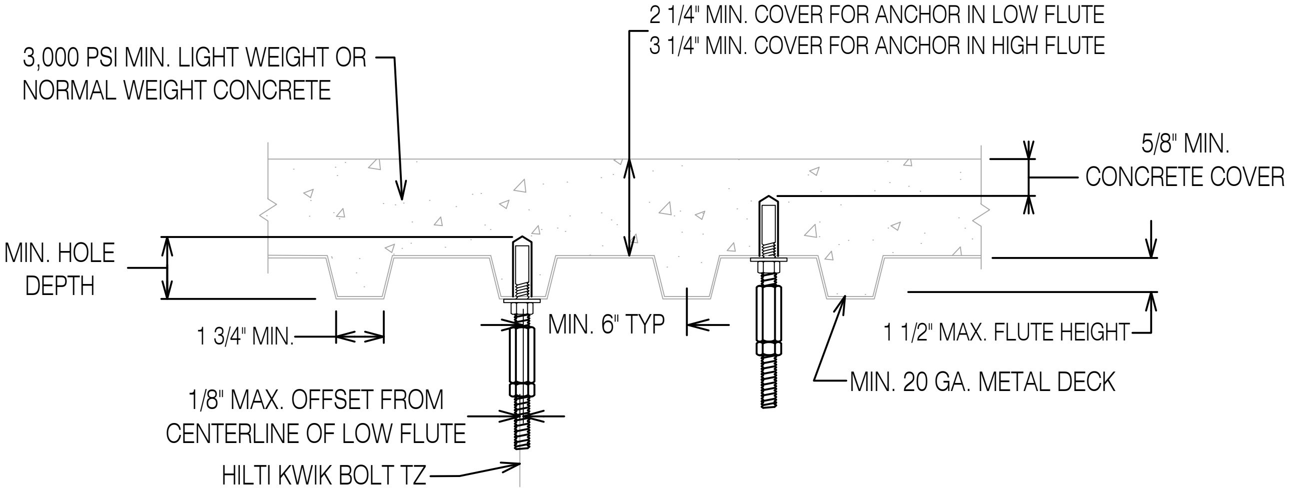

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5C**

| Anchor Diameter Inch | Design Tension 3 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Minimum Concrete Thickness 5 Metal Deck Flute Height 1 1/2" |
|---|---|---|---|---|---|---|---|
| 3/8 | 630 | 2 5/8 | 2 | 25 | 4 1/2 | 6 | 2 1/4 |
| 1/2 | 503 | 2 5/8 | 2 | 40 | 4 1/2 | 6 | 2 1/4 |
| 1/2 | 1,141 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 | 3 1/8 |
| 5/8 | 1,095 | 3 3/4 | 3 1/8 | 60 | 6 1/2 | 9 3/8 | 2 7/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
4. BASED ON INSTALLATION IN LOWER FLUTE.

# SINGLE ANCHOR HILTI KWIK BOLT TZ VERTICAL SUPPORT CONNECTION IN 1.5" METAL DECK SLAB

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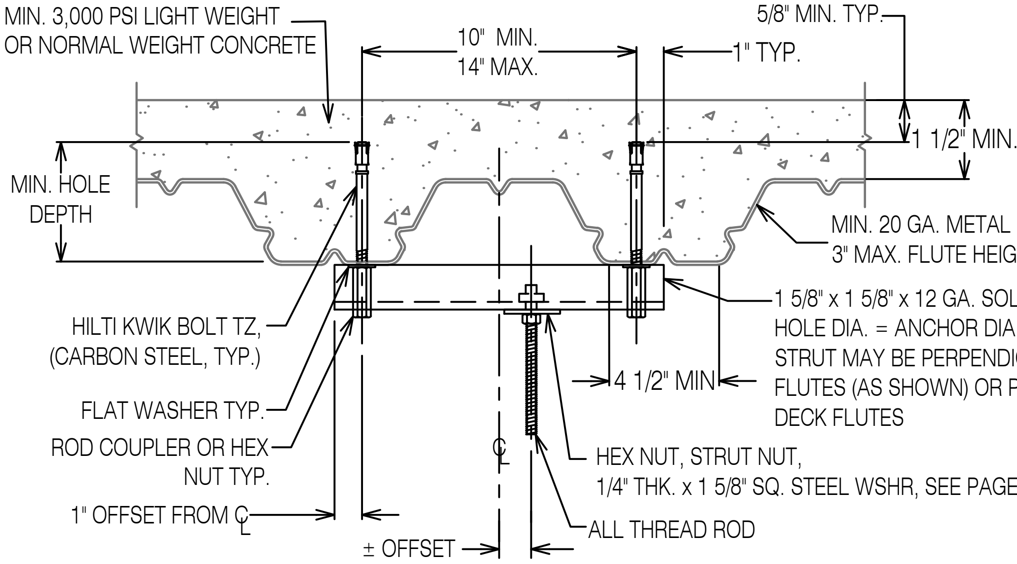

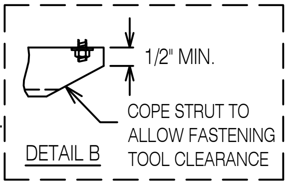

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs.[2] Vertical Support Rod Max. Offset From C.L. CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 1,109 | 924 | 792 | 693 | 616 | 2 5/8 | 2 | 25 | 4 1/2 | 6 |
| 1/2 | 1,109 | 924 | 792 | 693 | 616 | 2 5/8 | 2 | 40 | 4 1/2 | 6 |
| 1/2 | 1,426 | 1,455 | 1,421 | 1,243 | 1,105 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 |
| 5/8[3] | 1,426 | 1,455 | 1,552 | 1,747 | 1,960 | 4 3/4 | 4 | 60 | 8 3/4 | 12 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PG. H1, OR STRUT NUT PULL OUT STRENGTH, PG. H3.3.
3. USE DETAIL B. ANCHOR SPACING LESS THAN 12" IS ACCOUNTED FOR IN THE DESIGN VALUES SHOWN.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
6. REFER TO DETAIL G6.1TZ FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL HILTI KWIK BOLT TZ ANCHOR
# VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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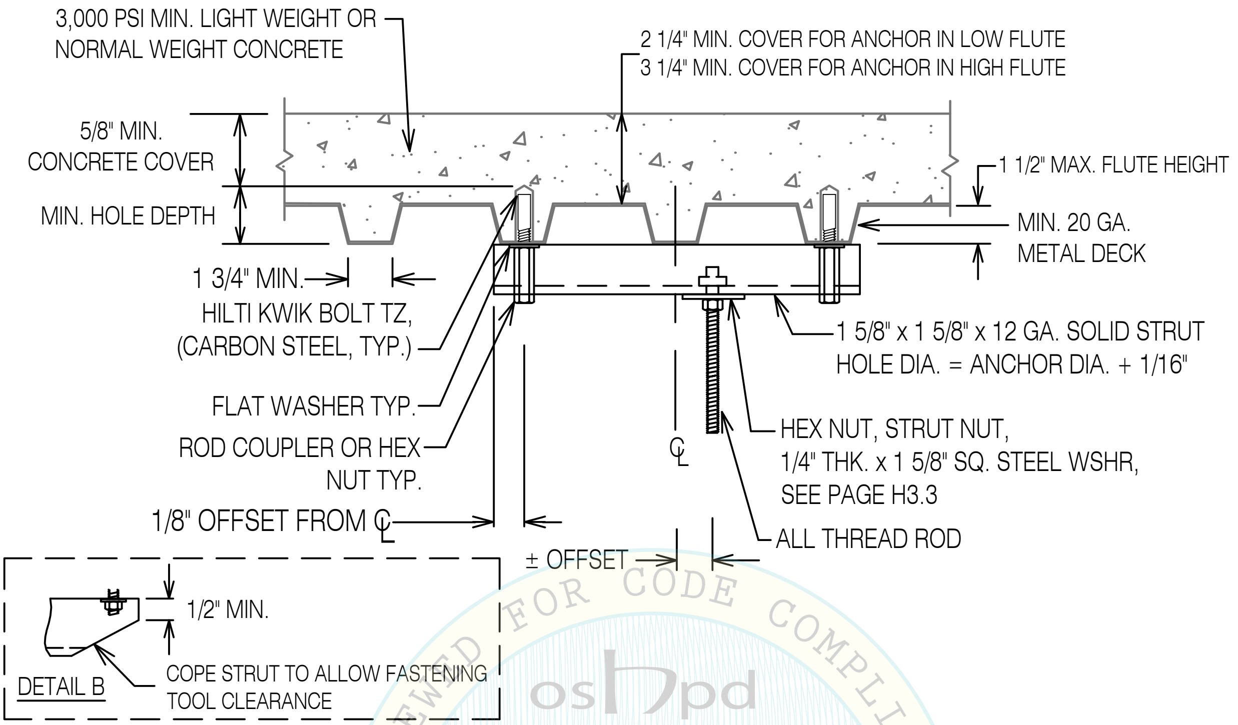

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5C**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs.[2] Vertical Offset From C.L. | | | | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | | | | | |
| 3/8 | 1,261 | 1,080 | 945 | 840 | 756 | 2 5/8 | 2 | 25 | 4 1/2 | 2 5/8 |
| 1/2 | 1,006 | 862 | 755 | 671 | 604 | 2 5/8 | 2 | 40 | 4 1/2 | 2 5/8 |
| 1/2 | 1,663 | 1,711 | 1,711 | 1,521 | 1,369 | 4 | 3 1/4 | 40 | 7 1/2 | 2 5/8 |
| 5/8[3] | 1,663 | 1,711 | 1,643 | 1,461 | 1,314 | 3 3/4 | 3 1/8 | 60 | 6 1/2 | 2 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PG. H1, OR STRUT NUT PULLOUT STRENGTH, PG. H3.3.
3. USE DETAIL B. ANCHOR SPACING LESS THAN 12" IS ACCOUNTED FOR IN THE DESIGN VALUES SHOWN.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
6. REFER TO DETAIL G6.1TZB FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL ANCHOR HILTI KWIK BOLT TZ VERTICAL SUPPORT CONNECTION IN 1.5" METAL DECK SLAB

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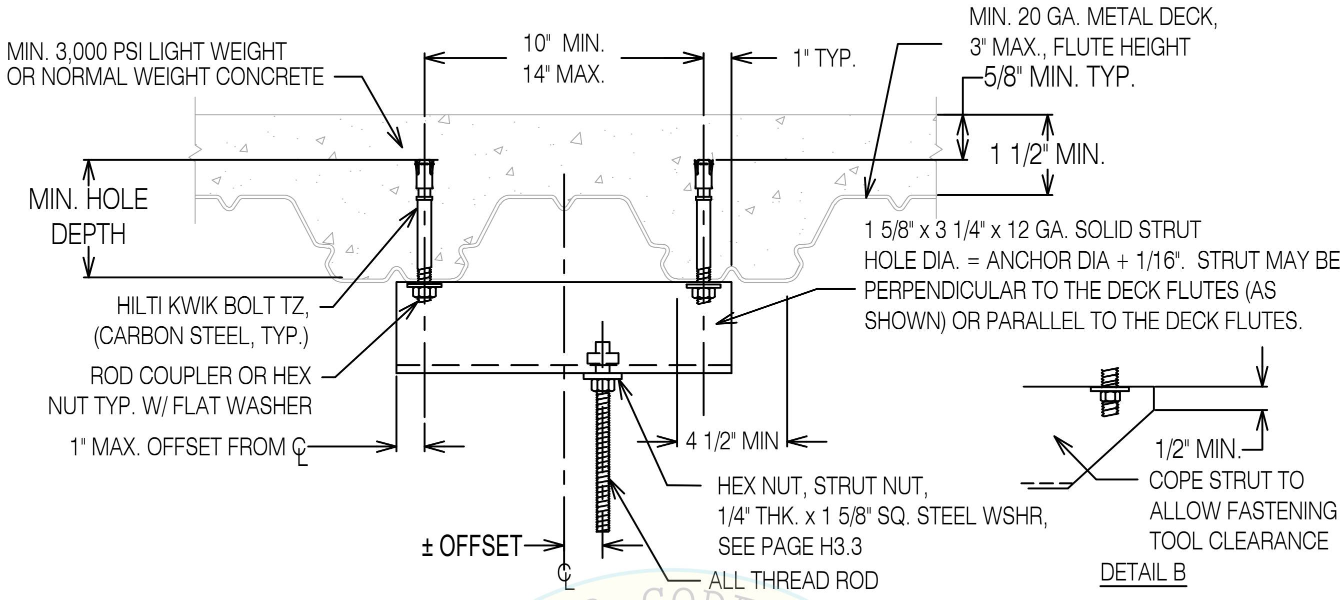

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Anchor Diameter Inch | Two Anchor Connection | | | | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tension Design Value Lbs.[2] Vertical Support Rod Max. Offset From C.L. | | | | | | | | | |
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | | | | | |
| 1/2 | 1990 | 1658 | 1421 | 1243 | 1105 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 |
| 5/8[3] | 3250 | 2939 | 2519 | 2205 | 1960 | 4 3/4 | 4 | 60 | 8 3/4 | 12 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PG. H1, OR STRUT NUT PULL OUT STRENGTH, PG. H3.3.
3. USE DETAIL B.
4. ANCHOR SPACING LESS THAN THE MINIMUM SPACING IS ACCOUNTED FOR IN THE DESIGN VALUES SHOWN.
5. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
7. REFER TO DETAIL G6.1TZ FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL HILTI KWIK BOLT TZ ANCHOR WITH 1 5/8" x 3 1/4" STRUT VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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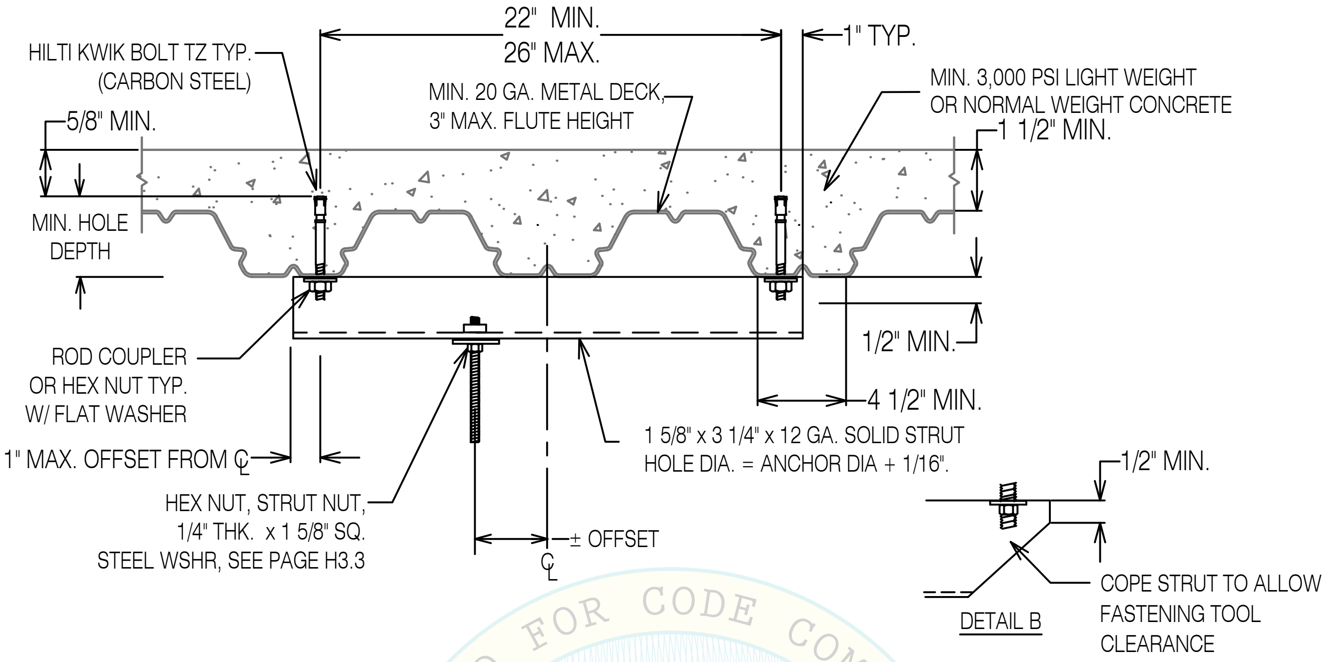

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Anchor Diameter Inch | Two Anchor Connection<br>Tension Design Value Lbs. [2]<br>Vertical Support Rod Max. Offset From C.L. | | | | | | | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 4" | CL ± 6" | CL ± 8" | CL ± 10" | | | | | |
| 3/8 | 1,109 | 1,016 | 938 | 813 | 717 | 642 | 581 | 2 5/8 | 2 | 25 | 4 1/2 | 6 |
| 1/2 | 1,109 | 1,016 | 938 | 813 | 717 | 642 | 581 | 2 5/8 | 2 | 40 | 4 1/2 | 6 |
| 1/2 | 1,990 | 1,824 | 1,683 | 1,459 | 1,287 | 1,152 | 1,042 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 |
| 5/8[4] | 2,383 | 2,397 | 2,440 | 2,587 | 2,282 | 2,042 | 1,848 | 4 3/4 | 4 | 60 | 8 3/4 | 12 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
3. REFER TO DETAIL G6.1TZ FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.
4. USE DETAIL B.
5. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL HILTI KWIK BOLT TZ ANCHOR WITH 1 5/8" x 3 1/4" STRUT. VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONC.

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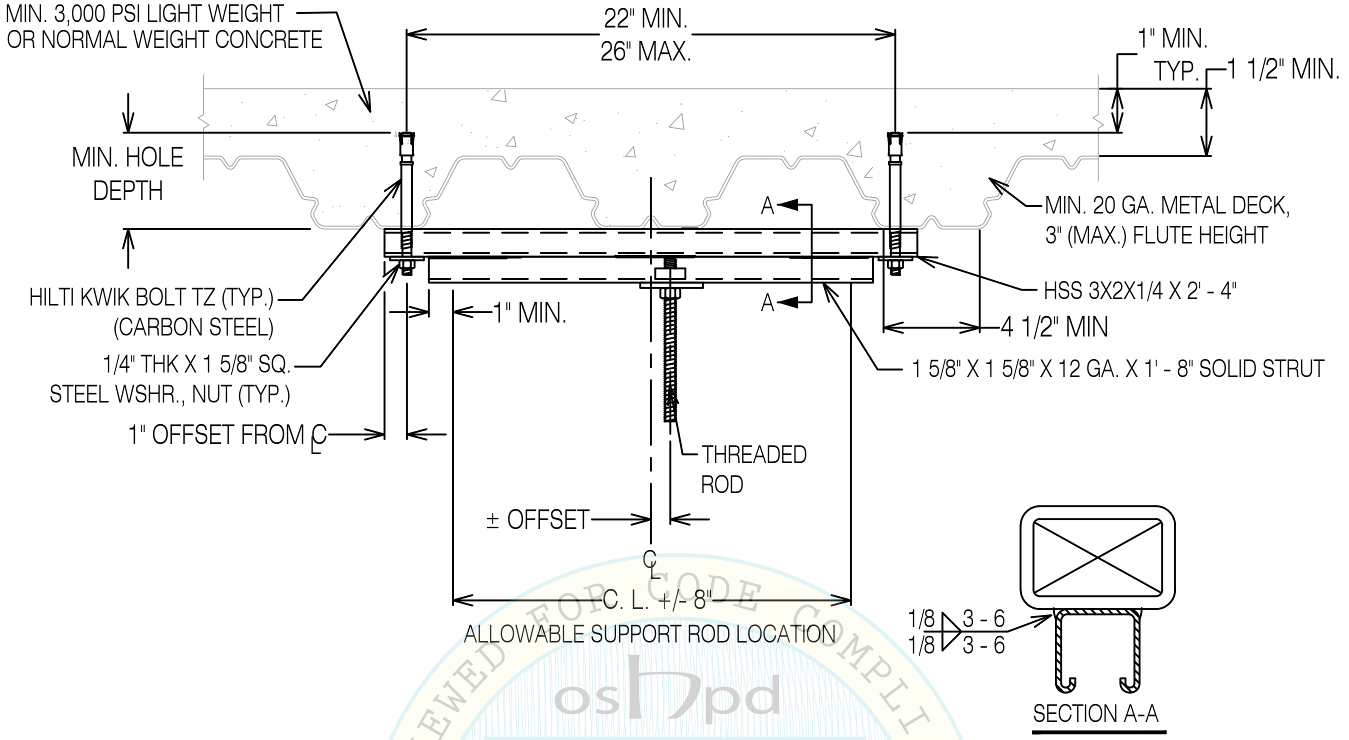

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs.[2,3] Vertical Support Rod Max. Offset From C.L. | | | | | | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 4" | CL ± 6" | CL ± 8" | CL ± 10" | | | | | |
| 5/8 | 3,250 | 3,233 | 2,985 | 2,587 | 2,282 | 2,042 | 1,848 | 4 3/4 | 4 | 60 | 8 3/4 | 12 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
3. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
5. REFER TO DETAIL G6.1TZ FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL HILTI KWIK BOLT TZ ANCHOR WITH HSS BEAM VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONC.

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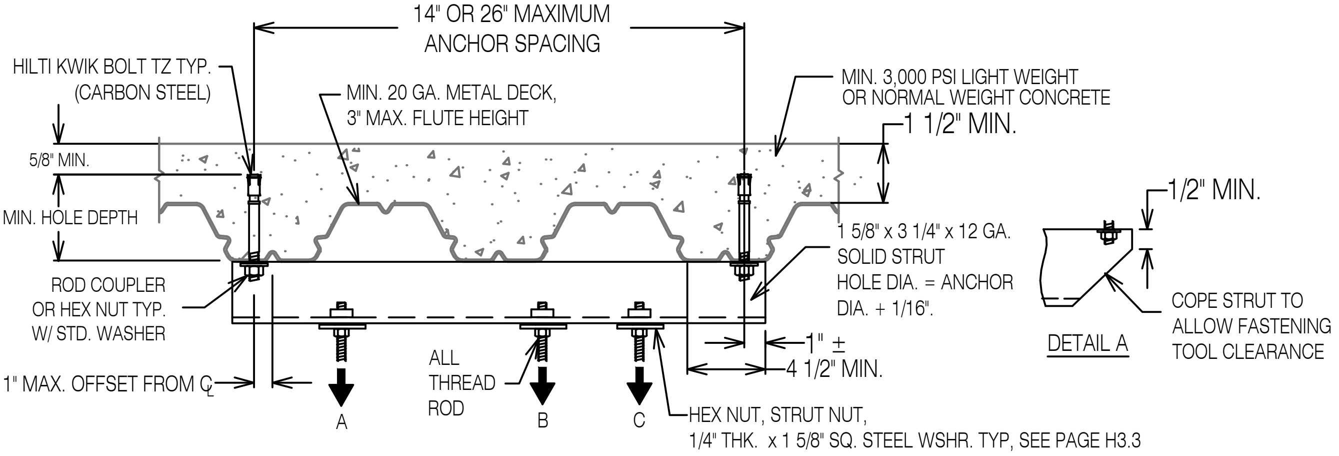

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Anchor Diameter Inch | Tension Value [2, 3] 14" Spacing Lbs | Tension Value [2, 3] 26" Spacing Lbs | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Installation Torque Ft - Lbs | Minimum Edge Distance Inch | Minimum Spacing Inch |
|---|---|---|---|---|---|---|---|
| 3/8 | 597 | 577 | 2 5/8 | 2 | 25 | 4 1/2 | 6 |
| 1/2 | 597 | 577 | 2 5/8 | 2 | 40 | 4 1/2 | 6 |
| 1/2 | 1,071 | 1,035 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 |
| 5/8[4] | 1,899 | 1,834 | 4 3/4 | 4 | 60 | 8 3/4 | 12 |

**LOADING NOTES:** SEE CHART FOR MAX ALLOWABLE LOAD. ANY NUMBER OF VERTICAL SUPPORT RODS MAY BE ATTACHED TO ABOVE ANCHORAGE, AT ANY LOCATION INBOARD OF ANCHORS.

**MAXIMUM LOADING EXAMPLES:**

a. MULTIPLE VERTICAL SUPPORTS @ LOCATIONS 'A', 'B' & 'C' W/ 3/8-INCH TZ ANCHORS MAX TOTAL LOAD (A+B+C) = 533 LBS. WITH 14-INCH ANCHOR SPACING.
b. SINGLE VERTICAL SUPPORT @ ANY LOCATION W/ 1/2-INCH X 4-INCH HOLE DEPTH TZ ANCHORS MAXIMUM LOAD = 924 LBS. WITH 26-INCH ANCHOR SPACING.

**NOTES:**

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR ASSEMBLY MAY BE INSTALLED PARALLEL TO DECK FLUTE.
3. TENSION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1 OR STRUT NUT PULL-OUT STRENGTH, PAGE H3.3.
4. USE DETAIL A.
5. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES ARE INSTALLED AT THE SAME LOCATION IN OPPOSING DIRECTIONS.
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
7. REFER TO DETAIL G6.1TZ FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL HILTI KWIK BOLT TZ ANCHOR WITH 1 5/8" x 3 1/4" STRUT. VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONC.

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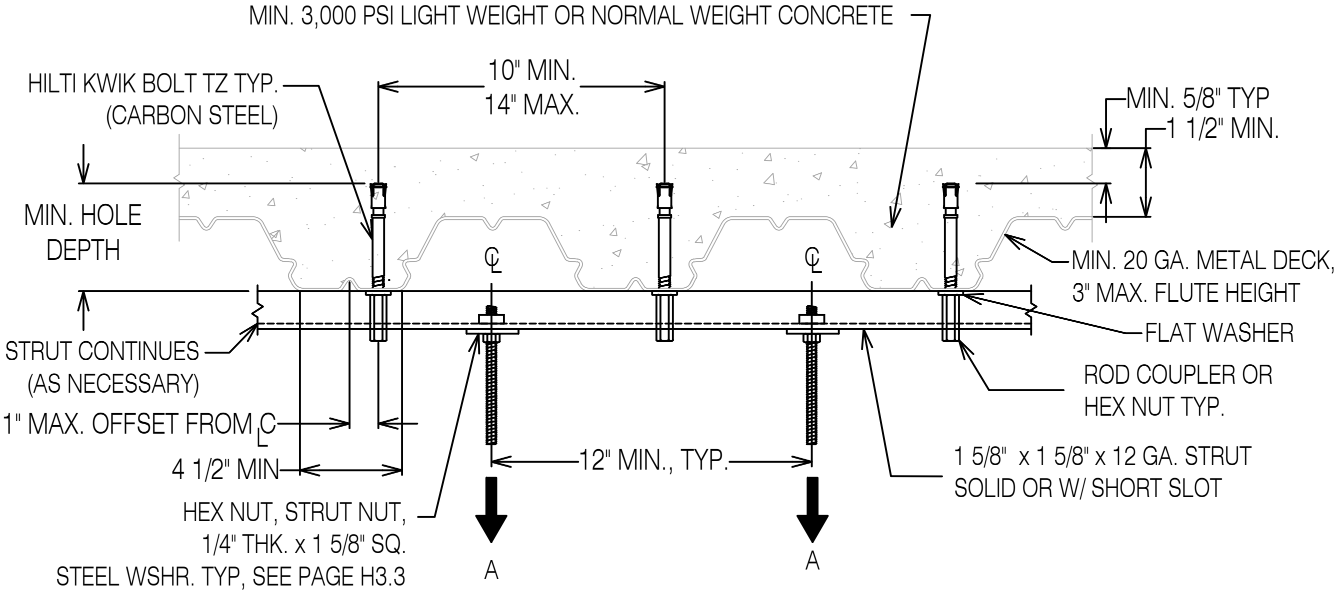

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Anchor Diameter Inch | Tension Design Value Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|
| 3/8 | 403 | 2 5/8 | 2 | 25 | 4 1/2 | 6 |
| 1/2 | 403 | 2 5/8 | 2 | 40 | 4 1/2 | 6 |
| 1/2 | 723 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 |
| 5/8 | 1283 | 4 3/4 | 4 | 60 | 8 3/4 | 12 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
4. REFER TO DETAIL G6.1TZ FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# MULTIPLE HILTI KWIK BOLT TZ ANCHORS VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONC.

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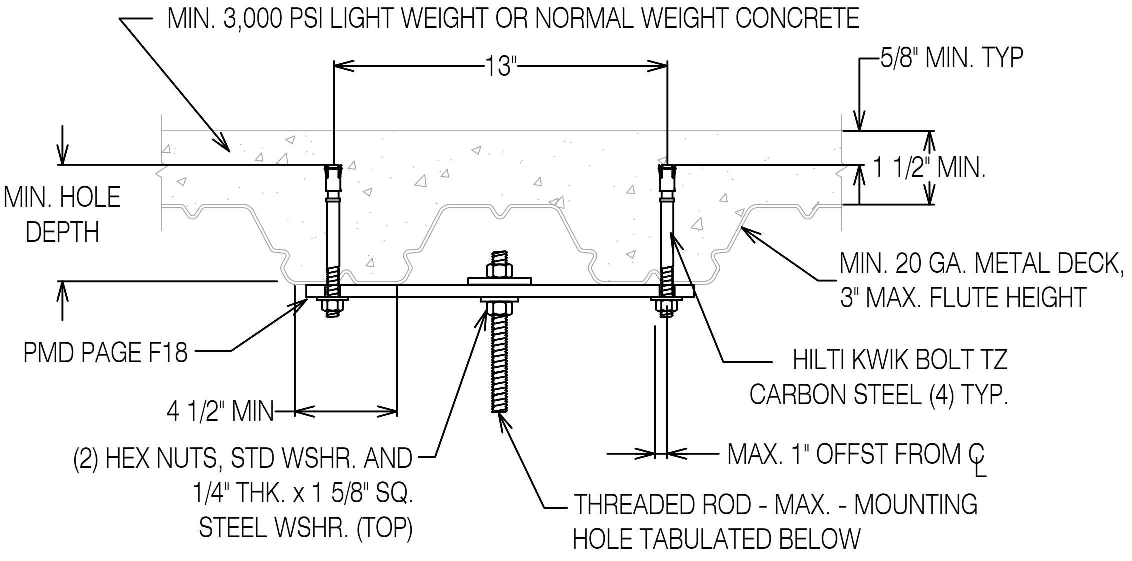

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik Bolt TZ Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-1917 (Dated May 2017), Table 5 and Fig. 5A**

| Anchor Diameter Inch | Maximum Vertical Load Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Plate Number Page F18 | Maximum Rod Diameter Inch |
|---|---|---|---|---|---|---|---|---|
| 3/8 | 1,460 | 2 5/8 | 2 | 25 | 4 1/2 | 6 | G634 | 1/2 |
| 1/2 | 2,217 | 2 5/8 | 2 | 40 | 4 1/2 | 6 | G645 | 5/8 |
| 1/2 | 3,500 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 | G646 | 3/4 |
| 5/8 | 4,452 | 4 3/4 | 4 | 60 | 8 3/4 | 12 | G657 | 7/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
4. REFER TO DETAIL G6.1TZ FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# 4-ANCHOR HILTI KWIK BOLT TZ
# VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONC.

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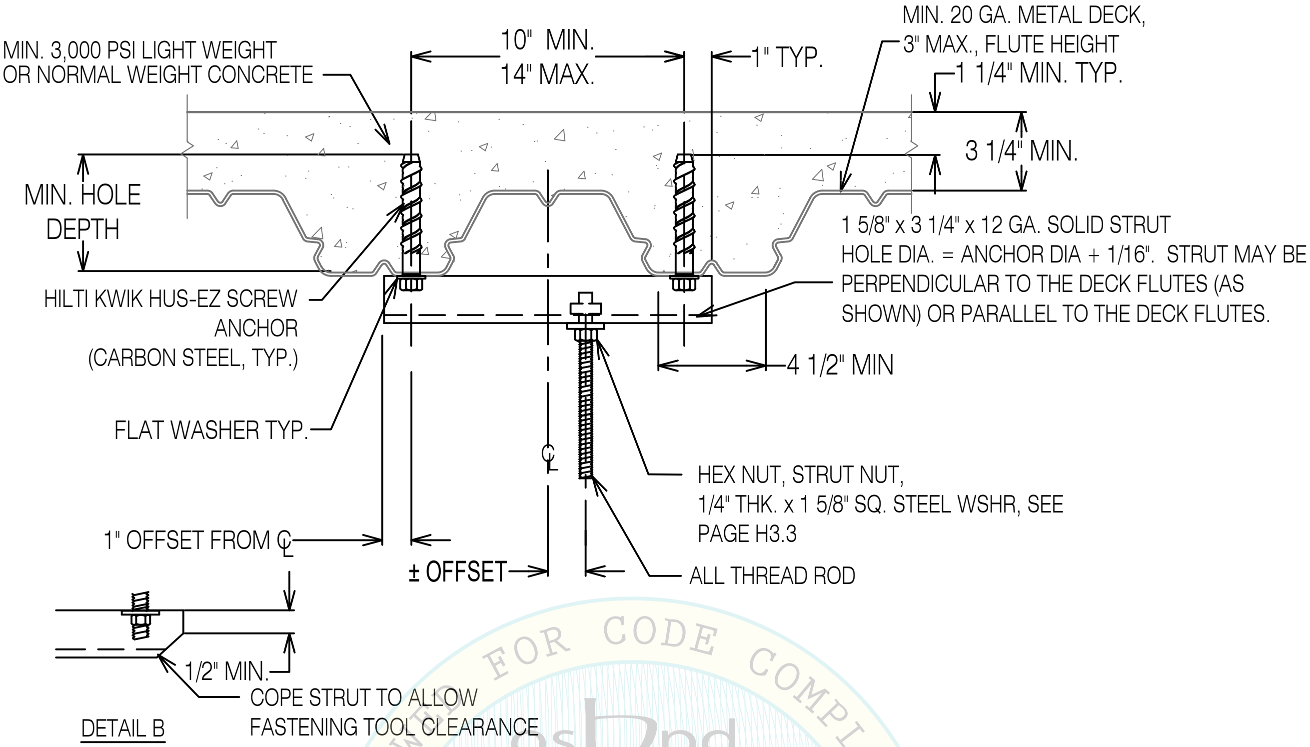

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 5**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs. [2] Vertical Support Rod Max. Offset From C.L. | | | | | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Max. Impact Wrench Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | | | | | |
| 1/4 | 471 | 392 | 336 | 294 | 262 | 2 | 1.18 | 114 | 4 1/2 | 6.75 |
| 3/8 | 615 | 513 | 439 | 384 | 342 | 1 7/8 | 1.11 | 114 | 4 1/2 | 6.75 |
| 1/2 | 623 | 519 | 445 | 389 | 346 | 2 5/8 | 1.52 | 137 | 4 1/2 | 6.75 |
| 1/2 | 1,426 | 1,455 | 1,552 | 1,602 | 1,424 | 4 5/8 | 3.22 | 450 | 7 1/2 | 9.66 |
| 5/8[3] | 1,426 | 1,455 | 1,552 | 1,747 | 2,117 | 5 3/8 | 3.88 | 450 | 8 3/4 | 11.64 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PG. H1, OR STRUT NUT PULL OUT STRENGTH, PG. H3.3.
3. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
5. REFER TO DETAIL D2.1HUS FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL HILTI KWIK HUS-EZ SCREW ANCHOR W/ 1 5/8" x 1 5/8" STRUT VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

ANTHONY A. RUBALCAVA
S 4710

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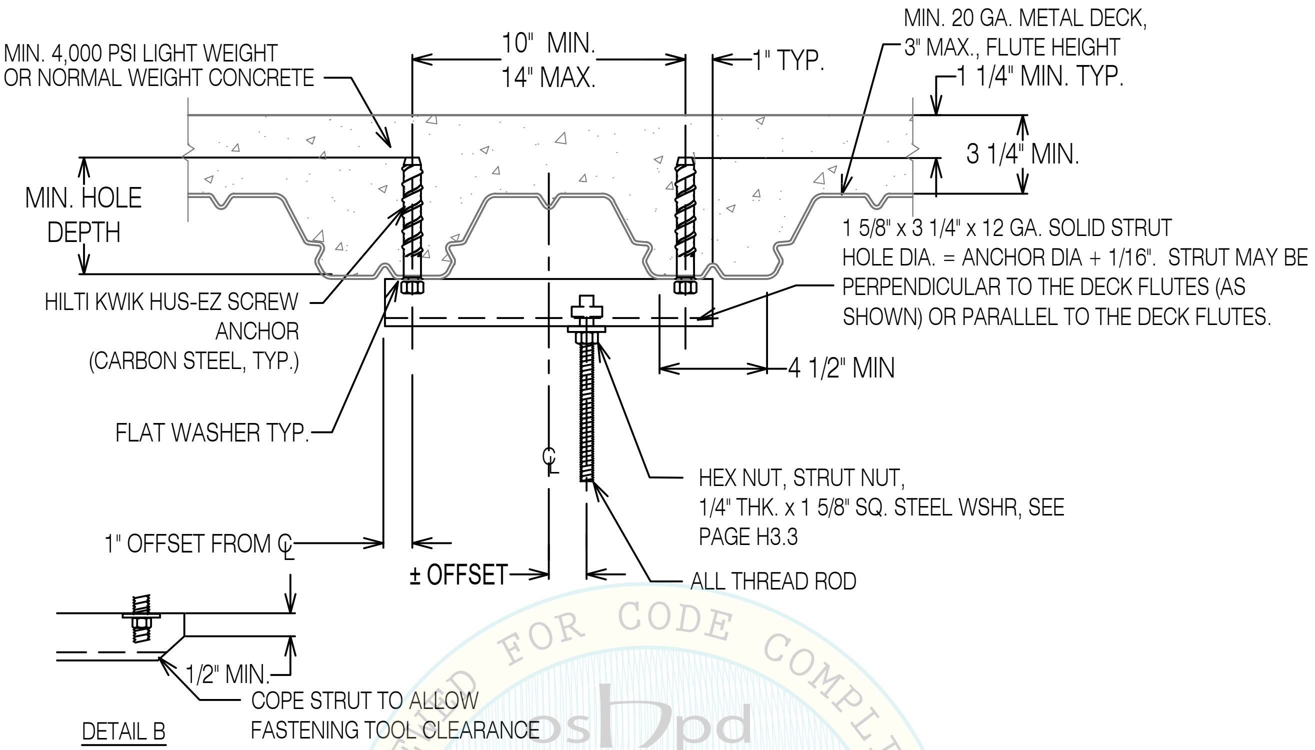

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Hilti Kwik HUS-EZ Screw Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-3027 (Dated December 2017), Table 5**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs. [2] Vertical Support Rod Max. Offset From C.L. CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Max. Impact Wrench Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| 1/4 | 544 | 453 | 388 | 340 | 302 | 2 | 1.18 | 114 | 4 1/2 | 6.75 |
| 3/8 | 710 | 592 | 507 | 444 | 395 | 1 7/8 | 1.11 | 114 | 4 1/2 | 6.75 |
| 1/2 | 719 | 599 | 514 | 449 | 399 | 2 5/8 | 1.52 | 137 | 4 1/2 | 6.75 |
| 1/2 | 1,426 | 1,455 | 1,552 | 1,747 | 1,644 | 4 5/8 | 3.22 | 450 | 7 1/2 | 9.66 |
| 5/8[3] | 1,426 | 1,455 | 1,552 | 1,747 | 2,117 | 5 3/8 | 3.88 | 450 | 8 3/4 | 11.64 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PG. H1, OR STRUT NUT PULL OUT STRENGTH, PG. H3.3.
3. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
5. REFER TO DETAIL D2.1HUS FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL HILTI KWIK HUS-EZ SCREW ANCHOR W/ 1 5/8" x 1 5/8" STRUT VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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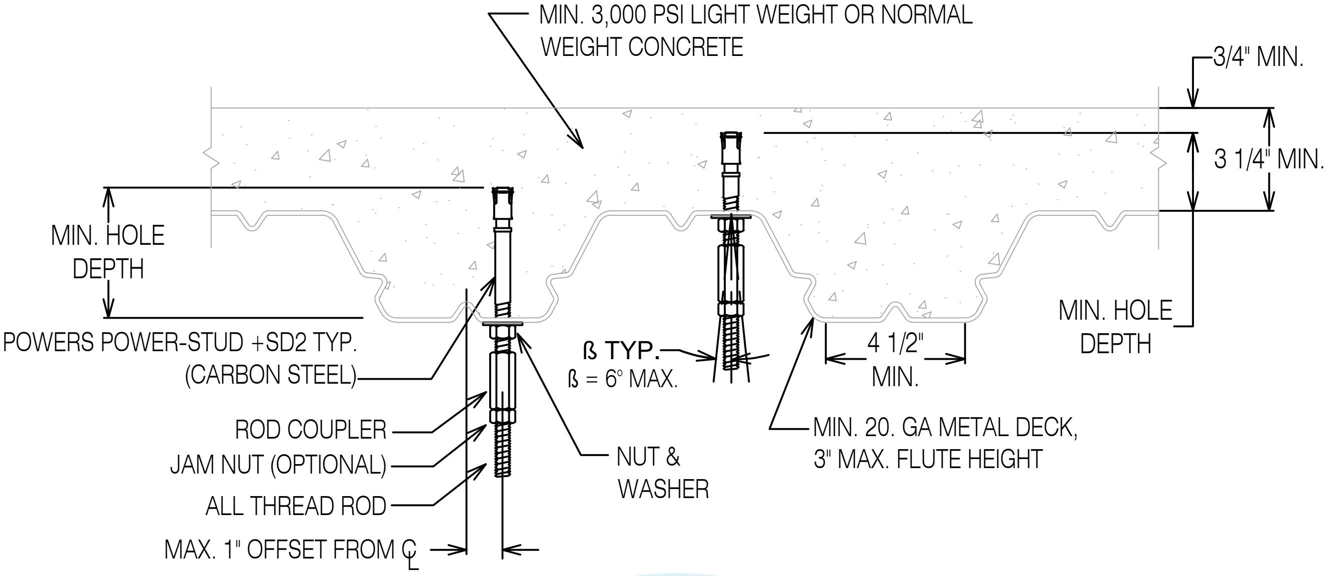

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Anchor Diameter Inch | Design Tension 3 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch)$^3$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Metal Deck Flute Height | | |
| | | | | | | | 1 1/2" | 2" | 3" |
| 3/8 | 549 | 2 5/8 | 2 | 20 | 4 1/2 | 6 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1/2 | 556 | 2 3/4 | 2 | 40 | 4 1/2 | 6 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1/2 | 987 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 5/8 | 1,980 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 | 4 1/2 | 4 | 3 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE POWERS POWER-STUD +SD2 ANCHOR VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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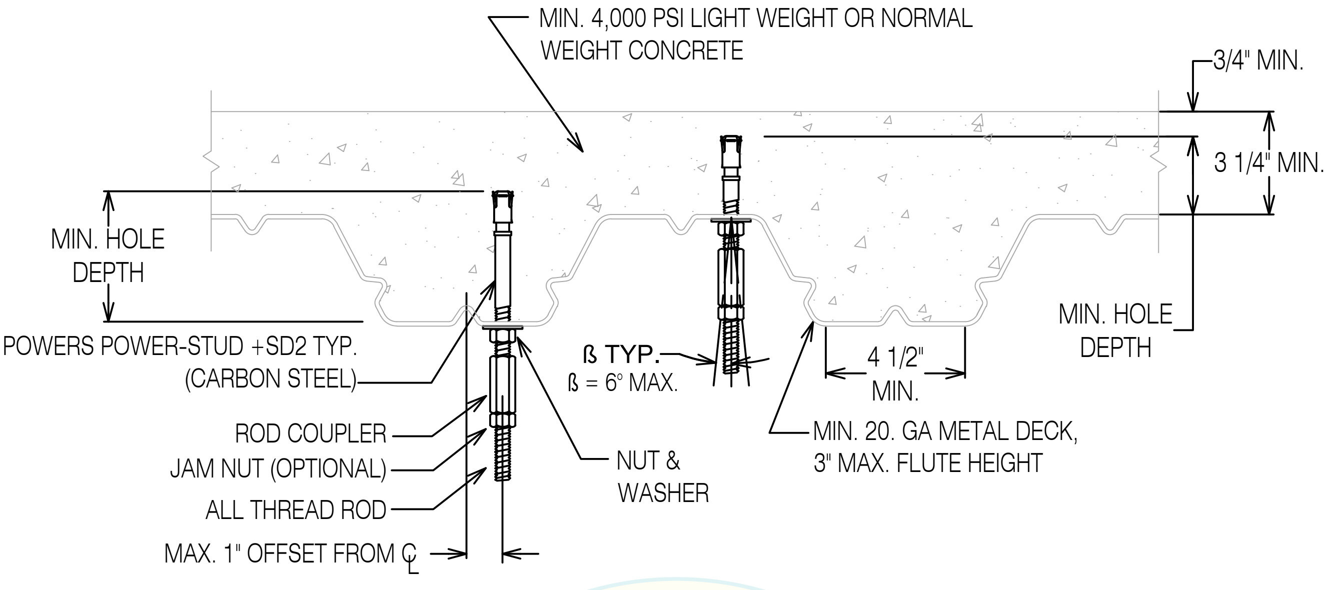

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Anchor Diameter Inch | Design Tension 4 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch)$^3$ Metal Deck Flute Height 1 1/2" | 2" | 3" |
|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 604 | 2 5/8 | 2 | 20 | 4 1/2 | 6 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1/2 | 642 | 2 3/4 | 2 | 40 | 4 1/2 | 6 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 1/2 | 1,140 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 | 3 1/4 | 3 1/4 | 3 1/4 |
| 5/8 | 2,286 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 | 4 1/2 | 4 | 3 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE POWERS POWER-STUD +SD2 ANCHOR VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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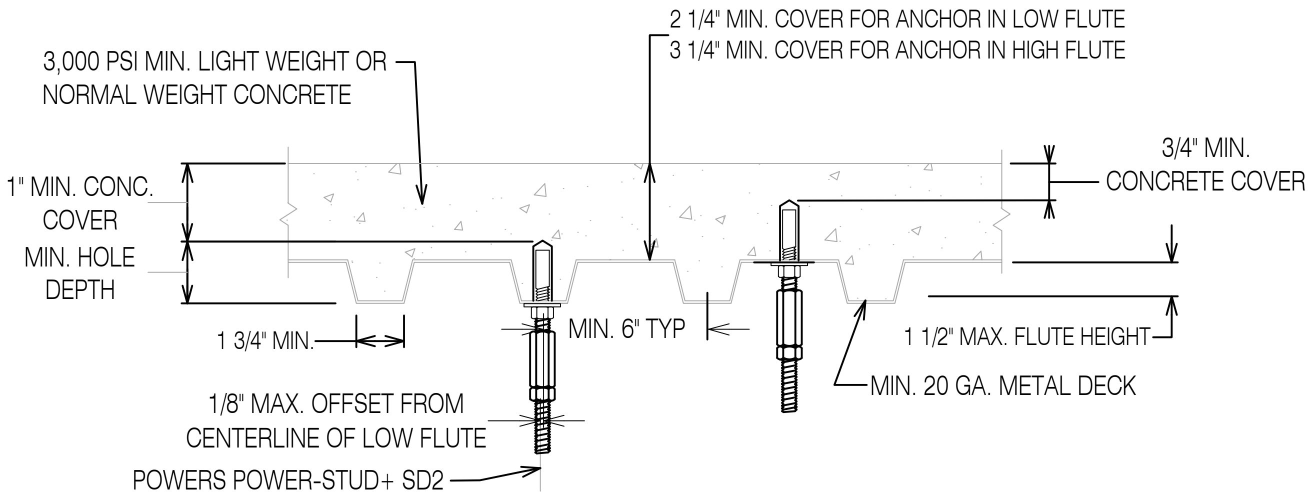

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5C.**

| Anchor Diameter Inch | Design Tension 3 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Minimum Concrete Thickness [5] Metal Deck Flute Height 1 1/2" |
|---|---|---|---|---|---|---|---|
| 3/8 | 475 | 2 5/8 | 2 | 20 | 4 1/2 | 6 | 2 1/4 |
| 1/2 | 545 | 2 3/4 | 2 | 40 | 4 1/2 | 6 | 2 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
4. BASED ON INSTALLATION IN LOWER FLUTE.

# SINGLE ANCHOR POWERS POWER-STUD+ SD2 VERTICAL SUPPORT CONNECTION IN 1.5" METAL DECK SLAB

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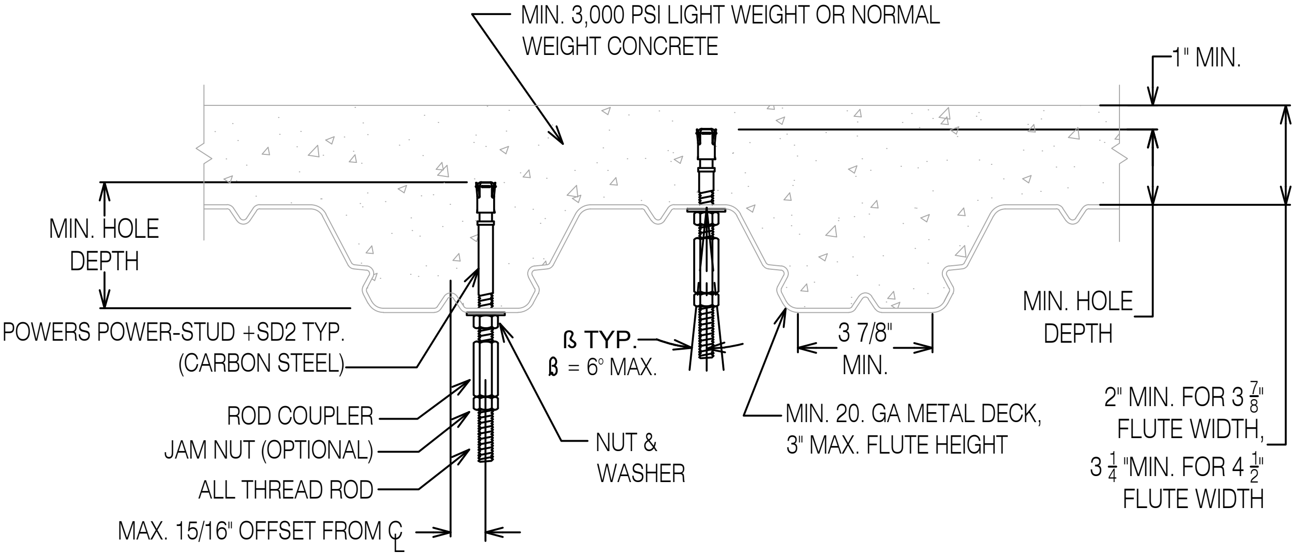

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2018), Table 1, Table 5 and Fig. 5B.**

| Anchor Diameter Inch | Design Tension 3 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch)$^3$ Metal Deck Flute Height 1 1/2" | 2" | 3" |
|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 549 | 2 5/8 | 2 | 20 | 4 1/2 | 6 3/4 | 2 1/8 | 2 | 2 |
| 1/2 | 556 | 2 3/4 | 2 | 40 | 4 1/2 | 6 3/4 | 2 1/4 | 2 | 2 |
| 1/2 | 987 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 | - | - | 2 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE POWERS POWER-STUD +SD2 ANCHOR VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE (SHALLOW TOPPING SLAB)

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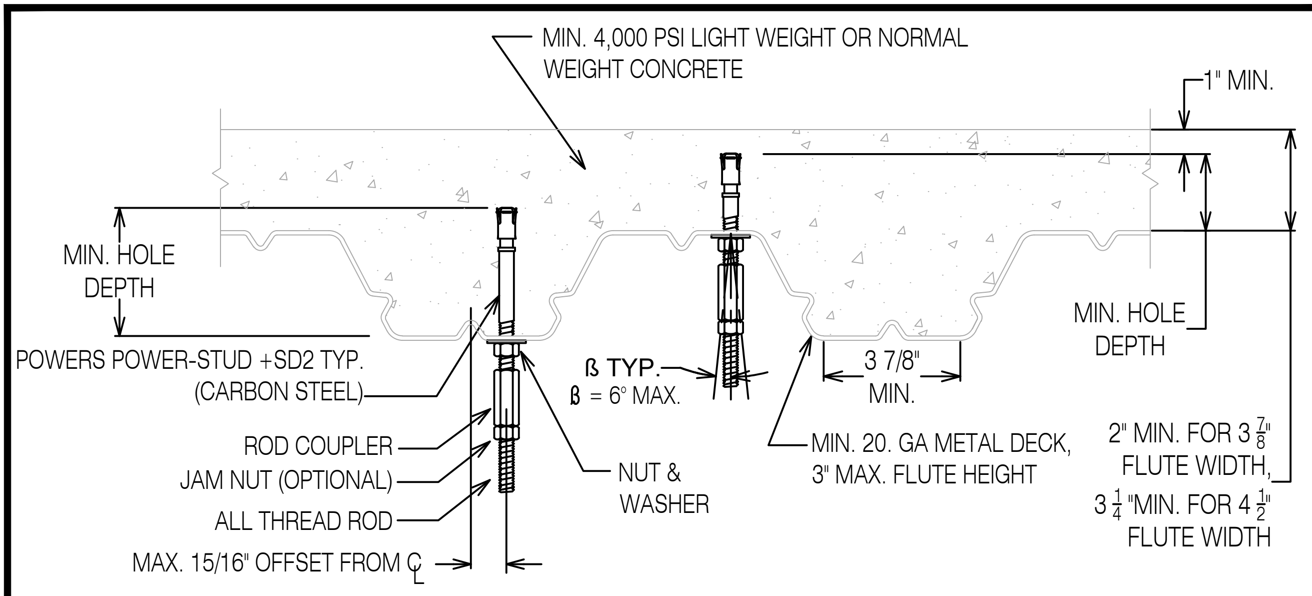

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2018), Table 1, Table 5 and Fig. 5B.**

| Anchor Diameter Inch | Design Tension 4 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch)$^3$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Metal Deck Flute Height | | |
| | | | | | | | 1 1/2" | 2" | 3" |
| 3/8 | 604 | 2 5/8 | 2 | 20 | 4 1/2 | 6 3/4 | 2 1/8 | 2 | 2 |
| 1/2 | 642 | 2 3/4 | 2 | 40 | 4 1/2 | 6 3/4 | 2 1/4 | 2 | 2 |
| 1/2 | 1,140 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 | - | - | 2 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE POWERS POWER-STUD +SD2 ANCHOR VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE (SHALLOW TOPPING SLAB)

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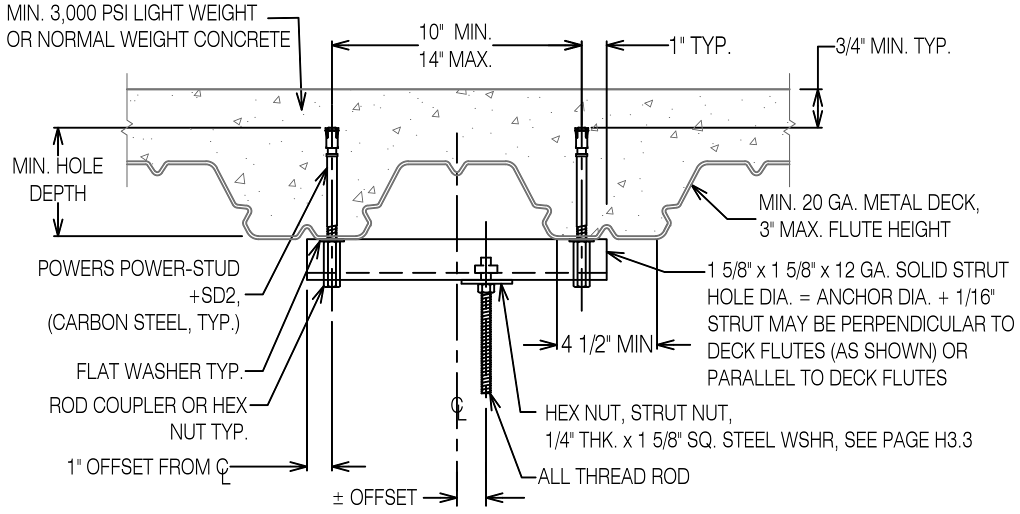

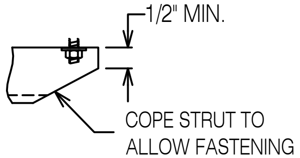

DETAIL B

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs. [2] Vertical Support Rod Max. Offset From C.L. CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 1,097 | 914 | 784 | 686 | 610 | 2 5/8 | 2 | 20 | 4 1/2 | 6 |
| 1/2 | 1,112 | 927 | 795 | 695 | 618 | 2 3/4 | 2 | 40 | 4 1/2 | 6 |
| 1/2 | 1,426 | 1,455 | 1,410 | 1,234 | 1,097 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 |
| 5/8 [3] | 1,426 | 1,455 | 1,552 | 1,747 | 2,117 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PG. H1, OR STRUT NUT PULL OUT STRENGTH, PG. H3.3.
3. USE DETAIL B. ANCHOR SPACING LESS THAN 12" IS ACCOUNTED FOR IN THE DESIGN VALUES SHOWN.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
6. REFER TO DETAIL G6.1SD2 FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL POWERS POWER-STUD +SD2 ANCHOR VERTICAL SUPPORT CONNECTION TO METAL DECK W/ CONCRETE

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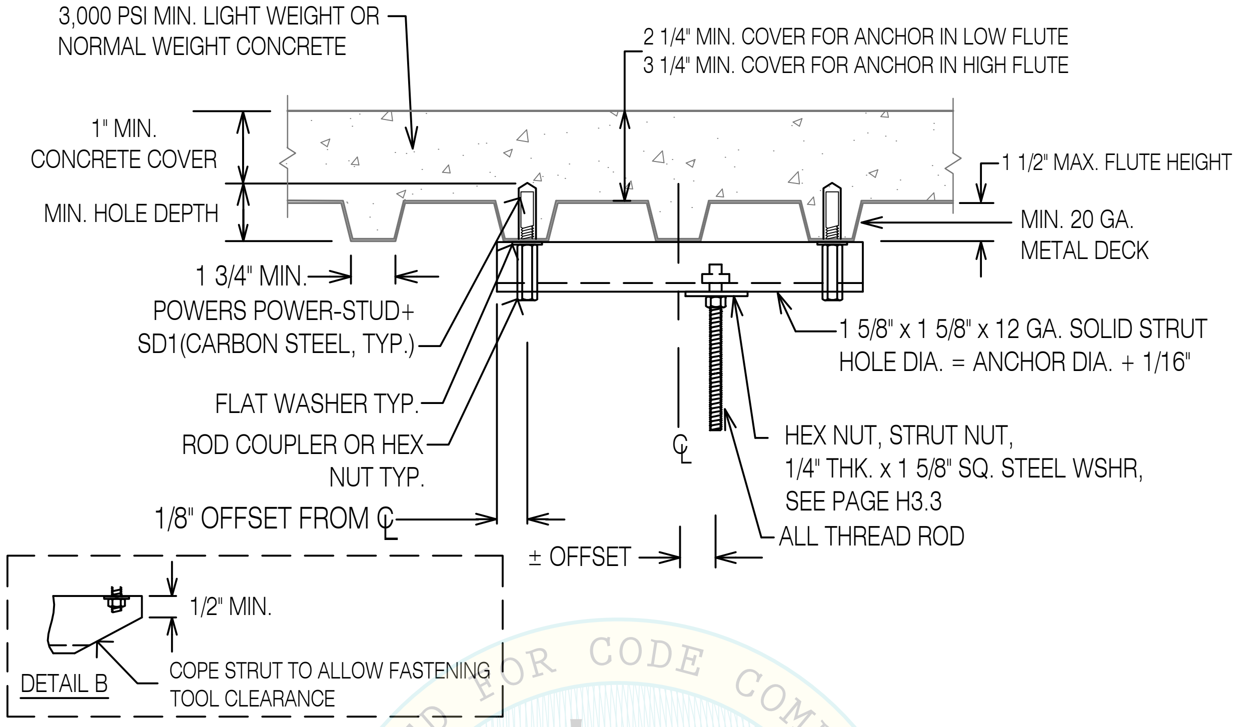

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5C.**

| Anchor Diameter | Two Anchor Connection Tension Design Value Lbs.[2] Vertical Offset From C.L. | | | | | Minimum Hole Depth | Minimum Effective Embed.[1] | Installation Torque | Minimum Edge Distance | Minimum Anchor Spacing |
|---|---|---|---|---|---|---|---|---|---|---|
| Inch | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | Inch | Inch | Ft-Lbs. | Inch | Inch |
| 3/8 | 949 | 814 | 712 | 633 | 570 | 2 5/8 | 2 | 20 | 4 1/2 | 2 5/8 |
| 1/2 | 1,090 | 934 | 817 | 726 | 654 | 2 3/4 | 2 | 40 | 4 1/2 | 2 5/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PG. H1, OR STRUT NUT PULLOUT STRENGTH, PG. H3.3.
3. USE DETAIL B. ANCHOR SPACING LESS THAN 12" IS ACCOUNTED FOR IN THE DESIGN VALUES SHOWN.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
6. REFER TO DETAIL G6.1SD2B FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL ANCHOR POWERS POWER-STUD+ SD2 VERTICAL SUPPORT CONNECTION IN 1.5" METAL DECK SLAB

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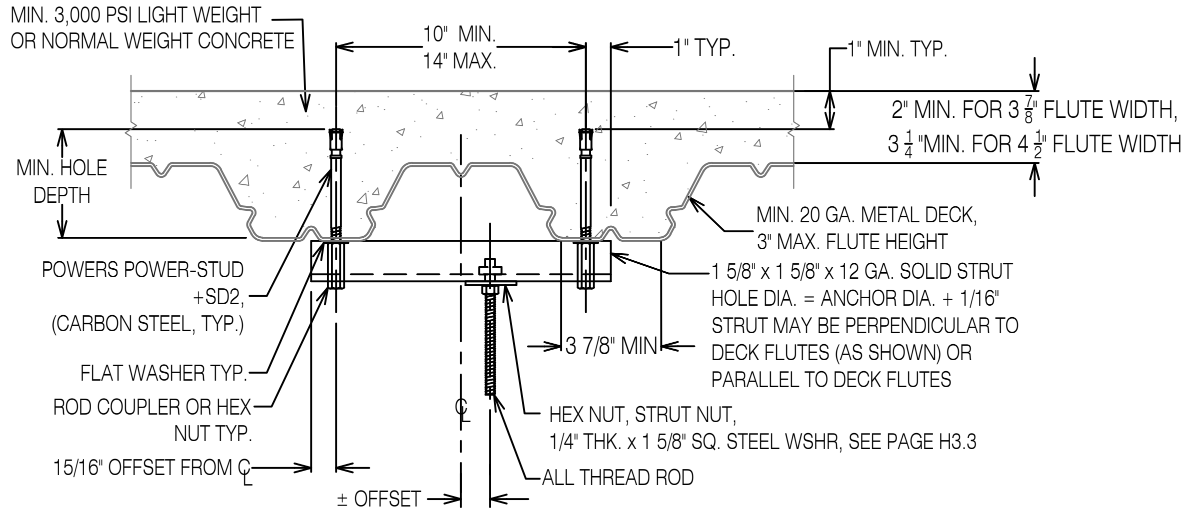

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2018), Table 1, Table 5 and Fig. 5B.**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs. [2] Vertical Support Rod Max. Offset From C.L. | | | | | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | | | | | |
| 3/8 | 1,097 | 914 | 784 | 686 | 610 | 2 5/8 | 2 | 20 | 4 1/2 | 6 |
| 1/2 | 1,112 | 927 | 795 | 695 | 618 | 2 3/4 | 2 | 40 | 4 1/2 | 6 |
| 1/2 | 1,426 | 1,455 | 1,410 | 1,234 | 1,097 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PG. H1, OR STRUT NUT PULL OUT STRENGTH, PG. H3.3.
3. ANCHOR SPACING LESS THAN 12" IS ACCOUNTED FOR IN THE DESIGN VALUES SHOWN.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND.

   THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
6. REFER TO DETAIL G6.1SD2S FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL POWERS POWER-STUD +SD2 ANCHOR VERTICAL SUPPORT CONNECTION TO METAL DECK W/ CONCRETE (SHALLOW TOPPING SLAB)

ANTHONY A. RUBALCAVA
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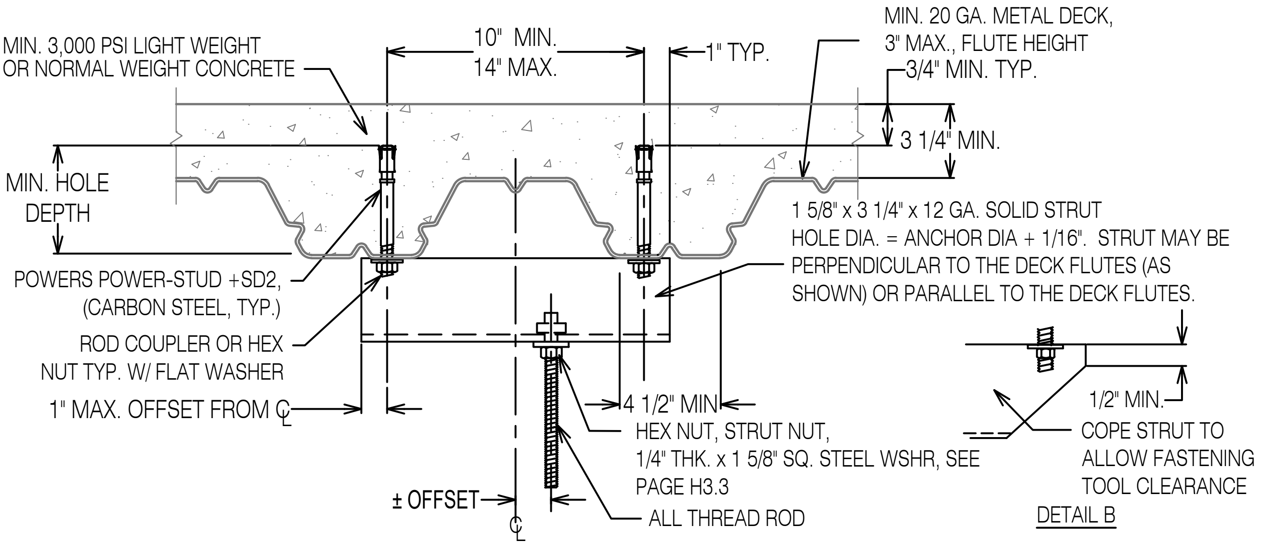

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2018), Table 1, Table 5 and Fig. 5A.**

| Anchor Diameter Inch | Two Anchor Connection<br>Tension Design Value Lbs.[2]<br>Vertical Support Rod Max. Offset From C.L. | | | | | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | | | | | |
| 1/2 | 1974 | 1645 | 1410 | 1234 | 1097 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 |
| 5/8[3] | 3250 | 3250 | 2829 | 2475 | 2200 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PG. H1, OR STRUT NUT PULL OUT STRENGTH, PG. H3.3.
3. USE DETAIL B.
4. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
5. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL POWERS POWER-STUD +SD2 ANCHOR
# WITH 1 5/8" x 3 1/4" STRUT
# VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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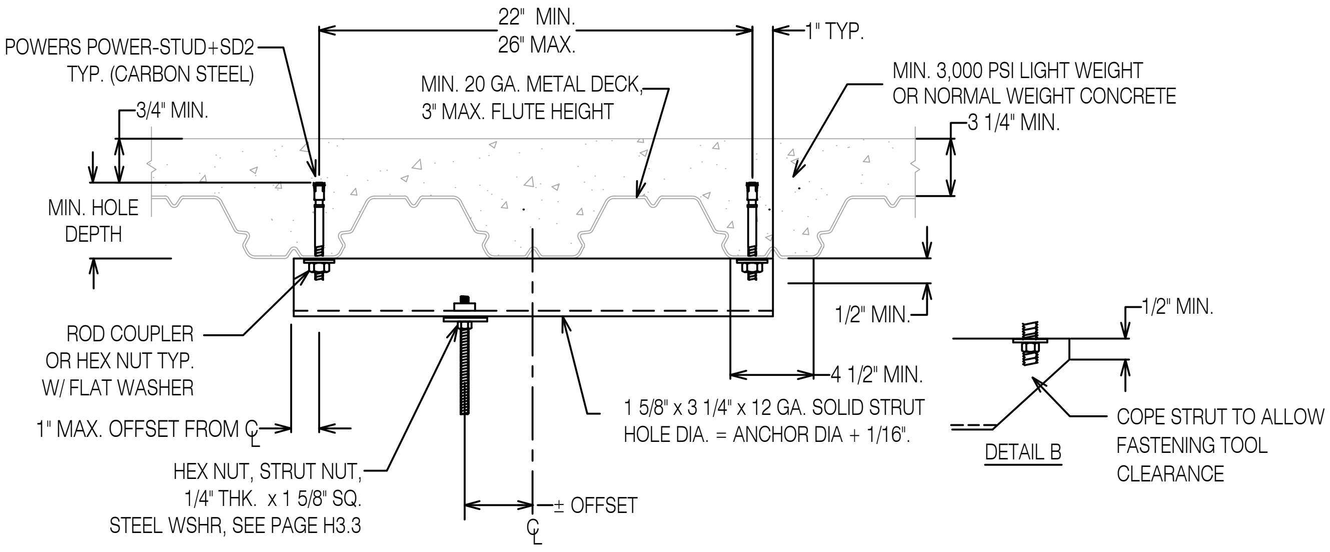

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2018), Table 1, Table 5 and Fig. 5A.**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs. [2] Vertical Support Rod Max. Offset From C.L. | | | | | | | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 4" | CL ± 6" | CL ± 8" | CL ± 10" | | | | | |
| 3/8 | 1,097 | 1,006 | 928 | 805 | 710 | 635 | 575 | 2 5/8 | 2 | 20 | 4 1/2 | 6 |
| 1/2 | 1,112 | 1,020 | 941 | 816 | 720 | 644 | 583 | 2 3/4 | 2 | 40 | 4 1/2 | 6 |
| 1/2 | 1,974 | 1,810 | 1,671 | 1,448 | 1,278 | 1,143 | 1,034 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 |
| 5/8[4] | 2,383 | 2,397 | 2,440 | 2,632 | 2,562 | 2,293 | 2,074 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
3. REFER TO DETAIL G6.1SD2 FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.
4. USE DETAIL B.
5. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# DUAL POWERS POWER-STUD +SD2
# WITH 1 5/8" x 3 1/4" LONG SPAN STRUT
# VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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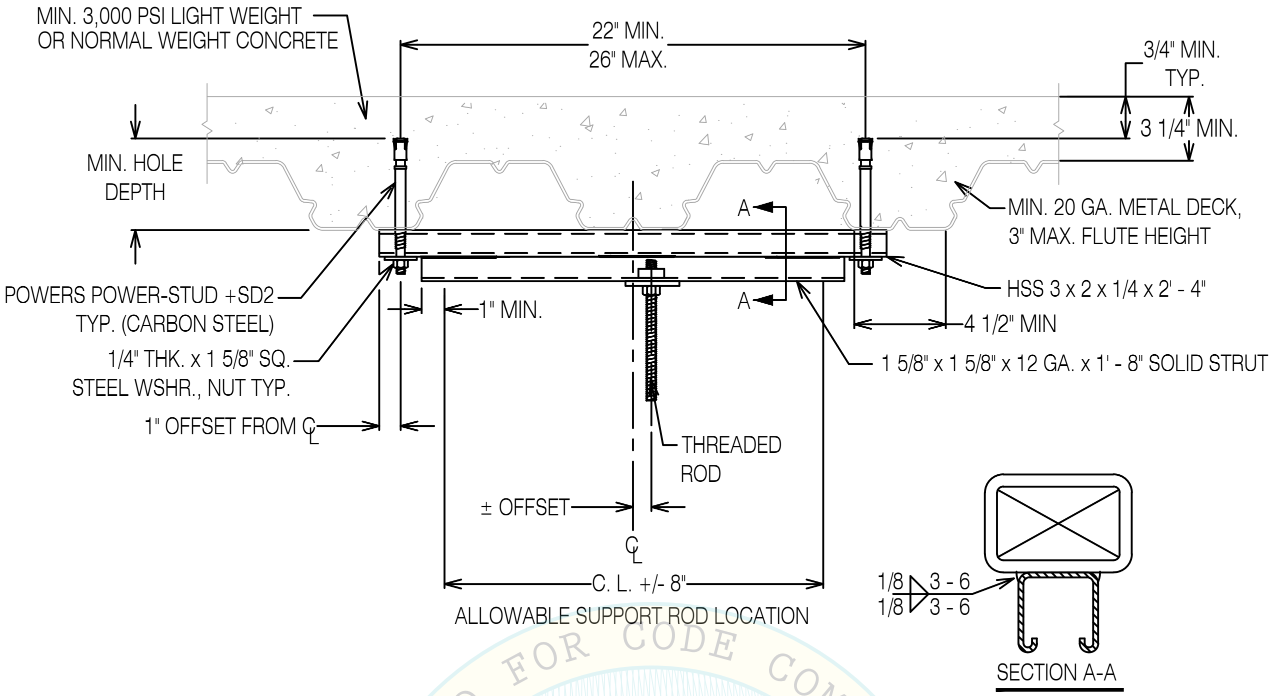

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2018), Table 1, Table 5 and Fig. 5A.**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs. [2, 3] Vertical Support Rod Max. Offset From C.L. | | | | | | | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 4" | CL ± 6" | CL ± 8" | CL ± 10" | | | | | |
| 5/8 | 3,250 | 3,250 | 3,250 | 2,904 | 2,562 | 2,293 | 2,074 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1, OR STRUT NUT PULL OUT STRENGTH, PAGE H3.3.
3. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
5. REFER TO DETAIL G6.1SD2 FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL POWERS POWER-STUD +SD2 ANCHOR WITH HSS BEAM VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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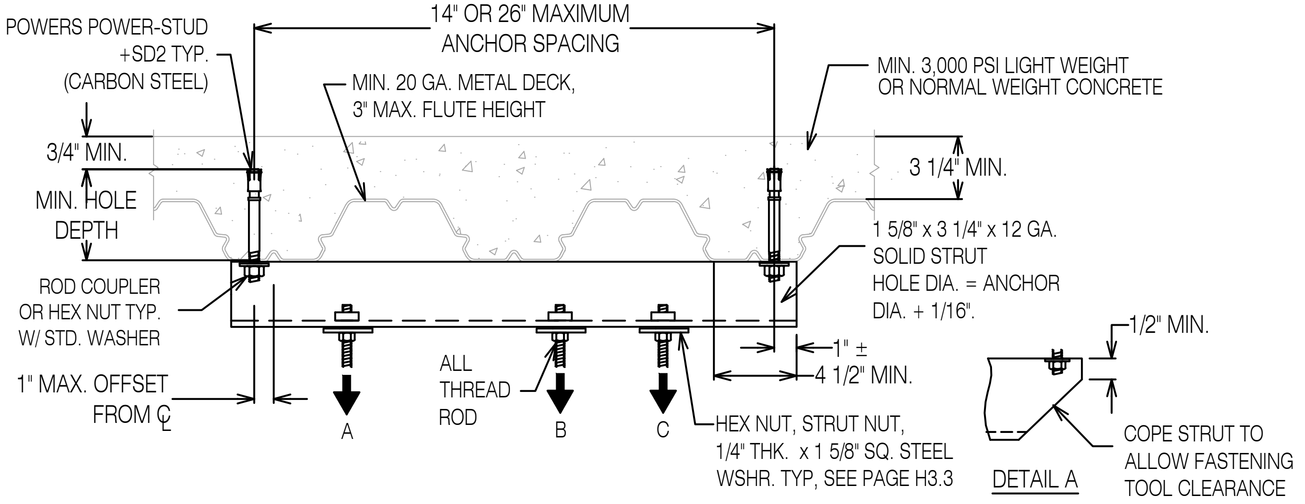

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Anchor Diameter Inch | Tension Value[2, 3] 14" Spacing Lbs | Tension Value[2, 3] 26" Spacing Lbs | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft - Lbs | Minimum Edge Distance Inch | Minimum Spacing Inch |
|---|---|---|---|---|---|---|---|
| 3/8 | 591 | 571 | 2 5/8 | 2 | 20 | 4 1/2 | 6 |
| 1/2 | 599 | 578 | 2 3/4 | 2 | 40 | 4 1/2 | 6 |
| 1/2 | 1,063 | 1,027 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 |
| 5/8[4] | 2,132 | 1,906 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 |

**LOADING NOTES:** SEE CHART FOR MAX ALLOWABLE LOAD. ANY NUMBER OF VERTICAL SUPPORT RODS MAY BE ATTACHED TO ABOVE ANCHORAGE, AT ANY LOCATION INBOARD OF ANCHORS.

**MAXIMUM LOADING EXAMPLES:**

a. MULTIPLE VERTICAL SUPPORTS @ LOCATIONS 'A', 'B' & 'C' W/ 3/8-INCH SD2 ANCHORS MAX TOTAL LOAD (A+B+C) = 527 LBS. WITH 14-INCH ANCHOR SPACING.

b. SINGLE VERTICAL SUPPORT @ ANY LOCATION W/ 1/2-INCH X 4-INCH HOLE DEPTH SD2 ANCHORS MAXIMUM LOAD = 917 LBS. WITH 26-INCH ANCHOR SPACING.

**NOTES:**

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ANCHOR ASSEMBLY MAY BE INSTALLED PARALLEL TO DECK FLUTE.
3. TENSION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PAGE H1 OR STRUT NUT PULL-OUT STRENGTH, PAGE H3.3.
4. USE DETAIL A.
5. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES ARE INSTALLED AT THE SAME LOCATION IN OPPOSING DIRECTIONS.
6. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
7. REFER TO DETAIL G6.1SD2 FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL POWERS POWER-STUD +SD2 MULTIPLE VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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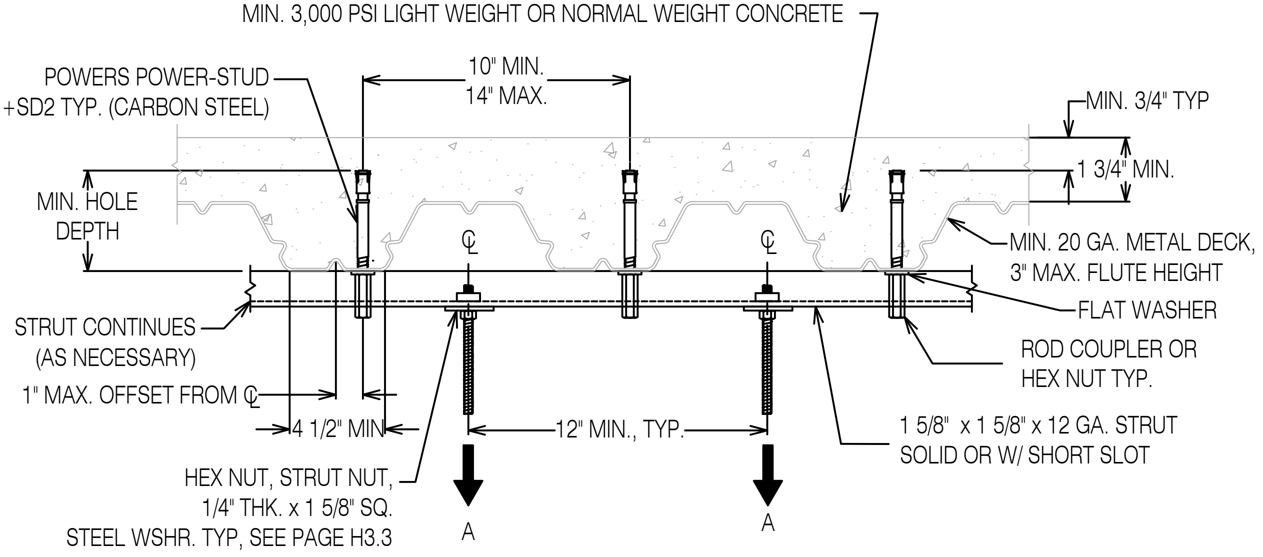

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Anchor Diameter Inch | Tension Design Value Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|
| 3/8 | 399 | 2 5/8 | 2 | 20 | 4 1/2 | 6 |
| 1/2 | 405 | 2 3/4 | 2 | 40 | 4 1/2 | 6 |
| 1/2 | 718 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 |
| 5/8 | 1440 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
4. REFER TO DETAIL G6.1SD2 FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# MULTIPLE POWERS POWER-STUD +SD2 ANCHOR VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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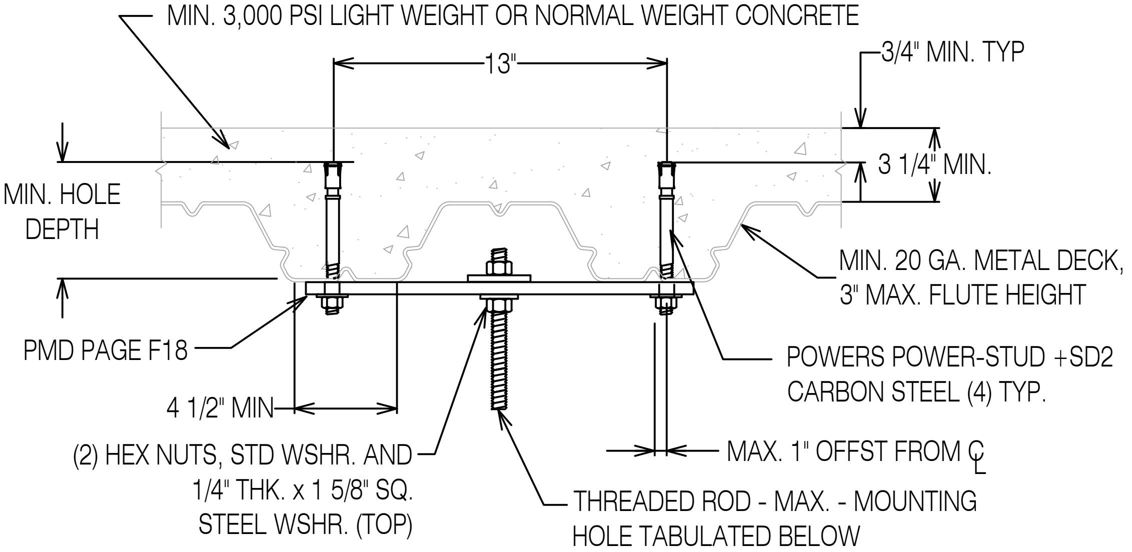

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Power-Stud+ SD2 Concrete Expansion Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2502 (Dated May 2017), Table 1, Table 5 and Fig. 5A.**

| Anchor Diameter Inch | Maximum Vertical Load Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed.[1] Inch | Installation Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Plate Number Page F18 | Maximum Rod Diameter Inch |
|---|---|---|---|---|---|---|---|---|
| 3/8 | 1,460 | 2 5/8 | 2 | 20 | 4 1/2 | 6 | G634 | 1/2 |
| 1/2 | 2,225 | 2 3/4 | 2 | 40 | 4 1/2 | 6 | G645 | 5/8 |
| 1/2 | 3,500 | 4 | 3 1/4 | 40 | 7 1/2 | 9 3/4 | G646 | 3/4 |
| 5/8 | 4,452 | 5 1/4 | 4 1/4 | 60 | 8 3/4 | 12 3/4 | G657 | 7/8 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
4. REFER TO DETAIL G6.1SD2 FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# 4-ANCHOR POWERS POWER-STUD +SD2
# VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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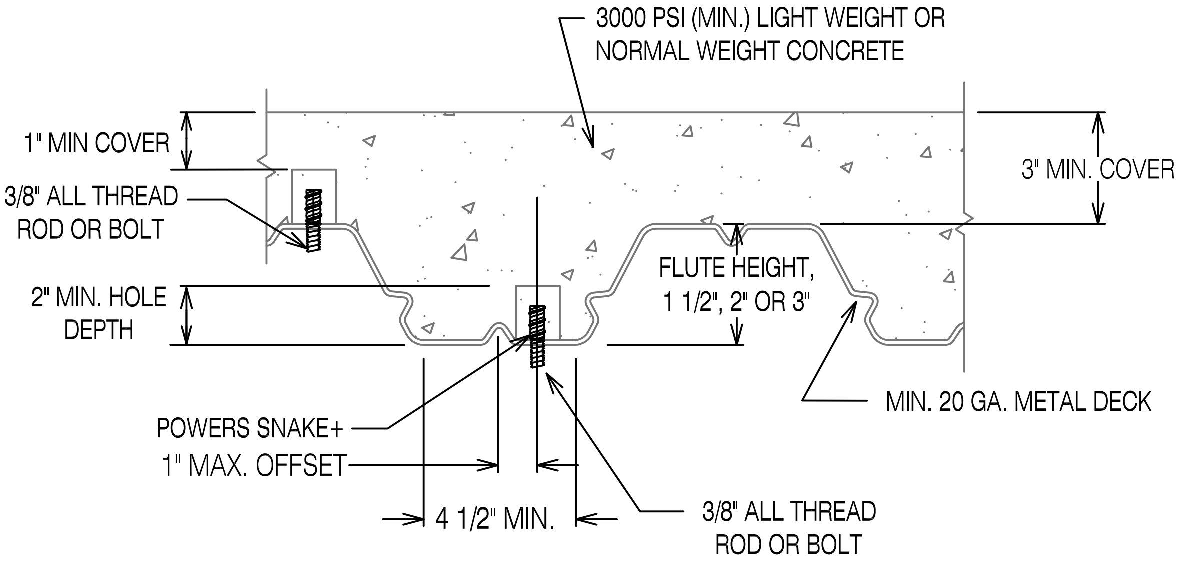

### SINGLE ANCHOR VERTICAL SUPPORT CONNECTION DETAILS

**Metal Deck With Minimum 3,000 psi Light Weight or Normal Weight Concrete**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Powers Snake+ Concrete Screw Anchor**
**ICC Report No. ESR-2272 (Dated Dec. 2016), Table 1 and Fig. 5.**
**Special Inspection Required By Manufacturer's ICC Report**

| Anchor Diameter Inch | Tension Design Value Lbs. | Minimum Hole Depth [1] Inch | Minimum Effective Embedment [2] Inch | Minimum Anchor Spacing Inch | Critical Edge Distance Inch | Screwdriver Installation Max. Torque Ft-Lbs. | Rod or Bolt Installation Max. Torque Ft-Lbs. | Min. Concrete Thickness Above Top Flute (Inch)<br>Metal Deck Flute Height | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 1 1/2" | 2" | 3" |
| 3/8 | 408 | 2 | 1 1/8 | 6 3/4 | 3 | 345 | 8 | 3 | 3 | 3 |

1. MINIMUM HOLE DEPTH IS TO BE VERIFIED BY THE INSPECTOR.
2. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
3. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND.
   THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.

# SINGLE ANCHOR POWERS SNAKE+
# FOR SEISMIC BRACE CONNECTION IN METAL DECK SLAB

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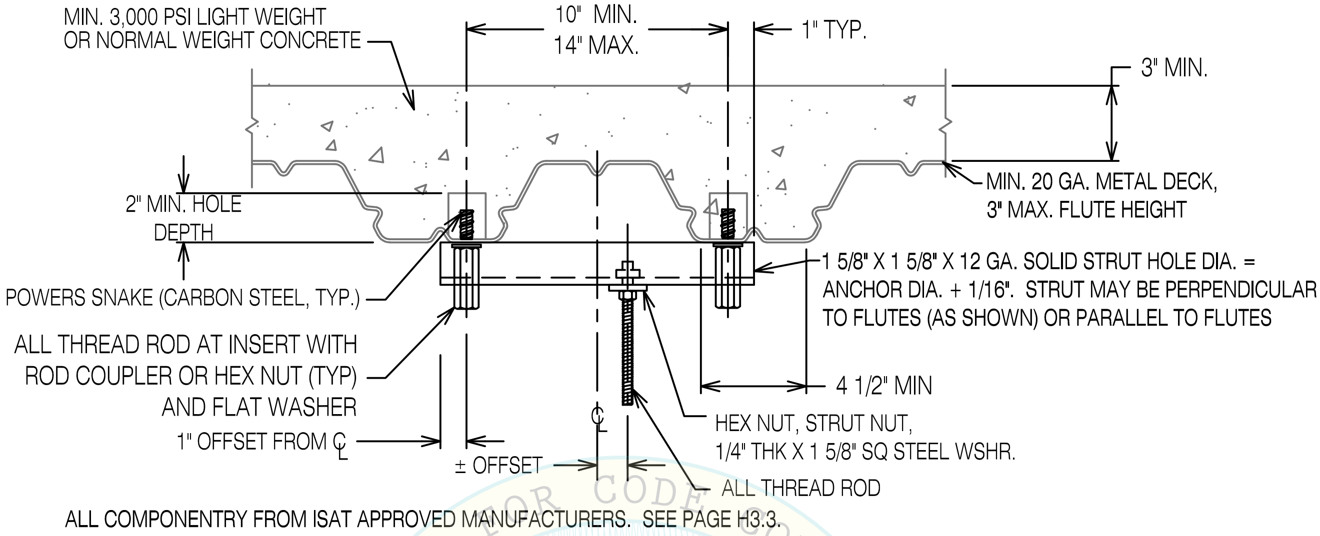

ALL COMPONENTRY FROM ISAT APPROVED MANUFACTURERS. SEE PAGE H3.3.

## DUAL ANCHOR VERTICAL SUPPORT CONNECTION DETAILS

**Metal Deck With Minimum 3000 psi Light Weight or Normal Weight Concrete**
**Seismically Qualified for Anchorage In Cracked Concrete**
**Powers Snake+ Concrete Screw Anchor**
**ICC Report No. ESR-2272 (Dated Dec. 2016), Table 1**
**Special Inspection Required by Manufacturer's ICC Report**

| Anchor Diameter Inch | Minimum Hole Depth [1] Inch | Minimum Effective Embedment [2] Inch | Minimum Concrete Thickness Inch | Screwdriver Installation Max. Torque Ft-Lbs. | Rod or Bolt Installation Max. Torque Ft-Lbs. | Minimum Anchor Spacing Inch | Minimum Edge Distance Inch | Two Anchor Connection<br>Tension Design Value Lbs.<br>Vertical Support Rod Max. Offset From C.L.<br>CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 2 | 1 1/8 | 4 | 345 | 8 | 6 3/4 | 3 | 816 | 680 | 583 | 510 | 454 |

1. MINIMUM HOLE DEPTH IS TO BE VERIFIED BY THE INSPECTOR.
2. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
3. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND.
THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.

# DUAL POWERS SNAKE+ VERTICAL SUPPORT CONNECTION

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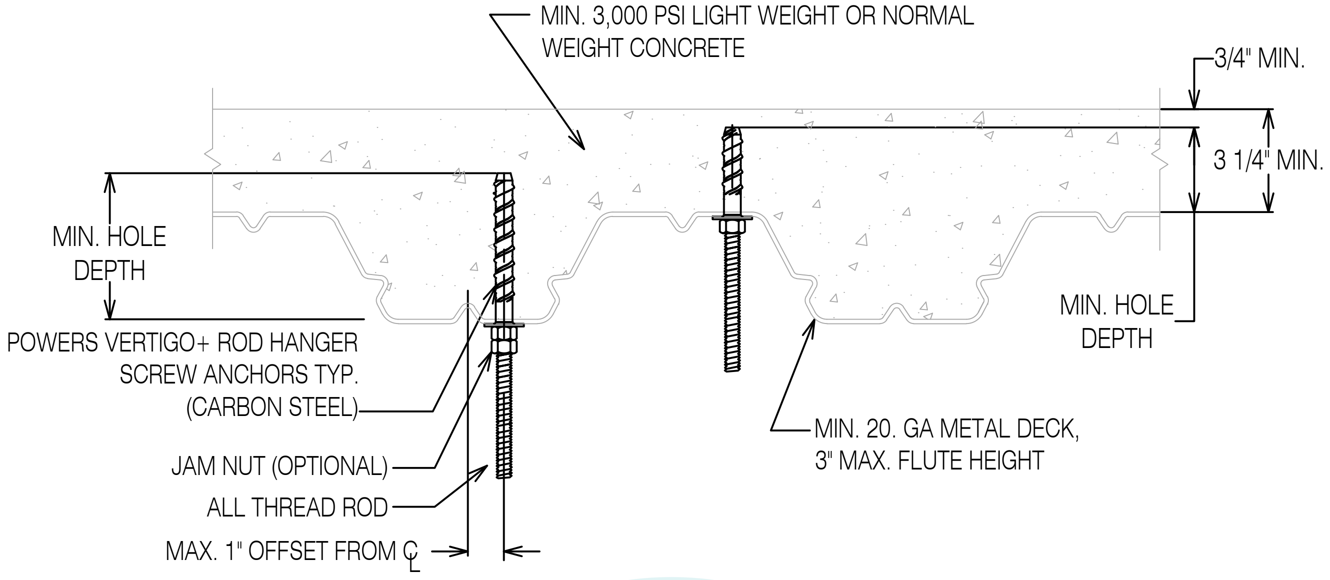

**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Vertigo+ Screw Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2526 (Dated June 2016), Table 4, 5 and 6**

| Anchor Diameter Inch | Design Tension 3 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Max. Impact Wrench Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch)3 | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Metal Deck Flute Height | | |
| | | | | | | | 1 1/2" | 2" | 3" |
| 1/4 | 535 | 2 1/2 | 1.425 | 185 | 4 1/2 | 6 3/4 | 2 1/4 | 2 1/4 | 2 1/4 |
| 3/8 | 535 | 2 1/2 | 1.425 | 185 | 4 1/2 | 6 3/4 | 2 1/4 | 2 1/4 | 2 1/4 |
| 1/2 | 535 | 2 1/2 | 1.425 | 185 | 7 1/2 | 6 3/4 | 2 1/4 | 2 1/4 | 2 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE POWERS VERTIGO+ ROD HANGER SCREW ANCHOR VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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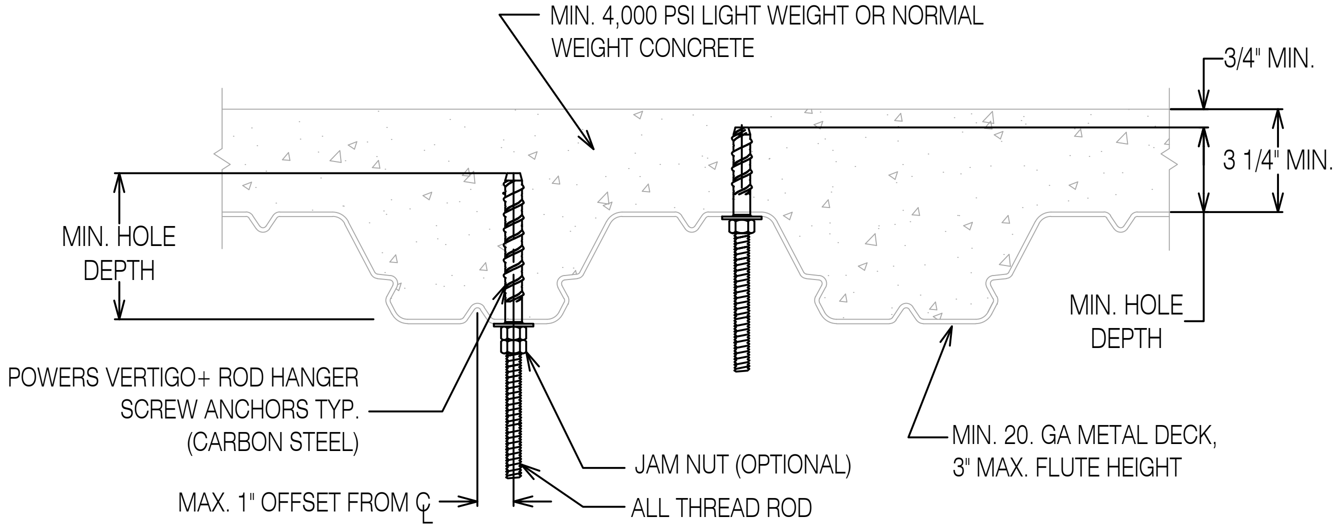

**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Vertigo+ Screw Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-2526 (Dated June 2016), Table 4, 5 and 6**

| Anchor Diameter Inch | Design Tension 4 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Max. Impact Wrench Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness Above Top Flute (Inch)$^3$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Metal Deck Flute Height | | |
| | | | | | | | 1 1/2" | 2" | 3" |
| 1/4 | 618 | 2 1/2 | 1.425 | 185 | 4 1/2 | 6 3/4 | 2 1/4 | 2 1/4 | 2 1/4 |
| 3/8 | 618 | 2 1/2 | 1.425 | 185 | 4 1/2 | 6 3/4 | 2 1/4 | 2 1/4 | 2 1/4 |
| 1/2 | 618 | 2 1/2 | 1.425 | 185 | 7 1/2 | 6 3/4 | 2 1/4 | 2 1/4 | 2 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. BASED ON INSTALLATION IN LOW FLUTE.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.

# SINGLE POWERS VERTIGO+ ROD HANGER SCREW ANCHOR VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

ANTHONY A. RUBALCAVA
S 4710

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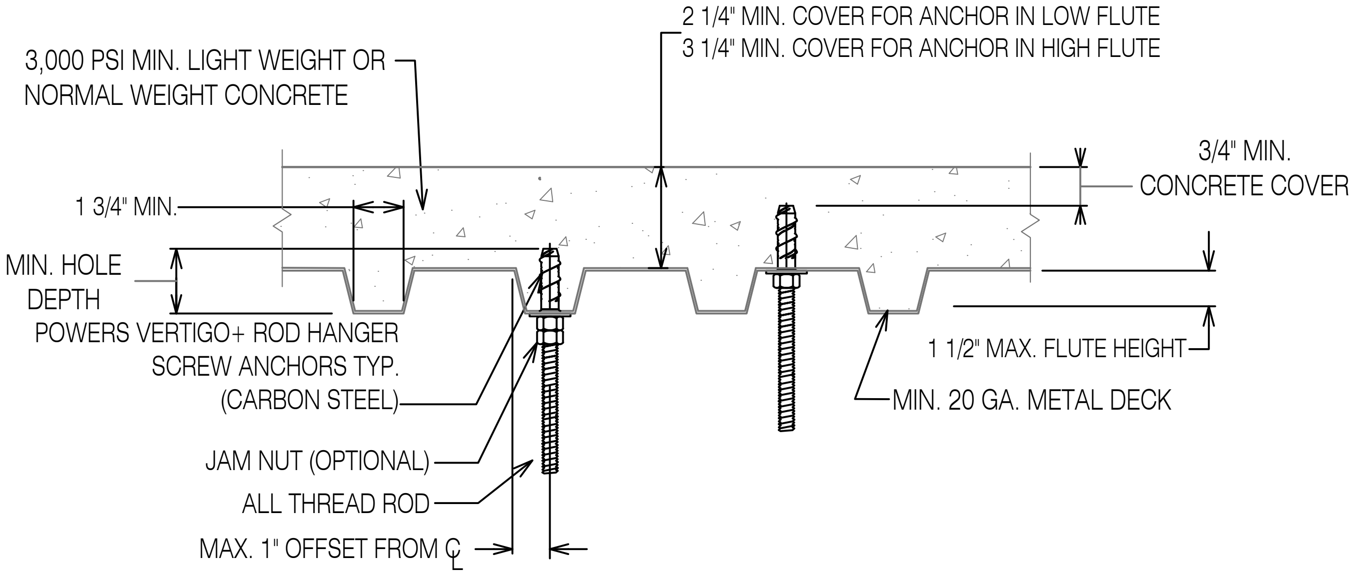

**Seismically Qualified for Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Vertigo+ Screw Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2526 (Dated June 2016), Table 4, 5 and 6**

| Anchor Diameter Inch | Design Tension 3 ksi Conc Lbs. | Minimum Hole Depth Inch | Minimum Effective Embed. Inch | Max. Impact Wrench Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch | Min. Concrete Thickness $^5$ Metal Deck Flute Height 1 1/2" |
|---|---|---|---|---|---|---|---|
| 1/4 | 513 | 2 1/2 | 1.425 | 185 | 1 1/2 | 4.275 | 2 1/4 |
| 3/8 | 535 | 2 1/2 | 1.425 | 185 | 1 1/2 | 4.275 | 2 1/4 |
| 1/2 | 535 | 2 1/2 | 1.425 | 185 | 1 1/2 | 4.275 | 2 1/4 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR W HERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
3. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
4. BASED ON INSTALLATION IN LOWER FLUTE.

# SINGLE POWERS VERTIGO+ ROD HANGER SCREW ANCHOR VERTICAL SUPPORT CONNECTION TO B DECK W/CONCRETE

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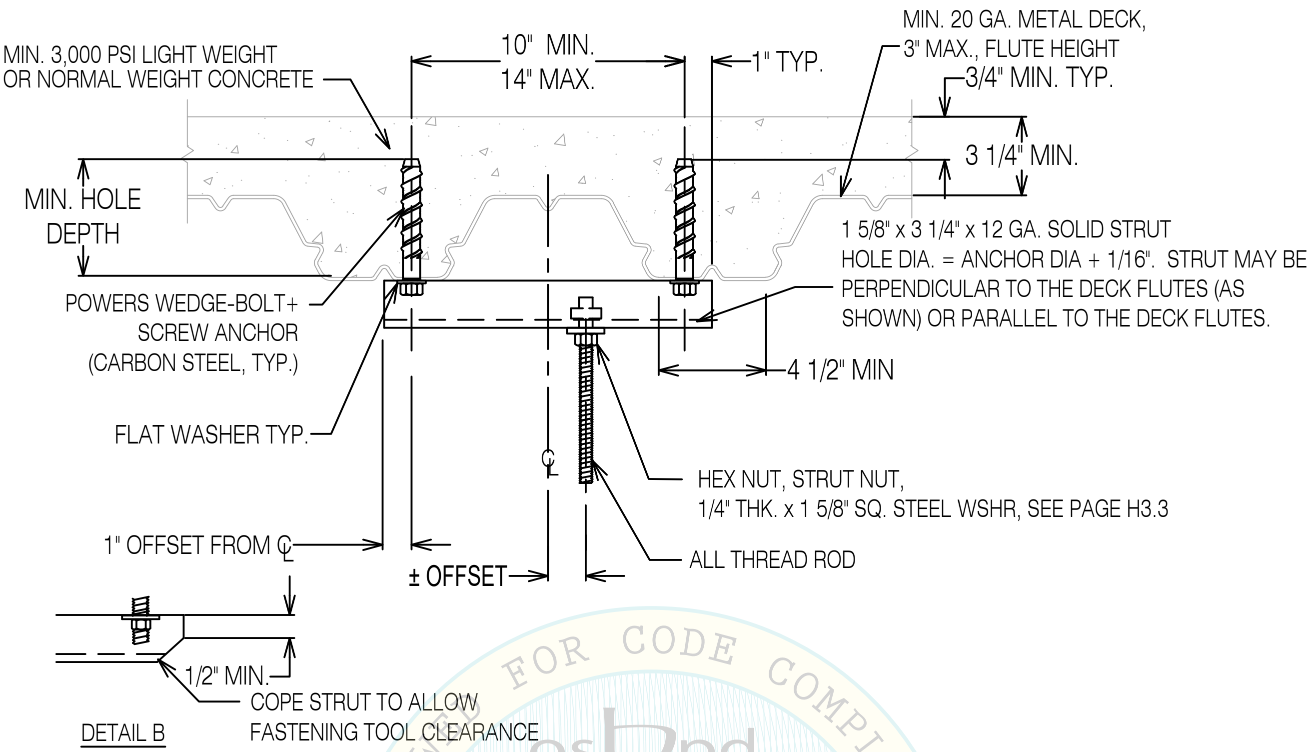

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 3000 psi LWC**
**ICC Report No. ESR-2526 (Dated June 2017), Table 1, 2 and 3, and Fig. 5**

| Anchor Diameter Inch | Two Anchor Connection | | | | | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Max. Impact Wrench Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tension Design Value Lbs. [2] Vertical Support Rod Max. Offset From C.L. | | | | | | | | | |
| | CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | | | | | |
| 3/8 | 1,082 | 902 | 773 | 676 | 601 | 2 1/4 | 1.43 | 245 | 4 1/2 | 6.75 |
| 1/2 | 1,333 | 1,111 | 952 | 833 | 740 | 2 3/4 | 1.65 | 300 | 4 1/2 | 6.75 |
| 1/2 | 1,333 | 1,111 | 952 | 833 | 740 | 4 | 2.50 | 300 | 7 1/2 | 7.50 |
| 5/8[3] | 1,426 | 1,455 | 1,446 | 1,265 | 1,124 | 5 | 3.10 | 350 | 8 3/4 | 9.30 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PG. H1, OR STRUT NUT PULL OUT STRENGTH, PG. H3.3.
3. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
5. REFER TO DETAIL D2.1WB FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL POWERS WEDGE-BOLT+ SCREW ANCHOR W/ 1 5/8" x 1 5/8" STRUT VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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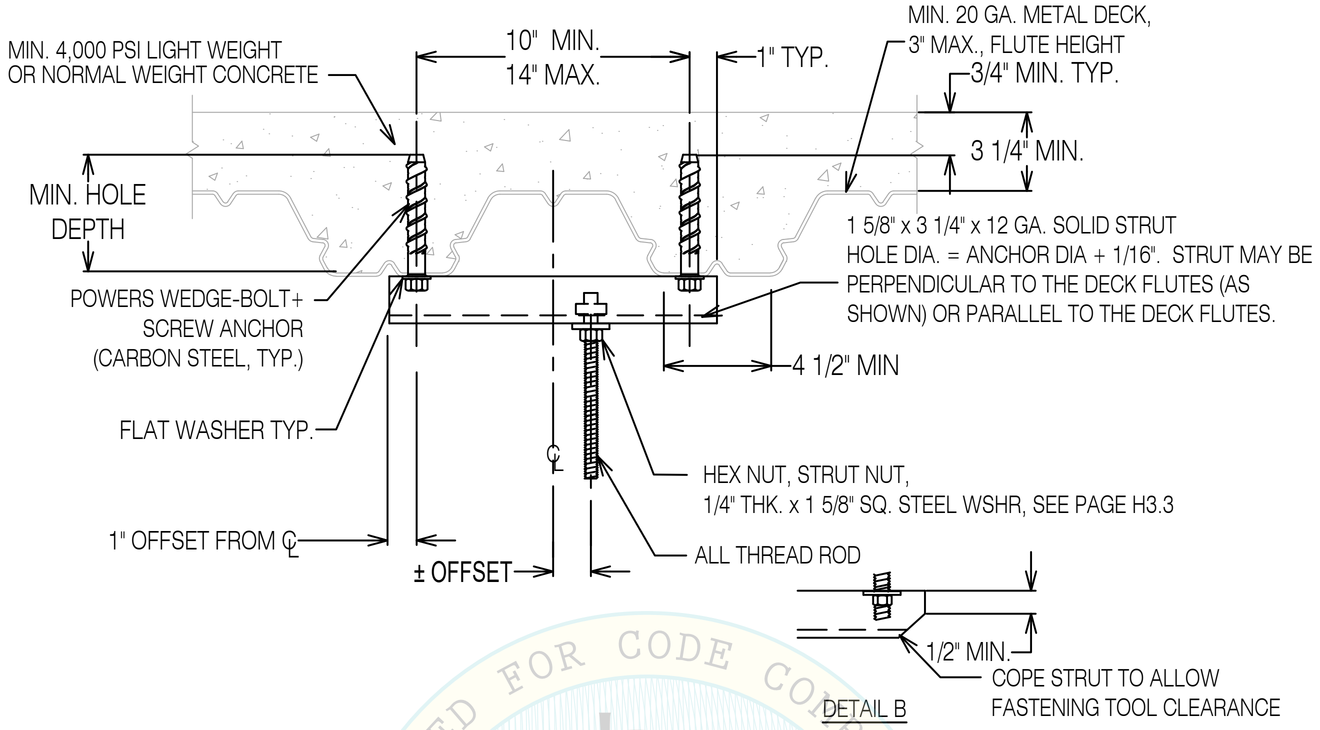

**Seismically Qualified For Anchorage In Cracked Concrete**
**Seismic Design Categories D, E and F**
**Powers Wedge-Bolt+ Screw Anchor, Minimum 4000 psi LWC**
**ICC Report No. ESR-2526 (Dated June 2017), Table 1, 2 and 3, and Fig. 5**

| Anchor Diameter Inch | Two Anchor Connection Tension Design Value Lbs. [2] Vertical Support Rod Max. Offset From C.L. CL ± 0" | CL ± 1" | CL ± 2" | CL ± 3" | CL ± 4" | Minimum Hole Depth Inch | Minimum Effective Embed. [1] Inch | Max. Impact Wrench Torque Ft-Lbs. | Minimum Edge Distance Inch | Minimum Anchor Spacing Inch |
|---|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 1,250 | 1,041 | 893 | 781 | 694 | 2 1/4 | 1.43 | 245 | 4 1/2 | 6.75 |
| 1/2 | 1,426 | 1,282 | 1,099 | 962 | 855 | 2 3/4 | 1.65 | 300 | 4 1/2 | 6.75 |
| 1/2 | 1,426 | 1,282 | 1,099 | 962 | 855 | 4 | 2.50 | 300 | 7 1/2 | 7.50 |
| 5/8[3] | 1,426 | 1,455 | 1,552 | 1,461 | 1,298 | 5 | 3.10 | 350 | 8 3/4 | 9.30 |

1. MINIMUM EFFECTIVE EMBEDMENT IS AFTER THE ANCHOR HAS BEEN SET.
2. CONNECTION DESIGN VALUE MAY BE LIMITED BY ROD STRENGTH, PG. H1, OR STRUT NUT PULL OUT STRENGTH, PG. H3.3.
3. ROD LOCATIONS WITH SINGLE, RIGID BRACE CONNECTIONS REQUIRE ADDITIONAL SEISMIC LOAD CONSIDERATIONS BEFORE APPLYING THE ABOVE VALUES. REFER TO PROJECT SPECIFIC ISAT BRACING LEGEND. THIS LOAD INCREASE DOES NOT APPLY TO CABLE BRACES OR WHERE TWO RIGID BRACES CONNECTED TO A COMMON ROD ARE INSTALLED IN OPPOSING DIRECTIONS.
4. LOAD VALUES SHOWN ARE ALLOWABLE STRESS DESIGN (ASD). CAPACITIES DERIVED IN CONFORMANCE WITH ASCE 7-10, PIN 62 & ACI 318-11, Appendix D.
5. REFER TO DETAIL D2.1WB FOR MINIMUM CONCRETE THICKNESS ABOVE TOP FLUTE.

# DUAL POWERS WEDGE-BOLT+ SCREW ANCHOR W/ 1 5/8" x 1 5/8" STRUT VERTICAL SUPPORT CONNECTION TO METAL DECK W/CONCRETE

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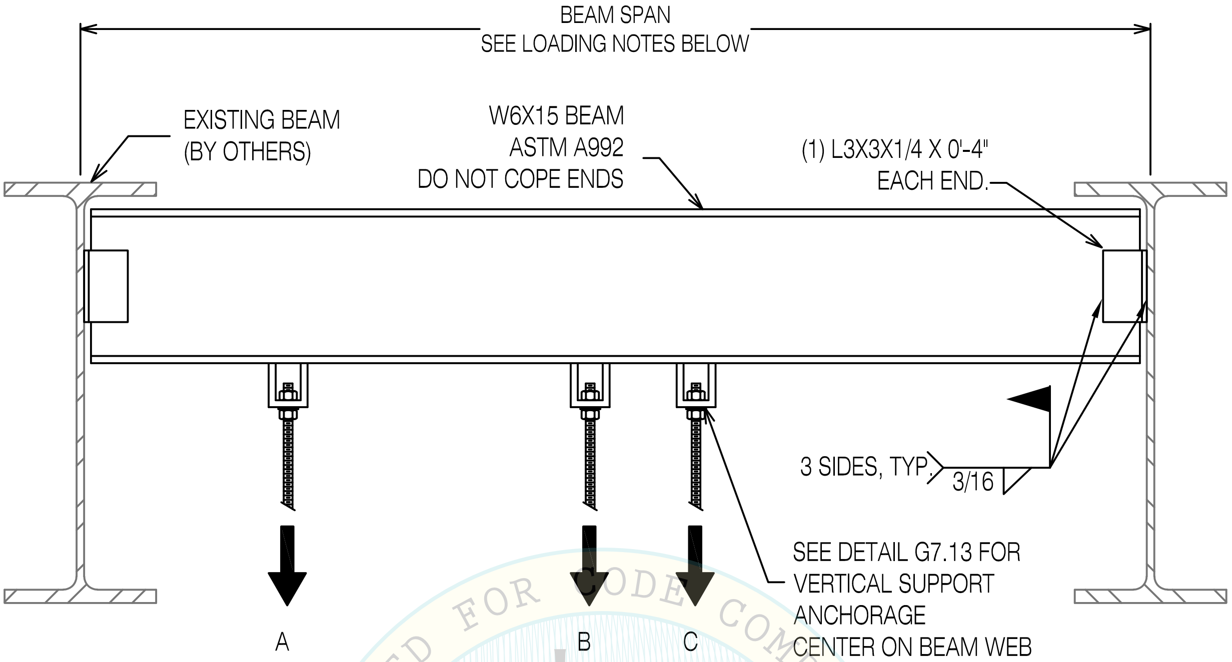

LOADING NOTES:

1. BEAM SPAN = 10' THE MAXIMUM ALLOWABLE LOAD = 10,000 LBS (TOTAL LOADING).
2. BEAM SPAN = 15' THE MAXIMUM ALLOWABLE LOAD = 5,000 LBS (TOTAL LOADING).
3. ANY NUMBER OF VERTICAL SUPPORT RODS MAY BE ATTACHED AT ANY LOCATION ALONG THE BOTTOM FLANGE OF BEAM. LOADS ARE TO BE CENTERED ON THE W6 BEAM WEB.

CONNECTION NOTES:

1. W6 SUPPLEMENTAL BEAM MAY BE SET AT ANY ELEVATION WITHIN THE DEPTH OF THE BEAM (DO NOT COPE ENDS).
2. W6 MAY BE PLACED ON TOP OF THE TOP FLANGE WITH 3" MINIMUM BEARING ON EACH END. USE (2) 3/16" X 2" FILLET WELDS AT THE W6 FLANGE EDGES.
3. W6 MAY BE PLACED AT THE BOTTOM OF THE BOTTOM FLANGE WITH 3" OF OVERLAP ON EACH END. USE 3/16" FILLET WELDS ALL AROUND.

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS FOR THE ACTUAL LOADING COMBINATIONS.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

# WIDE FLANGE BEAM
# SUPPLEMENTAL STEEL VERTICAL SUPPORT DETAIL

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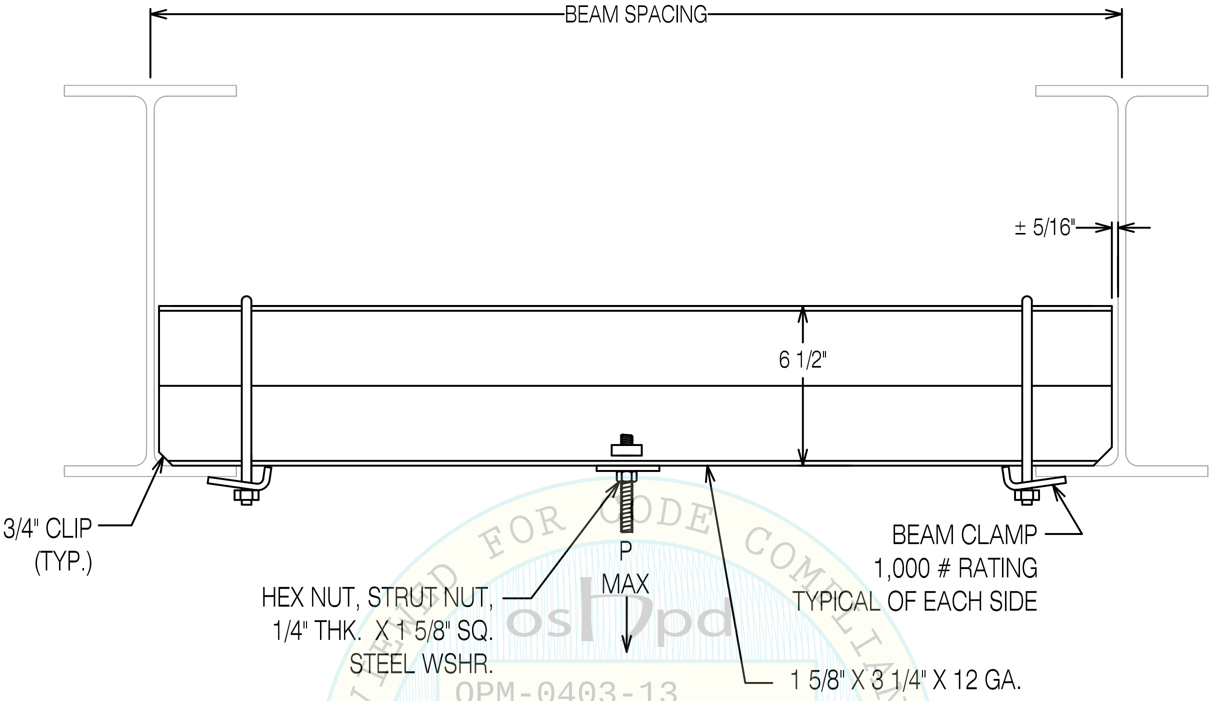

LOADING NOTES:

1. FOR 10'-0" BEAM SPACING, PMAX = 800# AT ANY LOCATION (700# FOR STRUT WITH SHORT SLOTS)
2. FOR 8'-0" BEAM SPACING , PMAX = 1000# AT ANY LOCATION (SOLID OR WITH SHORT SLOTS)
   = 1300# IN CENTER ±2'-0" FOR SOLID STRUT (1100# FOR SHORT SLOTS)
3. FOR 6'-0" BEAM SPACING , PMAX = 1000# AT ANY LOCATION (SOLID OR WITH SHORT SLOTS)
   = 1500# IN CENTER ±1'-0" (SOLID OR WITH SHORT SLOTS)

CONNECTION NOTES:

STRUT MAY BE PLACED ON THE TOP OF THE BOTTOM FLANGE (AS SHOWN), ON TOP OF THE TOP FLANGE, OR HUNG FROM EITHER THE TOP OR BOTTOM FLANGES.

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS FOR THE ACTUAL LOADING COMBINATIONS.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

# 1 5/8" x 3 1/4" BACK TO BACK STRUT VERTICAL SUPPORT CONNECTION

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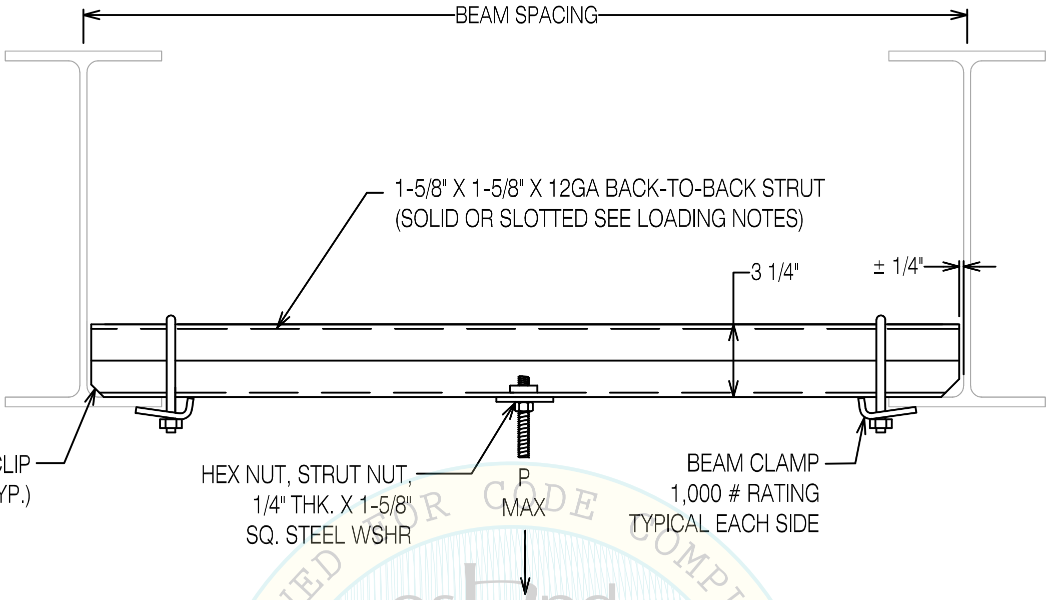

LOADING NOTES:

1. FOR 6'-0" BEAM SPACING PMAX = 700# AT ANY LOCATION FOR SOLID STRUT (PMAX = 600# FOR STRUT WITH SHORT SLOTS)
2. FOR 8'-0" BEAM SPACING PMAX = 500# AT ANY LOCATION FOR SOLID STRUT (PMAX = 400# FOR STRUT WITH SHORT SLOTS)
3. FOR 10'-0" BEAM SPACING PMAX = 350# AT ANY LOCATION FOR SOLID STRUT (PMAX = 300# FOR STRUT WITH SHORT SLOTS)

CONNECTION NOTES:

STRUT MAY BE PLACED ON THE TOP OF THE BOTTOM FLANGE (AS SHOWN) ON TOP OF THE TOP FLANGE OR HUNG FROM EITHER THE TOP OF BOTTOM FLANGES.

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS FOR THE ACTUAL LOADING COMBINATIONS.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

# 1 5/8" x 1 5/8" BACK TO BACK STRUT VERTICAL SUPPORT CONNECTION

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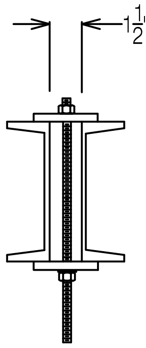
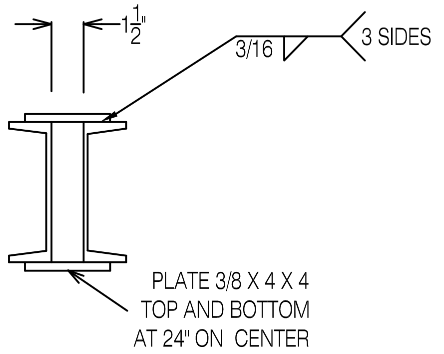
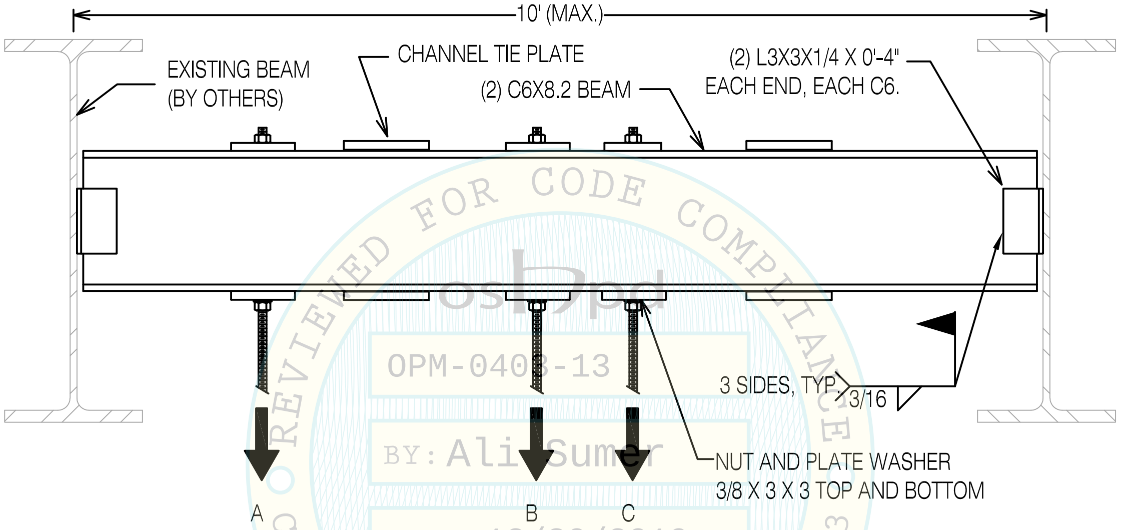


SUPPORT ROD DETAIL



CHANNEL TIE PLATE DETAIL



LOADING NOTES:

MAXIMUM ALLOWABLE LOAD =
4,000 LBS (TOTAL LOADING) FOR A 10' CHANNEL SPAN
6,000 LBS (TOTAL LOADING) FOR A 8' CHANNEL SPAN
9,000 LBS (TOTAL LOADING) FOR A 6' CHANNEL SPAN

CONNECTION NOTES:

1. ANY NUMBER OF VERTICAL SUPPORT RODS MAY BE ATTACHED TO ABOVE ANCHORAGE AT ANY LOCATION.
2. ROD EXTENDS TO THE TOP FLANGE FOR THE CHANNELS.
3. C6 SUPPLEMENTAL BEAMS MAY BE SET AT ANY ELEVATION WITHIN THE DEPTH OF THE BEAM (DO NOT COPE ENDS).

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS FOR THE ACTUAL LOADING COMBINATIONS.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

# (2)C6X8.2 STEEL CHANNELS (ASTM A36)
# SUPPLEMENTAL STEEL VERTICAL SUPPORT DETAIL

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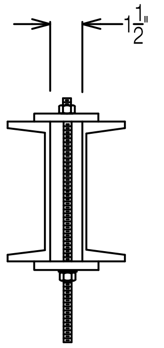
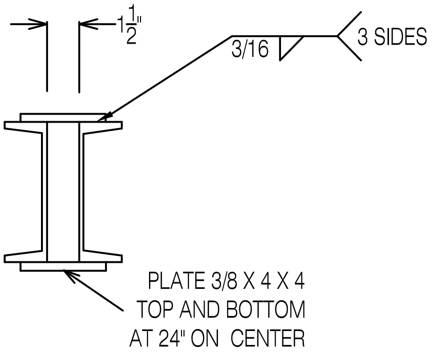
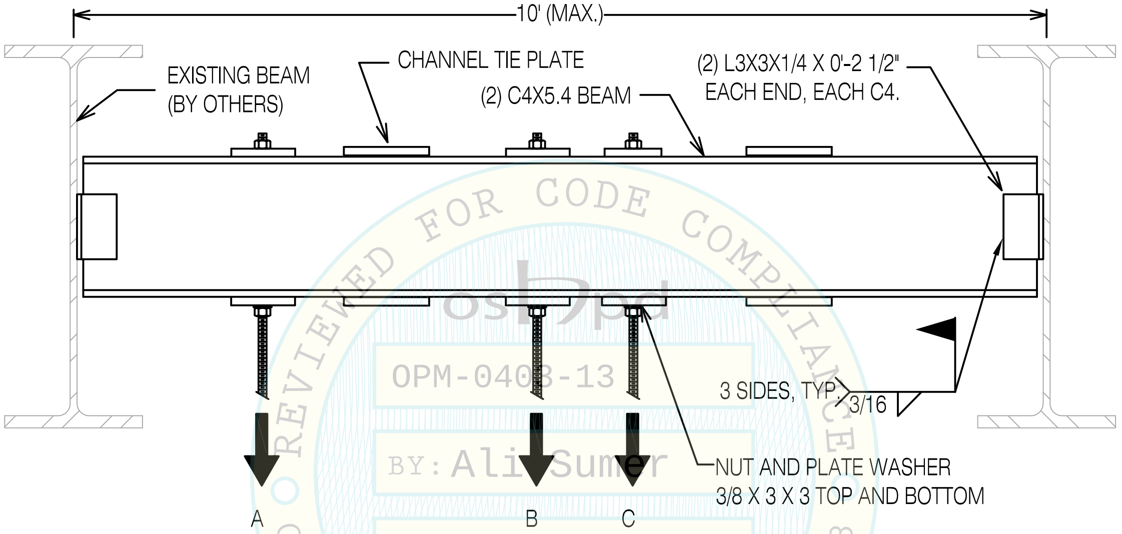


SUPPORT ROD DETAIL



CHANNEL TIE PLATE DETAIL



LOADING NOTES:

MAXIMUM ALLOWABLE LOAD =
1,750 LBS (TOTAL LOADING) FOR A 10' CHANNEL SPAN
2,500 LBS (TOTAL LOADING) FOR A 8' CHANNEL SPAN
4,000 LBS (TOTAL LOADING) FOR A 6' CHANNEL SPAN

CONNECTION NOTES:

1. ANY NUMBER OF VERTICAL SUPPORT RODS MAY BE ATTACHED TO ABOVE ANCHORAGE AT ANY LOCATION.
2. ROD EXTENDS TO THE TOP FLANGE FOR THE CHANNELS.
3. C4 SUPPLEMENTAL BEAMS MAY BE SET AT ANY ELEVATION WITHIN THE DEPTH OF THE BEAM (DO NOT COPE ENDS).

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS FOR THE ACTUAL LOADING COMBINATIONS.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

# (2)C4X5.4 STEEL CHANNELS (ASTM A36)
# SUPPLEMENTAL STEEL VERTICAL SUPPORT DETAIL

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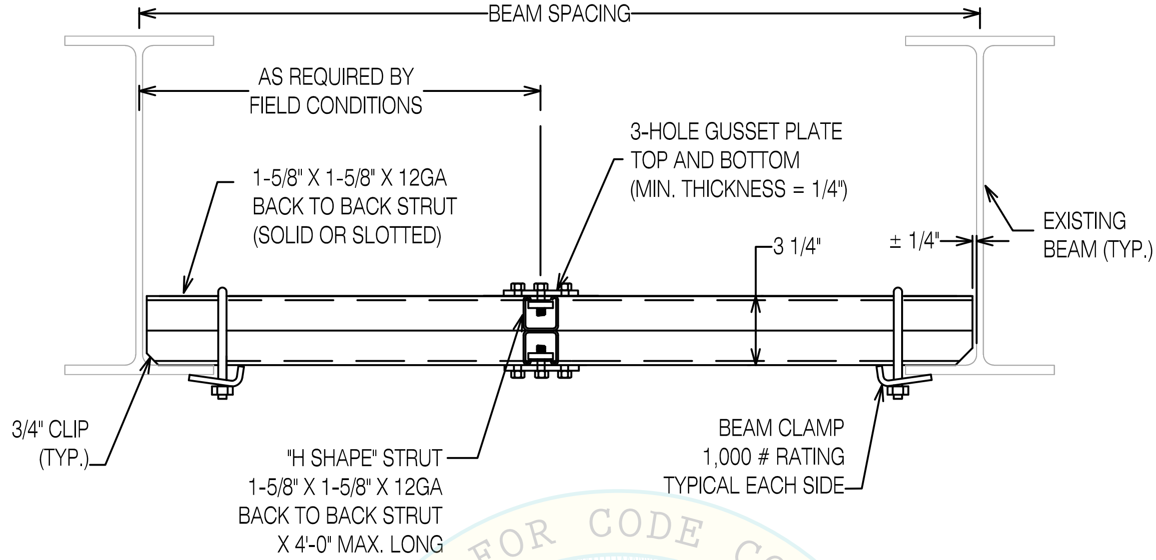
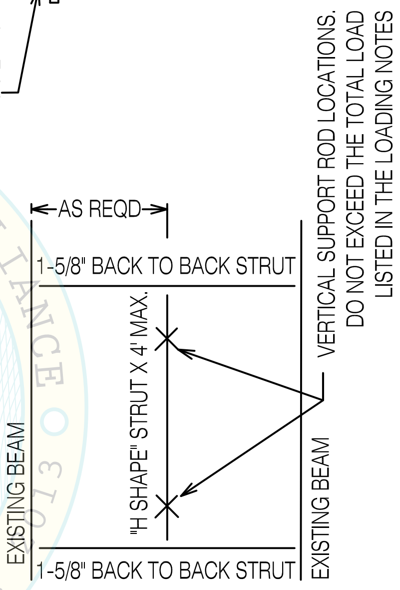


LOADING NOTES:

1. FOR 6'-0" BEAM SPACING PMAX = 700# AT ANY LOCATION FOR SOLID STRUT (PMAX = 600# FOR STRUT WITH SHORT SLOTS)
2. FOR 8'-0" BEAM SPACING PMAX = 500# AT ANY LOCATION FOR SOLID STRUT (PMAX = 400# FOR STRUT WITH SHORT SLOTS)
3. FOR 10'-0" BEAM SPACING PMAX = 350# AT ANY LOCATION FOR SOLID STRUT (PMAX = 300# FOR STRUT WITH SHORT SLOTS)

CONNECTION NOTES:

1. STRUT MAY BE PLACED ON THE TOP OF THE BOTTOM FLANGE (AS SHOWN) ON TOP OF THE TOP FLANGE OR HUNG FROM EITHER THE TOP OF BOTTOM FLANGES.
2. PMAX MAY BE LOCATED ANYWHERE ALONG THE 4'-0" LENGTH OF THE "H-SHAPE" STRUT.



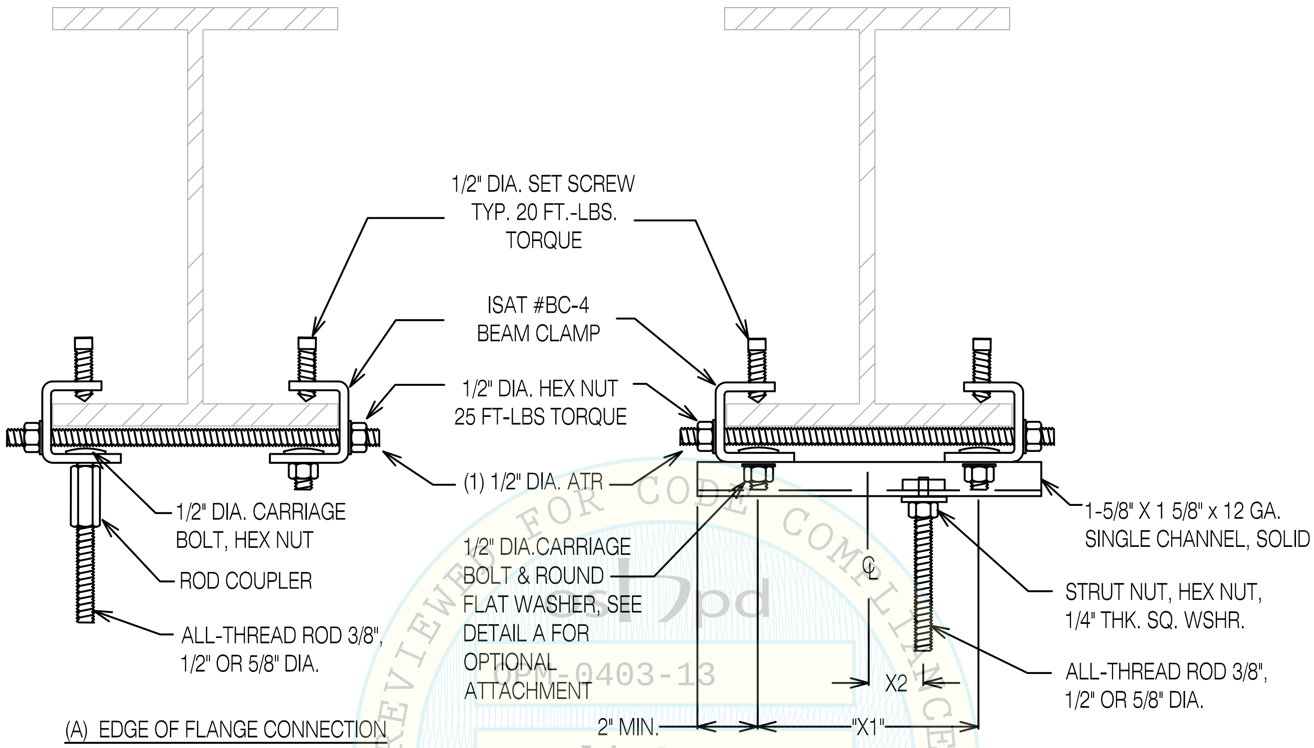
SCHEMATIC PLAN

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS FOR THE ACTUAL LOADING COMBINATIONS.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

# "H-SHAPE" 1 5/8" x 1 5/8" BACK TO BACK STRUT VERTICAL SUPPORT CONNECTION

ANTHONY A. RUBALCAVA
S 4710



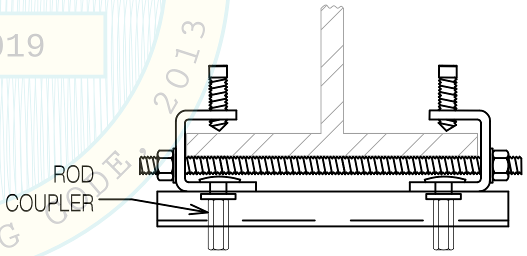
(A) EDGE OF FLANGE CONNECTION

(B) LOCATION OF ROD VARIES

VERTICAL SUPPORT TENSION DESIGN LOAD:
700 LBS MAX.

| MAXIMUM ALLOWABLE LOAD (LBS) | | | | | | |
|---|---|---|---|---|---|---|
| MAX SPAN | ROD LOCATION X2 CL +/- (INCH) | | | | | |
| X1 (INCH) | 0 | 1 | 2 | 3 | 4 | 5 |
| 6 | 1400 | 1050 | 840 | - | - | - |
| 8 | 1400 | 1120 | 933 | 800 | - | - |
| 10 | 1400 | 1167 | 1000 | 875 | 778 | - |
| 12 | 1400 | 1200 | 1050 | 933 | 840 | 764 |

ALLOWABLE LOAD MAY BE LIMITED BY ROD STRENGTH, PAGE H1
OR STRUT NUT PULL-OUT STRENGTH, PAGE H3.2.



DETAIL A - OPTIONAL ATTACHMENT
ROD COUPLER

CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR
APPROVAL FROM ENGINEER OF RECORD

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF
FLOOR/ROOF BEAMS FOR THE ACTUAL LOADING COMBINATIONS.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

# BC-4 BEAM CLAMP ASSEMBLY
# VERTICAL SUPPORT CONNECTION

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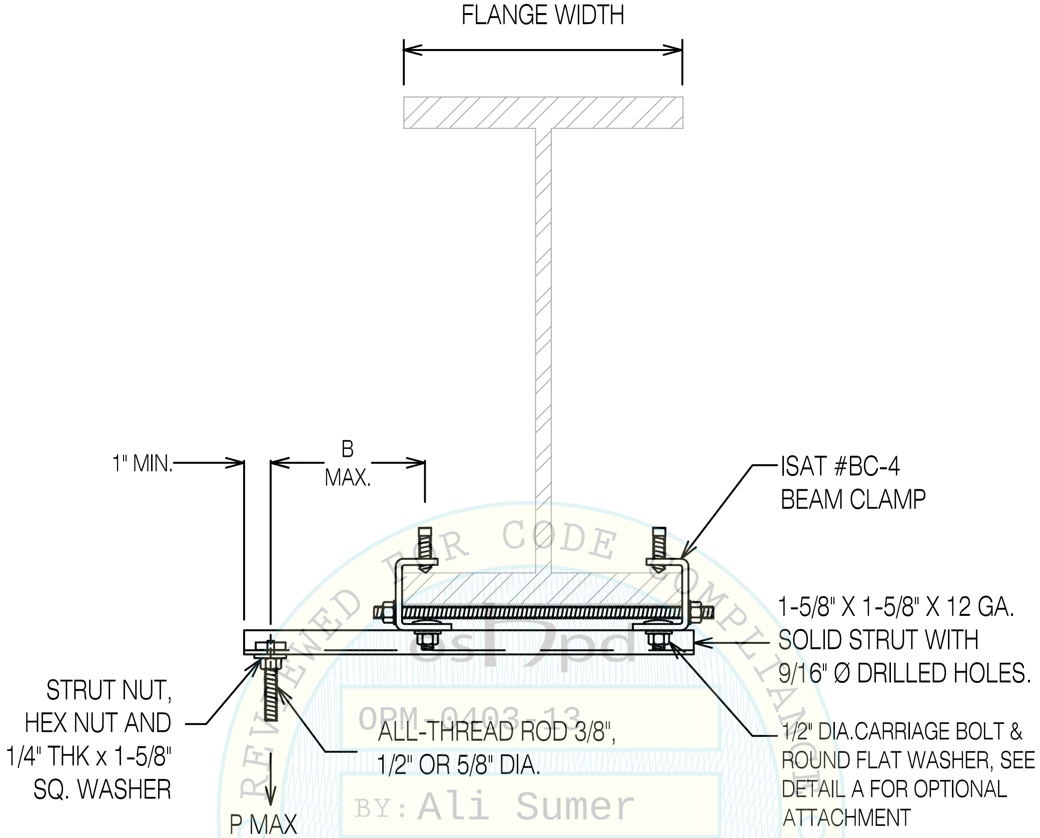
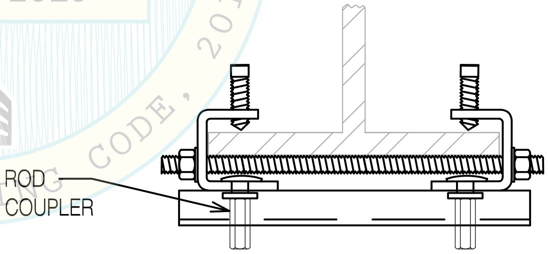


| B | FLANGE WIDTH | PMAX |
|---|---|---|
| 6" | ≥6" | 500# |
| 6" | <6" | 350# |
| 10" | ≥6" | 450# |
| 10" | <6" | 300# |



DETAIL A - OPTIONAL ATTACHMENT
ROD COUPLER

CONNECTION TO STRUCTURAL STEEL
SUBJECT TO PRIOR APPROVAL FROM
ENGINEER OF RECORD

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS FOR THE ACTUAL LOADING COMBINATIONS.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

# CANTILEVERED STRUT WITH BC-4 BEAM CLAMP VERTICAL SUPPORT CONNECTION

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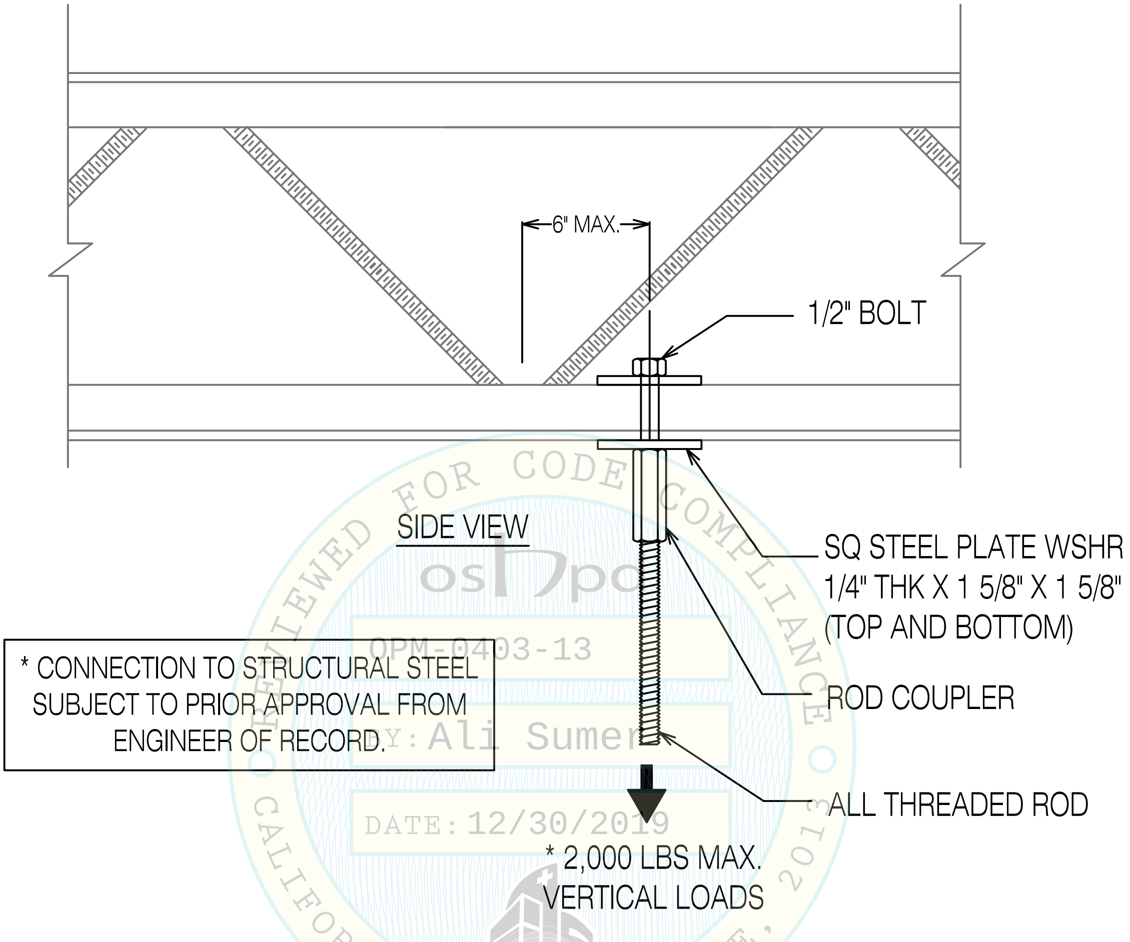

# IN-LINE VERTICAL SUPPORT CONNECTION BOTTOM OF CHORDS OF OPEN WEB STEEL JOIST

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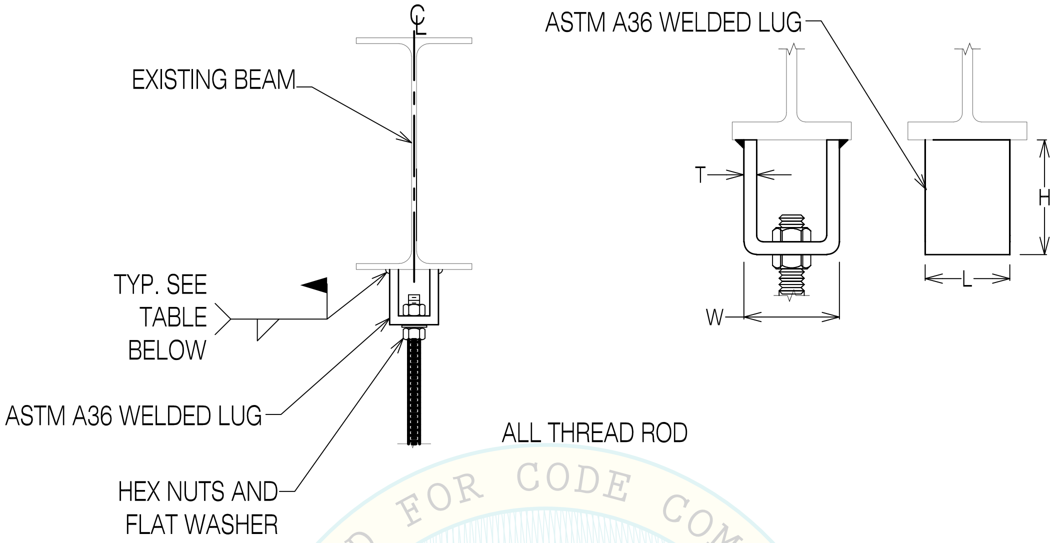

| WELDED LUG, ANSI/MSS SP58-2009, TYPE 22 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ROD DIA. (IN) | MOUNTING LUG PART NUMBER | LUG DIMENSIONS (IN) | | | | | | | MIN. WELD SIZE (IN) | MAX. DESIGN TENSION (LBS) |
| | | H | C | D | E | L | T | W | | |
| 3/8 | LUGS | 3 | 1 7/8 | 1 | 7/8 | 2 1/2 | 0.364 | 3 | 3/16 | 730 |
| 1/2 | LUGS | 3 | 1 7/8 | 1 | 7/8 | 2 1/2 | 0.364 | 3 | 3/16 | 1,350 |
| 5/8 | LUGS | 3 | 1 7/8 | 1 | 7/8 | 2 1/2 | 0.364 | 3 | 3/16 | 2,160 |
| 3/4 | LUGS | 3 | 1 7/8 | 1 | 7/8 | 2 1/2 | 0.364 | 3 | 3/16 | 3,230 |
| 7/8 | LUGS | 3 | 1 7/8 | 1 | 7/8 | 2 1/2 | 0.364 | 3 | 3/16 | 4,480 |
| 1 | LUGL | 4 1/2 | 1 3/4 | 1 | 7/8 | 3 | 0.500 | 3 3/4 | 3/16 | 5,900 |
| 1-1/8 | LUGL | 4 1/2 | 1 3/4 | 1 | 7/8 | 3 | 0.500 | 3 3/4 | 3/16 | 6,230 |
| 1-1/4 | LUGL | 4 1/2 | 1 3/4 | 1 | 7/8 | 3 | 0.500 | 3 3/4 | 3/16 | 8,620 |

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS FOR THE ACTUAL LOADING COMBINATIONS.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

# WELDED LUG ATTACHMENT TO WIDE FLANGE BEAM

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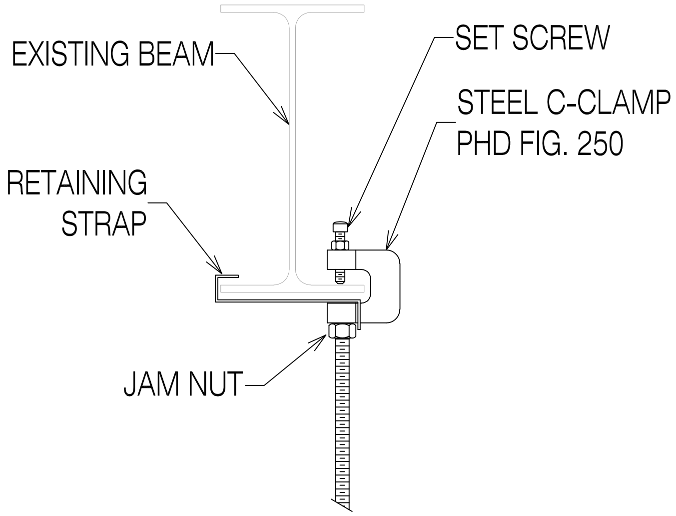

| STEEL C-CLAMP<br>ANSI-MSS SP58-2009<br>TYPE 23 | |
|---|---|
| ROD. DIA. Inch | MAX. DESIGN TENSION Lbs |
| 3/8 | 400 |
| 1/2 | 500 |
| 5/8 | 550 |
| 3/4 | 600 |
| 7/8 | 900 |

| SET SCREW TORQUE | | | | |
|---|---|---|---|---|
| NOMINAL THREAD SIZE | | 3/8" | 5/8" | 3/4" |
| REQ'D TORQUE | IN-LBS | 60 | 250 | 400 |

1. PRODUCTS FROM MANUFACTURERS ARE TO MEET THE MINIMUM TABULATED DESIGN TENSION VALUES.
2. WHEN USED AT SEISMIC VERTICAL SUPPORT LOCATIONS, C-CLAMPS REQUIRE RETAINING STRAPS.

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS FOR THE ACTUAL LOADING COMBINATIONS.

NO ATTACHMENTS IN PROTECTED ZONES AS DEFINED IN AISC 341

# BEAM CLAMP ATTACHMENT TO WIDE FLANGE BEAM

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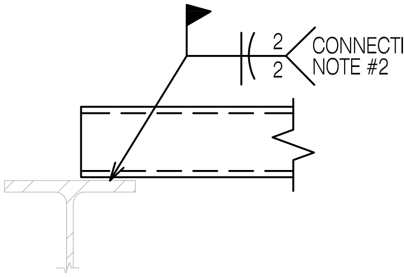
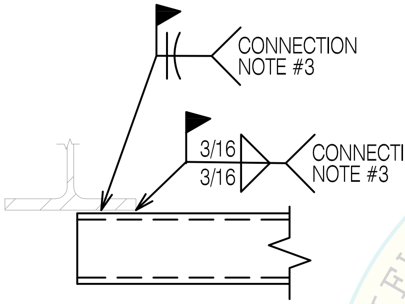
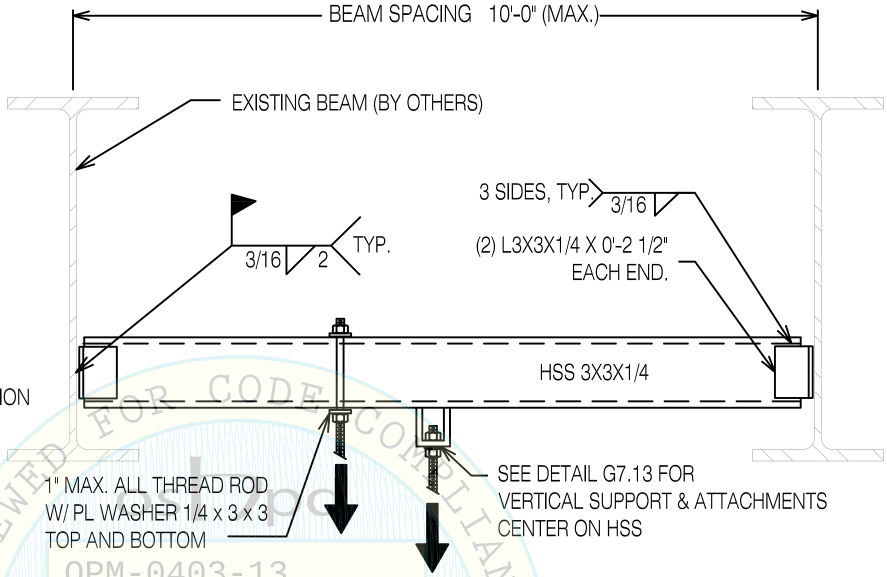


HSS CONNECTION TO TOP FLANGE
MINIMUM 3" BEARING



HSS CONNECTION TO BOTTOM FLANGE
MINIMUM 3" OVERLAP



MULTIPLE VERTICAL LOADS MAY BE ATTACHED TO BOTTOM OF HSS.
SUM OF LOADS NOT EXCEED THE MAX. TOTAL VERTICAL LOAD

| BEAM SPACING | MAX. TOTAL VERTICAL LOAD |
|---|---|
| 10'-0" | 2200 LBS. |
| 8'-0" | 2800 LBS. |
| 6'-0" | 3200 LBS. |

CONNECTION NOTES:

1. HSS SUPPLEMENTAL BEAM MAY BE SET AT ANY ELEVATION WITHIN THE DEPTH OF THE BEAM (DO NOT COPE ENDS).
2. HSS MAY BE PLACED ON TOP OF THE TOP FLANGE WITH 3" MINIMUM BEARING ON EACH END.
USE (2) 3/16" X 2" BEVEL WELDS AT THE HSS CORNERS.
3. HSS MAY BE PLACED AT THE BOTTOM OF THE BOTTOM FLANGE WITH 3" OF OVERLAP ON EACH END.
USE 3/16" BEVEL WELDS AT THE HSS CORNERS AND 3/16" FILLET WELDS ACROSS THE END AND BEAM FLANGE.

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS AND DIAPHRAM FOR THE ACTUAL LOADING COMBINATIONS.

STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF FLOOR/ROOF BEAMS FOR THE ACTUAL LOADING COMBINATIONS.

# HSS 3X3 SUPPLEMENTAL STEEL VERTICAL SUPPORT CONNECTION

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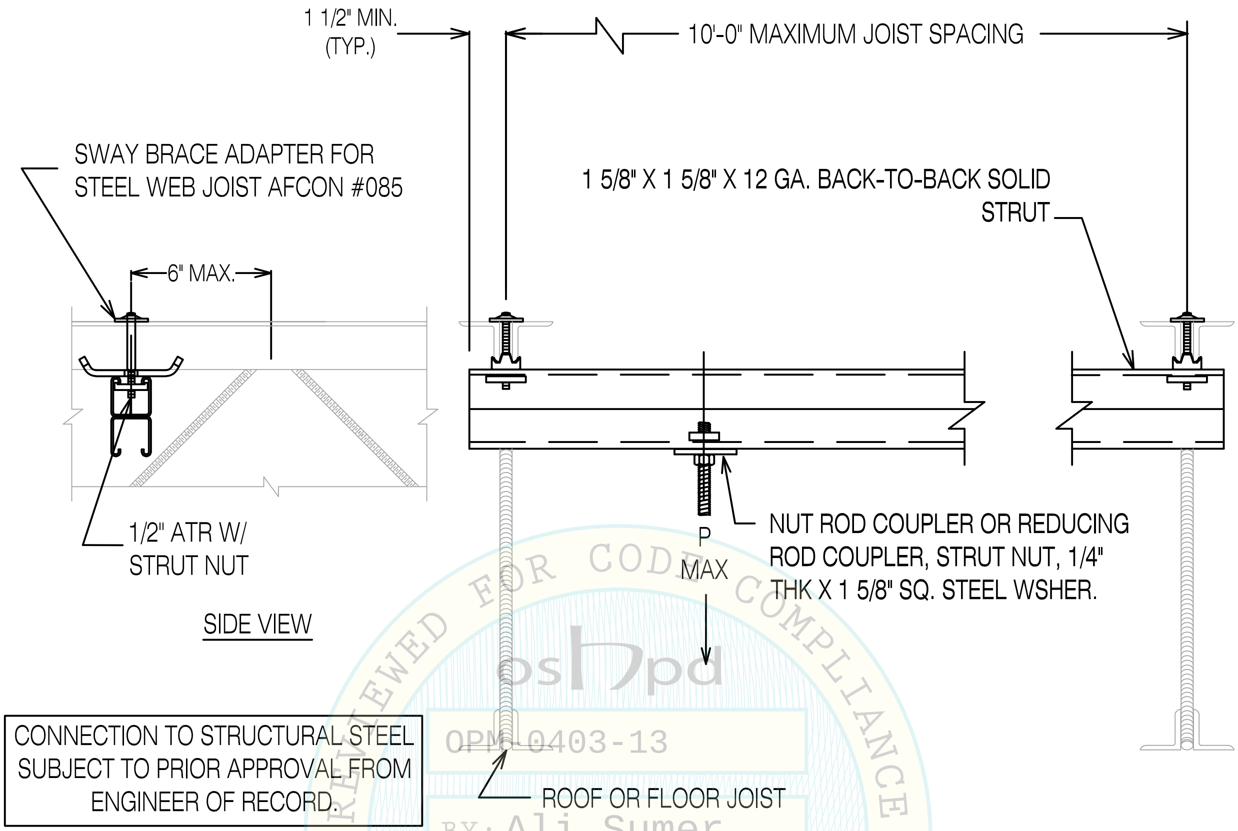
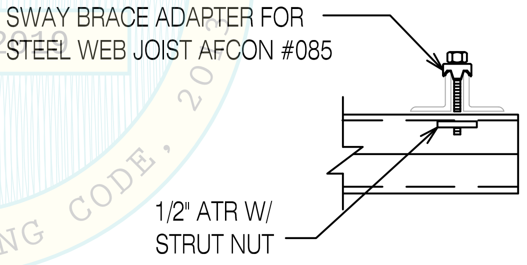


CONNECTION TO STRUCTURAL STEEL
SUBJECT TO PRIOR APPROVAL FROM
ENGINEER OF RECORD.

MAXIMUM VERTICAL SUPPORT LOAD

| JOIST SPACING | MAX. TOTAL VERTICAL LOAD | |
|---|---|---|
| | SOLID STRUT | SLOTTED STRUT |
| 6' - 0" | 700 LBS | 600 LBS |
| 8' - 0" | 500 LBS | 400 LBS |
| 10' - 0" | 350 LBS | 300 LBS |



BOTTOM CHORD CONNECTION DETAILS
LOCATE CENTER WITHIN 6" OF JOIST PANEL POINT

# STRUT CONNECTION TO STEEL BAR JOIST VERTICAL SUPPORT CONNECTION

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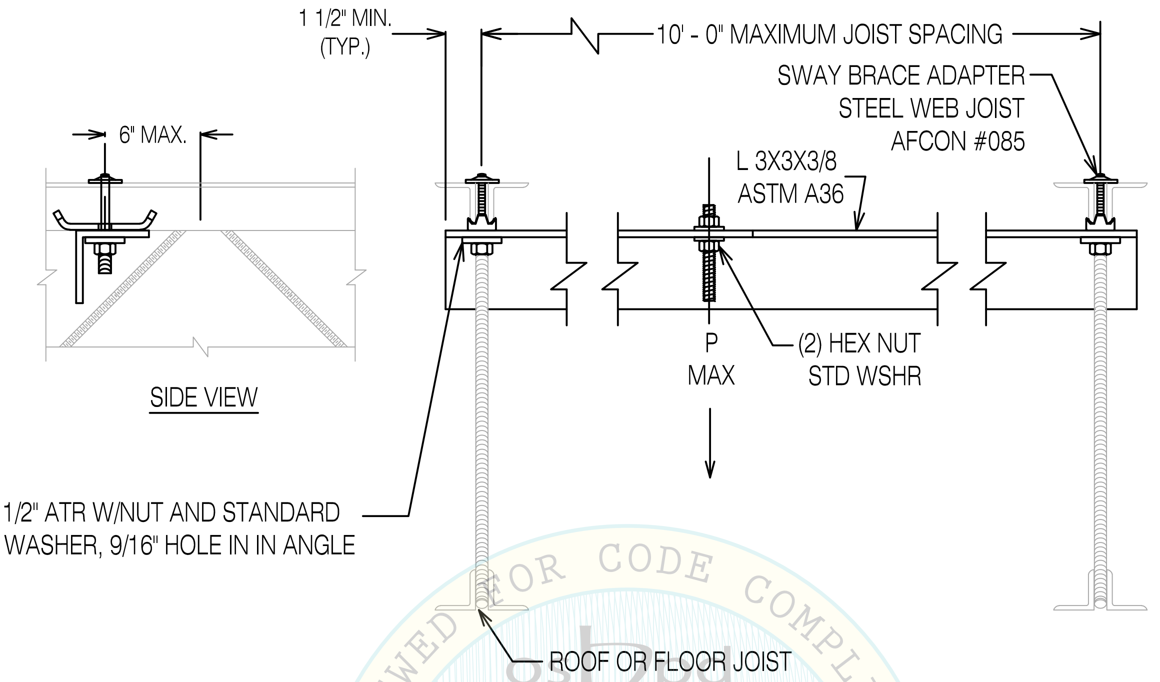

VERTICAL SUPPORT LOAD

| JOIST SPACING | MAX. TOTAL VERTICAL LOAD |
|---|---|
| 10' - 0" | 600 LBS |
| 8' - 0" | 800 LBS |
| 6' - 0" | 1,100 LBS |

1. CONNECTION TO STRUCTURAL STEEL SUBJECT TO PRIOR APPROVAL FROM ENGINEER OF RECORD.
2. JOIST BRIDGING, CHORD BENDING AND TRANSFER OF LOADS INTO THE STRUCTURAL DIAPHRAGM ARE TO BE DESIGNED BY THE ENGINEER OF RECORD.

# STRUCTURAL ANGLE AT STEEL BAR JOIST VERTICAL SUPPORT CONNECTION

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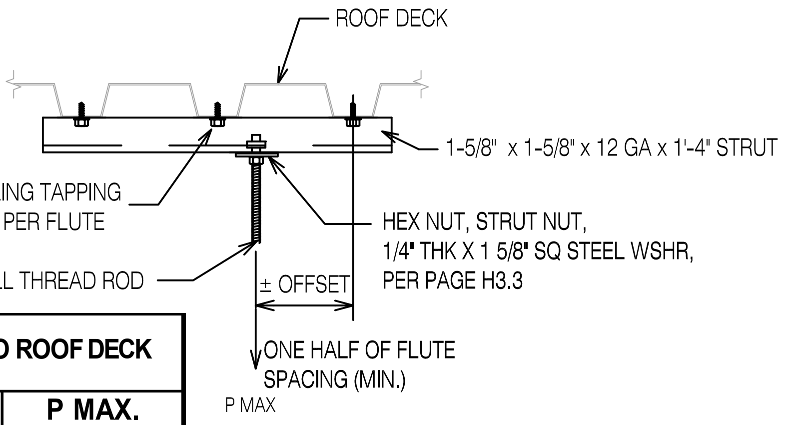
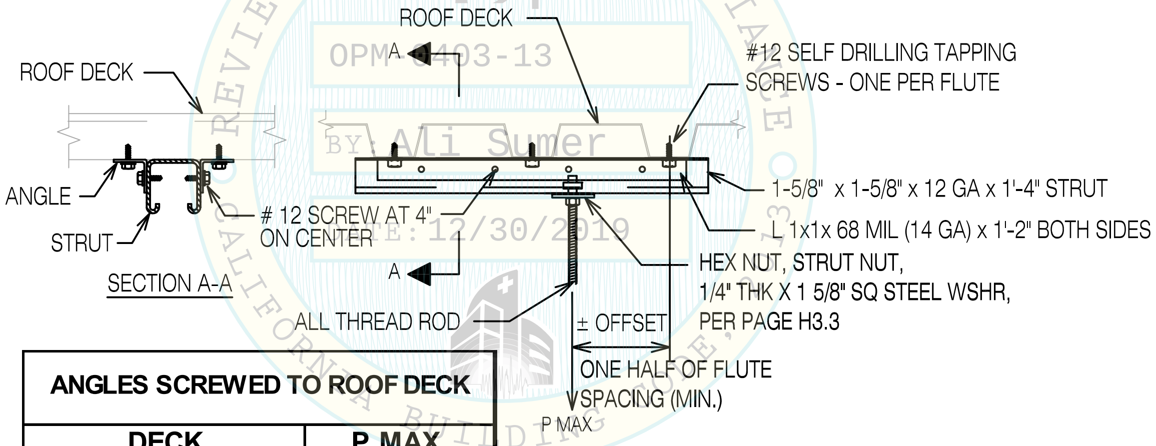
STRUCTURAL ENGINEER OF RECORD IS TO VERIFY THE CAPACITY OF THE DECK AND THE STRUCTURE FOR THE LOADS SHOWN



| STRUT SCREWED TO ROOF DECK | |
|---|---|
| **DECK THICKNESS** | **P MAX. LBS.** |
| 33 MIL (20 GAGE) | 190 |
| 43 MIL (18 GAGE) | 245 |
| 54 MIL (16 GAGE) | 300 |

DETAIL 1 - SINGLE STRUT SCREWED DIRECTLY TO ROOF DECK



| ANGLES SCREWED TO ROOF DECK | |
|---|---|
| **DECK THICKNESS** | **P MAX. LBS.** |
| 33 MIL (20 GAGE) | 380 |
| 43 MIL (18 GAGE) | 490 |
| 54 MIL (16 GAGE) | 600 |

DETAIL 2 - SINGLE STRUT WITH ANGLES ON BOTH SIDES

# ROOF DECK VERTICAL SUPPORT CONNECTION

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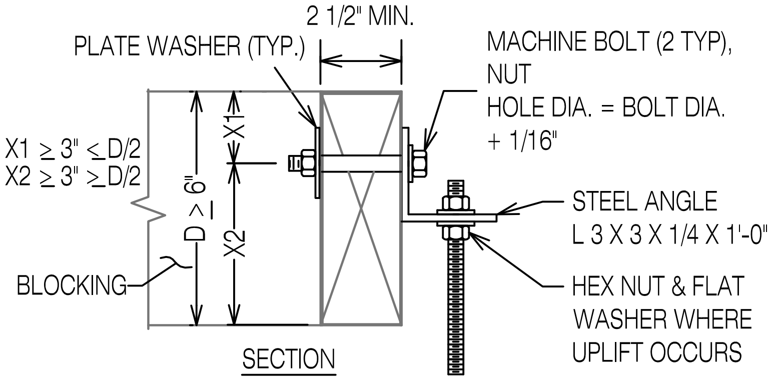
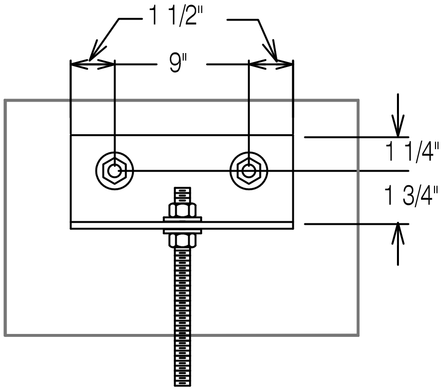
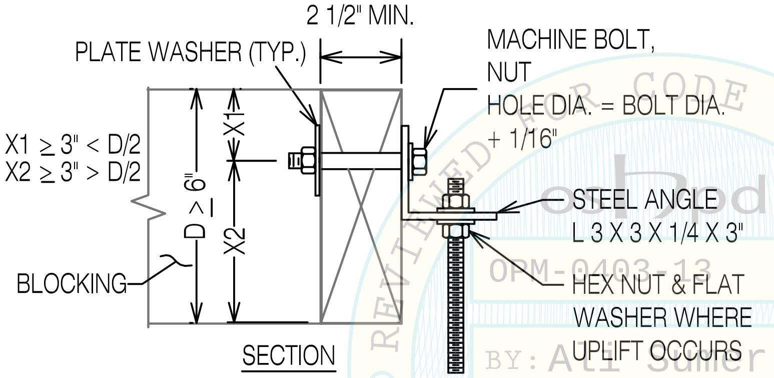


SECTION

TWO BOLT

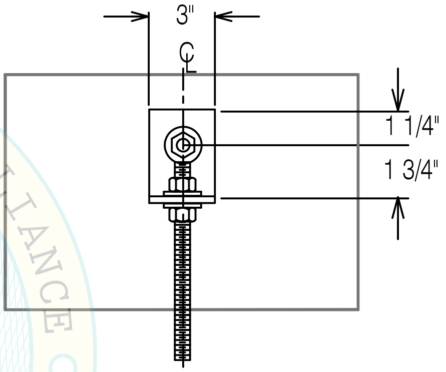


SIDE VIEW - PERPENDICULAR



SECTION

SINGLE BOLT



SIDE VIEW - PERPENDICULAR

WOOD SPECIES SPECIFIC GRAVITY G=0.50 MIN.
PLATE WASHER REQ'D UNDER BOLT HEAD OR NUT BEARING ON WOOD.
REFER TO INSTALLATION REQUIREMENTS PAGE D6.1.

NOTE: ENGINEER OF RECORD TO CONFIRM SUITABILITY OF STRUCTURE TO ACCOMMODATE THE LOADS SHOWN BELOW.

| MAXIMUM ALLOWABLE VERTICAL LOAD | | |
|---|---|---|
| BOLT DIAMETER Inch | 1 BOLT Lbs. | 2 BOLT Lbs. |
| 1/2 | 410 | 650 |
| 5/8 | 470 | 750 |
| 3/4 | 530 | 900 |

DESIGN AND DETAILING OF BLOCKING REQUIRED FOR STRUCTURAL STABILITY AND TIES TO HORIZONTAL DIAPHRAGM ARE TO BE BY THE STRUCTURAL ENGINEER OF RECORD (TYP OF ALL CONFIGURATIONS).

# THRU BOLT VERTICAL SUPPORT CONNECTIONS TO STRUCTURAL LUMBER

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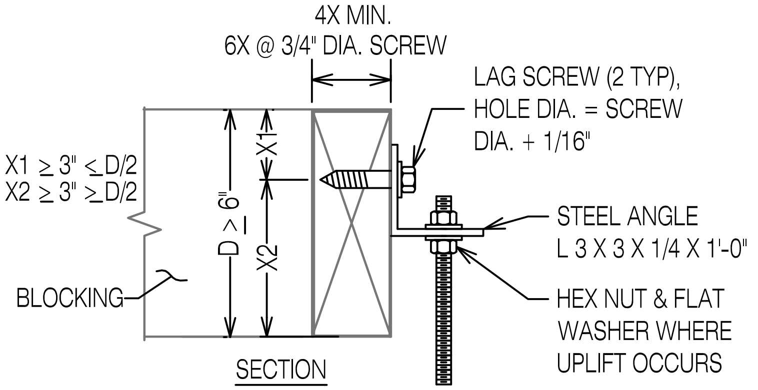
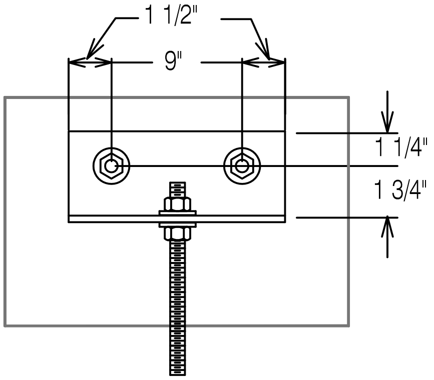
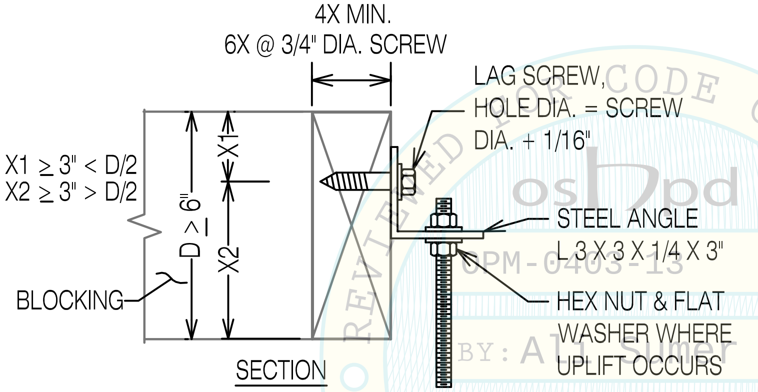


SECTION

TWO BOLT

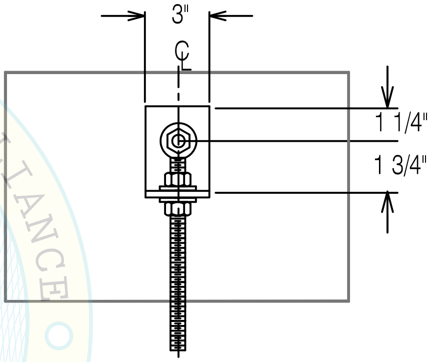


SIDE VIEW - PERPENDICULAR



SECTION

SINGLE BOLT



SIDE VIEW - PERPENDICULAR

WOOD SPECIES SPECIFIC GRAVITY G=0.50 MIN.
REFER TO INSTALLATION REQUIREMENTS PAGE D6.1.

NOTE: ENGINEER OF RECORD TO CONFIRM SUITABILITY OF STRUCTURE TO ACCOMMODATE THE LOADS SHOWN BELOW.

| MAXIMUM ALLOWABLE VERTICAL LOAD | | |
|---|---|---|
| LAG SCREW Inch | 1 SCREW Lbs. | 2 SCREWS Lbs. |
| 1/2 X 3 1/2 | 230 | 460 |
| 5/8 X 3 1/2 | 250 | 500 |
| 3/4 X 5 1/2 | 470 | 940 |

DESIGN AND DETAILING OF BLOCKING REQUIRED FOR STRUCTURAL STABILITY AND TIES TO HORIZONTAL DIAPHRAGM ARE TO BE BY THE STRUCTURAL ENGINEER OF RECORD (TYP OF ALL CONFIGURATIONS).

# LAG SCREW VERTICAL SUPPORT CONNECTIONS TO STRUCTURAL LUMBER

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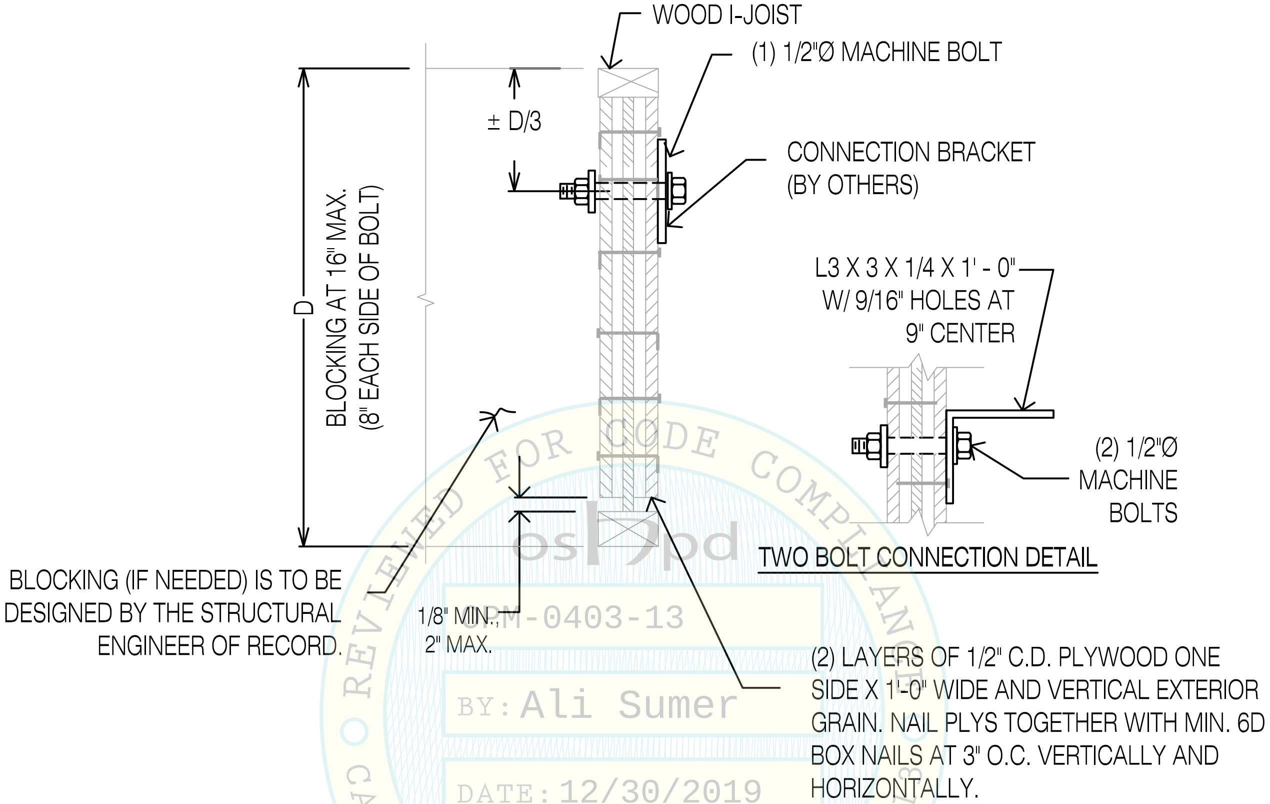

MAXIMUM ALLOWABLE VERTICAL LOAD:
= 360 LBS FOR SINGLE BOLT
= 640 LBS FOR TWO BOLTS

STRUCTURAL ENGINEER OF RECORD TO CONFIRM SUITABILITY OF STRUCTURE TO ACCOMMODATE THE LOADS SHOWN .

# VERTICAL SUPPORT CONNECTION TO TJI WOOD JOIST

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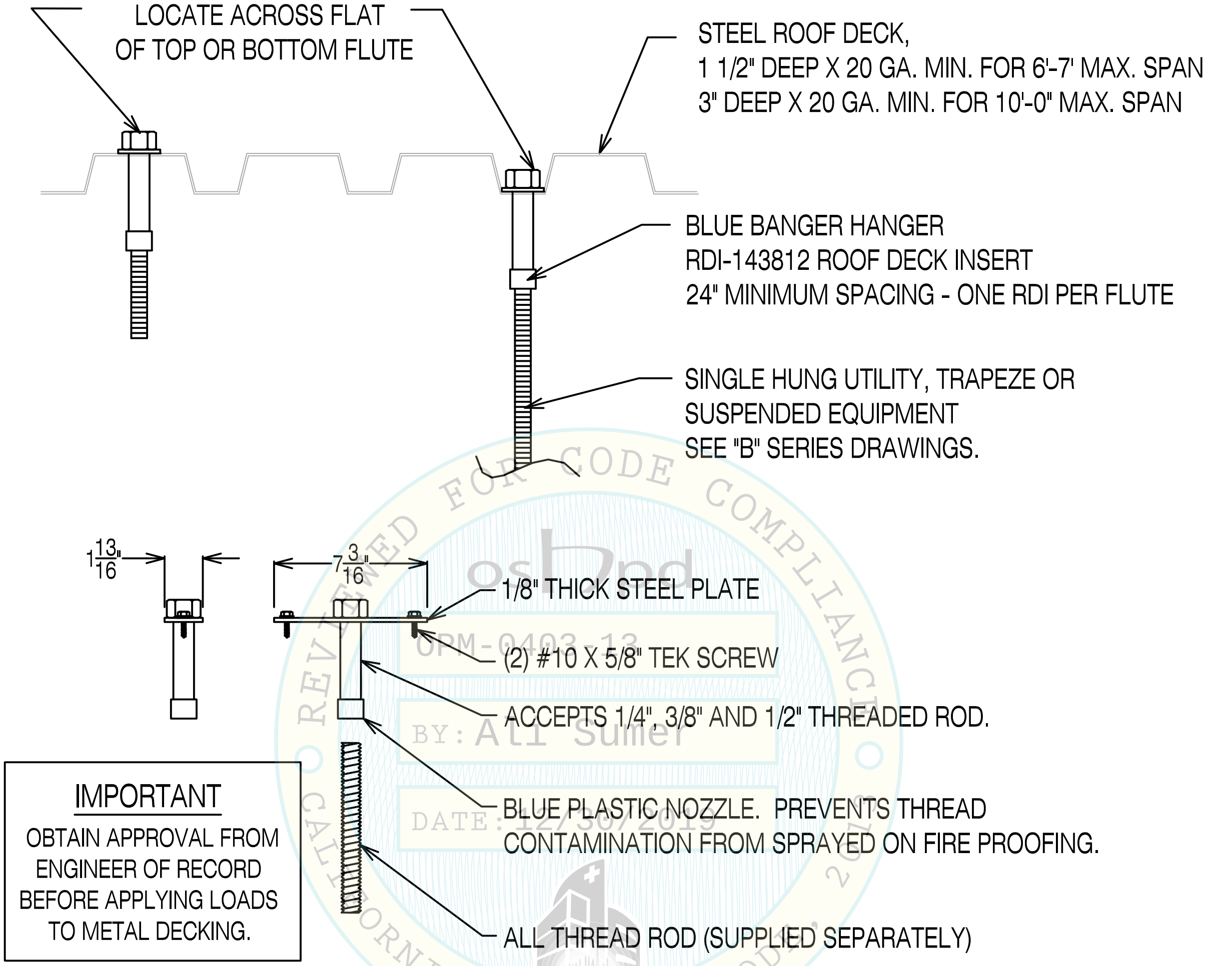

**IMPORTANT**

OBTAIN APPROVAL FROM
ENGINEER OF RECORD
BEFORE APPLYING LOADS
TO METAL DECKING.

DESIGN VALUE (VERTICAL SUPPORT LOADS ONLY)
300 LBS MAXIMUM PER INSERT

## BLUE BANGER HANGER "RDI-143812" ROOF DECK INSERT VERTICAL SUPPORT APPLICATIONS

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### ROD CHARACTERISTICS

### STRUT CHANNELS

### PHD HARDWARE

### SCREW STRENGTHS / DESIGN VALUES

### SEISMIC TUNING FORK (STF) ACCESSORIES

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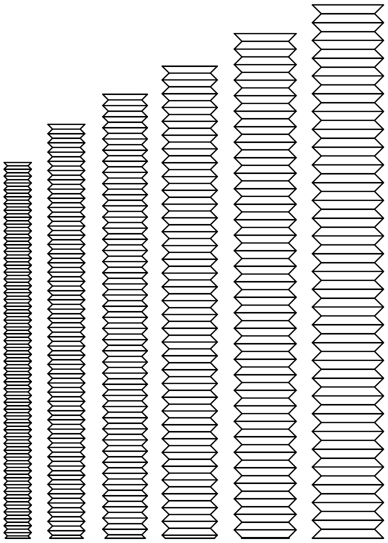

| Rod Diameter Inch | Min. ASTM A36 Steel | |
|---|---|---|
| | High Temperature Applications Maximum Tension Design Value Lbs | Building Services Piping Maximum Tension Design Value Lbs |
| 3/8 | 730 | 790 |
| 1/2 | 1,350 | 1,460 |
| 5/8 | 2,160 | 2,340 |
| 3/4 | 3,230 | 3,500 |
| 7/8 | 4,480 | 4,860 |
| 1 | 5,900 | 6,400 |
| 1-1/8 | 6,230 | 8,000 |
| 1-1/4 | 9,500 | 10,300 |
| 1-3/8 | 9,500 | 12,180 |
| 1-1/2 | 13,800 | 14,960 |
| 1-3/4 | 18,600 | 20,180 |
| 2 | 24,600 | 26,680 |
| | ASME B31.1<br>Rod Temp of 650 Deg. | ASME B31.9 |

# ALL-THREAD ROD MAXIMUM TENSION DESIGN VALUES
# PIPING SYSTEM VERTICAL SUPPORTS

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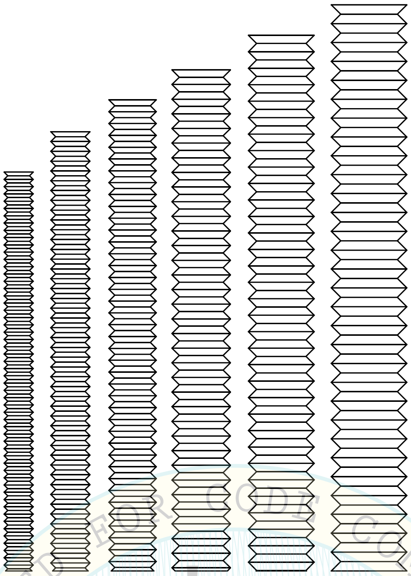

| Min. ASTM A36 Steel | |
|---|---|
| Rod Diameter IN | Maximum Tension Design Value LBS |
| 3/8 | 2,400 |
| 1/2 | 4,270 |
| 5/8 | 6,670 |
| 3/4 | 9,600 |
| 7/8 | 13,070 |
| 1 | 17,080 |
| 1-1/8 | 16,700 |
| 1-1/4 | 20,600 |
| 1-3/8 | 25,000 |
| 1-1/2 | 29,700 |
| 1-3/4 | 40,400 |
| 2 | 52,800 |

# ALL-THREAD ROD MAXIMUM TENSION DESIGN VALUES EXCEPT PIPING SYSTEMS

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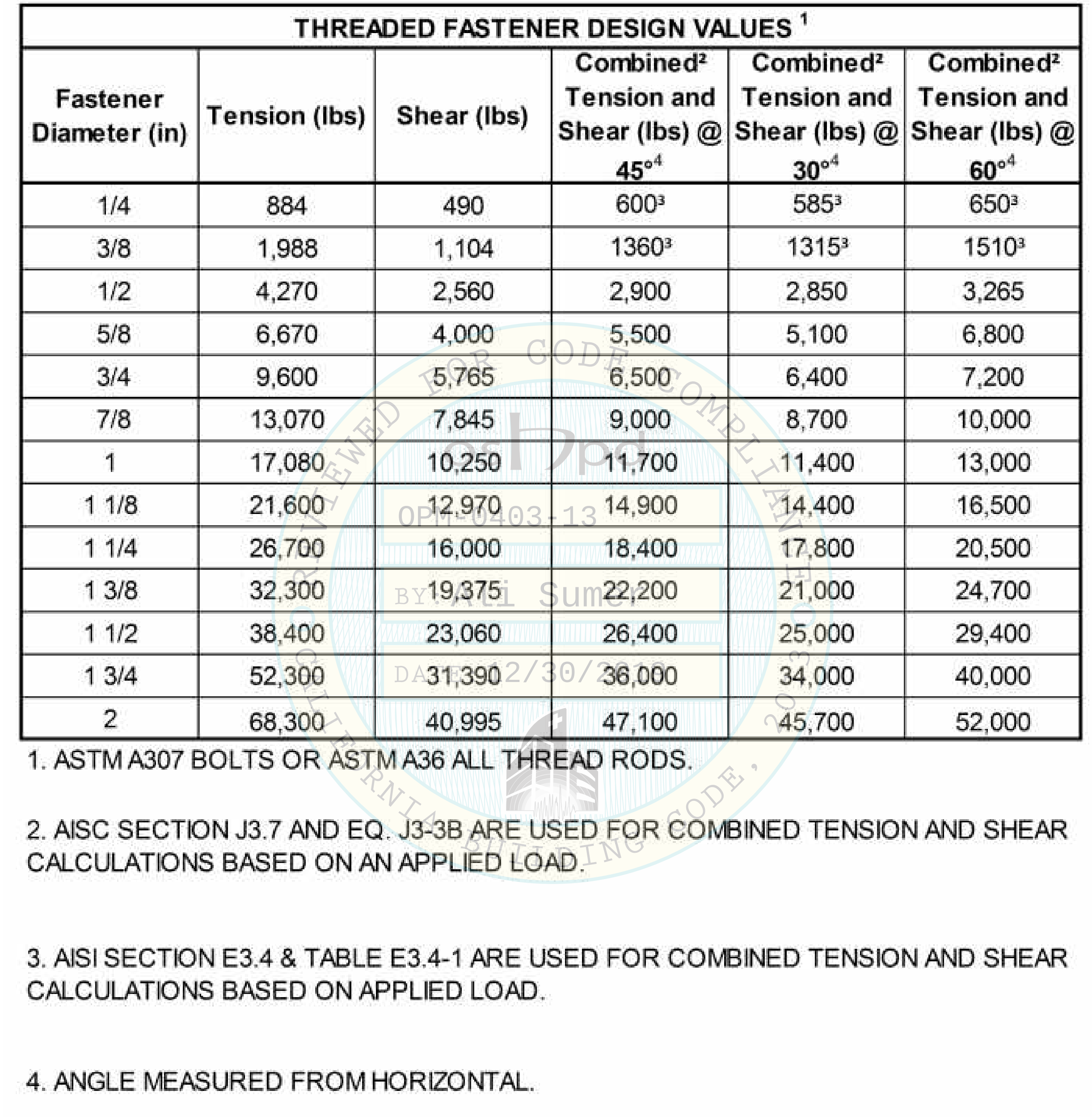

| THREADED FASTENER DESIGN VALUES [1] | | | | | |
|---|---|---|---|---|---|
| Fastener Diameter (in) | Tension (lbs) | Shear (lbs) | Combined[2] Tension and Shear (lbs) @ 45°[4] | Combined[2] Tension and Shear (lbs) @ 30°[4] | Combined[2] Tension and Shear (lbs) @ 60°[4] |
| 1/4 | 884 | 490 | 600[3] | 585[3] | 650[3] |
| 3/8 | 1,988 | 1,104 | 1360[3] | 1315[3] | 1510[3] |
| 1/2 | 4,270 | 2,560 | 2,900 | 2,850 | 3,265 |
| 5/8 | 6,670 | 4,000 | 5,500 | 5,100 | 6,800 |
| 3/4 | 9,600 | 5,765 | 6,500 | 6,400 | 7,200 |
| 7/8 | 13,070 | 7,845 | 9,000 | 8,700 | 10,000 |
| 1 | 17,080 | 10,250 | 11,700 | 11,400 | 13,000 |
| 1 1/8 | 21,600 | 12,970 | 14,900 | 14,400 | 16,500 |
| 1 1/4 | 26,700 | 16,000 | 18,400 | 17,800 | 20,500 |
| 1 3/8 | 32,300 | 19,375 | 22,200 | 21,000 | 24,700 |
| 1 1/2 | 38,400 | 23,060 | 26,400 | 25,000 | 29,400 |
| 1 3/4 | 52,300 | 31,390 | 36,000 | 34,000 | 40,000 |
| 2 | 68,300 | 40,995 | 47,100 | 45,700 | 52,000 |

1. ASTM A307 BOLTS OR ASTM A36 ALL THREAD RODS.

2. AISC SECTION J3.7 AND EQ. J3-3B ARE USED FOR COMBINED TENSION AND SHEAR CALCULATIONS BASED ON AN APPLIED LOAD.

3. AISI SECTION E3.4 & TABLE E3.4-1 ARE USED FOR COMBINED TENSION AND SHEAR CALCULATIONS BASED ON APPLIED LOAD.

4. ANGLE MEASURED FROM HORIZONTAL.

## THREADED FASTENER DESIGN VALUES

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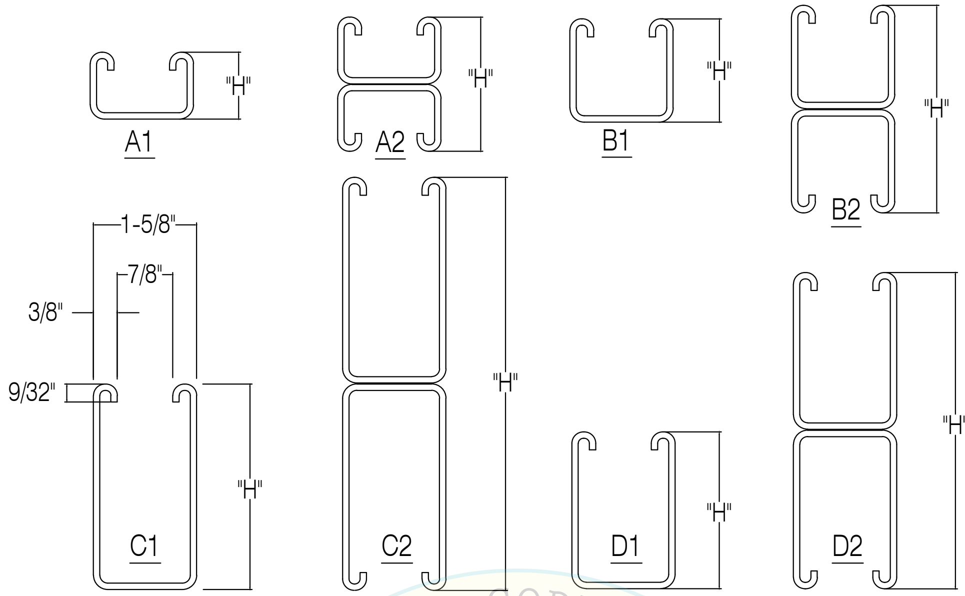

| Channel | Steel Gage | Height "H" Inch | Area Of Section Inch ² | MINIMUM ELEMENTS OF SECTION (For Solid) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | X-X AXIS | | | Y-Y AXIS | | |
| | | | | Moment of Inertia Inch ⁴ | Section Modulus Inch ³ | Radius of Gyration Inch | Moment of Inertia Inch ⁴ | Section Modulus Inch ³ | Radius of Gyration Inch |
| A1 | 12 | 13/16 | 0.376 | 0.031 | 0.064 | 0.283 | 0.115 | 0.142 | 0.554 |
| A2 | 12 | 1 5/8 | 0.752 | 0.146 | 0.180 | 0.436 | 0.230 | 0.284 | 0.554 |
| B1 | 12 | 1 5/8 | 0.552 | 0.185 | 0.202 | 0.576 | 0.234 | 0.288 | 0.647 |
| B2 | 12 | 3 1/4 | 1.104 | 0.928 | 0.571 | 0.914 | 0.468 | 0.576 | 0.647 |
| C1 | 12 | 3 1/4 | 0.887 | 1.098 | 0.627 | 1.107 | 0.431 | 0.530 | 0.695 |
| C2 | 12 | 6 1/2 | 1.775 | 6.225 | 1.915 | 1.863 | 0.862 | 1.060 | 0.695 |
| D1 | 12 | 2 7/16 | 0.720 | 0.522 | 0.39 | 0.848 | 0.334 | 0.411 | 0.679 |
| D2 | 12 | 4 7/8 | 1.439 | 2.805 | 1.151 | 1.390 | 0.667 | 0.82 | 0.679 |
| E1 | 10 | 2 | 0.912 | 0.476 | 0.438 | 0.723 | 0.569 | 0.569 | 0.790 |

1. QUALIFIED BRANDS MEETING OR EXCEEDING ABOVE VALUES MAY BE USED SUBJECT TO ISAT REVIEW AND APPROVAL FROM ENGINEER-OF-RECORD.
2. BEAM LOAD SHALL BE LIMITED BY APPROVED SPOT WELD CAPACITY.
3. A2, B2, C2 AND D2 - FACTORY SPOT WELDED BACK-TO-BACK CHANNEL.
4. TABULATED VALUES ARE SOLID STRUT. STRUT WITH STANDARD HOLES HAVE SECTION PROPERTIES REDUCED BY 0.10. STRUT WITH SLOTS (9/16" WIDE X 1-1/8" LONG 2" OC TYP) HAVE SECTION REDUCED BY 0.15.

# CHANNEL PROFILE DESIGNATIONS AND SECTION VALUES, ASTM A653 GRADE 33

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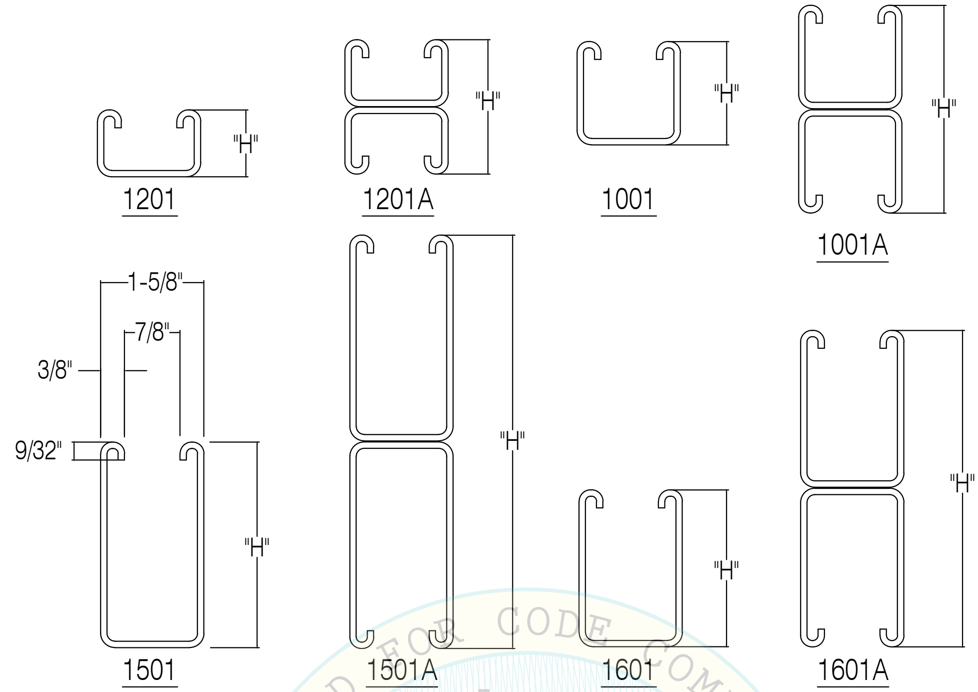

| Channel | Steel Gage | Height "H" Inch | Area Of Section Inch $^2$ | MINIMUM ELEMENTS OF SECTION (For Solid) X-X AXIS Moment of Inertia Inch $^4$ | X-X AXIS Section Modulus Inch $^3$ | X-X AXIS Radius of Gyration Inch | Y-Y AXIS Moment of Inertia Inch $^4$ | Y-Y AXIS Section Modulus Inch $^3$ | Y-Y AXIS Radius of Gyration Inch |
|---|---|---|---|---|---|---|---|---|---|
| 1201 | 12 | 13/16 | 0.376 | 0.033 | 0.068 | 0.297 | 0.115 | 0.142 | 0.554 |
| 1201A | 12 | 1 5/8 | 0.752 | 0.148 | 0.182 | 0.444 | 0.230 | 0.284 | 0.554 |
| 1001 | 12 | 1 5/8 | 0.561 | 0.189 | 0.209 | 0.580 | 0.239 | 0.294 | 0.653 |
| 1001A | 12 | 3 1/4 | 1.122 | 0.958 | 0.589 | 0.924 | 0.479 | 0.588 | 0.653 |
| 1501 | 12 | 3 1/4 | 0.902 | 1.115 | 0.641 | 1.112 | 0.436 | 0.537 | 0.695 |
| 1501A | 12 | 6 1/2 | 1.804 | 6.349 | 1.953 | 1.876 | 0.873 | 1.074 | 0.695 |
| 1601 | 12 | 2 7/16 | 0.732 | 0.531 | 0.401 | 0.852 | 0.338 | 0.416 | 0.680 |
| 1601A | 12 | 4 7/8 | 1.464 | 2.874 | 1.179 | 1.401 | 0.676 | 0.832 | 0.680 |

1. BEAM LOAD MAY BE LIMITED BY SPOT WELD SHEAR. REFER TO PHD TECHNICAL DATA.
2. 1001A, 1201A, 1501A AND 1601A
3. TABULATED VALUES ARE SOLID STRUT. STRUT WITH STANDARD HOLES HAVE SECTION PROPERTIES REDUCED BY 0.10. STRUT WITH SLOTS (9/16" WIDE X 1-1/8" LONG 2"OC TYP) HAVE SECTION REDUCED BY 0.15.

# 'PHD' BRAND CHANNEL PROFILE DESIGNATIONS AND SECTION VALUES, ASTM A653 GRADE 33

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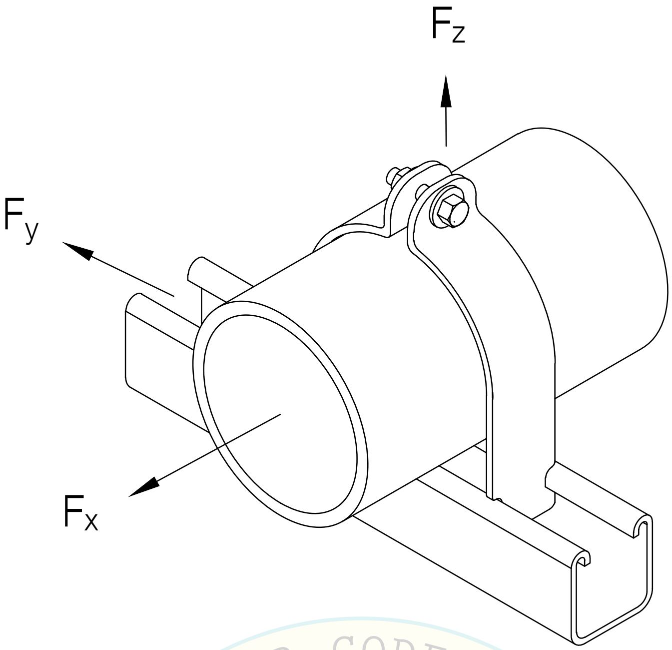
***H2.1***



MATERIAL: CLAMP - HOT ROLLED MILD STEEL, ASTM A1011SS, GRADE 33
BOLT - ASTM A307, GRADE A
FLAT WASHER - ANSI/ASME B18.22.1

| PHD Figure Number | Nominal Pipe Size (in) | Bolt + Washer Diameter (in) | Bolt Torque (ft-lbs) | Design Loads, ASD (lbs) | | |
|---|---|---|---|---|---|---|
| | | | | Fx | Fy | Fz |
| 2005 | 1 1/4 | 1/4 | 6 | 265 | 230 | 64 |
| 2006 | 1 1/2 | 5/16 | 14 | 380 | 215 | 76 |
| 2007 | 2 | 5/16 | 14 | 365 | 405 | 106 |
| 2008-38 | 2 1/2 | 3/8 | 19 | 215 | 305 | 159 |
| 2009 | 3 | 5/16 | 14 | 420 | 310 | 213 |
| 2010 | 3 1/2 | 5/16 | 14 | 400 | 315 | 260 |
| 2011 | 4 | 5/16 | 14 | 440 | 395 | 351 |
| 2012 | 5 | 3/8 | 19 | 270 | 525 | 484 |
| 2013 | 6 | 3/8 | 19 | 215 | 360 | 643 |

1. TRAPEZE STRUT SECTIONAL PROPERTIES MUST MEET OR EXCEED THE SECTIONAL PROPERTIES ON PAGE H2.
2. A 7/16" DRILLED HOLE ON PHD FIGURE NUMBER 2008 SAMPLES TO ACCOMMODATE THE 3/8" DIAMETER BOLT
3. FOR USE WITH STEEL PIPE AND RMC CONDUIT.
4. FACTOR OF SAFETY = 2.0

# 2 PIECE PHD TRAPEZE CLAMP - FOR USE WITH STEEL PIPE ≥ SCH 10 OR RMC CONDUIT

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***H3.1***

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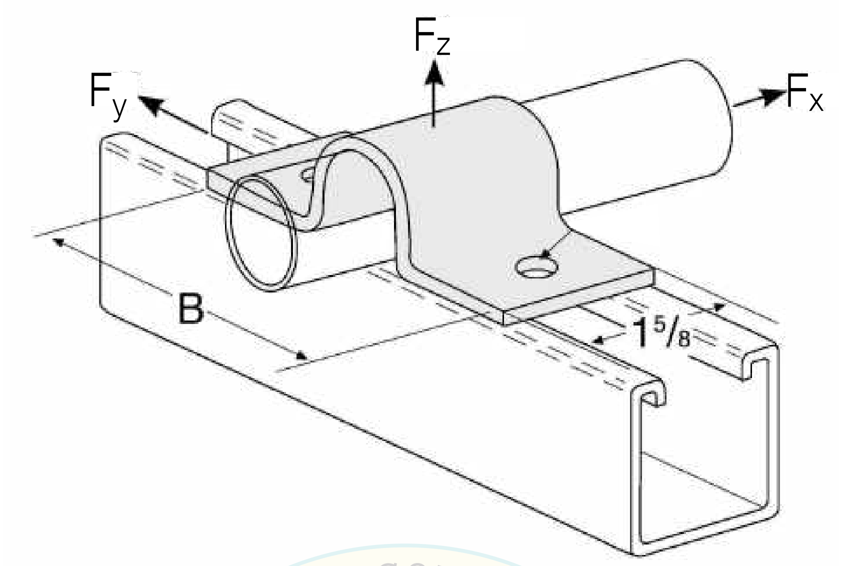

**MATERIAL:** CLAMP - HOT ROLLED MILD STEEL, ASTM A1011SS, GRADE 33
BOLT - ASTM A307, GRADE A

| PHD Figure Number | Nominal Pipe Diameter (in) | Bolt Diameter (in) | Bolt Torque (ft-lbs) | Design Loads, ASD (lbs) | | |
|---|---|---|---|---|---|---|
| | | | | Fx | Fy | Fz |
| 7256 | 2 | 3/8 | 19 | 675 | 910 | 106 |
| 7260 | 4 | 3/8 | 19 | 505 | 965 | 351 |

1. TRAPEZE STRUT SECTIONAL PROPERTIES MUST MEET OR EXCEED THE SECTIONAL PROPERTIES ON PAGE H2.
2. FOR USE WITH CAST IRON.
3. FACTOR OF SAFETY = 2.0

# 1 PIECE PHD STANDARD 2-HOLE PIPE STRAP - FOR USE WITH CAST IRON PIPING

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*12/20/18*

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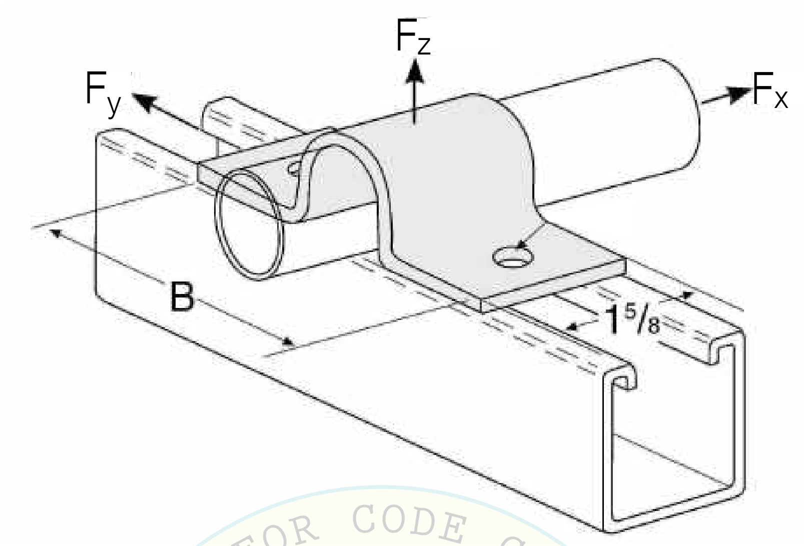
***H3.1.1***



**MATERIAL: CLAMP - HOT ROLLED MILD STEEL, ASTM A1011SS, GRADE 33**
**BOLT - ASTM A307, GRADE A**

| PHD Figure Number | Nominal Pipe Diameter (in) | Bolt Diameter (in) | Bolt Torque (ft-lbs) | Design Loads, ASD (lbs) | | |
|---|---|---|---|---|---|---|
| | | | | Fx | Fy | Fz |
| 7254 | 1 1/4 | 5/16 | 14 | 380 | 210 | 64 |
| 7255 | 1 1/2 | 5/16 | 14 | 250 | 240 | 76 |
| 7256 | 2 | 3/8 | 19 | 615 | 1420 | 106 |
| 7257 | 2 1/2 | 3/8 | 19 | 200 | 675 | 159 |
| 7258 | 3 | 3/8 | 19 | 615 | 1350 | 213 |
| 7259 | 3 1/2 | 3/8 | 19 | 555 | 555 | 260 |
| 7260 | 4 | 3/8 | 19 | 415 | 1190 | 351 |
| 7262 | 6 | 3/8 | 19 | 165 | 875 | 643 |

1 TRAPEZE STRUT SECTIONAL PROPERTIES MUST MEET OR EXCEED THE SECTIONAL PROPERTIES ON PAGE H2.
2. FOR USE WITH STEEL PIPE AND RMC CONDUIT.
3. FACTOR OF SAFETY = 2.0

# 1 PIECE PHD STANDARD 2-HOLE PIPE STRAP - FOR USE WITH STEEL PIPE ≥ SCH 10 OR RMC CONDUIT

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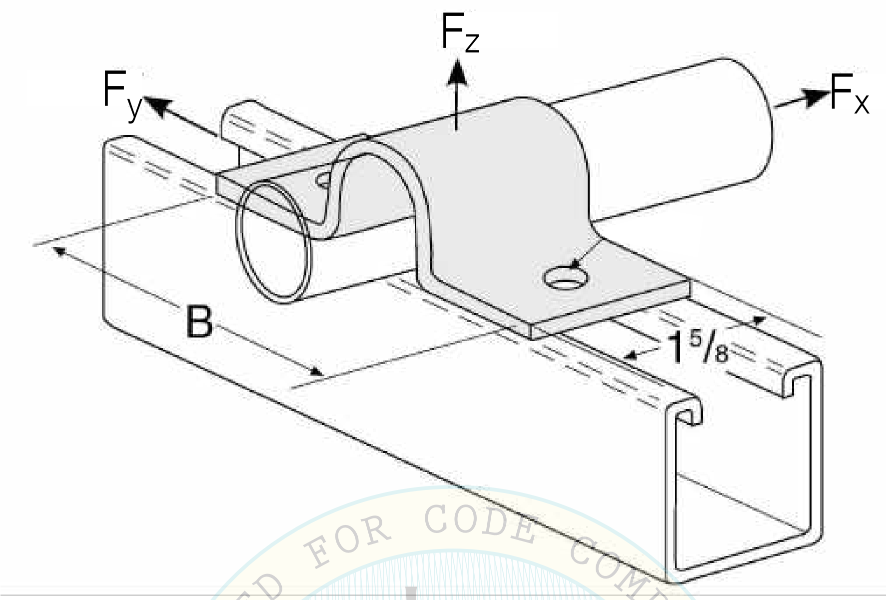
***H3.1.2***



**MATERIAL:** CLAMP - HOT ROLLED MILD STEEL, ASTM A1011SS, GRADE 33
BOLT - ASTM A307, GRADE A

| PHD Figure Number | Nominal Pipe Diameter (in) | Bolt Diameter (in) | Bolt Torque (ft-lbs) | Design Loads, ASD (lbs) | | |
|---|---|---|---|---|---|---|
| | | | | Fx | Fy | Fz |
| 7257 | 2 1/2 | 3/8 | 19 | 180 | 655 | 159 |
| 7258 | 3 | 3/8 | 19 | 585 | 1160 | 213 |
| 7260 | 4 | 3/8 | 19 | 395 | 1210 | 351 |

1. TRAPEZE STRUT SECTIONAL PROPERTIES MUST MEET OR EXCEED THE SECTIONAL PROPERTIES ON PAGE H2.
2. FOR USE WITH EMT/IMT CONDUIT.
3. FACTOR OF SAFETY = 2.0

# 1 PIECE PHD STANDARD 2-HOLE PIPE STRAP - FOR USE WITH EMT/IMT CONDUIT

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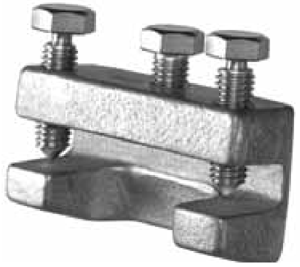
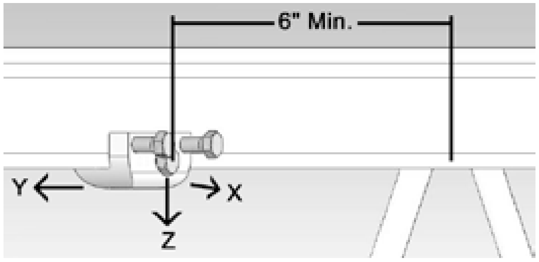
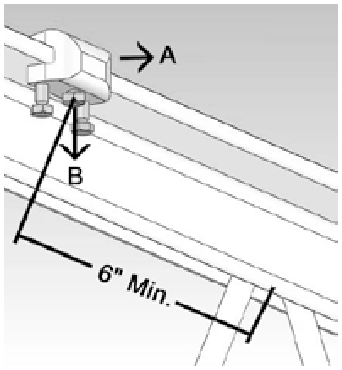
*12/06/18*







BAR JOIST CLAMP

BAR JOIST CLAMP AS BEAM CLAMP

| **Bar Joist Clamp** | **Maximum Design Load** | |
|---|---|---|
| Brace Angle From Horizontal | X-Z (Lateral) | Y-Z (Longitudinal) |
| 46°-60° | 1040 lbs. | 970 lbs. |
| 31°-45° | 1490 lbs. | 1370 lbs. |
| 16°-30° | 1800 lbs. | 2060 lbs. |
| 0°-15° | 2010 lbs. | 2300 lbs. |

| **Bar Joist Clamp As Beam Clamp** | **Maximum Design Load** |
|---|---|
| Brace Angle From Horizontal | A-B (Lateral) |
| 46°-60° | 1150 lbs. |
| 31°-45° | 1660 lbs. |
| 16°-30° | 1990 lbs. |
| 0°-15° | 2220 lbs. |

Minimum Beam Flange Thickness = 1/4"
Maximum Beam Flange Thickness = 3/8"

**FUNCTION:** Allows for attachment of a sway brace assembly to a steel bar joist or structural member as a point of connection in lieu of drilling or welding. Utilize the Fig. 035 Bar Joist Clamp as a beam clamp, or bar joist clamp in the transverse direction of beam/ joist; as a bar joist clamp in the longitudinal direction of the bar joist with a bracing element to form a complete sway brace assembly.

**FASTENER SIZE:** 1/2" Diameter M. B.

**FINISH:** Electro-galvanized

**INSTALL:** Place on structural member with the flange contacting the back of the jaw. Tighten set screws finger tight then evenly tighten until hex heads break off. Attach brace arm connector to the integral attachment bolt. Ensure that the attachment bolt head bottoms out securely.

# PHD FIG. 035 SWAY BRACE BAR STRUCTURAL JOIST ADAPTER

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***H3.1.4***

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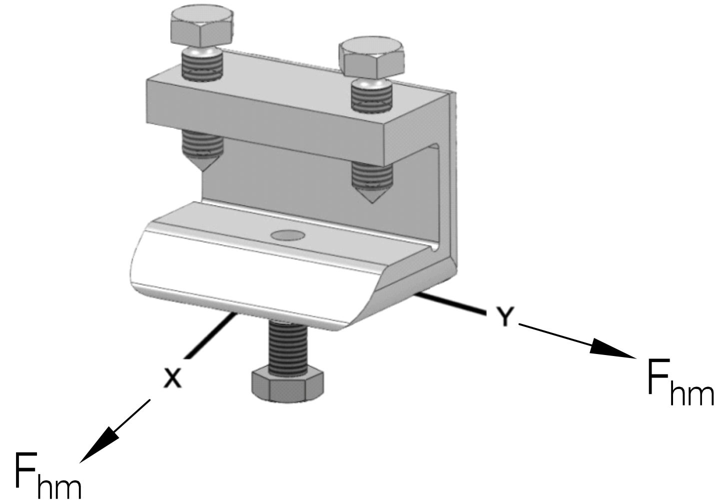

| **FM Maximum Design Load, Horizontal** | | | |
|---|---|---|---|
| **Beam Flange Thickness** | **Brace Angle From Horizontal (Degrees)** | **X** | **Y** |
| | | **$F_{hm}$ Lbs.** | **$F_{hm}$ Lbs.** |
| 3/8" Min. 1-1/4" Max. | 46° - 60° | 1,150 | 900 |
| | 31° - 45° | 1,800 | 1,050 |
| | 16° - 30° | 2,230 | 1,260 |
| | 0° - 15° | 2,460 | 1,410 |

**FUNCTION:** Allows for attachment of a sway brace assembly to a steel structural member as a point of connection in lieu of drilling or welding. Utilize the Fig. 045 beam clamp with a bracing element to form a complete sway brace assembly.

**FASTENER SIZE:** 1/2" Diameter M. B.

**FINISH:** Electro-galvanized

**INSTALL:** Place on structural member with the flange contacting the back of the jaw. Tighten set screws finger tight then evenly tighten until hex heads break off. Attach brace arm connector with the supplied attachment bolt. Ensure that the attachment bolt head bottoms out.

***NOTE: "FM Maximum Design Load" Shown = Maximum Horizontal Force, F(hm)***
***Maximum Allowable Axial Brace Force (P) at 45 Degrees = F(hm) x 1.414***
***Multiplier For Axial Brace Capacity (P) at ___Degrees From Horizontal:***

| | ***Degrees*** | | |
|---|---|---|---|
| | ***30*** | ***45*** | ***60*** |
| ***= F(hm) x*** | ***1.155*** | ***1.414*** | ***2.000*** |

## PHD FIG. 045 SWAY BRACE STRUCTURAL ADAPTER

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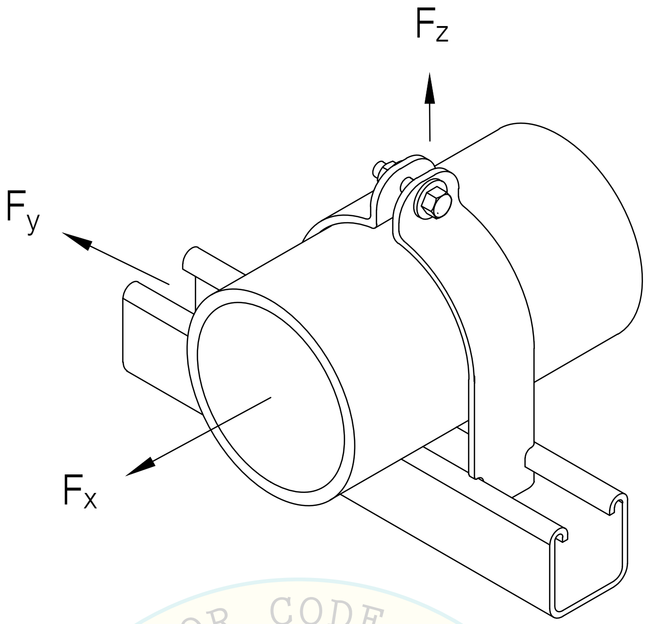
***H3.1.5***



**MATERIAL:** **CLAMP - HOT ROLLED MILD STEEL, ASTM A1011SS, GRADE 33**
**BOLT - ASTM A307, GRADE A**
**FLAT WASHER - ANSI/ASME B18.22.1 ON EACH SIDE**

| PHD Figure Number | Nominal Pipe Size (in) | Bolt + Washer Diameter (in) | Bolt Torque (ft-lbs) | Design Loads, ASD (lbs) | | |
|---|---|---|---|---|---|---|
| | | | | Fx | Fy | Fz |
| 2205 | 1 1/4 | 1/4 | 6 | 145 | 150 | 64 |
| 2206 | 1 1/2 | 5/16 | 11 | 195 | 215 | 76 |
| 2207 | 2 | 5/16 | 11 | 245 | 275 | 106 |
| 2008 | 2 1/2 | 5/16 | 11 | 310 | 375 | 159 |
| 2009 | 3 | 5/16 | 11 | 320 | 330 | 213 |
| 2011 | 4 | 5/16 | 11 | 295 | 440 | 260 |

1. TRAPEZE STRUT SECTIONAL PROPERTIES MUST MEET OR EXCEED THE SECTIONAL PROPERTIES ON PAGE H2
2. FOR USE WITH EMT CONDUIT.
3. FACTOR OF SAFETY = 2.0

## 2 PIECE PHD TRAPEZE CLAMP - FOR USE WITH EMT CONDUIT

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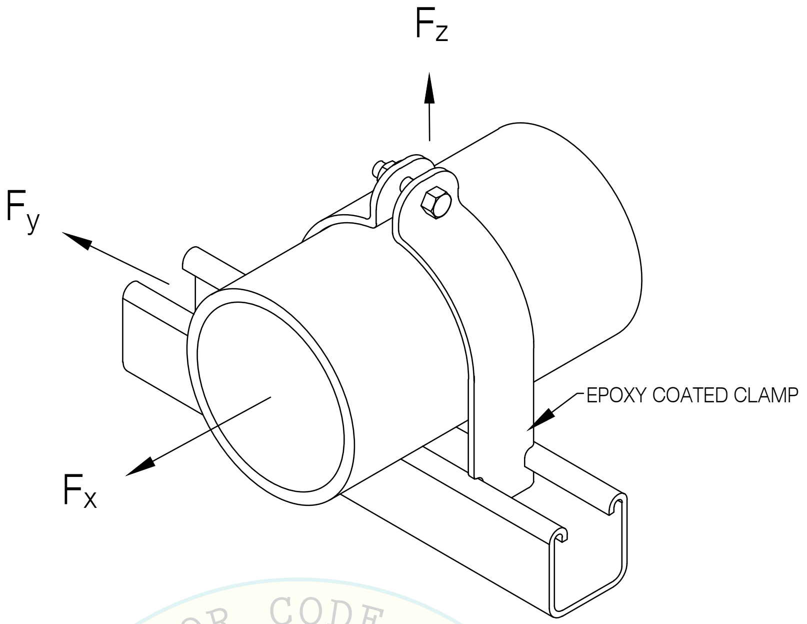
***H3.1.6***



**MATERIAL: CLAMP - HOT ROLLED MILD STEEL, ASTM A1011SS, GRADE 33**
**BOLT - ASTM A307, GRADE A**

| PHD Figure Number | Nominal Pipe Size (in) | Bolt Diameter (in) | Bolt Torque (ft-lbs) | Design Loads, ASD (lbs) | | |
|---|---|---|---|---|---|---|
| | | | | Fx | Fy | Fz |
| 2306 | 1 1/4 | 1/4 | 7 | 100 | 165 | 64 |
| 2307 | 1 1/2 | 1/4 | 7 | 130 | 125 | 76 |
| 2308 | 2 | 1/4 | 7 | 205 | 155 | 106 |
| 2309 | 2 1/2 | 5/16 | 11 | 280 | 175 | 159 |
| 2310 | 3 | 5/16 | 16 | 215 | 375 | 213 |
| 2312 | 4 | 5/16 | 16 | 275 | 305 | 351 |
| 2313 | 5 | 3/8 | 24 | 735 | 380 | 484 |
| 2314 | 6 | 3/8 | 24 | 435 | 415 | 643 |

1. TRAPEZE STRUT SECTIONAL PROPERTIES MUST MEET OR EXCEED THE SECTIONAL PROPERTIES ON PAGE H2.
2 FOR USE WITH COPPER TYPE L & K.
3 FACTOR OF SAFETY = 2.0

# 2 PIECE PHD TRAPEZE CLAMP WITH EPOXY - FOR USE WITH COPPER TYPE L & K

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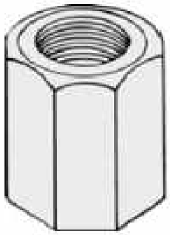
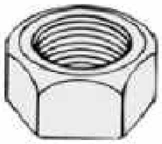
***H3.1.10***

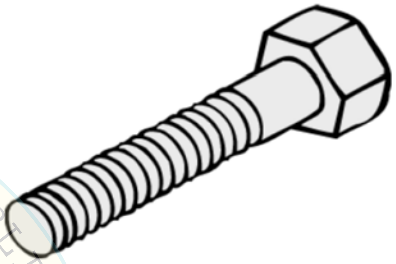


**Rod Coupler**
**IFI-128**

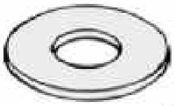
Threaded Rod
ASTM A36
Yield Strength = 36 ksi Min.



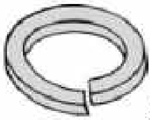
**Hex Nut**
**ANSI/ASME B18.2.2**



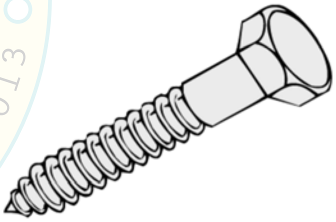
**Hex Head Bolt**
**ANSI/ASME B18.2.1**



**Flat Washer**
**ANSI/ASME B18.22.1**

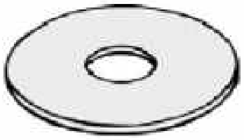


**Lock Washer**
**ANSI/ASME B18.21.1**



**Lag Screw**
**ANSI/ASME B18.6.1**

Note: Lag screws not allowed
for fire sprinkler bracing



**Fender Washer**
**ANSI/ASME B18.22.1**

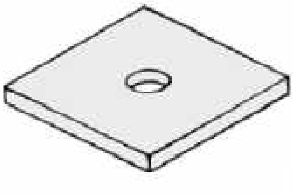


Plate Washer
1/4" Thickness and below ASTM A1011
Structural Steel, Grade 33
3/8" Thickness and above ASTM A-36,
Structural Grade

## FASTENERS - GENERAL

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S 4710

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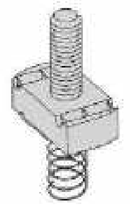
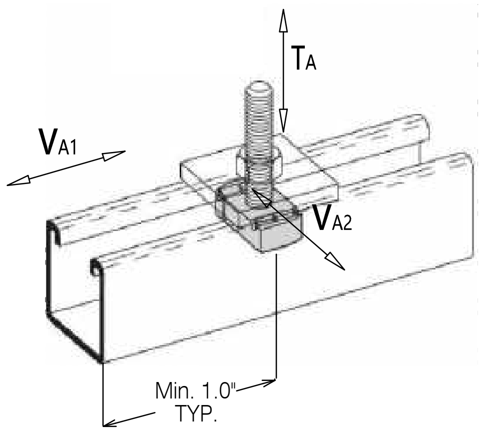
***H3.2***

PHD 3008, 3108
Strut Nut



PHD 3611
Studded Strut Nut

With or Without Spring



**DESIGN VALUES IN 12 GA. STRUT (ASD) WITHOUT PRYING [1]**

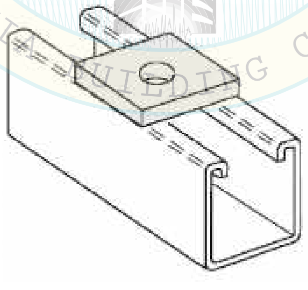
| PHD PART# | Thread Size Inch | Pull-Out Strength $T_A$ Lbs | Resistance To Slip (Parallel) $V_{A1}$ Lbs | Shear Strength (Perpend.) $V_{A2}$ Lbs | Bolt [2] Torque Ft-Lbs | Nut Thickness Inch |
|---|---|---|---|---|---|---|
| 3008/3108/3611 | 1/2-13 | 3,250 | 1,850 | 1,415 | 50 | 1/2 |

**Steel : ASTM A-576, Grade M1015 Case Hardened to RC25 Min.**

1. Check for unity when determining allowed combined tenion and shear capacity:
$T / T_A + V_1 / V_{A1} + V_2 / V_{A2} \leq 1.2$

2. Hex Bolt With Std Hex Nut Only. For Studded Strut Nut With Tite-End Fastener (Pg F14), Tighten Till Hex Head Shears Off.

3. Effects of prying to be analyzed when brace attachments are used.



SQUARE WASHER (1-5/8" x 1-5/8" x 1/4" TYP.)
FOR 3/8", 1/2", 5/8" DIA. ROD OR BOLT
STEEL: ASTM A-1011, GRADE 33

## STRUT NUTS, SQUARE WASHERS

ANTHONY A. RUBALCAVA
S 4710

**ALLOWABLE SCREW SHEAR STRENGTH FOR Fu = 45 KSI (33 KSI YIELD STRENGTH) [1]**

Ω = 3

| SCREW SIZE | SCREW DIAMETER | THICKNESS OF MEMBER IN CONTACT WITH SCREW HEAD | ALLOWABLE FASTENER STRENGTH | ALLOWABLE SHEAR STRENGTH, Pns / Ω [2] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | THICKNESS OF MEMBER NOT IN CONTACT WITH SCREW HEAD | | | | | | |
| | | | | INCH | INCH | INCH | INCH | INCH | INCH | INCH |
| | | | Pss / Ω | 0.036 | 0.048 | 0.060 | 0.075 | 0.090 | 0.105 | 0.135 |
| | INCH | INCH | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. |
| #8 | 0.164 | 0.036 | 464 | 174 | 239 | 239 | 239 | 239 | 239 | 239 |
| | | 0.048 | 464 | 174 | 268 | 319 | 319 | 319 | 319 | 319 |
| | | 0.060 | 464 | 174 | 268 | 373 | 400 | 400 | 400 | 400 |
| | | 0.075 | 464 | 174 | 268 | 373 | 497 | 497 | 497 | 497 |
| | | 0.090 | 464 | 174 | 268 | 373 | 497 | 597 | 597 | 597 |
| | | 0.105 | 464 | 174 | 268 | 373 | 497 | 597 | 697 | 697 |
| | | 0.135 | 464 | 174 | 268 | 373 | 497 | 597 | 697 | 897 |
| | | | | | | | | | | |
| #10 | 0.190 | 0.036 | 495 | 188 | 277 | 277 | 277 | 277 | 277 | 277 |
| | | 0.048 | 495 | 188 | 289 | 370 | 370 | 370 | 370 | 370 |
| | | 0.060 | 495 | 188 | 289 | 403 | 463 | 463 | 463 | 463 |
| | | 0.075 | 495 | 188 | 289 | 403 | 563 | 577 | 577 | 577 |
| | | 0.090 | 495 | 188 | 289 | 403 | 563 | 693 | 693 | 693 |
| | | 0.105 | 495 | 188 | 289 | 403 | 563 | 693 | 807 | 807 |
| | | 0.135 | 495 | 188 | 289 | 403 | 563 | 693 | 807 | 1040 |
| | | | | | | | | | | |
| #12 | 0.216 | 0.036 | 692 | 200 | 309 | 315 | 315 | 315 | 315 | 315 |
| | | 0.048 | 692 | 200 | 308 | 420 | 420 | 420 | 420 | 420 |
| | | 0.060 | 692 | 200 | 308 | 430 | 523 | 523 | 523 | 523 |
| | | 0.075 | 692 | 200 | 308 | 430 | 600 | 657 | 657 | 657 |
| | | 0.090 | 692 | 200 | 308 | 430 | 600 | 787 | 787 | 787 |
| | | 0.105 | 692 | 200 | 308 | 430 | 600 | 787 | 920 | 920 |
| | | 0.135 | 692 | 200 | 308 | 430 | 600 | 787 | 920 | 1180 |
| | | | | | | | | | | |
| #14 | 0.237 | 0.036 | 924 | 218 | 340 | 363 | 363 | 363 | 363 | 363 |
| | | 0.048 | 924 | 218 | 331 | 467 | 487 | 487 | 487 | 487 |
| | | 0.060 | 924 | 218 | 331 | 463 | 607 | 607 | 607 | 607 |
| | | 0.075 | 924 | 218 | 331 | 463 | 647 | 760 | 760 | 760 |
| | | 0.090 | 924 | 218 | 331 | 463 | 647 | 850 | 910 | 910 |
| | | 0.105 | 924 | 218 | 331 | 463 | 647 | 850 | 1063 | 1063 |
| | | 0.135 | 924 | 218 | 331 | 463 | 647 | 850 | 1063 | 1367 |

1. MINIMUM SPACING IS TO BE THREE TIMES THE FASTENER DIAMETER. MINIMUM EDGE DISTANCE SHALL BE 1.5 TIMES THE FASTENER DIAMETER.
2. CONNECTION CAPACITY MAY BE GOVERNED BY THE ALLOWABLE SHEAR STRENGTH OF THE FASTENER. TABULATED VALUES ARE BASED ON DARTS SELF-DRILLING SCREWS GIVEN IN ESR-1408.
3. PENETRATION OF SCREWS THROUGH JOINED MATERIALS SHALL NOT BE LESS THAN 3 EXPOSED THREADS.

# SCREW SHEAR DESIGN VALUES

## AISI SPECIFICATION, 2007 EDITION / S2-10

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*Rev. 9*
*05/23/17*

**ALLOWABLE SCREW SHEAR STRENGTH FOR Fu = 45 KSI (33 KSI YIELD STRENGTH) [1]**

Ω = 3

| SCREW SIZE | SCREW DIAMETER | THICKNESS OF MEMBER IN CONTACT WITH SCREW HEAD $T_1$ | | ALLOWABLE FASTENER STRENGTH | ALLOWABLE SHEAR STRENGTH, Pns / Ω [2]<br>THICKNESS OF MEMBER NOT IN CONTACT WITH SCREW HEAD $T_2$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | INCH | INCH | INCH | INCH | INCH | INCH |
| | | DESIGN | | | 0.031 | 0.035 | 0.045 | 0.057 | 0.071 | 0.102 |
| | | THICKNESS | MILS [4] | Pss / Ω | 33 (DW) | 33 (ST) | 43 | 54 | 68 | 97 |
| | INCH | INCH | | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. |
| #8 | 0.164 | 0.031 | 33 (DW) | 464 | 141 | 142 | 142 | 142 | 142 | 142 |
| | | 0.035 | 33 (ST) | 464 | 141 | 164 | 177 | 177 | 177 | 177 |
| | | 0.045 | 43 | 464 | 141 | 164 | 244 | 254 | 254 | 254 |
| | | 0.057 | 54 | 464 | 141 | 164 | 244 | 344 | 349 | 349 |
| | | 0.071 | 68 | 464 | 141 | 164 | 244 | 344 | 474 | 474 |
| | | 0.102 | 97 | 464 | 141 | 164 | 244 | 344 | 474 | 677 |
| #10 | 0.190 | 0.031 | 33 (DW) | 495 | 151 | 153 | 153 | 153 | 153 | 153 |
| | | 0.035 | 33 (ST) | 495 | 151 | 177 | 194 | 194 | 194 | 194 |
| | | 0.045 | 43 | 495 | 151 | 177 | 263 | 277 | 277 | 277 |
| | | 0.057 | 54 | 495 | 151 | 177 | 263 | 370 | 381 | 381 |
| | | 0.071 | 68 | 495 | 151 | 177 | 263 | 370 | 523 | 530 |
| | | 0.102 | 97 | 495 | 151 | 177 | 263 | 370 | 523 | 785 |
| #12 | 0.216 | 0.031 | 33 (DW) | 692 | 161 | 163 | 163 | 163 | 163 | 163 |
| | | 0.035 | 33 (ST) | 692 | 161 | 188 | 207 | 207 | 207 | 207 |
| | | 0.045 | 43 | 692 | 161 | 188 | 280 | 300 | 300 | 300 |
| | | 0.057 | 54 | 692 | 161 | 188 | 280 | 394 | 412 | 412 |
| | | 0.071 | 68 | 692 | 161 | 188 | 280 | 394 | 557 | 576 |
| | | 0.102 | 97 | 692 | 161 | 188 | 280 | 394 | 557 | 892 |
| #14 | 0.250 | 0.031 | 33 (DW) | 924 | 174 | 176 | 176 | 176 | 176 | 176 |
| | | 0.035 | 33 (ST) | 924 | 174 | 203 | 223 | 223 | 223 | 223 |
| | | 0.045 | 43 | 924 | 174 | 203 | 302 | 323 | 323 | 323 |
| | | 0.057 | 54 | 924 | 174 | 203 | 302 | 424 | 450 | 450 |
| | | 0.071 | 68 | 924 | 174 | 203 | 302 | 424 | 600 | 635 |
| | | 0.102 | 97 | 924 | 174 | 203 | 302 | 424 | 600 | 1026 |

1. MINIMUM SPACING IS TO BE 3 TIMES THE FASTENER DIAMETER. MINIMUM EDGE DISTANCE SHALL BE 1.5 TIMES THE FASTENER DIAMETER.
2. CONNECTION CAPACITY MAY BE GOVERNED BY THE ALLOWABLE SHEAR STRENGTH OF THE FASTENER. TABULATED VALUES ARE BASED ON DARTS SELF-DRILLING SCREWS GIVEN IN ESR-1408.
3. PENETRATION OF SCREWS THROUGH JOINED MATERIALS SHALL NOT BE LESS THAN 3 EXPOSED THREADS.
4. 33 MIL (DW) = 20 GA. DRYWALL, 33 MIL (ST) = 20 GA. STRUCTURAL, 43 MIL = 18 GA., 54 MIL = 16 GA. 68 MIL = 14 GA., 97 MIL = 12 GA.

# SCREW SHEAR DESIGN VALUES FOR METAL STUDS, JOISTS AND ACCESSORIES (STEEL TO STEEL CONNECTIONS)

## AISI SPECIFICATION, 2007 EDITION / S2-10

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***H3.8.1***

2013 CBC OSHPD

**ALLOWABLE SCREW PULL-OUT TENSION STRENGTH FOR Fu - 45 KSI (33 KSI YIELD STRENGTH)**[1]

**MATERIAL NOT IN CONTACT WITH SCREW HEAD** Ω = 3

| SCREW SIZE | SCREW DIAMETER | ALLOWABLE FASTENER STRENGTH | ALLOWABLE PULL-OUT STRENGTH, Pnot / Ω[2] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | THICKNESS OF MEMBER NOT IN CONTACT WITH SCREW HEAD | | | | | | |
| | | | INCH | INCH | INCH | INCH | INCH | INCH | INCH |
| | | Pst / Ω | 0.036 | 0.048 | 0.060 | 0.075 | 0.090 | 0.105 | 0.125 |
| | INCH | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. |
| #8 | 0.164 | 658 | 75 | 100 | 125 | 157 | 188 | 220 | 282 |
| #10 | 0.190 | 386 | 87 | 116 | 145 | 182 | 218 | 254 | 327 |
| #12 | 0.216 | 868 | 99 | 126 | 165 | 207 | 248 | 289 | 373 |
| #14 | 0.250 | 1067 | 115 | 153 | 191 | 239 | 287 | 333 | 430 |

**ALLOWABLE SCREW PULL-OVER TENSION STRENGTH FOR Fu - 45 KSI (33 KSI YIELD STRENGTH)**[1]

**MATERIAL IN CONTACT WITH SCREW HEAD - HEX WASHER HEAD SCREWS** Ω[3] = 6

| SCREW SIZE | HEX HEAD DIAMETER | ALLOWABLE FASTENER STRENGTH | ALLOWABLE PULL-OVER STRENGTH, PnoV / Ω[2] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | THICKNESS OF MEMBER NOT IN CONTACT WITH SCREW HEAD | | | | | | |
| | | | INCH | INCH | INCH | INCH | INCH | INCH | INCH |
| | | Pst / Ω | 0.036 | 0.048 | 0.060 | 0.075 | 0.090 | 0.105 | 0.125 |
| | INCH | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. |
| #8 | 0.335 | 329 | 136 | 182 | 227 | 283 | 340 | 395 | 508 |
| #10 | 0.399 | 193 | 153 | 215 | 270 | 337 | 403 | 472 | 607 |
| #12 | 0.415 | 433 | 168 | 223 | 280 | 350 | 420 | 490 | 630 |
| #14 | 0.500 | 533 | 203 | 270 | 338 | 422 | 507 | 590 | 760 |

1. MINIMUM SPACING IS TO BE THREE TIMES THE FASTENER DIAMETER. MINIMUM EDGE DISTANCE SHALL BE 1.5 TIMES THE FASTENER DIAMETER.
2. CONNECTION CAPACITY MAY BE GOVERNED BY THE ALLOWABLE TENSILE STRENGTH OF THE FASTENER. TABULATED VALUES ARE BASED ON DARTS SELF-DRILLING SCREWS GIVEN IN ESR-1408.
3. FOR ECCENTRICALLY LOADED CONNECTIONS THAT PRODUCE A NON-UNIFORM PULL-OVER FORCE ON THE FASTENER, THE NOMINAL PULL-OVER STRENGTH HAS BEEN TAKEN AS 50 PERCENT OF Pnov.
4. PENETRATION OF SCREWS THROUGH JOINED MATERIALS SHALL NOT BE LESS THAN 3 EXPOSED THREADS.

# SCREW TENSION DESIGN VALUES

## AISI SPECIFICATION, 2007 EDITION / S2-10

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**ALLOWABLE SCREW PULL-OUT TENSION STRENGTH FOR Fu = 45 KSI (33 KSI YIELD STRENGTH)** [1]
**MATERIAL NOT IN CONTACT WITH SCREW HEAD** $\Omega = 3$

| SCREW SIZE | SCREW DIAMETER | ALLOWABLE FASTENER STRENGTH | ALLOWABLE PULL-OUT STRENGTH, Pnot / Ω [2] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | THICKNESS OF MEMBER NOT IN CONTACT WITH SCREW HEAD | | | | | |
| | | | MIL | MIL | MIL | MIL | MIL | MIL |
| | | Pst / Ω | 33 (DW) | 33 (ST) | 43 | 54 | 68 | 97 |
| | INCH | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. |
| #8 | 0.164 | 726 | 65 | 72 | 94 | 118 | 149 | 213 |
| #10 | 0.190 | 386 | 76 | 84 | 109 | 137 | 173 | 247 |
| #12 | 0.216 | 868 | 86 | 95 | 124 | 156 | 196 | 281 |
| 1/4 | 0.250 | 1067 | 99 | 110 | 144 | 180 | 227 | 325 |

**ALLOWABLE PULL-OVER TENSION STRENGTH - Fu = 45 KSI (33 KSI YIELD STRENGTH)** [1]
**MATERIAL IN CONTACT WITH SCREW HEAD - HEX WASHER HEAD SCREWS** $\Omega$ [3] = 6

| SCREW SIZE | HEX HEAD DIAMETER | ALLOWABLE FASTENER STRENGTH | ALLOWABLE PULL-OVER STRENGTH, Pnov / Ω [2] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | THICKNESS OF MEMBER IN CONTACT WITH SCREW HEAD | | | | | |
| | | | MIL | MIL | MIL | MIL | MIL | MIL |
| | | Pst / Ω | 33 (DW) | 33 (ST) | 43 | 54 | 68 | 97 |
| | INCH | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. | LBS. |
| #8 | 0.335 | 363 | 118 | 130 | 170 | 213 | 269 | 384 |
| #10 | 0.399 | 193 | 140 | 155 | 202 | 254 | 320 | 458 |
| #12 | 0.415 | 434 | 146 | 162 | 211 | 264 | 333 | 476 |
| 1/4 | 0.500 | 533 | 175 | 195 | 254 | 318 | 401 | 574 |

1. MINIMUM SPACING IS TO BE THREE TIMES THE FASTENER DIAMETER. MINIMUM EDGE DISTANCE SHALL BE 1.5 TIMES THE FASTENER DIAMETER.
2. CONNECTION CAPACITY MAY BE GOVERNED BY THE ALLOWABLE TENSILE STRENGTH OF THE FASTENER. TABULATED VALUES ARE BASED ON DARTS SELF-DRILLING SCREWS GIVEN IN ESR-1408.
3. FOR ECCENTRICALLY LOADED CONNECTIONS THAT PRODUCE A NON-UNIFORM PULL-OVER FORCE ON THE FASTENER, THE NOMINAL PULL-OVER STRENGTH HAS BEEN TAKEN AS 50 PERCENT OF Pnov.
4. PENETRATION OF SCREWS THROUGH JOINED MATERIALS SHALL NOT BE LESS THAN 3 EXPOSED THREADS.
5. 33 MIL (DW) = 20 GA. DRYWALL, 33 MIL (ST) = 20 GA. STRUCTURAL, 43 MIL = 18 GA., 54 MIL = 16 GA., 68 MIL = 14 GA., 97 MIL = 12 GA.

# SCREW TENSION DESIGN VALUES FOR METAL STUDS, JOISTS AND ACCESSORIES

## AISI SPECIFICATION, 2007 EDITION / S2-10

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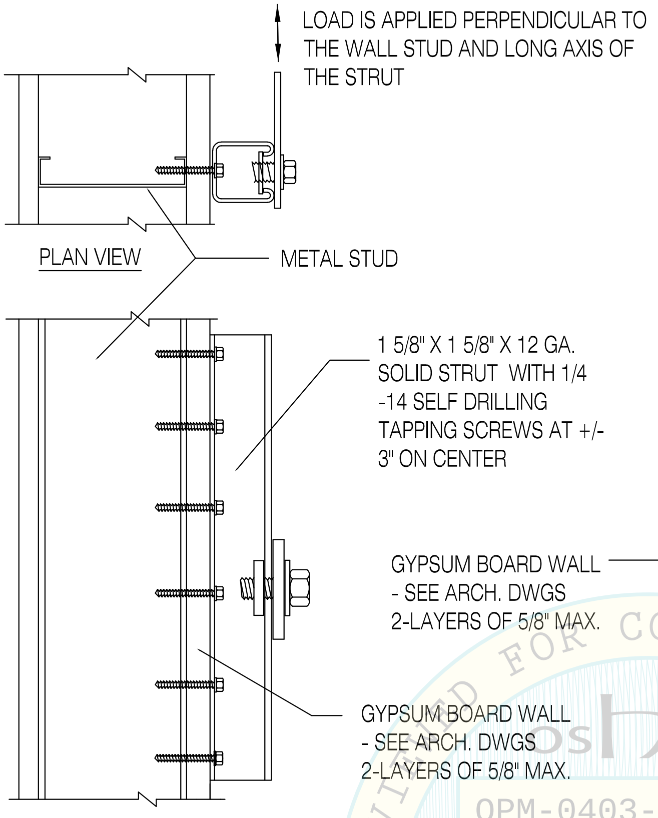
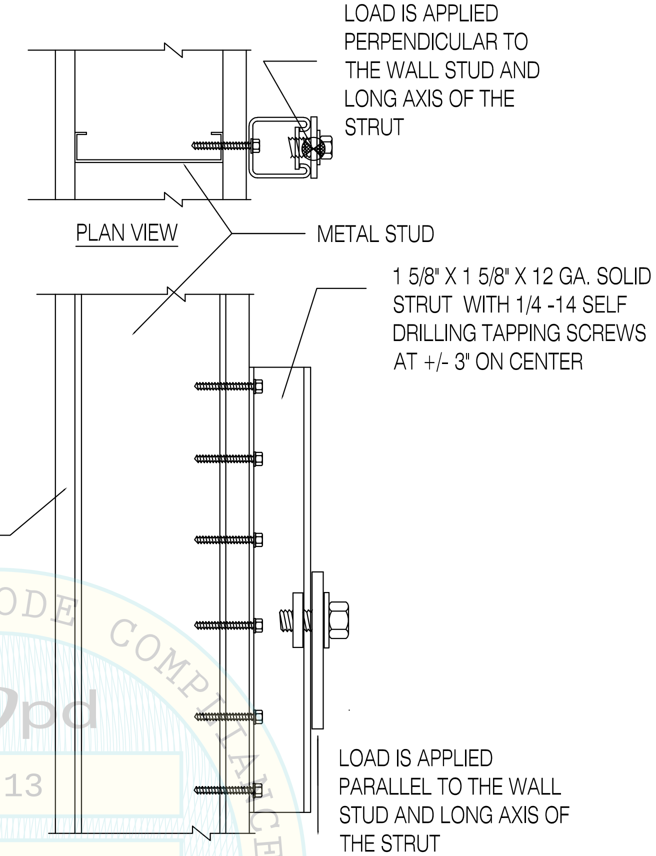


WALL ELEVATION
LOAD APPLIED PERPENDICULAR TO WALL STUD



WALL ELEVATION
LOAD APPLIED PARALLEL TO WALL STUD

| ALLOWABLE SHEAR PER SCREW | | | | | | |
|---|---|---|---|---|---|---|
| SCREW SIZE | WALL STUD THINCKNESS (GAGE) | GYPSUM BOARD THICKNESS INCH | LOAD APPLIED PARALLEL LBS. | GYPSUM BOARD THICKNESS INCH | LOAD APPLIED PARALLEL LBS. | LOAD APPLIED PERPENDICULAR LBS. |
| #14 | 33 MIL (20 GA.) | 5/8 | 124 | (2) AT 5/8 | 97 | 40 |
| | ≥ 43 MIL (18 GA ) | 5/8 | 226 | (2) AT 5/8 | 166 | 40 |
| #12 | 33 MIL (20 GA.) | 5/8 | N/A | (2) AT 5/8 | N/A | N/A |
| | ≥ 43 MIL (18 GA ) | 5/8 | 180 | (2) AT 5/8 | 130 | 30 |
| #10 | 33 MIL (20 GA.) | 5/8 | 100 | (2) AT 5/8 | 70 | 15 |
| | ≥ 43 MIL (18 GA ) | 5/8 | 140 | (2) AT 5/8 | 100 | 25 |

NOTES:

1 THE PRINCIPLE OF SUPERPOSTION CAN BE USED TO COMBINE LOADS NOT PARALLEL OR PERPENDICULAR TO THE WALL SUCH AS A BRACE SPLAYED AT A 45 DEGREE ANGLE.

2. INSPECTION SHALL INCLUDE VERIFICATION OF SCREWS BEARING AGAINST THE STRUT AND THE STRUT BEARING AGAINST THE WALL BOARD MATERIAL.

# SCREW SHEAR DESIGN VALUES FOR GYPSUM WALL BOARD
## (Based Static and Cyclic Load Tests)

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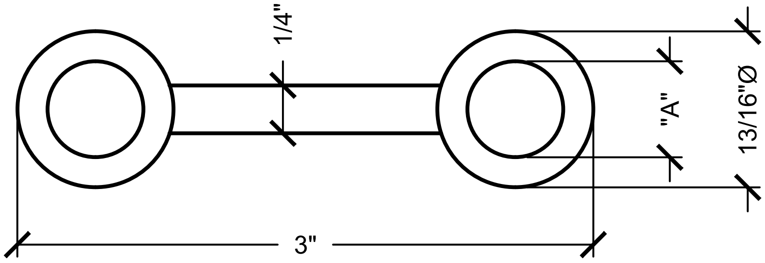
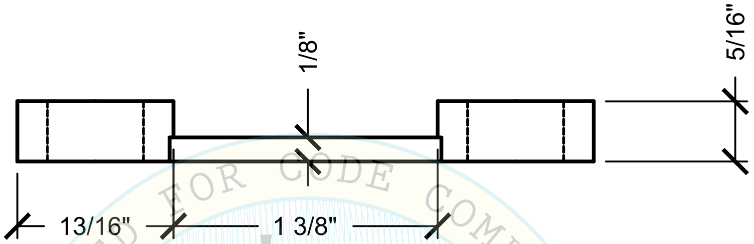
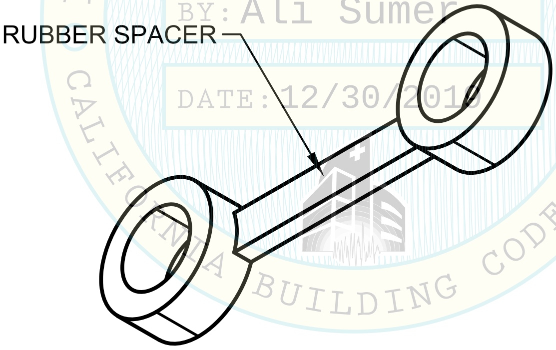


## PLAN VIEW



## SIDE VIEW



| SPACER | | |
|---|---|---|
| MODEL # | BOLT SIZE (in) | A (in) |
| TFS38 | 3/8 | 3/8 |
| TFS12 | 1/2 | 1/2 |
| TFS58 | 5/8 | 5/8 |

# SEISMIC TUNING FORK (TFS) SPACER

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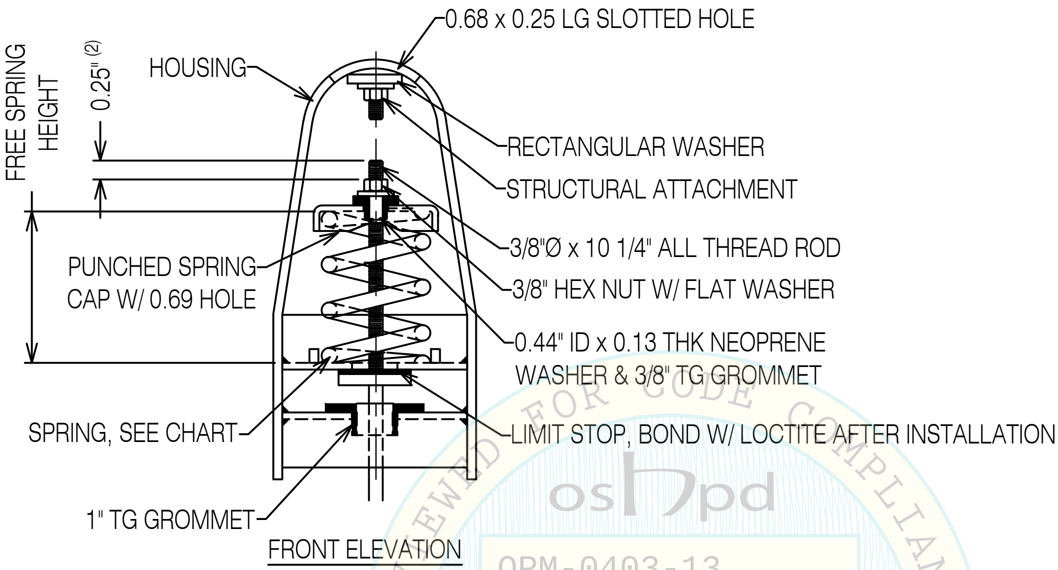

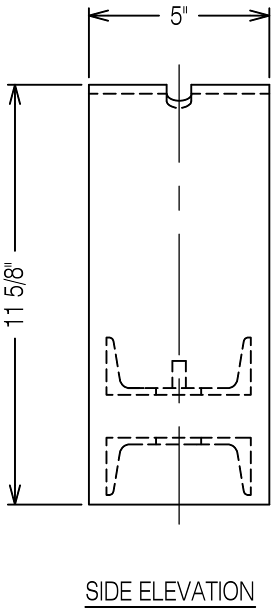

| KINETICS NOISE CONTROL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ITEM NO. | MODEL NO. (OUTER) | SPR. NO. (OUTER) | COLOR | WIRE DIA. | MATERIAL | DEFL. | FREE HT. | SPRING O.D. | COMP. HT. | RATE LB/IN |
| | | 22,030 | | | | | | | | |
| 01 | SROH-1-50 | 12 | BEIGE | 0.234 | ASTM A229 $^{6}$ | 1.00 | 4.20 | 3.00 | 1.42 | 50 |
| 02 | SROH-1-100 | 13 | CHROME | 0.273 | ASTM A229 $^{6}$ | 1.00 | 4.20 | 3.00 | 1.62 | 100 |
| 03 | SROH-1-250 | 01 | BLUE | 0.273 | ASTM A229 $^{6}$ | 1.79 | 4.20 | 3.00 | 1.32 | 140 |
| 04 | SROH-1-450 | 02 | GREEN | 0.331 | ASTM A229 $^{6}$ | 1.54 | 4.20 | 3.00 | 1.69 | 292 |
| 05 | SROH-1-625 | 03 | BLACK | 0.363 | ASTM A229 $^{6}$ | 1.44 | 4.20 | 3.00 | 1.86 | 434 |
| 06 | SROH-1-800 | 04 | GRAY | 0.394 | ASTM A229 $^{6}$ | 1.31 | 4.20 | 3.00 | 2.05 | 611 |
| 07 | SROH-1-1000 | 05 | RED | 0.430 | ASTM A229 $^{6}$ | 1.15 | 4.20 | 3.00 | 2.29 | 870 |

NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
2. WHEN COIL IS AT FREE HT AND LIMIT STOP IS IN CONTACT WITH HSG
3. MAX. SEISMIC LOAD RATING: 1990 LBS. LOAD RATING IS ASD VALUE. FACTOR OF SAFETY = 1.5
4. MATERIAL: MIN. ASTM A36 (HOUSING, TAPPED PLATE, RECTANGULAR WASHER)
5. MIN. TENSILE STRENGTH IS 147 KSI.

# SROH-1-50/1000 SPRING ASSEMBLY

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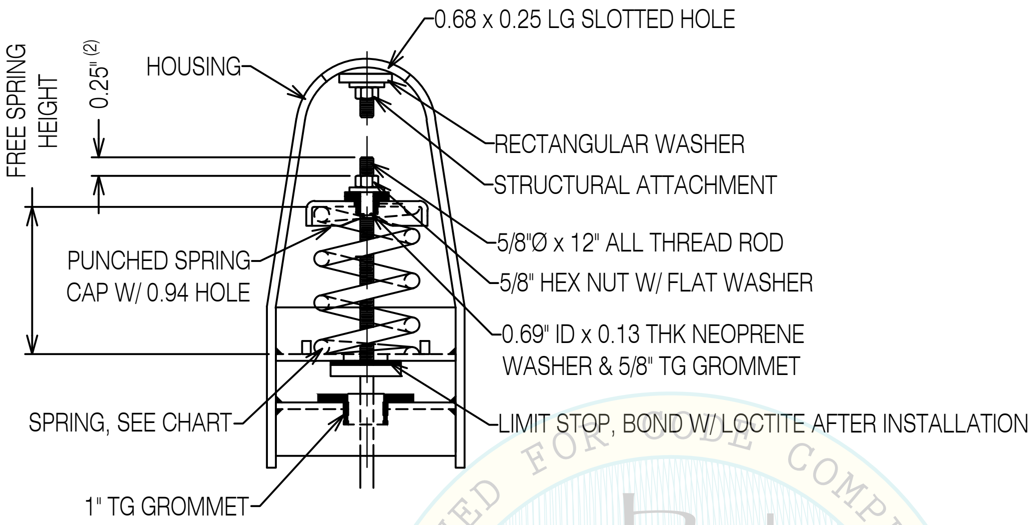
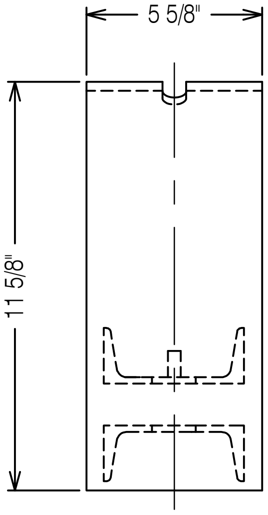
***H5.1***



FRONT ELEVATION



SIDE ELEVATION

| KINETICS NOISE CONTROL | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ITEM NO. | MODEL NO. (OUTER) | SPR. NO. (OUTER) | COLOR | WIRE DIA. | MATERIAL | DEFL. | FREE HT. | SPRING O.D. | COMP. HT. | SPR. NO. (INNER) | COLOR | WIRE DIA. | MATERIAL | DEFL. | FREE HT. | SPRING O.D. | COMP. HT. | RATE LB/IN |
| | | 22.030 | | | | | | | | 22.025 | | | | | | | | |
| 01 | SROH-1-1250 | 06 | BROWN | 0.454 | ASTM A229[7] | 1.09 | 4.20 | 3.00 | 2.37 | | | | | | | | | 1147 |
| 02 | SROH-1-1700 | 07 | ORANGE | 0.499 | ASTM A229[7] | 0.95 | 4.20 | 3.00 | 2.59 | | | | | | | | | 1789 |
| 03 | SROH-1-2200 | 07 | ORANGE | 0.499 | ASTM A229[7] | 0.95 | 4.20 | 3.00 | 2.59 | 01 | GRAY | 0.283 | ASTM A229[7] | 1.00 | 4.20 | 1.84 | 2.29 | 2189 |
| 04 | SROH-1-2465 | 11 | BLUE | 0.531 | ASTM A401[6] | 1.00 | 4.20 | 3.00 | 2.70 | | | | | | | | | 2465 |
| 05 | SROH-1-2865 | 11 | BLUE | 0.531 | ASTM A401[6] | 1.00 | 4.20 | 3.00 | 2.70 | 01 | GRAY | 0.283 | ASTM A229[7] | 1.00 | 4.20 | 1.84 | 2.29 | 2865 |

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. WHEN COIL IS AT FREE HT AND LIMIT STOP IS IN CONTACT WITH HSG.
3. MAX. SEISMIC LOAD RATING: 2625 LBS. LOAD RATING IS ASD VALUE.
   FACTOR OF SAFETY = 1.5
4. MATERIAL: MIN. ASTM A36 (HOUSING, TAPPED PLATE, RECTANGULAR WASHER)
5. MIN. TENSILE STRENGTH IS 202 KSI.
6. MIN. TENSILE STRENGTH IS 147 KSI.

# SROH-1-1250/2865 SPRING ASSEMBLY

ANTHONY A. RUBALCAVA
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www.isatsb.com

*Rev.*
*11/16/18*

*Page*
***H5.2***

2013 CBC OSHPD

## *INDEX - REFERENCE DOCUMENTS*

| *PAGE* | *DESCRIPTION* |
|---|---|
| X1.1 - X1.2 | PROJECT INFORMATION WORKSHEET |

WEIGHT CHARTS

SHEET METAL HVAC GALVANIZED DUCT WEIGHT CHARTS

OPM-0403-13
BY: Ali Sumer
DATE: 12/30/2019

ANTHONY A. RUBALCAVA
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www.isatsb.com

## PROJECT INFORMATION WORKSHEET

**DATE:** ________

**PROJECT NAME:** ________

**PROJECT ADDRESS:** ________

________ **ZIP CODE:** ________

**GENERAL CONTRACTOR:** ________

**CONTRACTOR ADDRESS:** ________ **FAX NO.:** ________

**OFFICE CONTACT:** ________ **PHONE:** ________ **E-MAIL:** ________

**FIELD CONTACT:** ________ **PHONE:** ________ **E-MAIL:** ________

**SUB-CONTRACTOR:** ________ **TRADE:** ________

**CONTRACTOR ADDRESS:** ________ **FAX NO.:** ________

**OFFICE CONTACT:** ________ **PHONE:** ________ **E-MAIL:** ________

**FIELD CONTACT:** ________ **PHONE:** ________ **E-MAIL:** ________

**STRUCTURAL ENGINEER OF RECORD:** ________ **PHONE:** ________ **E-MAIL:** ________

**INSPECTOR:** ________ **PHONE:** ________ **E-MAIL:** ________

**BUILDING CODE:** ________ (CBC 2013, Etc.)

***SEISMIC DESIGN CRITERIA: (Refer To Cover Sheet Of Project's Structural Plan Set, S.0)***

***Note: Data Required In Block 1 Is Crucial. Only Proceed To Fill In Block 2 If Block 1 Data Unavailable.***

**BLOCK 1**

**$S_{DS}$ =** ________ **SEISMIC DESIGN CATEGORY:** ________ **(A, B, C, D, E, or F)**

**$I_p$ =** ________ (Component Importance Factor: 1.0 or 1.50)

**BLOCK 2**

$S_{MS}$ = ________ SITE CLASS(Or Soil Type): ________ (A, B, C, D, E, or F)

Fa = ________ SEISMIC USE GROUP: ________ (I, II, or III)

Ss = ________

**ADDITIONAL REQUIRED PROJECT DATA:**

AVERAGE ROOF ELEVATION RELATIVE TO GRADE (*h*): ________ (FT.)

EACH FLOORS (FINISHED FLOOR) ELEVATION (*z*) RELATIVE TO GRADE:

**FOR REFERENCE ONLY**

| BASEMENT | 1st FLOOR | 2nd FLOOR | 3rd FLOOR | 4th FLOOR | 5th FLOOR | 6th FLOOR | 7th FLOOR | 8th FLOOR |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

**FOR REFERENCE ONLY**

***CONTINUED ON PAGE X1.2***

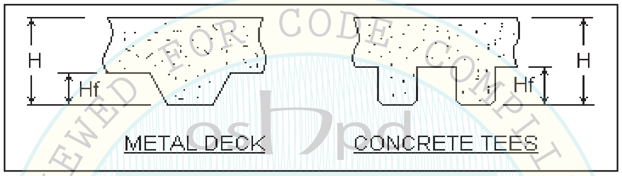
# *ISAT* PROJECT INFORMATION WORKSHEET, PAGE X1.2

## DECK STRUCTURE(S):

| | DECK TYPE* | CONCRETE TYPE / DENSITY** | THICKNESS (H) | FLUTE HEIGHT ($H_f$) |
|---|---|---|---|---|
| 1st FLOOR (FLOOR / BASEMENT CEILING DECK): | | | | |
| OTHER FLOORS (FLOOR / CEILING DECKS): | | | | |
| TOP FLOOR CEILING DECK (ROOF DECK): | | | | |
| MECHANICAL PENTHOUSE CEILING DECK (ROOF DECK): | | | | |

** EXAMPLE DECK TYPES….FORM POUR SLAB, METAL DECK ("W" DECK), CONCRETE TEES, WAFFLE SLAB, ETC…*

***EXAMPLE: 4000psi NORMAL WEIGHT (HARDROCK), 3000psi LIGHT WEIGHT, ETC…*



## SCHEDULE OF SUSPENDED UTILITIES:

| SINGLE HUNG PIPE* OR CONDUIT** TYPE & DIAMETER | TYPE OF CONNECTIONS*** | ROD DIA. (IN.) | VERT. SUPPORT SPACING (FT.) | VERT. DROP LENGTH |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

* STEEL (S), COPPER (C), CAST IRON (CI), VIBRATION ISOLATED (VI)

** EMT (EMT), RIGID STEEL (RS) ***THREADED PIPE, BOLTED, WELDED, ETC…

| TRAPEZE TYPE* | WEIGHT (LBS/LF) or DUCT WEIGHT (LBS/LF) | ROD. DIA. (IN.) | VERT. SUPPORT SPACING (FT.) | VERT. DROP LENGTH |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

*TRAPEZE ABBREVIATIONS: PIPE RACK (PR), VIBRATION ISOLATED PIPE RACK (VPR), CONDUIT RACK (CR), CABLE TRAY (CT), BUS DUCT (BD), HVAC DUCT (DUCT), VIBRATION ISOLATED DUCT (VDUCT), MECHANICAL EQUIPMENT (EQ), VIBRATION ISOLATED MECHANICAL EQUIPMENT (VEQ)

**FOR REFERENCE ONLY**

| ELECTRICAL METALLIC TUBING (EMT) - THINWALL CONDUIT | | | |
|---|---|---|---|
| Trade Size | Weight of Conduit (Lbs/Lf) | Weight of Conductor (Lbs/Lf) | Combined Weight (Lbs/Lf) |
| 1/2 | 0.30 | 0.24 | **0.54** |
| 3/4 | 0.46 | 0.46 | **0.92** |
| 1 | 0.67 | 0.71 | **1.38** |
| 1 1/4 | 1.01 | 1.32 | **2.33** |
| 1 1/2 | 1.16 | 2.20 | **3.36** |
| 2 | 1.48 | 3.30 | **4.78** |
| 2 1/2 | 2.16 | 4.12 | **6.28** |
| 3 | 2.63 | 6.97 | **9.60** |
| 3 1/2 | 3.49 | 8.45 | **11.94** |
| 4 | 3.93 | 9.14 | **13.07** |

| INTERMEDIATE METAL CONDUIT (IMC) | | | |
|---|---|---|---|
| Trade Size | Weight of Conduit (Lbs/Lf) | Weight of Conductor (Lbs/Lf) | Combined Weight (Lbs/Lf) |
| 1/2 | 0.60 | 0.24 | **0.84** |
| 3/4 | 0.82 | 0.46 | **1.28** |
| 1 | 1.16 | 0.71 | **1.87** |
| 1 1/4 | 1.50 | 1.32 | **2.82** |
| 1 1/2 | 1.82 | 2.20 | **4.02** |
| 2 | 2.42 | 3.30 | **5.72** |
| 2 1/2 | 4.28 | 4.12 | **8.40** |
| 3 | 5.26 | 6.97 | **12.23** |
| 3 1/2 | 6.12 | 8.45 | **14.57** |
| 4 | 6.82 | 9.14 | **15.96** |

| RIGID METAL CONDUIT (RMC) | | | |
|---|---|---|---|
| Trade Size | Weight of Conduit (Lbs/Lf) | Weight of Conductor (Lbs/Lf) | Combined Weight (Lbs/Lf) |
| 1/2 | 0.82 | 0.24 | **1.06** |
| 3/4 | 1.09 | 0.46 | **1.55** |
| 1 | 1.61 | 0.71 | **2.32** |
| 1 1/4 | 2.18 | 1.32 | **3.50** |
| 1 1/2 | 2.63 | 2.20 | **4.83** |
| 2 | 3.50 | 3.30 | **6.80** |
| 2 1/2 | 5.59 | 4.12 | **9.71** |
| 3 | 7.27 | 6.97 | **14.24** |
| 3 1/2 | 8.80 | 8.45 | **17.25** |
| 4 | 10.30 | 9.14 | **19.44** |
| 5 | 14.00 | 16.95 | **30.95** |
| 6 | 18.40 | 39.30 | **57.70** |

## CONDUIT WEIGHT CHARTS

ANTHONY A. RUBALCAVA
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*Rev. 3*
*05/29/18*

| ELECTRICAL METALLIC TUBING (EMT) - THINWALL CONDUIT | | | |
|---|---|---|---|
| Trade Size | Weight of Conduit (Lbs/Lf) | Weight of Conductor (Lbs/Lf) | Combined Weight (Lbs/Lf) |
| 1/2 | 0.30 | 0.09 | 0.39 |
| 3/4 | 0.46 | 0.17 | 0.63 |
| 1 | 0.67 | 0.26 | 0.93 |
| 1 1/4 | 1.01 | 0.47 | 1.48 |
| 1 1/2 | 1.16 | 0.70 | 1.86 |
| 2 | 1.48 | 1.12 | 2.60 |
| 2 1/2 | 2.16 | 1.46 | 3.62 |
| 3 | 2.63 | 2.30 | 4.93 |
| 3 1/2 | 3.49 | 2.80 | 6.29 |
| 4 | 3.93 | 3.42 | 7.35 |

| INTERMEDIATE METAL CONDUIT (IMC) | | | |
|---|---|---|---|
| Trade Size | Weight of Conduit (Lbs/Lf) | Weight of Conductor (Lbs/Lf) | Combined Weight (Lbs/Lf) |
| 1/2 | 0.60 | 0.09 | 0.69 |
| 3/4 | 0.82 | 0.17 | 0.99 |
| 1 | 1.16 | 0.26 | 1.42 |
| 1 1/4 | 1.50 | 0.47 | 1.97 |
| 1 1/2 | 1.82 | 0.70 | 2.52 |
| 2 | 2.42 | 1.12 | 3.54 |
| 2 1/2 | 4.28 | 1.46 | 5.74 |
| 3 | 5.26 | 2.30 | 7.56 |
| 3 1/2 | 6.12 | 2.80 | 8.92 |
| 4 | 6.82 | 3.42 | 10.24 |

| RIGID METAL CONDUIT (RMC) | | | |
|---|---|---|---|
| Trade Size | Weight of Conduit (Lbs/Lf) | Weight of Conductor (Lbs/Lf) | Combined Weight (Lbs/Lf) |
| 1/2 | 0.82 | 0.09 | 0.91 |
| 3/4 | 1.09 | 0.17 | 1.26 |
| 1 | 1.61 | 0.26 | 1.87 |
| 1 1/4 | 2.18 | 0.47 | 2.65 |
| 1 1/2 | 2.63 | 0.70 | 3.33 |
| 2 | 3.50 | 1.12 | 4.62 |
| 2 1/2 | 5.59 | 1.46 | 7.05 |
| 3 | 7.27 | 2.30 | 9.57 |
| 3 1/2 | 8.80 | 2.80 | 11.60 |
| 4 | 10.30 | 3.42 | 13.72 |
| 5 | 14.00 | 5.86 | 19.86 |
| 6 | 18.40 | 7.82 | 26.22 |

# CONDUIT WEIGHT CHARTS (ALUMINUM CONDUCTORS)

ANTHONY A. RUBALCAVA
S 4710

| ELECTRICAL METALLIC TUBING (EMT) - THINWALL CONDUIT | | | |
|---|---|---|---|
| Trade Size | Weight of Conduit (Lbs/Lf) | Weight of Cable (Lbs/Lf) | Combined Weight (Lbs/Lf) |
| 1/2 | 0.30 | 0.05 | **0.35** |
| 3/4 | 0.46 | 0.09 | **0.55** |
| 1 | 0.67 | 0.19 | **0.86** |
| 1 1/4 | 1.01 | 0.28 | **1.29** |
| 1 1/2 | 1.16 | 0.44 | **1.60** |
| 2 | 1.48 | 0.75 | **2.23** |
| 2 1/2 | 2.16 | 1.18 | **3.34** |
| 3 | 2.63 | 1.71 | **4.34** |
| 3 1/2 | 3.49 | 2.33 | **5.82** |
| 4 | 3.93 | 3.05 | **6.98** |

| INTERMEDIATE METAL CONDUIT (IMC) | | | |
|---|---|---|---|
| Trade Size | Weight of Conduit (Lbs/Lf) | Weight of Cable (Lbs/Lf) | Combined Weight (Lbs/Lf) |
| 1/2 | 0.60 | 0.05 | **0.65** |
| 3/4 | 0.82 | 0.09 | **0.91** |
| 1 | 1.16 | 0.19 | **1.35** |
| 1 1/4 | 1.50 | 0.28 | **1.78** |
| 1 1/2 | 1.82 | 0.44 | **2.26** |
| 2 | 2.42 | 0.75 | **3.17** |
| 2 1/2 | 4.28 | 1.18 | **5.46** |
| 3 | 5.26 | 1.71 | **6.97** |
| 3 1/2 | 6.12 | 2.33 | **8.45** |
| 4 | 6.82 | 3.05 | **9.87** |

| RIGID METAL CONDUIT (RMC) | | | |
|---|---|---|---|
| Trade Size | Weight of Conduit (Lbs/Lf) | Weight of Cable (Lbs/Lf) | Combined Weight (Lbs/Lf) |
| 1/2 | 0.82 | 0.05 | **0.87** |
| 3/4 | 1.09 | 0.09 | **1.18** |
| 1 | 1.61 | 0.19 | **1.80** |
| 1 1/4 | 2.18 | 0.28 | **2.46** |
| 1 1/2 | 2.63 | 0.44 | **3.07** |
| 2 | 3.50 | 0.75 | **4.25** |
| 2 1/2 | 5.59 | 1.18 | **6.77** |
| 3 | 7.27 | 1.71 | **8.98** |
| 3 1/2 | 8.80 | 2.33 | **11.1** |
| 4 | 10.30 | 3.05 | **13.3** |
| 5 | 14.00 | 3.76 | **17.8** |
| 6 | 18.40 | 5.47 | **23.9** |

## CONDUIT WEIGHT CHARTS (CAT 6 CABLES)

REGISTERED PROFESSIONAL ENGINEER
ANTHONY A. RUBALCAVA
S 4710
STRUCTURAL
STATE OF CALIFORNIA

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*Rev. 0*
*02/19/19*

| STEEL PIPE DATA: SCHEDULE 40 & STD. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Schedule | Pipe Dia. Inch | Pipe Weight Empty Lbs/Lf | Weight of Water Lbs/Lf | Pipe Weight Full Lbs/Lf | Insulation Thickness* Inch | Insulation Weight Lbs/Lf | Pipe Weight Full & Insulated Lbs/Lf |
| 40 | 1/2 | 0.85 | 0.13 | 1.0 | 1" | 0.46 | 1.5 |
| | 3/4 | 1.13 | 0.23 | 1.4 | 1" | 0.43 | 1.8 |
| | 1 | 1.70 | 0.37 | 2.1 | 1" | 0.6 | 2.7 |
| | 1 1/2 | 2.70 | 0.88 | 3.6 | 1" | 0.66 | 4.2 |
| | 2 | 3.60 | 1.45 | 5.1 | 1" | 0.84 | 5.9 |
| | 2 1/2 | 5.80 | 2.07 | 7.9 | 1" | 0.96 | 8.8 |
| | 3 | 7.60 | 3.20 | 10.8 | 1" | 1.06 | 11.9 |
| | 4 | 10.80 | 5.51 | 16.3 | 2" | 3.18 | 19.5 |
| | 5 | 14.62 | 8.66 | 23.3 | 2" | 3.61 | 26.9 |
| | 6 | 19.00 | 12.51 | 31.5 | 2" | 4.21 | 35.7 |
| | 8 | 28.50 | 21.60 | 50.1 | 2" | 5.14 | 55.2 |
| | 10 | 40.50 | 34.10 | 74.6 | 2" | 6.35 | 81.0 |
| STD | 12 | 49.70 | 48.50 | 98.2 | 2" | 7.33 | 105.5 |
| | 14 | 54.70 | 59.75 | 114.5 | 2" | 7.42 | 121.9 |
| | 16 | 62.70 | 79.12 | 141.8 | 2" | 8.34 | 150.2 |
| | 18 | 70.80 | 101.18 | 172.0 | 2" | 9.20 | 181.2 |
| | 20 | 78.80 | 125.67 | 204.5 | 2" | 10.10 | 214.6 |
| | 24 | 94.62 | 183.95 | 278.6 | 2" | 11.87 | 290.4 |
| | 26 | 102.63 | 216.99 | 319.6 | 2" | 12.78 | 332.4 |
| | 28 | 110.64 | 252.73 | 363.4 | 2" | 13.69 | 377.1 |
| | 30 | 118.65 | 291.18 | 409.8 | 2" | 14.53 | 424.4 |
| | 36 | 142.70 | 422.89 | 565.6 | 2" | 40.00 | 605.6 |

* Fiber Glass Pipe Insulation With ASJ

| STEEL PIPE DATA: SCHEDULE 80 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Schedule | Pipe Dia. Inch | Pipe Weight Empty Lbs/Lf | Weight of Water Lbs/Lf | Pipe Weight Full Lbs/Lf | Insulation Thickness* Inch | Insulation Weight Lbs/Lf | Pipe Weight Full & Insulated Lbs/Lf |
| 80 | 1/2" | 1.09 | 0.10 | 1.2 | 1" | 0.46 | 1.7 |
| | 3/4" | 1.47 | 0.19 | 1.7 | 1" | 0.43 | 2.1 |
| | 1" | 2.17 | 0.31 | 2.5 | 1" | 0.6 | 3.1 |
| | 1 1/2" | 3.63 | 0.77 | 4.4 | 1" | 0.66 | 5.1 |
| | 2" | 5.02 | 1.28 | 6.3 | 1" | 0.84 | 7.1 |
| | 2 1/2" | 7.66 | 1.83 | 9.5 | 1" | 0.96 | 10.5 |
| | 3" | 10.25 | 2.86 | 13.1 | 1" | 1.06 | 14.2 |
| | 4" | 14.98 | 4.98 | 20.0 | 2" | 3.18 | 23.1 |
| | 5" | 20.78 | 7.87 | 28.7 | 2" | 3.61 | 32.3 |
| | 6" | 28.57 | 11.29 | 39.9 | 2" | 4.21 | 44.1 |
| | 8" | 43.39 | 19.80 | 63.2 | 2" | 5.14 | 68.3 |
| | 10" | 64.42 | 31.11 | 95.5 | 2" | 6.35 | 101.9 |

* Fiber Glass Pipe Insulation With ASJ

# STEEL PIPE WEIGHT CHARTS

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*11/06/18*

*Page*
***X2.1***

| TYPE K COPPER TUBING | | | | | | |
|---|---|---|---|---|---|---|
| Dia. Inch | Pipe Weight Empty Lbs/Lf | Weight of Water Lbs/Lf | Pipe Weight Full Lbs/Lf | Insulation Thickness Inch | Insulation Weight* Lbs/Lf | Pipe Weight Full & Insulated Lbs/Lf |
| 1/2 | 0.34 | 0.09 | 0.4 | 1" | 0.46 | 0.9 |
| 3/4 | 0.64 | 0.19 | 0.8 | 1" | 0.43 | 1.3 |
| 1 | 0.84 | 0.34 | 1.2 | 1" | 0.6 | 1.8 |
| 1 1/2 | 1.36 | 0.74 | 2.1 | 1" | 0.66 | 2.8 |
| 2 | 2.06 | 1.31 | 3.4 | 1" | 0.84 | 4.2 |
| 2 1/2 | 2.92 | 2 | 4.9 | 1" | 0.96 | 5.9 |
| 3 | 4.01 | 2.96 | 7.0 | 1" | 1.06 | 8.0 |
| 3 1/2 | 5.12 | 3.9 | 9.0 | 1" | 1.66 | 10.7 |
| 4 | 6.51 | 5.06 | 11.6 | 2" | 3.18 | 14.8 |
| 5 | 9.67 | 8 | 17.7 | 2" | 3.61 | 21.3 |
| 6 | 13.87 | 11.2 | 25.1 | 2" | 4.21 | 29.3 |
| 8 | 25.9 | 19.5 | 45.4 | 2" | 5.14 | 50.5 |
| 10 | 40.3 | 30.42 | 70.7 | 2" | 6.35 | 77.1 |
| 12 | 57.8 | 43.68 | 101.5 | 2" | 7.33 | 108.8 |

* Fiber Glass Pipe Insulation With ASJ

| TYPE L COPPER TUBING | | | | | | |
|---|---|---|---|---|---|---|
| Dia. Inch | Pipe Weight Empty Lbs/Lf | Weight of Water Lbs/Lf | Pipe Weight Full Lbs/Lf | Insulation Thickness Inch | Insulation Weight* Lbs/Lf | Pipe Weight Full & Insulated Lbs/Lf |
| 1/2 | 0.29 | 0.1 | 0.4 | 1" | 0.46 | 0.9 |
| 3/4 | 0.46 | 0.21 | 0.7 | 1" | 0.43 | 1.1 |
| 1 | 0.66 | 0.36 | 1.0 | 1" | 0.6 | 1.6 |
| 1 1/2 | 1.14 | 0.77 | 1.9 | 1" | 0.66 | 2.6 |
| 2 | 1.75 | 1.34 | 3.1 | 1" | 0.84 | 3.9 |
| 2 1/2 | 2.48 | 2.06 | 4.5 | 1" | 0.96 | 5.5 |
| 3 | 3.33 | 2.95 | 6.3 | 1" | 1.06 | 7.3 |
| 3 1/2 | 4.29 | 3.99 | 8.3 | 1" | 1.66 | 9.9 |
| 4 | 5.38 | 5.19 | 10.6 | 2" | 3.18 | 13.8 |
| 5 | 7.61 | 8.08 | 15.7 | 2" | 3.61 | 19.3 |
| 6 | 10.2 | 11.62 | 21.8 | 2" | 4.21 | 26.0 |
| 8 | 19.29 | 20.29 | 39.6 | 2" | 5.14 | 44.7 |
| 10 | 30.1 | 31.59 | 61.7 | 2" | 6.35 | 68.0 |
| 12 | 40.4 | 45.42 | 85.8 | 2" | 7.33 | 93.2 |

* Fiber Glass Pipe Insulation With ASJ

# COPPER TUBING WEIGHT CHARTS

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Rev. 2
03/07/16

| NO-HUB CAST IRON PIPE | | | |
|---|---|---|---|
| Dia. Inch | Pipe Weight Empty Lbs/Lf | Weight of Water Lbs/Lf | Pipe Weight Full Lbs/Lf |
| 2 | 3.60 | 1.36 | 5.0 |
| 3 | 5.20 | 3.06 | 8.3 |
| 4 | 7.40 | 5.44 | 12.8 |
| 5 | 9.40 | 8.50 | 17.9 |
| 6 | 11.00 | 12.23 | 23.2 |
| 8 | 18.00 | 21.75 | 39.7 |
| 10 | 25.80 | 33.98 | 59.8 |
| 12 | 35.50 | 48.93 | 84.4 |
| 15 | 51.50 | 76.46 | 128.0 |

## N0-HUB CAST IRON PIPE WEIGHT CHART

| ROUND HVAC DUCT - GALVANIZED STEEL<br>DUCT AREA ≥ 6 SQUARE FEET | | | |
|---|---|---|---|
| Diameter Inches | Insul. Thick [1] Inches | Sht Metal Gage | Weight Lbs / LF [2] |
| 34 | 2 | 20 | 15 |
| 36 | 2 | 20 | 16 |
| 38 | 2 | 20 | 17 |
| 40 | 2 | 20 | 18 |
| 42 | 2 | 28 | 24 |
| 48 | 2 | 28 | 27 |
| 54 | 2 | 28 | 30 |
| 60 | 2 | 28 | 34 |
| 66 | 2 | 26 | 46 |
| 72 | 2 | 26 | 50 |

1. INSULATION THICKNESS SHOWN IS FOR WEIGHT ESTIMATE ONLY. FOIL FACED FIBERGLASS INSULATION AT 1.5 POUNDS PER CUBIC FOOT IS USED.
2. BASED ON POSITIVE PRESSURE WITH INSULATION OR A NEGATIVE PRESSURE OF 4 INCHES OF WATER WITH NO INSULATION.

## ROUND DUCT WEIGHT CHART

S 4710

## RECTANGULAR GALVANIZED STEEL DUCT FROM 16X60 TO 60x60

| Inches | 30 | 32 | 34 | 36 | 40 | 44 | 48 | 52 | 56 | 60 | Property |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | | | | | | | | | 25.8 | 27.3 | Duct Wt. |
| | | | | | | | | | 28.8 | 30.4 | Wt. Per Ft. with 2-in. Insulation |
| 18 | | | | | | | 23.7 | 25.1 | 26.6 | 28.0 | Duct Wt. |
| | | | | | | | 26.4 | 28.0 | 29.6 | 31.2 | Wt. Per Ft. with 2-in. Insulation |
| 20 | | | | | | 23.0 | 24.4 | 25.8 | 27.3 | 28.7 | Duct Wt. |
| | | | | | | 25.6 | 27.2 | 28.8 | 30.4 | 32.0 | Wt. Per Ft. with 2-in. Insulation |
| 22 | | | | | 22.2 | 23.7 | 25.1 | 26.6 | 28.0 | 29.4 | Duct Wt. |
| | | | | | 24.8 | 26.4 | 28.0 | 29.6 | 31.2 | 32.8 | Wt. Per Ft. with 2-in. Insulation |
| 24 | | | | 18.3 | 23.0 | 24.4 | 25.8 | 27.3 | 28.7 | 30.1 | Duct Wt. |
| | | | | 20.8 | 25.6 | 27.2 | 28.8 | 30.4 | 32.0 | 33.6 | Wt. Per Ft. with 2-in. Insulation |
| 26 | | | 18.3 | 18.9 | 23.7 | 25.1 | 26.6 | 28.0 | 29.4 | 30.9 | Duct Wt. |
| | | | 21.0 | 21.0 | 26.0 | 28.0 | 30.0 | 31.0 | 33.0 | 34.0 | Wt. Per Ft. with 2-in. Insulation |
| 28 | | 18.3 | 18.9 | 19.5 | 24.4 | 25.8 | 27.3 | 28.7 | 30.1 | 31.6 | Duct Wt. |
| | | 20.8 | 21.5 | 22.2 | 27.2 | 28.8 | 30.4 | 32.0 | 33.6 | 35.2 | Wt. Per Ft. with 2-in. Insulation |
| 30 | 18.3 | 18.9 | 19.5 | 20.1 | 25.1 | 26.6 | 28.0 | 29.4 | 30.9 | 32.0 | Duct Wt. |
| | 20.8 | 21.5 | 22.2 | 22.9 | 28.0 | 29.6 | 31.2 | 32.8 | 34.4 | 35.8 | Wt. Per Ft. with 2-in. Insulation |
| 36 | | 20.1 | 20.7 | 21.3 | 25.8 | 27.3 | 30.1 | 31.6 | 33.0 | 34.4 | Duct Wt. |
| | | 23.5 | 24.2 | 24.9 | 30.4 | 32.0 | 33.6 | 35.2 | 36.8 | 38.4 | Wt. Per Ft. with 2-in. Insulation |
| 40 | | 21.9 | 22.5 | 23.2 | 28.7 | 30.1 | 31.6 | 33.0 | 34.4 | 35.9 | Duct Wt. |
| | | 24.9 | 25.6 | 26.3 | 32.0 | 33.6 | 35.2 | 36.8 | 38.4 | 40.0 | Wt. Per Ft. with 2-in. Insulation |
| 44 | | | | | | 31.6 | 33.0 | 34.4 | 35.9 | 37.3 | Duct Wt. |
| | | | | | | 35.2 | 36.8 | 38.4 | 40.0 | 41.6 | Wt. Per Ft. with 2-in. Insulation |
| 48 | | | | | | | 34.4 | 35.9 | 37.3 | 38.8 | Duct Wt. |
| | | | | | | | 38.4 | 40.0 | 41.6 | 43.3 | Wt. Per Ft. with 2-in. Insulation |
| 54 | | | | | | | | | 39.5 | 40.9 | Duct Wt. |
| | | | | | | | | | 44.1 | 45.7 | Wt. Per Ft. with 2-in. Insulation |
| 60 | | | | | | | | | | 43.1 | Duct Wt. |
| | | | | | | | | | | 48.1 | Wt. Per Ft. with 2-in. Insulation |

# DUCT WEIGHT CHART
# RECTANGULAR GALVANIZED STEEL DUCT 16 x 60 TO 60 x 60

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*02/24/17*

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***X3.2***

| RECTANGULAR GALVANIZED STEEL DUCT FROM 16X64 TO 72x92 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Inches | 64 | 68 | 72 | 76 | 80 | 84 | 88 | 92 | Property |
| 16 | 28.7 | 30.1 | 31.6 | 43.0 | 44.8 | | | | Duct Wt. |
| | 32.0 | 33.6 | 35.2 | 46.8 | 48.8 | | | | Wt. Per Ft. with 2-in Insulation |
| 18 | 29.4 | 30.9 | 32.3 | 43.9 | 45.8 | 47.6 | 49.5 | 51.4 | Duct Wt. |
| | 32.8 | 34.4 | 36.0 | 47.8 | 49.9 | 51.9 | 53.9 | 56.0 | Wt. Per Ft. with 2-in Insulation |
| 20 | 30.1 | 31.6 | 33.0 | 44.8 | 46.7 | 48.6 | 50.5 | 52.3 | Duct Wt. |
| | 33.6 | 35.2 | 36.8 | 48.8 | 50.9 | 52.9 | 55.0 | 4.7 | Wt. Per Ft. with 2-in Insulation |
| 22 | 30.9 | 32.3 | 33.7 | 45.8 | 47.6 | 49.5 | 51.4 | 53.3 | Duct Wt. |
| | 34.4 | 36.0 | 37.6 | 49.9 | 51.9 | 53.9 | 56.0 | 58.0 | Wt. Per Ft. with 2-in Insulation |
| 24 | 31.6 | 33.0 | 34.4 | 46.7 | 48.6 | 50.5 | 52.3 | 54.2 | Duct Wt. |
| | 35.2 | 36.8 | 38.4 | 50.9 | 52.9 | 55.0 | 57.0 | 59.0 | Wt. Per Ft. with 2-in Insulation |
| 26 | 32.3 | 33.7 | 35.2 | 47.6 | 49.5 | 51.4 | 53.3 | 0.0 | Duct Wt. |
| | 36.0 | 37.6 | 39.2 | 51.9 | 53.9 | 56.0 | 58.0 | 60.0 | Wt. Per Ft. with 2-in Insulation |
| 28 | 33.0 | 34.4 | 0.0 | 48.6 | 50.5 | 52.3 | 54.2 | 56.1 | Duct Wt. |
| | 36.8 | 38.4 | 40.0 | 52.9 | 55.0 | 57.0 | 59.0 | 61.1 | Wt. Per Ft. with 2-in Insulation |
| 30 | 33.7 | 35.2 | 0.0 | 49.5 | 51.4 | 53.3 | 55.1 | 57.0 | Duct Wt. |
| | 37.6 | 39.2 | 40.8 | 53.9 | 56.0 | 58.0 | 60.0 | 62.1 | Wt. Per Ft. with 2-in Insulation |
| 36 | 35.9 | 37.3 | 38.8 | 52.3 | 54.2 | 56.1 | 57.9 | 59.8 | Duct Wt. |
| | 40.0 | 41.6 | 43.3 | 57.0 | 59.0 | 61.1 | 63.1 | 5.3 | Wt. Per Ft. with 2-in Insulation |
| 40 | 37.3 | 38.8 | 40.2 | 54.2 | 56.1 | 57.9 | 59.8 | 61.7 | Duct Wt. |
| | 41.6 | 43.3 | 44.9 | 59.0 | 61.1 | 63.1 | 65.1 | 67.2 | Wt. Per Ft. with 2-in Insulation |
| 44 | 38.8 | 40.2 | 41.6 | 56.1 | 57.9 | 59.8 | 61.7 | 63.5 | Duct Wt. |
| | 43.3 | 44.9 | 46.5 | 61.1 | 63.1 | 65.1 | 67.2 | 69.2 | Wt. Per Ft. with 2-in Insulation |
| 48 | 40.2 | 41.6 | 43.1 | 57.9 | 59.8 | 61.7 | 63.5 | 65.4 | Duct Wt. |
| | 44.9 | 46.5 | 48.1 | 63.1 | 65.1 | 67.2 | 69.2 | 71.2 | Wt. Per Ft. with 2-in Insulation |
| 54 | 42.3 | 43.8 | 45.2 | 60.7 | 62.6 | 64.5 | 66.3 | 68.2 | Duct Wt. |
| | 47.3 | 48.9 | 50.5 | 66.1 | 68.2 | 70.2 | 72.2 | 74.3 | Wt. Per Ft. with 2-in Insulation |
| 60 | 44.5 | 45.9 | 47.4 | 63.5 | 65.4 | 67.3 | 69.1 | 71.0 | Duct Wt. |
| | 49.7 | 51.3 | 52.9 | 69.2 | 71.2 | 73.3 | 75.3 | 77.3 | Wt. Per Ft. with 2-in Insulation |
| 66 | | 48.1 | 49.5 | 66.3 | 68.2 | 70.1 | 71.9 | 73.8 | Duct Wt. |
| | | 53.7 | 5.8 | 72.2 | 74.3 | 76.3 | 78.4 | 80.4 | Wt. Per Ft. with 2-in Insulation |
| 72 | | | 51.7 | 69.1 | 71.0 | 72.9 | 74.7 | 76.6 | Duct Wt. |
| | | | 57.7 | 75.3 | 77.3 | 79.4 | 81.4 | 83.4 | Wt. Per Ft. with 2-in Insulation |

# DUCT WEIGHT CHART
# RECTANGULAR GALVANIZED STEEL DUCT 16 x 64 TO 72 x 92

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***X3.3***

## RECTANGULAR GALVANIZED STEEL DUCT FROM 20X96 TO 72x120

| Inches | 96 | 100 | 104 | 108 | 112 | 116 | 120 | Property |
|---|---|---|---|---|---|---|---|---|
| 20 | 54.2 | 56.1 | | | | | | Duct Wt. |
| | 59.0 | 61.1 | | | | | | Wt. Per Ft. with 2-in Insulation |
| 22 | 55.1 | 57.0 | 58.9 | 60.7 | 62.6 | | | Duct Wt. |
| | 60.0 | 62.1 | 64.1 | 66.1 | 68.2 | | | Wt. Per Ft. with 2-in Insulation |
| 24 | 56.1 | 57.9 | 59.8 | 61.7 | 63.5 | 65.4 | 67.3 | Duct Wt. |
| | 61.1 | 63.1 | 65.1 | 67.2 | 69.2 | 71.2 | 73.3 | Wt. Per Ft. with 2-in Insulation |
| 26 | 57.0 | 58.9 | 60.7 | 62.6 | 64.5 | 66.3 | 68.2 | Duct Wt. |
| | 62.1 | 64.1 | 66.1 | 68.2 | 70.2 | 72.2 | 74.3 | Wt. Per Ft. with 2-in Insulation |
| 28 | 57.9 | 59.8 | 61.7 | 63.5 | 65.4 | 67.3 | 69.1 | Duct Wt. |
| | 63.1 | 65.1 | 67.2 | 69.2 | 71.2 | 73.3 | 75.3 | Wt. Per Ft. with 2-in Insulation |
| 30 | 58.9 | 60.7 | 62.6 | 64.5 | 66.3 | 68.2 | 70.1 | Duct Wt. |
| | 64.1 | 66.1 | 68.2 | 70.2 | 72.2 | 74.3 | 76.3 | Wt. Per Ft. with 2-in Insulation |
| 36 | 61.7 | 63.5 | 65.4 | 67.3 | 69.1 | 71.0 | 72.9 | Duct Wt. |
| | 67.2 | 69.2 | 71.2 | 73.3 | 75.3 | 77.3 | 79.4 | Wt. Per Ft. with 2-in Insulation |
| 40 | 63.5 | 65.4 | 67.3 | 69.1 | 71.0 | 72.9 | 74.7 | Duct Wt. |
| | 69.2 | 71.2 | 73.3 | 75.3 | 77.3 | 79.4 | 81.4 | Wt. Per Ft. with 2-in Insulation |
| 44 | 65.4 | 67.3 | 69.1 | 71.0 | 72.9 | 74.7 | 76.6 | Duct Wt. |
| | 71.2 | 73.3 | 75.3 | 77.3 | 79.4 | 81.4 | 83.4 | Insulation Thickness<br>Wt. Per Ft. with |
| 48 | 67.3 | 69.1 | 71.0 | 72.9 | 74.7 | 76.6 | 78.5 | Duct Wt. |
| | 73.3 | 75.3 | 77.3 | 79.4 | 81.4 | 83.4 | 85.5 | Wt. Per Ft. with 2-in Insulation |
| 54 | 70.1 | 71.9 | 73.8 | 75.7 | 77.5 | 79.4 | 81.3 | Duct Wt. |
| | 76.3 | 78.4 | 80.4 | 82.4 | 84.5 | 86.5 | 88.5 | Wt. Per Ft. with 2-in Insulation |
| 60 | 72.9 | 74.7 | 76.6 | 78.5 | 80.3 | 82.2 | 84.1 | Duct Wt. |
| | 79.4 | 81.4 | 83.4 | 85.5 | 87.5 | 89.5 | 91.6 | Wt. Per Ft. with 2-in Insulation |
| 66 | 75.7 | 77.5 | 79.4 | 81.3 | 83.1 | 85.0 | 86.9 | Duct Wt. |
| | 82.4 | 84.5 | 86.5 | 88.5 | 90.6 | 92.6 | 94.6 | Wt. Per Ft. with 2-in Insulation |
| 72 | 78.5 | 80.3 | 82.2 | 84.1 | 86.0 | 87.8 | 89.7 | Duct Wt. |
| | 85.5 | 87.5 | 89.5 | 91.6 | 93.6 | 95.7 | 97.7 | Wt. Per Ft. with 2-in Insulation |

# DUCT WEIGHT CHART
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