APPLICATION FOR OSHPD PREAPPROVAL OF MANUFACTURER'S CERTIFICATION (OPM)

OFFICE USE ONLY
APPLICATION #: OPM-0203-13

OSHPD Preapproval of Manufacturer's Certification (OPM)

Type: ☒ New ☐ Renewal ☐ Update to Pre-CBC 2013 OPA Number: _____

Manufacturer Information

Manufacturer: M.W. Saussé & Co., Inc.

Manufacturer's Technical Representative: Pankaj (Peter) K. Sachdeva, P.E.

Mailing Address: 28744 Witherspoon Parkway, Valencia, CA 91355

Telephone: (661) 257-3311 ext. 114 Email: PSachdeva@vibrex.net

Product Information

Product Name: Hanger Box Model PRMXA-1C & Seismic Bracket & Cable Assembly

Product Type: Seismic support and bracing system

Product Model Number: SLH-34 (bracket), SLW-12 & 34 (bracket washer), Vibrex Cable Clamp, PRMXA-1C (spring hanger)

General Description: Seismic support and bracing system for suspended mechanical & electrical equipment & suspended distribution systems (mechanical pipe, ductwork, conduit, cable trays).

Applicant Information

Applicant Company Name: M.W. Saussé & Co., Inc.

Contact Person: Pankaj (Peter) K. Sachdeva, P.E.

Mailing Address: 28744 Witherspoon Parkway, Valencia, CA 91355

Telephone: (661) 257-3311 ext. 114 Email: PSachdeva@vibrex.net

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: _____ Date: 3/30/2015

Title: General Manager Company Name: M.W. Saussé & Co., Inc.

Registered Design Professional Preparing Engineering Recommendations

Company name: M.W. Saussé & Co., Inc.

Name: Pankaj (Peter) K. Sachdeva, P.E. California License Number: C59644

Mailing Address: 28744 Witherspoon Parkway, Valencia, CA 91355

Telephone: (661) 257-3311 ext. 114 Email: PSachdeva@vibrex.net

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):

*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 ONLY

Signature: Date: 05-27-2016

Print Name: Jeffrey Kikumoto

Title: SSE

Condition of Approval (if applicable):

M.W. Saussé & Co., Inc.
28744 Witherspoon Parkway | Valencia, CA 91355
Ph: (661) 257-3311 | Fax: (661) 257-6050

SEISMIC RESTRAINT GUIDELINES FOR SUSPENDED DISTRIBUTION SYSTEMS AND EQUIPMENT

1st EDITION, 2016

OPM-0203-13

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SECTION 1

GENERAL INFORMATION

1. PREFACE

This OSHPD Pre-approval of Manufacturer's Certification (OPM) is based on the 2013 edition of the California Building Code (2013 CBC).
The demand/design forces for use with this OPM shall be based on the 2013 CBC.
The maximum S_{DS} for this OPM is less than or equal to 2.5g.

I. Scope & Limitations:

This pre-approval is for the seismic bracing of interior suspended equipment and mechanical pipe & duct systems as well as electrical cable trays/raceways. It does not address other loads such as, but not limited to, those generated by thermal growth, pressure or pressure thrust, & fluid dynamics. It does not address components that cross seismic separations of buildings or components attached to portions of the structure or equipment that will experience relative seismic drifts other than pipe & duct risers.

II. The ranges of component sizes and material included in the pre-approval are listed as follows:

a) Mechanical Pipe:
   Schedule 40 Steel Pipe – 1-1/4", 1-1/2", 2", 2-1/2", 3", 3-1/2", 4", 5", 6", 8", 10"
   Schedule STD Steel Pipe – 12"
b) Mechanical Duct – steel sheet metal ductwork up 72" diameter round or 184" perimeter rectangular, all galvanized. See Page A.3 & A.4 for full list of sizes and gages.
c) Electrical Distribution Systems –Cable Trays/Raceways
d) Suspended Equipment – fan coils, distribution boxes, VAV's, pumps, air handlers, heaters, tanks, and any other types of equipment of metal construction.

III. The anchorage/attachment substrates included in this pre-approval are as follows:

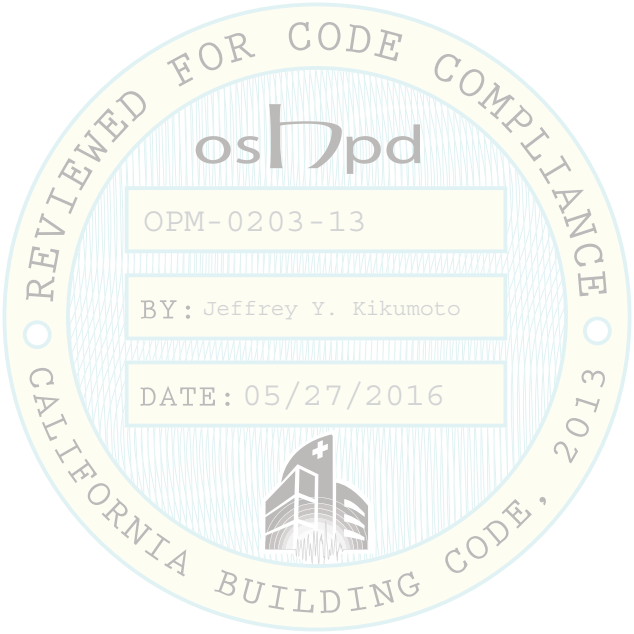
a) Concrete
b) Metal Deck
c) Composite Deck (concrete cast over metal deck)
d) Steel
e) Wood

IV. Construction Tolerances:

a) Construction tolerances shall be as noted on the drawing details and appendices.
b) Construction Tolerance for angles of all braces shall be limited to ±5°, out of plan & elevation as shown in the details of section 2.
c) The recommended brace angle is 45° for the diagonal brace, or 1:1 slope brace ratio. The cable brace shall be installed between 30° to 70° from the vertical. See details in Section 2.
d) Construction tolerance for the angle of the hanger rod from the vertical when using the PRMXA-1C spring hanger box is limited to ±10° from the vertical.

V. Definitions:

a) Snug Tight: Tightness required to bring the connected plies into firm contact and that the nuts could not be removed without the use of a wrench.



2. INTRODUCTION

I. This Manual is a guideline for seismic bracing design for interior equipment and mechanical piping and duct systems, & electrical cable trays/raceways. The following is an outline of the manual:

Section 1 – General Information: Lists general notes and requirements for seismic bracing systems of mechanical systems, electrical systems, and equipment as well as a general guided procedure for seismic bracing design for attachment/anchorage to steel, concrete, and wood structural members using this manual.

Section 2 –Cable Brace Details: Includes seismic bracing details for individually hung and trapeze supported pipe, cable trays/raceways, and duct as well as suspended equipment.

Section 3 – Structural Attachments: Shows structural attachment details and design strengths for attaching the seismic bracing cable to the supporting structure. This includes attachments to concrete slabs/walls/beams, steel deck with minimum sand lightweight concrete, bare steel deck, structural steel members, and structural wood members.

Section 4 – Seismic Brace Components: Includes details and design strengths for seismic bracing components used in the seismic bracing design as well as the brace attachment fittings.

Section D – Design Tables: Tables that utilize either pipe size or distribution system linear weight as well as the calculated "g" value to determine the required cable bracing detail, bracing attachment detail(s), maximum bracing kit spacing, and hanger/rod attachment detail(s). Refer to section D and the examples in pages 1.32 to 1.41 for instructions on use of these tables.

Appendix A: Includes a metric conversion chart and weight charts for pipe, duct, and electrical distribution systems. Utility weights are for reference only and are not within the scope of work of the OPM approval.

II. This pre-approval may be used for the design of seismic sway bracing of interior equipment, pipe, cable tray/raceways and duct systems. A California Licensed Civil Engineer has designed this pre-approval, along with supporting calculations. Therefore, the pre-approved details and calculations are not to be re-reviewed by regional staff. However each system and equipment design requires submittals that must be reviewed and approved by OSHPD.

III. Seismic bracing design and layout drawings shall be either prepared by Registered Design Professional licensed in California with experience in the design of seismic bracing for equipment, piping, and duct or prepared by a qualified designer (under the supervision of a Registered Design Professional) with experience in the design of seismic bracing for equipment, pipe, cable trays/raceways and duct, stamped and signed by a Registered Civil or Structural Engineer licensed in California with the same applicable experience. This is the definition of "user".

IV. Modifications and/or changes to the designs shown in this guideline shall be performed or reviewed by a qualified Registered Civil Engineer and approved by OSHPD.

V. When more than one criterion is presented, the more stringent shall be used.

VI. It is the responsibility of the user of this manual to be familiar with all requirements for seismic bracing and shall be proficient in determining and applying utility loads for their application.

VII. The user of this manual shall determine the spacing and layout for the required bracing. The user shall determine the maximum horizontal, vertical and axial force component of the earthquake demand loads. The user's calculations must take into consideration the increases in loads caused by construction tolerances. For use of the **simplified design procedure** the tolerance of the cable angle from the vertical must remain within the values equal to and greater than 45° and less than 60°.

VIII. As with all pre-approved details, systems, etc., construction documents are still required showing how and where this pre-approved support, attachment and bracing system will be applied on a project specific basis. This process is needed to verify that the appropriate detail has been selected and applied for each condition and for the actual substrate that it will be connected/attached to.

IX. The Structural Engineer of Record (SEOR) must review and forward the support, attachment and bracing plans for plan check with a notation indicating that the plans have been reviewed and they have been found to be in general conformance with the design of the project. A "shop drawing stamp" is usually acceptable for compliance with this requirement. The regional staff, on a project specific basis, must review support, attachment, and bracing details and supporting calculations that are not part of this pre-approval. Review of support, attachment and bracing details of this nature does not constitute a pre-approval that may be used on other projects without the benefit of plan review. The Structural Engineer of Record shall verify the adequacy of the supporting structure and its components for the loads applied to the supporting structure and

its components by the seismic bracing systems, and compliance with the applicable codes and standards, as well as performing the following tasks:

a) Verify that the nonstructural components and/or systems are seismically qualified in accordance with the 2013 California Building Code.
b) Verify that the installation is in conformance with the 2013 California Building Code & with the details shown in this OPM.
c) Verify that the structure to which the M. W. Saussé & Co., Inc. seismic brace is anchored to meets the requirements of the applicable ICC-ES Report (ICC ESR).

X. Layout Drawings:

a. Layout drawings of the support and bracing systems per this pre-approval shall be submitted to the discipline in responsible charge of the project for review to verify that the details are in conformance with all code requirements. The layout drawings shall be accordance with ASCE 7-10 (including supplement numbers 1 & 2) as modified by the 2013 CBC Section 1616A.
    i. The Structural Engineer of Record (SEOR) shall verify that the supporting structure is adequate for the loads imposed on it by the supports and braces installed per the pre-approval in addition to all other loads.
    ii. The SEOR will forward the supports, attachments, and bracing plans (including approved change order for supplementary framing where required) to the discipline in charge with a notation indicating that the plans have been reviewed and are in general conformance with this pre-approval & the design of the project.
    iii. A "shop drawing stamp" may be used to indicate compliance with this requirement.
    iv. The Registered Design Professional (other than the SEOR) may provide the shop drawing stamp for small installations at the discretion of the District Structural Engineer.

b. The SEOR shall design any supplementary framing that is needed to resist the loads, maintain stability and/or is required for installation of this pre-approval. The supplementary framing shall be submitted to OSHPD as an Amended Construction Document (ACD).

c. The layout drawings (with the shop drawing stamp) shall be submitted to OSHPD to review:
    i. Structure supporting the distribution system has adequate capacity.
    ii. Seismic Design Forces (F_p) are in accordance with the 2013 CBC.
    iii. Verify that the submittal is within the scope of the OSHPD Pre-approval of Manufacturer's Certification (OPM):
        1. Size of distribution system components or equipment.
        2. Spacing of bracing and flex joints.
        3. Substrate for attachments.
        4. 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 for the support and bracing. OSHPD field will review the installation.
e. A copy of this pre-approval shall be on the jobsite prior to starting installation of hangers and/or braces. It is the contractor's and IOR's responsibility to obtain copies of OSHPD Pre-approvals from the OSHPD Pre-approval Program's website.

XI. The bracing components of this pre-approved bracing system may not be substituted with components of another pre-approved bracing system for any single run of pipe, duct, or for a piece of equipment. Any substitution of a component shall require OSHPD review and approval.

XII. Post-installed Anchors:

a. All post-installed concrete anchors shall meet requirements of 2013 CBC 1616A.1.19, and be installed per their ICC ESR report; see Section 3 for specified ICC ESR listing for each anchor.
b. The special inspector shall be on the jobsite continuously during anchor installation, unless otherwise noted in the ICC ESR.
c. Expansion anchors shall be torque tested per the requirements specified in Section 1913A.7 of the 2013 CBC. See page 3.0.1 for details.
d. Screw-type anchors shall be tension tested as specified in Section 1913A.7.5 of the 2013 CBC. See page 3.0.1 for details.

3. Building Codes, Standards, & Guidelines

I. The Vibrex Seismic Restraint Guidelines are designed to meet or exceed the requirements of the following:

2013 California Building Code (2013 CBC)
AISI Standard for Cold Formed Structural Members (S100-2007)
ANSI / AWC NDS-2012
American Concrete Institute (ACI 318-11)
American Institute of Steel Construction (AISC 360-10)
American Society of Civil Engineers (ASCE 7-10)
American Welding Society (AWS D1.1-10)
American Society of Mechanical Engineers (ASME B31)
ESR-1917 (Hilti KB-TZ, Issued May 2015, corrected October 2015)
ESR-2502 (Powers SD2, Issued May 2016)
ESR-2526 (Powers Wedge-Bolt+ & Vertigo +, Issued June 2015, revised July 2015)
ESR-2713 (Simpson Titen HD, Issued & revised September 2015)
ESR-2818 (Powers SD1, Issued January 2014, revised July 2015)
ESR-3027 (Hilti KH-EZ, Issued December 2013, revised October 2015)
ESR-3037 (Simpson Strong-Bolt 2, Issued August 2015, revised October 2015
ESR-1976 (ITW Buildex TEKS, Issued July 2015)
Note: ESR's for post-installed anchor bolts into concrete & self-tapping screws to steel are in compliance with the 2013 California Building Code.

These guidelines are intended to describe seismic restraints for the HVAC industry's most commonly utilized pipe sizes, duct sizes, cable trays/raceways and equipment.

Determine bracing design utilizing the applicable factors and their specific values listed in Table 13.6-1 of the ASCE 7-10 based on the equipment, pipe, cable tray/raceway or duct construction, material composition and type, as well as proper utilization of the Ω_o factor (note c. from table 13.6-1 of ASCE 7-10) for anchorage to concrete substrates. See Section 6 for the required equations and factors on page 1.26.

4. SEISMIC BRACING GENERAL REQUIREMENTS

I. Transverse & Longitudinal Seismic Bracing is required for single hung pipe suspended more than 12" from the substrate above under the following parameters:

a. For Seismic Design Categories D, E, or F where Ip is equal to 1.0 and Rp is 4.5 or greater, all pipe larger than 3" in diameter.
b. For Seismic Design Category D, E, or F where Ip is *greater* than 1.0 and Rp is 4.5 or greater, all pipe larger than 1" in diameter.
c. For Seismic Design Category C where Ip is *greater* than 1.0 and Rp is 4.5 or greater, all pipe larger than 2" in diameter.

II. Transverse & Longitudinal Seismic Bracing is required for trapeze supported pipe systems where the total weight of all pipes supported by the trapeze assembly is 10lb/ft or greater (trapeze supported pipe is not part of this OPM, design will be required on a project to project basis using M.W. Saussé cable bracing kit and attachments).

III. Transverse & Longitudinal Seismic Bracing is required for cable trays, and other electrical distribution systems (raceways) under the following parameters:

a. The total system supported by a trapeze assembly weighs 10lb/ft or greater where the hangers are greater than 12" in length from the substrate.

IV. Transverse & Longitudinal Seismic Bracing is required for duct under the following parameters:

a. The total system supported by a trapeze assembly weighs 10lb/ft or greater and where the hangers are greater than 12" in length from the substrate.
b. A singly supported duct that has a cross-sectional area of 6ft^2 or weighs more than 17lb/ft.

V. All directional Seismic Bracing is required for suspended equipment where the Seismic Design Category is C with Ip greater than 1.0, and for Seismic Design Category D, E, & F and any value of Ip, as well as under the following parameters:

a. Equipment in-line and rigidly attached to duct weighing more than 75 lbs.
b. Equipment weighing more than 20lbs and connected to the ductwork or piping with flexible connections, or independently suspended.
c. Actual connection of equipment to support will have to be done on a project-by-project basis.

VI. A pipe systems shall not be braced to different parts of the building that may respond differently during seismic activity.

VII. Refer to the appropriate codes and standards for additional information and requirements.

VIII. Vertical Offsets / Risers:

a. Tops of vertical offsets/risers exceeding 3’ in length shall be provided with a four-way brace. Bracing shall be located within 24” of the end of the vertical run. Refer to partial isometric A on page 1.16.
b. Distance between four-way braces for risers shall not exceed 25’.
c. Vertical ductwork systems supported at each floor shall be considered seismically braced if the penetration through each floor is tightly packed and the floor-to-floor spacing is not in excess of 30 feet. Tops of risers exceeding 3 feet shall be provided with a 4-way brace. Where the 4-way brace is attached on the horizontal ductwork, it shall be installed within 2 feet of the centerline of the riser.
d. Vertical duct risers in an open shaft must be attached to steel supports with both steel supports and connections sized to accept the combined gravity and seismic loads. Thermal loads shall be considered where applicable. Transverse seismic restraint spacing shall not exceed 30 feet. Supports and connections must be engineered on a job by job basis subject to approval by OSHPD. Seismic relative displacement between floors shall be considered in the design.

IX. 12” Exception Rule for Pipe and Duct supports:

Pipe and duct need not be seismically braced when the following exceptions apply:

- The pipe is supported by hangers and each hanger in the piping run is 12 in. (305 mm) or less in length from the top of the pipe to the supporting structure. Where pipes are supported on a trapeze, the trapeze shall be supported by hangers having a length of 12 in. (305 mm) or less. Where rod hangers are used with a diameter greater than 3/8 inch, they shall be equipped with swivels, eye nuts, or other devices to prevent bending in the rod (section 1616A.1.26, part 2 of the 2013 CBC).

- The ductwork is supported by hangers and each hanger in the duct run is 12 in. (305 mm) or less in length from the duct support point to the supporting structure. Where rod hangers are used with a diameter greater than 3/8 inch, they shall be equipped with swivels to prevent inelastic bending in the rod (section 1616A.1.24, part 1, item b. of the 2013 CBC)

NOTE:
Ductwork designed to carry toxic, highly toxic or flammable gases, or used for smoke control shall be designed and braced without consideration of the above exceptions.

5. SEISMIC BRACING LAYOUT – GENERAL REQUIREMENTS – DUCT, PIPE, CABLE TRAY/RACEWAYS, AND EQUIPMENT

I. The Vibrex Seismic Restraint Guidelines provide for the protection of suspended pipe, duct, cable trays/raceways, & equipment against excessive movement due to seismic forces.

II. The seismic restraint assemblies in this guideline are designed to simultaneously resist vertical loads due to the weight of the component and its contents and both horizontal and vertical seismic loads.

III. Horizontal loads are braced with two types of seismic restraints:

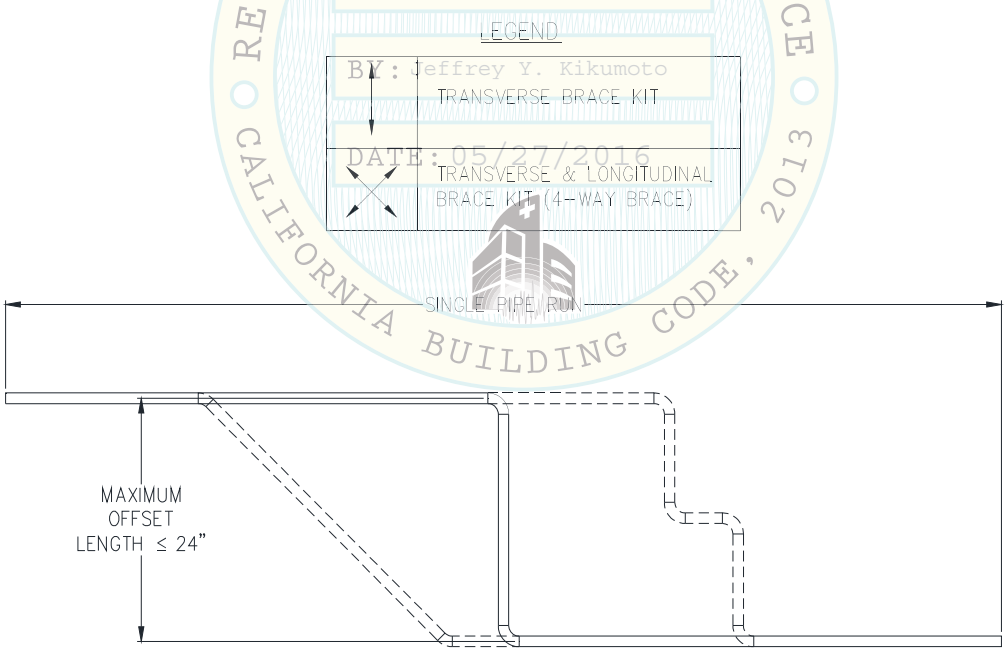
a. Transverse bracing to protect pipe, duct, & cable tray/raceway against movement perpendicular to its run.

b. Longitudinal bracing to protect pipe, duct, & cable tray/raceway against movement parallel to its run.

- Spacing must not exceed the values listed in the tables of Section D.

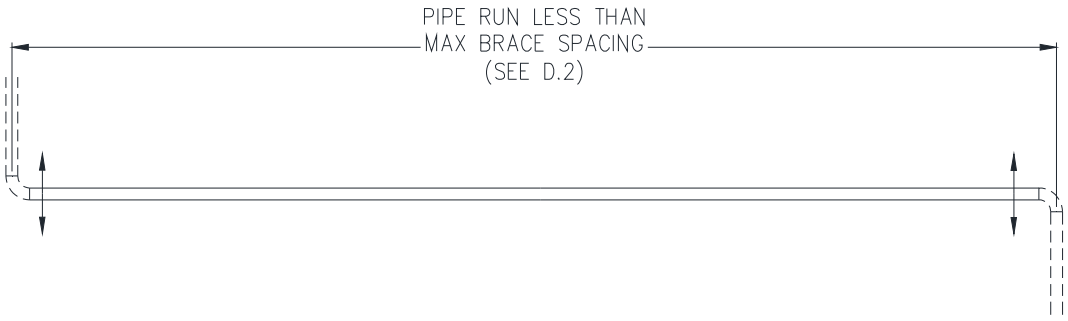
IV. Pipe System bracing distances and requirements:

a. A run of pipe is defined as a continuous straight length, or one with allowable offsets, that are less than 24". If the offset is 24" or greater, each straight segment shall be treated as an independent run and shall be braced. Refer to partial plan under item "f" on page 1.12.

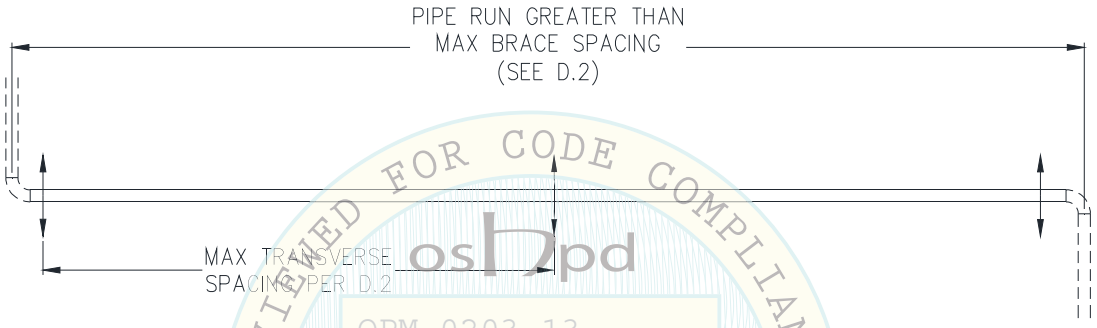


Note: When a run of pipe that requires bracing transitions down to a size that does not, the point of transition is considered the end of the run and will require a transverse brace. For an offset less than 24", this is still considered a single run of pipe.

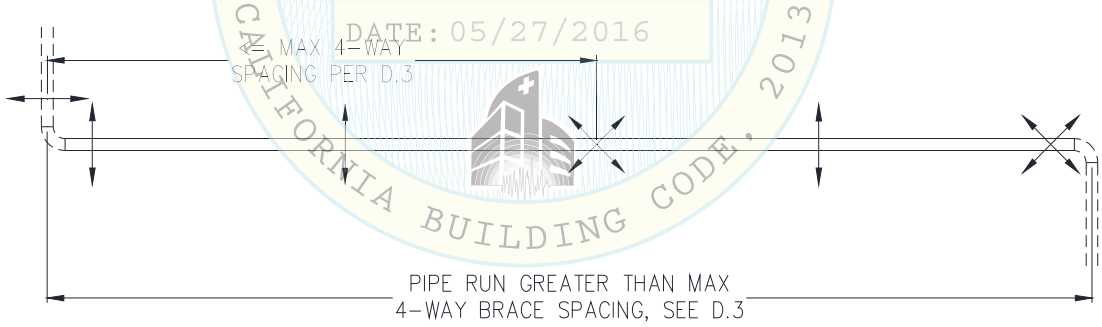
b. Each run of pipe requires a minimum of two transverse (lateral) bracing kits (perpendicular to the run), one at each end of the run.



c. If the distance between the two transverse bracing kits exceeds the maximum allowable spacing, add transverse bracing kits as needed.



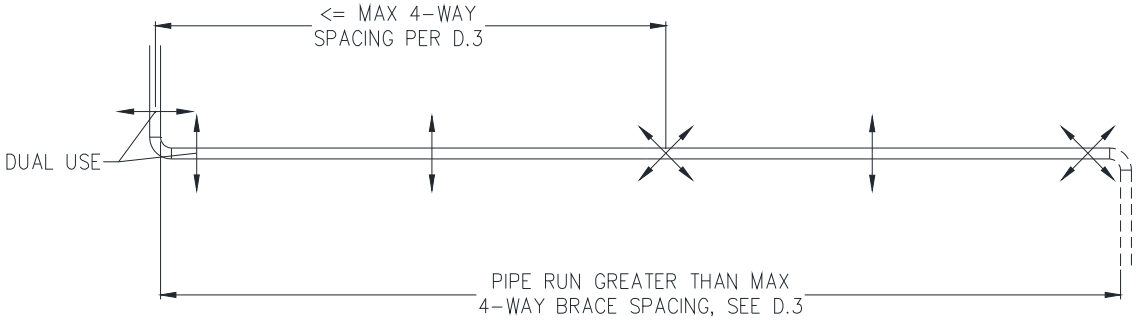
d. Each pipe run must have at least one transverse and longitudinal (4-way) bracing kit. If the maximum allowable longitudinal spacing is exceeded then add longitudinal bracing kits to meet the spacing requirement.



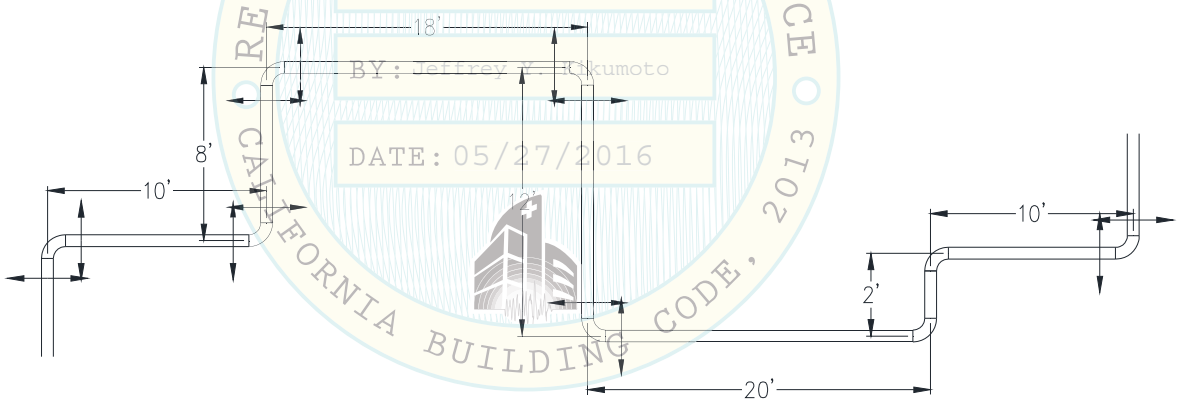
e. Each run of pipe requires a minimum of one longitudinal bracing kit. However, a transverse bracing kit placed on the run section at the opposite side of an elbow or tee within 24" may act as a longitudinal bracing kit, and is labeled as "DUAL USE" bracing kit. See layout example under ii. on page 1.13.

i. Longitudinal and longitudinal “DUAL USE” bracing kits on single support pipe shall be attached directly to the pipe.

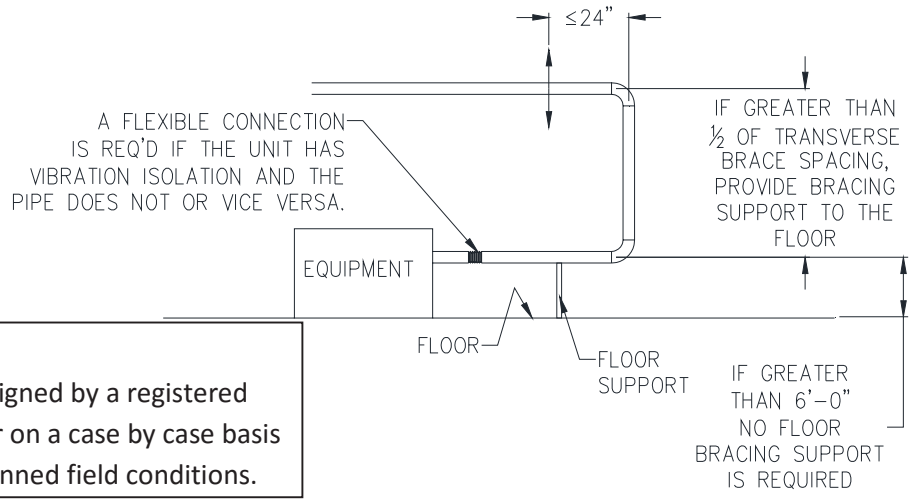
ii. Bracing installed to smaller piping shall not be used to brace larger piping.



f. In some cases several short runs may occur in close proximity. By following the preceding guidelines each run should have longitudinal and transverse bracing. Transverse bracing may be used as longitudinal bracing and vice versa on runs adjacent to each other as long as the total length of pipe tributary to the brace does not exceed the maximum design spacing. In cases where it does, additional bracing kits are required.



g. At vertical pipe drop to equipment, where pipe is connected to the equipment using a flexible connection, provide transverse bracing before the vertical drop. The total length from the transverse brace to the vertical drop should not be more than the design offset previously determined. Provide transverse bracing at the floor after the vertical drop if the total length of the pipe from the transverse brace before the vertical drop to the flexible connection is greater than ½ the maximum transverse brace spacing.



NOTE:
Floor support must be designed by a registered Civil or Structural Engineer on a case by case basis to meet the existing or planned field conditions.

h. When pipe crosses a building seismic separation or seismic joint it must be capable of accommodating the joint displacements as specified by the engineer of record.

i. A rigid pipe shall not be braced to dissimilar parts of a building structure or two dissimilar building systems that may move different from one another during an earthquake. Bracing should be attached to the part of the building structure that is vertically supporting the pipe.

j. Transverse and longitudinal braces shall be installed as shown in this guideline up to 30°-70° from the vertical. However, the recommended brace angle range is 45° to 60° from the vertical, or a 1:1 and up to but not including a 1:1.7 brace ratio which conforms to the **simplified design procedure**

k. The seismic brace assemblies in this guideline consist of three important components: anchorage and connections to building structure including the A36 threaded rod with rod stiffeners as occurring, diagonal bracing members consisting of 7x19 cable, and seismic brace attachments. For details of cable brace assemblies see Section 2. For details and load information of structural attachments & spring hanger or rod attachments, see Section 3. The vertical hanger (A36 threaded rod) must be within 6" of the diagonal components to be considered part of the brace assembly.

l. Transverse bracing kit locations are required to be at or within 6 inches of a vertical component of the seismic brace assembly to protect against vertical movement (typically a stiffened hanger rod). The M.W. Saussé & Co., Inc. seismic brace attachment may be connected directly to the threaded vertical hanger rod <u>not</u> used for supporting system gravity loads.

m. Steel bolt connections to structural steel members or components shall not have a diameter less than 1/16" than that of the mounting hole. Steel bolt connections to concrete structure shall not have a diameter less than 1/8" than that of the mounting hole.

n. Bracing may be omitted for short runs of pipe if its tributary seismic load can be transferred to an adjacent run of pipe that is braced and can properly restrain the additional seismic loads.

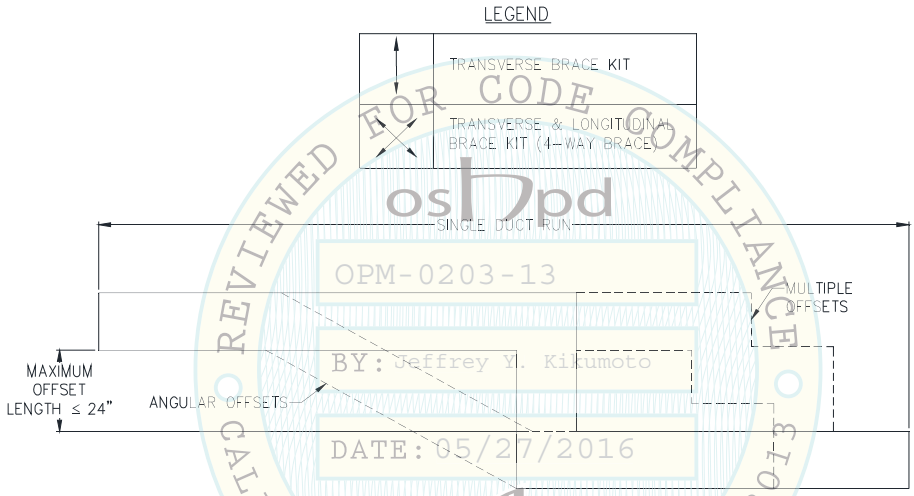
o. Splicing of the pipe may be achieved with the following methods:

   i. UL Listed rigid grooved couplings for horizontal runs and flexible grooved couplings in vertical risers (to accommodate inter-story drift movement of the surrounding structure). Couplings must meet UL Standard 213. Non-listed couplings are not permitted.

   ii. Welding of pipe must conform to the ASME B31 and AWS D1.1 standards.

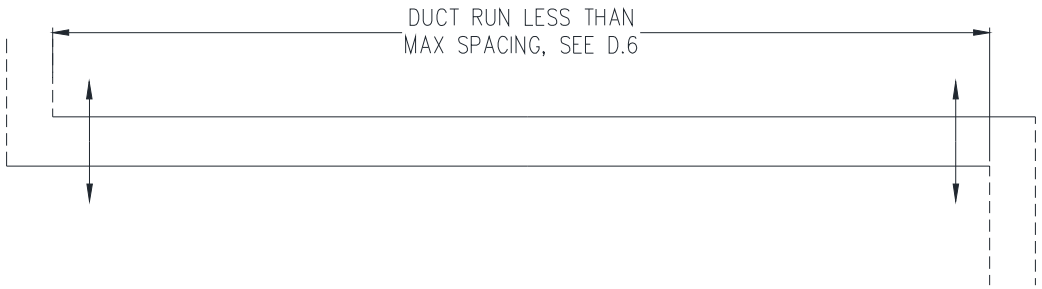
V. Duct Systems bracing distances and requirements:

a. A run of duct is defined as a continuous straight length, or one with allowable offsets, that are less than 24". If the offset is 24" or greater, each straight segment shall be treated as an independent run and shall be braced. Refer to partial plan under item "f" on page 1.16.

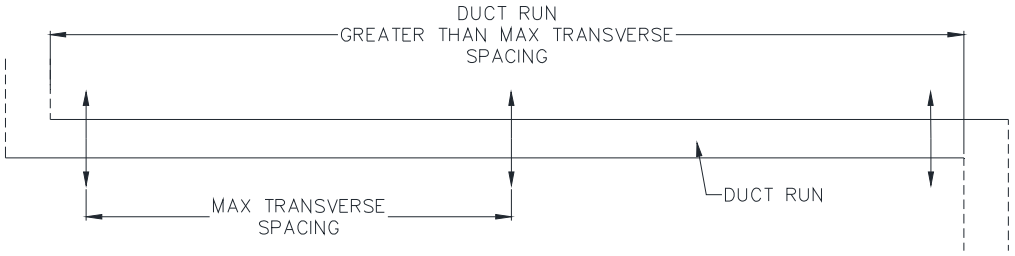


Note: When a run of duct that requires bracing transitions down to a size that does not, the point of transition is considered the end of the run and will require a transverse brace. For an offset less than 24", this is still considered a single run of duct.

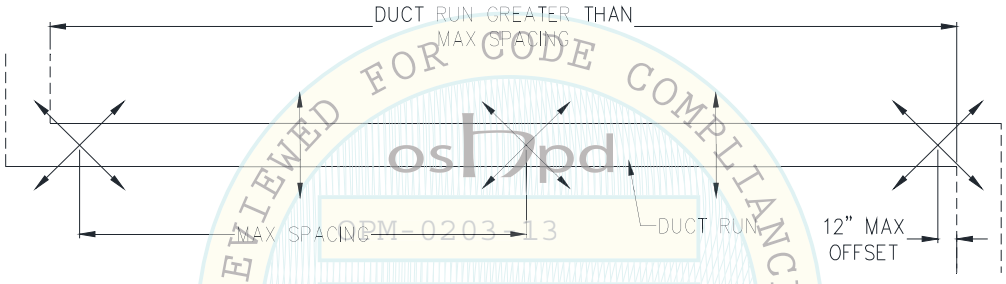
b. Each run of duct requires a minimum of two transverse bracing kits, one at each end of the run.



c. If the distance between the two transverse bracing kits exceeds the maximum allowable spacing, add lateral bracing kits as needed.



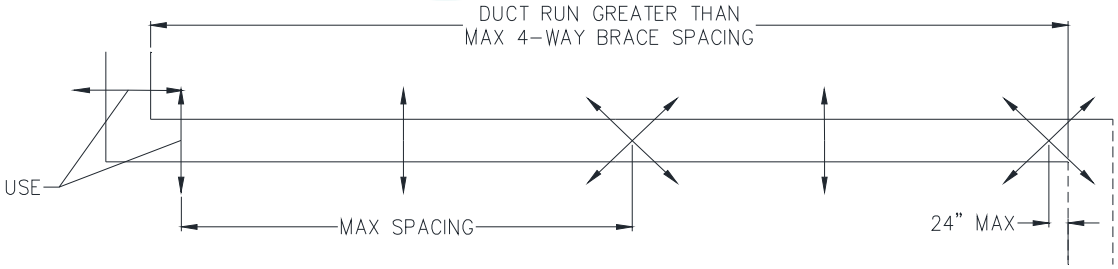
d. Each duct run must have at least one longitudinal bracing kit. If the maximum allowable longitudinal spacing is exceeded then add longitudinal bracing kits to meet the spacing requirement.



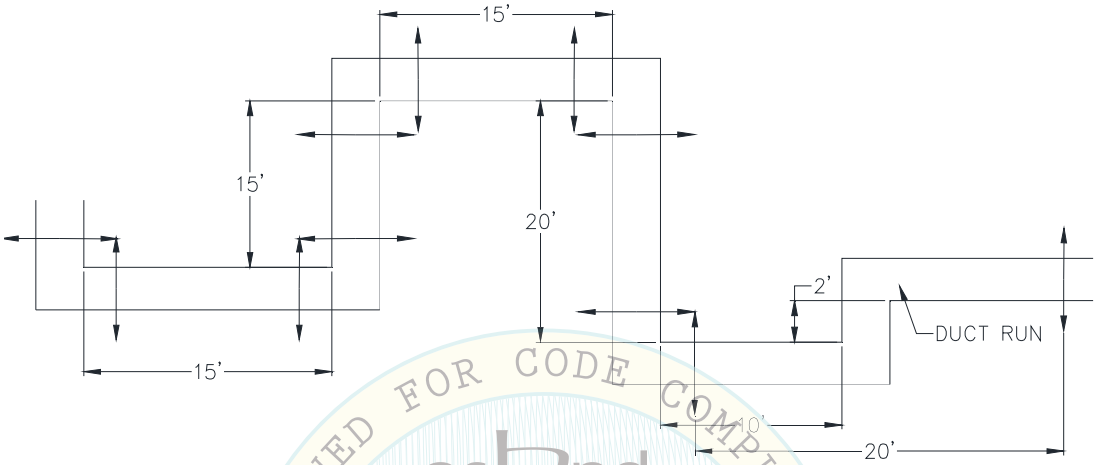
e. Each run of duct requires a minimum of one transverse & longitudinal (4-way) bracing kit parallel to the run. However, a transverse bracing kit placed on the run section at the opposite side of an elbow or tee within 24" may act as a longitudinal bracing kit, and is labeled as "DUAL USE" bracing kit. See layout example below.

iii. Transverse "DUAL USE" bracing kits on a duct support shall be attached directly to the duct.

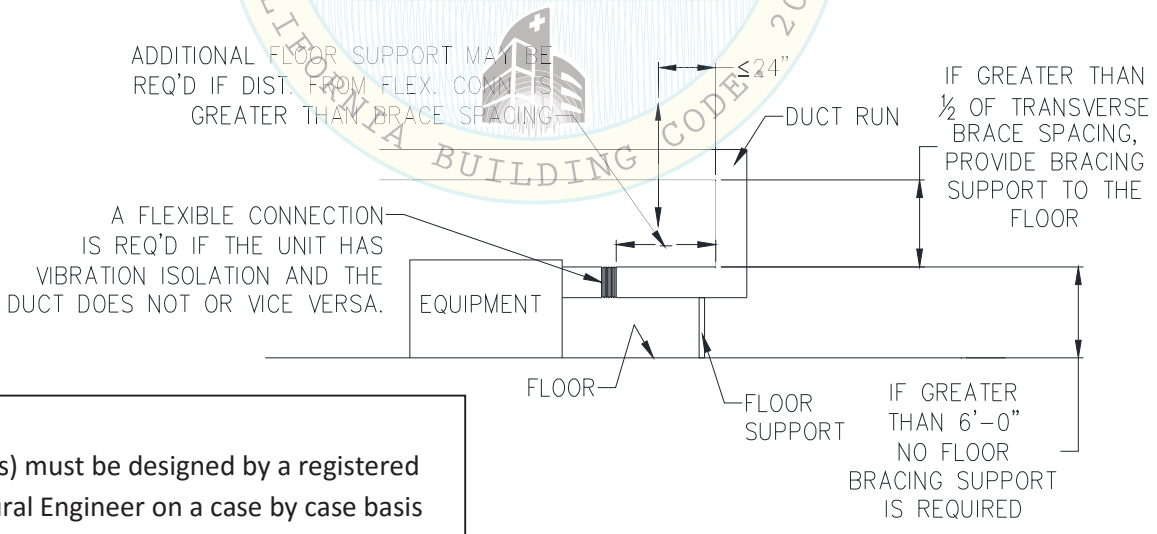
iv. Bracing installed to smaller duct shall not be used to brace larger duct.



f. In some cases several short runs may occur in close proximity. By following the preceding guidelines, each run should have longitudinal and transverse bracing. Transverse bracing may be used as longitudinal bracing and vice versa on runs adjacent to each other as long as the total length of duct tributary to the brace does not exceed the maximum design spacing. In cases where it does, additional bracing kits are required.



g. At vertical pipe drop to equipment, where duct is connected to the equipment using a flexible connection, provide transverse bracing before the vertical drop. The total length from the transverse brace to the vertical drop should not be more than the design offset previously determined. Provide transverse bracing at the floor after the vertical drop if the total length of the duct from the transverse brace before the vertical drop to the flexible connection is greater than ½ the maximum transverse brace spacing.



NOTE:
Floor support(s) must be designed by a registered Civil or Structural Engineer on a case by case basis to meet the existing or planned field conditions.

h. When duct crosses a building seismic separation or seismic joint it must be capable of accommodating the joint displacements as specified by the engineer of record.
i. A rigid duct shall not be braced to dissimilar parts of a building structure or two dissimilar building systems that may move different from one another during an earthquake. Bracing should be attached to the part of the building structure that is supporting the duct.
j. Transverse and longitudinal braces that project up to the structure above shall be installed as shown in this guideline up to 30°-70° from the vertical. However, the recommended brace angle range is equal to or greater than 45° & less than 60° from the vertical, or a 1:1 and up to but not including a 1:1.7 brace ratio which conforms to the **simplified design procedure.**
k. The seismic brace assemblies in this guideline consist of three important components; anchorage and connections to building structure including the A36 threaded rod with rod stiffeners as occurring, diagonal bracing members consisting of 7x19 cable, and seismic brace attachments. For details of cable brace assemblies see Section 2. For details and load information of structural attachments & spring hanger or rod attachments, see Section 3. The vertical hanger (A36 threaded rod) must be within 6" of the diagonal components to be considered part of the brace assembly.
l. Transverse bracing kit locations are required to be at or within 6 inches of a stiffened hanger rod to protect against vertical movement.
m. Steel bolt connections to structural steel members or components shall not have a diameter less than 1/16" than that of the mounting hole. Steel bolt connections to concrete structure shall not have a diameter less than 1/8" than that of the mounting hole.
n. Bracing may be omitted for short runs of duct if its tributary seismic load can be transferred to an adjacent run of duct that is braced and can properly restrain the additional seismic loads.
o. Wall penetrations may be considered transverse brace locations where duct is tightly blocked unless smoke dampers are installed in the wall, subject to approval by the SEOR.
p. Floor penetrations of vertical duct may be considered transverse and longitudinal brace locations where duct is tightly blocked, no smoke dampers are installed, and the distance from the floor penetration to the inside of the 90 degree turn horizontal is less than 2 feet.

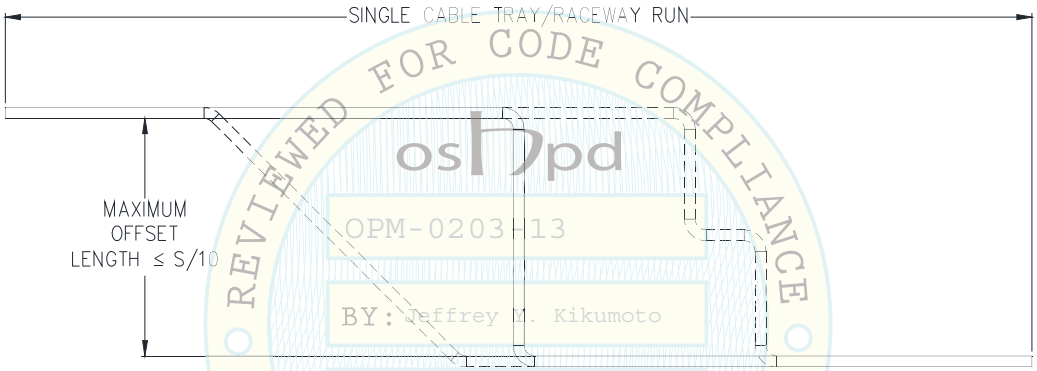
VI. For bracing distances and requirements of trapeze suspended cable tray/raceway systems:

a. A run of cable tray/raceway is defined as a continuous straight length, or one with design offsets, that are less than S/10 (w/ S = maximum transverse brace spacing, see page D.8 for spacing limits). If the offset is S/10 or greater, each straight segment shall be treated as an independent run and shall be braced. Refer to partial plan under item "f" on page 1.21.

LEGEND

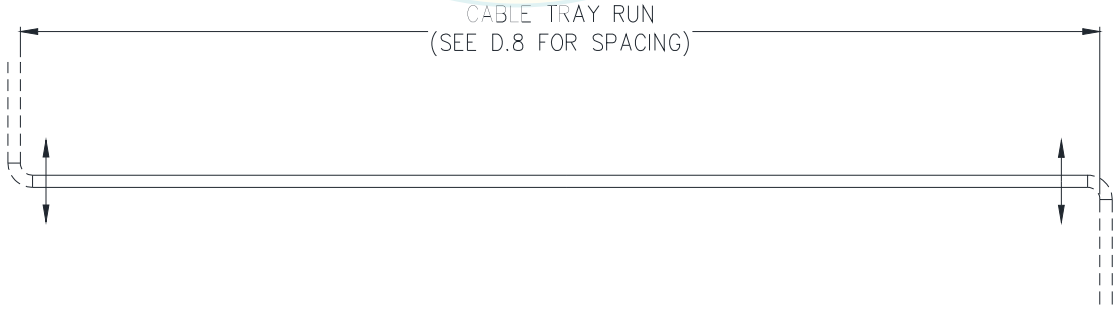
↕	TRANSVERSE BRACE KIT
✕	TRANSVERSE & LONGITUDINAL BRACE KIT (4-WAY BRACE)

CRITICAL BRACE SPACING NOTE:
Cable tray must be approved on a project specific basis or preapproved by OSHPD. The spacing limits shown on D.8 are based solely on the strength of the cable kits as shown in Section 2. The maximum spacing limits of the specific cable tray itself shall not be exceeded.

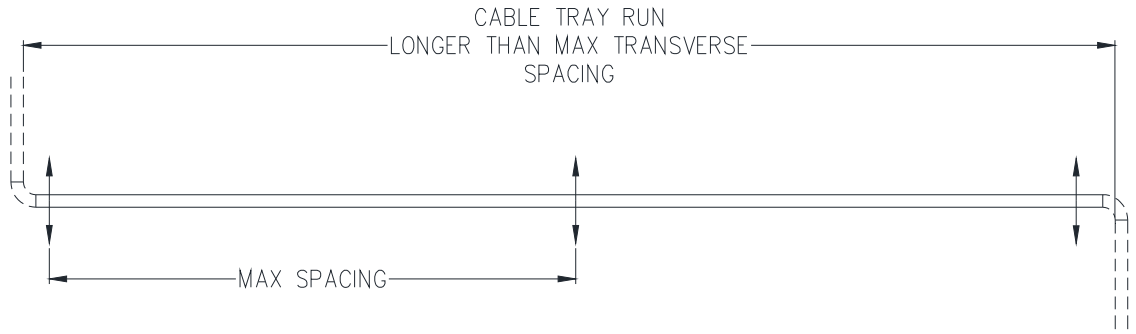


Note: When a run of a cable tray/raceway that requires bracing transitions down to a size that does not, the point of transition is considered the end of the run and will require a transverse brace. For an offset less than S/10, this is still considered a single run of cable tray/raceway.

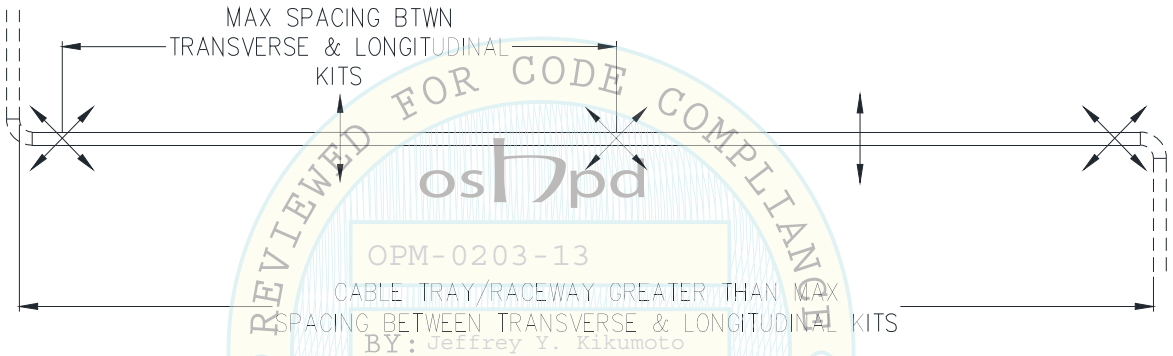
b. Each run of cable tray/raceway requires a minimum of two transverse bracing kits, one at each end of the run.



c. If the distance between the two transverse bracing kits exceeds the maximum design spacing, add lateral bracing kits as needed.



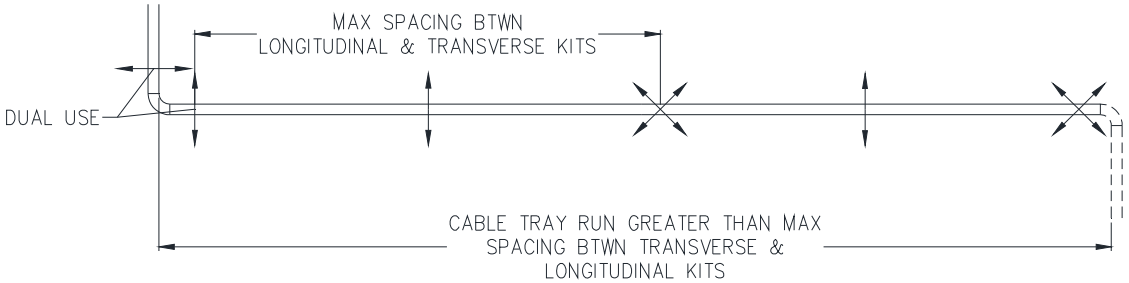
d. Each cable tray/raceway run must have at least one longitudinal bracing kit. If the maximum design transverse & longitudinal (4-way) spacing is exceeded then add transverse & longitudinal bracing kits to meet the spacing requirement.



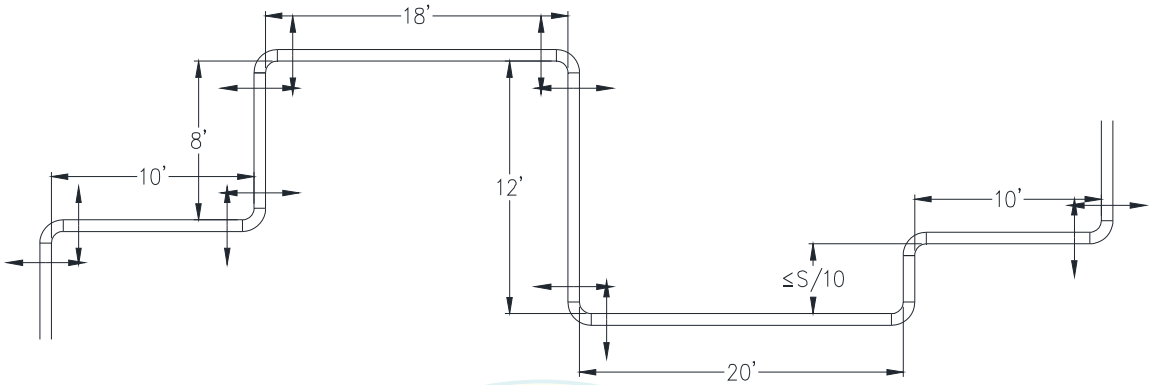
Each run of cable tray/raceway requires a minimum of one longitudinal bracing kit. However, a transverse bracing kit placed on the run section at the opposite side of an elbow or tee within 24" may act as a longitudinal bracing kit, and is labeled as "DUAL USE" bracing kit. See layout example below.

i. Longitudinal and longitudinal "DUAL USE" bracing kits on single support cable tray/raceway shall be attached directly to the cable tray or raceway.

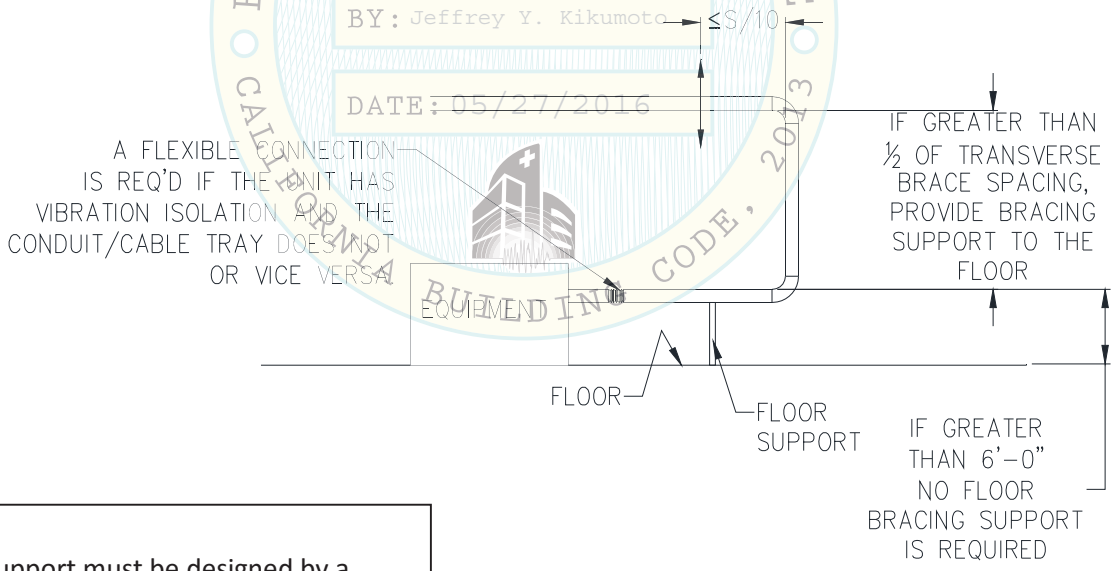
ii. Bracing installed to smaller cable tray/raceway shall not be used to brace a larger cable tray/raceway.



e. In some cases several short runs may occur in close proximity. By following the preceding guidelines each run should have longitudinal and transverse bracing. Transverse bracing may be used as longitudinal bracing and vice versa on runs adjacent to each other as long as the total length of cable tray/raceway tributary to the brace does not exceed the maximum design spacing. In cases where it does, additional bracing kits are required.



f. At vertical pipe drop to equipment, where cable tray/raceway is connected to the equipment using a flexible connection, provide transverse bracing before the vertical drop. The total length from the transverse brace to the vertical drop should not be more than the design offset previously determined. Provide transverse bracing at the floor after the vertical drop if the total length of the pipe from the transverse brace before the vertical drop to the flexible connection is greater than ½ the maximum transverse brace spacing.



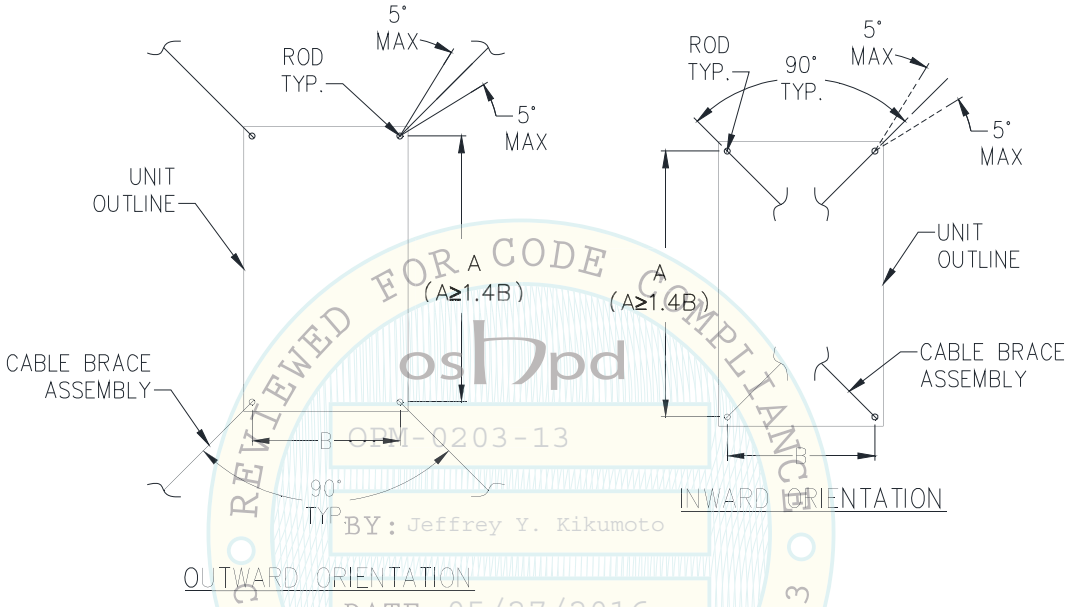
NOTE:
Floor support must be designed by a registered Civil or Structural Engineer on a case by case basis to meet existing or planned field conditions.

g. When pipe crosses a building seismic separation or seismic joint it must be capable of accommodating the joint displacements as specified by the engineer of record.
h. A rigid pipe shall not be braced to dissimilar parts of a building structure or two dissimilar building systems that may move different from one another during an earthquake. Bracing should be attached to the part of the building structure that is vertically supporting the pipe.
i. Transverse and longitudinal braces shall be installed as shown in this guideline up to 30° to 70° from the vertical. However, the recommended brace angle range is equal to or greater than 45° & less than 60° from the vertical, or a 1:1 and up to but not including a 1:1.7 brace ratio, which conforms to the **simplified design procedure.**
j. The seismic brace assemblies in this guideline consist of three important components; anchorage and connections to building structure, bracing members consisting of 7x19 cable, and seismic brace attachments. For details of cable brace assemblies see Section 2. For details and load information of structural attachments & spring hanger or rod attachments, see Section 3. The vertical hanger (A36 threaded rod) must be within 6" of the diagonal components to be considered part of the brace assembly.
k. Transverse bracing kit locations are required to be at or within 6 inches of a vertical seismic brace assembly to protect against vertical movement (typically a stiffened hanger rod).
l. Steel bolt connections to structural steel members or components shall not have a diameter less than 1/16" than that of the mounting hole. Steel bolt connections to concrete structure shall not have a diameter less than 1/8" than that of the mounting hole.
m. Bracing may be omitted for short runs of cable tray if its tributary seismic load can be transferred to an adjacent run of cable tray that is braced and can properly restrain the additional seismic loads.
n. Final brace spacing must not exceed the maximum design spacing permitted for the cable tray itself as stated in the critical spacing note on page 1.19.

VII. Suspended Equipment Bracing Requirements:

a. Suspended equipment is defined as a unit of any kind that is supported by and attached to the structure above using threaded rod. The rod is connected directly to the unit or to a steel trapeze member that the unit is attached to.

b. Each piece of equipment requires (4) cable brace assemblies, (1) in each orthogonal direction in the plan view. The cables must be splayed outward (or inward) from each corner of the unit. A variance of ±5° of the plan view angle of the cable is permitted for installation purposes.



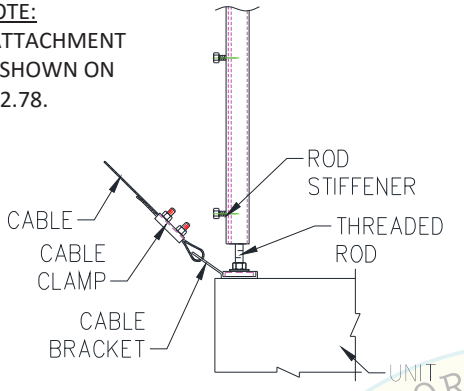
c. Transverse and longitudinal braces shall be installed as shown in this guideline up to 90° from the vertical. However, the recommended brace angle range is equal to or greater than 45° & less than 60° from the vertical, or a 1:1 and up to but not including a 1:1.7 brace ratio.

d. The seismic brace assemblies in this guideline consist of three important components: anchorage and connections to the building structure, bracing members consisting of 7x19 cable, and seismic brace attachments. For details of cable brace assemblies see Section 2. For details and load information of structural attachments & spring hanger or rod attachments, see Section 3. The vertical hanger (A36 threaded rod) must be within 6" of the diagonal components to be considered part of the brace assembly.

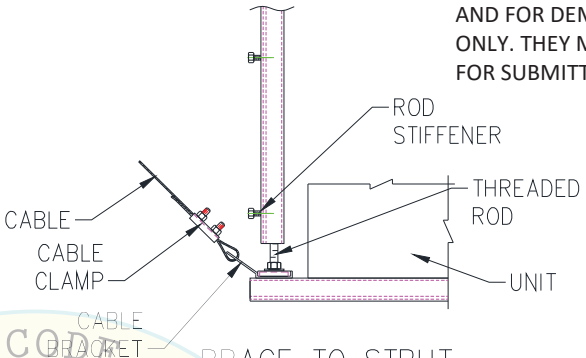
e. The cable bracing assemblies must be attached at the same location where the threaded rods are attached to the equipment. The unit connection point to either the rod or the supporting member must be verified to ensure failure will not occur on a case by case basis (either via equipment OSP # or through project specific analysis of the attachment point).

IMPORTANT NOTE:
ALTERNATIVE ATTACHMENT METHODS ARE SHOWN ON PAGES 2.73 TO 2.78.

IMPORTANT NOTE:
THESE DETAILS ARE GENERIC AND FOR DEMONSTRATION ONLY. THEY MAY NOT BE USED FOR SUBMITTAL PURPOSES.



BRACE TO UNIT



BRACE TO STRUT SUPPORTING UNIT

f. Connection point to the unit must be of steel construction with a tapped hole or welded nut that is internally attached to the unit and part of the structural elements of the unit itself. See drawings on pages 2.73 to 2.78 for more detail.

g. Steel bolt connections to structural steel members or components shall not have a diameter less than 1/16" than that of the mounting hole. Steel bolt connections to concrete structure shall not have a diameter less than 1/8" than that of the mounting hole.

6. GENERAL DESIGN PROCEDURE

The following is a general procedure for the design of seismic bracing and assumes that a piping, duct or electrical distribution system has been provided.The following also assumes that seismic bracing has been determined to be required.

I. Seismic Force Coefficient

Determine the total design lateral seismic force coefficient based on the applicable code, project drawings, and specifications. This coefficient is commonly referred to as the "G-factor"; i.e. F_p = 0.5g * Wp. In case of a conflict, use the more stringent criteria. The total design horizontal seismic force coefficient, when multiplied by the weight of the piping, duct, or electrical distribution systems, represents the total design lateral seismic force. To utilize the design tables in section D, use the value of "g" along with the specific pipe size or duct/cable tray linear weight to find the required cable bracing kit detail, cable brace attachment detail, and rod or hanger attachment detail. To calculate the value of "g" use the equations below less the value of Wp.

According to the 2013 CBC the total design lateral seismic force, F_p, and the total vertical seismic force F_{pv}, shall be determined from the following formulas. The final F_p and F_{pv} will be utilized at either 100% value for LRFD (Load Resistance Factored Design) or SD (Strength Design). This is necessary as the brace design, spacing, and anchorage methods are based on these design methods.

Per Section 13.3.1 of the ASCE 7-10, the horizontal seismic force is:

$$F_p = \frac{0.4a_pS_{DS}Wp}{R_p/I_p}\left(1+2\frac{Z}{h_r}\right)$$

But is not required to be taken greater than:

$$F_p = 1.6S_{DS}I_pWp$$

And shall not be taken as less than:

$$F_p = 0.3S_{DS}I_pWp$$

The additional vertical seismic force shall be:

$$F_p = \pm 0.2S_{DS}Wp$$

Where:

F_p = the horizontal seismic force

S_{DS} = spectral acceleration, short period. This is either provided within the structural plans of the project through the SEOR or can be determined using the project address at the following URL -http://earthquake.usgs.gov/designmaps/us/application.php
For additional information, see section 1613A.3 of the 2013 CBC.

a_p = component amplification factor. See the table below for all applicable values.

R_p = component response modification factor. See the table below for all applicable values.

I_p = component importance factor. Use 1.0 for a building I value of 1.0 or 1.25, and 1.5 for a building I value of 1.5, when the system is critical to life safety and operation after a seismic event, or the system contains materials/chemicals that are hazardous.

Wp = the operating weight of the component.

z = vertical location from grade of the component or system where it is supported by the structure.

h_r = height of the roof of the structure from grade.

SUMMARY OF TABLE 13.6-1 OF ASCE 7-10 (including Supplements 1 & 2):

MECHANICAL & ELECTRICAL COMPONENTS	a_p[a]	R_p[b]	Ω_0[c]
Air-side HVAC, fans, air handlers, air conditioning units, cabinet heaters, air distribution boxes, & other mechanical components constructed of sheet metal framing.	2½	6	2½
Wet-side HVAC, atmospheric tanks & bins, air separators, pumps, pressure vessels, & other mechanical components constructed of high deformability materials.	1	2½	2½
Lighting Fixtures	1	1½	1½
Other Mechanical or electrical components	1	1½	1½
VIBRATION ISOLATED COMPONENTS & SYSTEMS[b]			
Suspended vibration isolated equipment including in-line duct devices and suspended internally isolated components.	2½	2½	2½
DISTRIBUTION SYSTEMS			
Piping in accordance with ASME B31, including in-line components with joints made by welding or brazing.	2½	12[d]	2½
Piping in accordance with ASME B31, including in-line components, constructed of high or limited deformability materials, with joints made by threading, bonding, compression couplings, or grooved couplings.	2½	6	2½
Piping and tubing not in accordance with ASME B31, including in-line components, constructed of high-deformability materials, with joints made by welding or brazing.	2½	9	2½

Piping and tubing no in accordance with ASME B31, including in-line components, constructed of high- or limited-deformability materials, with joints made by threading, bonding, compression couplings, or grooved couplings.	2½	4½	2½
Piping and tubing constructed of low-deformability materials, such as cast iron, glass, and non-ductile plastics.	2½	3	2½
Ductwork, including in-line components, constructed of high-deformability materials, with joints made by welding or brazing.	2½	9	2½
Ductwork, including in-line components, constructed of high- or limited-deformability materials with joints made by means other than welding or brazing.	2½	6	2½
Ductwork, including in-line components, constructed of low-deformability materials, such as cast iron, glass, and non-ductile plastics.	2½	3	2½
Electrical cable trays	2½	6	2½
Bus Ducts	1	2½	2½
Plumbing	1	2½	2½
Manufacturing or process conveyors (non-personnel)	2½	3	2½

Table Notes:

a. A lower value for a_p is permitted where justified by detailed dynamic analysis. The value for a_p shall not be less than 1. The value of a_p equal to 1 is for rigid components and rigidly attached components. The value of a_p equal to 2½ is for flexible components and flexibly attached components.

b. Components mounted on vibration isolators shall have a bumper restraint or snubber in each horizontal direction. The design force shall be taken as $2F_p$ if the nominal clearance (air gap) between the equipment support frame and restraint is greater than 0.25in. If the nominal clearance specified on the construction documents in not greater than 0.25in the design force is permitted to be taken as F_p.

c. Overstrength as required for anchorage to concrete where brittle failure controls the design. See section 12.4.3 of the ASCE 7-10 and Appendix D of the ACI 318-11 for inclusion of the overstrength factor in the horizontal seismic load effect (F_p).

d. R_p must not exceed 9.0 for design of attachments of the pipe bracing.

II. Seismic Bracing Detail

Select a seismic bracing detail. For example, if a cable transverse brace is required for installation, go to page 2.1 through 2.78 in Section 2 “Cable Brace Details” for all applicable transverse and longitudinal brace details. For quick detail selection use the tables on pages D.1, D.4, D.5, and D.7.

III. Structural Attachment Details

Select a structural attachment detail. For example, if a Hilti KB-TZ wedge anchor into normal weight (NW) concrete slab is required for installation at a seismic brace location, go to page 3.11 in Section 3 “Structural Attachments”. All types of concrete, steel, and wood anchorage are covered with various fastener types in pages 3.1 through 3.42 for the cable brace, rod & spring hanger box attachment to the structure. For quick detail selection utilize the tables on pages D.2, D.3, D.6 and D.8 to determine the required minimum. Attachment Designation (i.e. load category). From there, find a corresponding Attachment Type listed in the tables on pages D.9 to D.12 that meets the requirements to attach to the surrounding building structure.
For the same quick detail selection method of the required rod or hanger, use the same tables on pages D.2, D.3, D.6 & D.8 to obtain a Hanger/Rod Attachment Designation and select the subsequent Hanger/Rod Attachment Type in the tables on pages D.13 to D.16 that meets the requirements to attach to the surrounding building structure.

IV. Brace Spacing

Determine the maximum transverse and longitudinal brace spacing from the Section 3 “Structural Attachments”. This brace spacing is based on the allowable loads for the specific structural attachment detail previously selected.
The brace spacing shall not exceed the maximum allowable brace spacings listed on the tables on pages D.2, D.3, D.6, and D.8.
For pipe distribution systems, the pipe may not deflect from the at rest position more than 6” or L/60 with L equal to the spacing between the transverse/lateral braces. Also, the combined stress in the steel pipe with welded or bolted connections must not exceed 90% of the pipe yield stress. For threaded or coupled connections, the combined stress in the pipe must not exceed 70% of the pipe yield stress. For threaded and bonded connections the maximum spacing of the lateral braces must be reduced by a factor of 1.7 per section 3.3.2 of the ASME B31E-08 as well. See item IV.o of part 5 of this section. For pre-calculated maximum brace spacing based on the stress and deflection limits of the pipe itself, see the top table on page D.3.1.

V. Brace Cable

Select a cable kit size. The horizontal bracing capacity as well as the maximum cable kit tension are listed on the bracing kit details in Section 2. The maximum applied horizontal seismic load shall be equal to or less than the maximum design horizontal seismic loads. If the design tables in Section D are utilized, the cable size is specified accordingly in the preselected detail pages.

VI. Bracing Layout

Layout the seismic bracing as explained in part 5 of Section 1 “Seismic Bracing Layout – General Requirements – Duct, Pipe, & Equipment”.

7. GENERAL INSTALLATION NOTES:

I. Single Hanger Cable Brace Installation Guideline

a. The design of all gravity hangers is included in the scope of this pre-approval for both use of threaded rod alone or use of the Vibrex type PRMXA-1C spring hanger box.

b. All rod hangers that correspond with a bracing cable must be stiffened. In some instances rod stiffeners will not be required and will be indicated accordingly.

c. For **simplified design approach**, the brace angle range from the vertical is equal to or greater than 45° & less than 60° for the diagonal brace, or a 1:1 and up to but not including a 1:1.7 brace ratio. However, the brace may be installed between 30° to 70° degrees from the vertical. Note, when angle "x" is outside the **simplified design approach** angle range the design requires analysis as the tables in section D will not be applicable.

d. All lateral and longitudinal braces have an in-plane alignment tolerance of 5° from center in both plan and elevation without adversely affecting the given capacities. See Section 2 for more information.

e. All stiffened rods suspended from the PRMXA-1C hanger have an alignment tolerance of 10° without adversely affecting the given capacities. See page 4.1 for more information.

8. COMPONENT PART NUMBER REFERENCE:

PART NAME	PART NUMBER	DESCRIPTION
SLH-34	315-1002	Attachment bracket for 1/8" & 3/16" cable
SLW-38	315-1039	Slotted Washer for 3/8" dia. rod and anchors
SLW-12	315-1003	Slotted Washer for 1/2" dia. rod and anchors
SLW-58	315-1040	Slotted Washer for 5/8" dia. rod and anchors
SLW-34	315-1004	Slotted Washer for 3/4" dia. rod & anchors
RS-1	315-1037	Rod Stiffener Clamp
1/8" DIA. CABLE	313-1800	7x19 Steel Cable, 1/8" dia., ASTM 1023
1/8" VIBREX CABLE CLAMP	315-1042	Cable clamp for 1/8" dia. cable with integrated fastening system.
3/16" DIA. CABLE	313-3600	7x19 Steel Cable, 3/16" dia., ASTM 1023
3/16" VIBREX CABLE CLAMP	315-1043	Cable clamp for 3/16" dia. cable with integrated fastening system.
PL-38 PIPE LUG	315-1101	Welded pipe lug for 3/8" A36 ATR from A500 Gr. B 46ksi HSS STEEL
PL-12 PIPE LUG	315-1102	Welded pipe lug for 1/2" A36 ATR from A500 Gr. B 46ksi HSS STEEL
PL-58 PIPE LUG	315-1103	Welded pipe lug for 5/8" A36 ATR from A500 Gr. B 46ksi HSS STEEL
PL-34 PIPE LUG	315-1104	Welded pipe lug for 3/4" A36 ATR from A500 Gr. B 46ksi HSS STEEL
PL-78 PIPE LUG	315-1105	Welded pipe lug for 7/8" A36 ATR from A500 Gr. B 46ksi HSS STEEL
PRMXA-1C	203-3001	Spring hanger box with vertical limit stops with allowable 10° angularity of the hanger rod. Maximum spring load: 225#

-See Section 4 for details of all parts listed above.

TYPICAL SUSPENDED EQUIPMENT DESIGN EXAMPLE

A. GENERAL

1. The Registered Design Professional (RDP) reviews Section 1 – overview of this OPM.

B. DEMAND

1. The RDP determines the lateral and vertical acceleration "g" for the seismic forces F_p and F_{pv} using information provided in the project documents. In the example below, the maximum factors utilized to determine horizontal and vertical forces on the seismic braces are calculated for use anywhere within the State of California. Please note that these maximum factor values may be reduced for the site specific project location as well as for the location within the height of a building in order to obtain lower demand values if so required to meet bracing criteria.

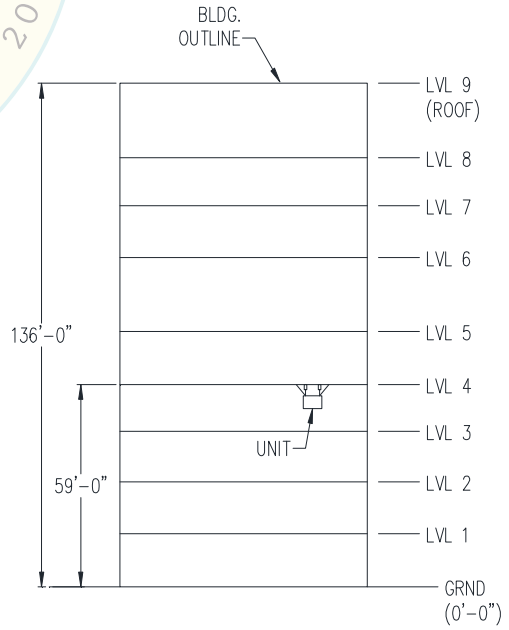
ASCE 7-10 AS AMENDED BY THE 2013 CBC

The equipment being suspended is a unit weighing 265 lbs. It is a fan coil (containing a fan with coils) with min. 20 gage steel housing and internal fully threaded connection points suspended using threaded rod and the PRMXA-1C spring hanger. The hangers are attached to the underside of structural sand light weight concrete over 3" metal deck on the 4th floor of 9 floors total at the elevation provided in the figure.

Determine the horizontal and vertical seismic forces of the unit to design the cable bracing and attachment requirements to the structure.

→ ALL FORCES ARE IN LBS & LENGTHS ARE IN INCHES

SECTION	13.3	HORIZONTAL SEISMIC FORCES FOR NON-STRUCTURAL COMPONENTS IN LRFD, UNO
EQUATION	13.3.1	$F_p = \frac{0.4 a_p S_{DS} W_p}{R_p / I_p}\left(1+2\frac{Z}{h_r}\right) = 742.4$
TABLE	13.6.1	$a_p = 2.5$ (unit w/ vib. isolation)
		$R_p = 2.5$ (unit w/ vib. isolation)
		$\Omega_0 = 2.5$ (for anchorage to conc.)
		$S_{DS} = 2.5$ (short period design value)
		$W_p = 265$
SECTION	13.1.3	$I_p = 1.5$ (Located in a Hosp.)
		$z = 59/136$ (Attached to flr shown)
EQUATION	13.3.2	Max $F_p = 1.6 S_{DS} I_p W_p = 1590.0$
EQUATION	13.3.3	Min $F_p = 0.3 S_{DS} I_p W_p = 298.13$
SECTION	13.3.1	$F_{pv} = +/- 0.2 S_{DS} W_p = +/- 132.5$

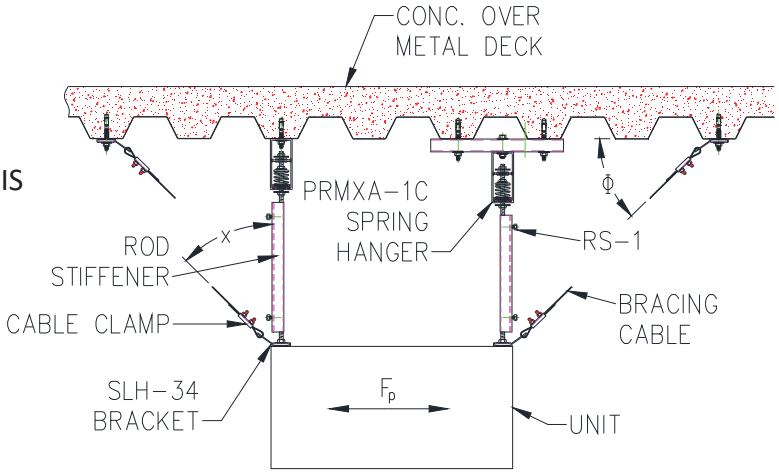


GOVERNING EQN. IS 13.3.1, THEREFORE

$F_p = 742.4$

AND THE SUPPLEMENTAL VERTICAL FORCE IS

$F_{pv} = +/-132.5$



→ DETERMINE THE CABLE FORCE TO SIZE THE CABLE:

x = 45°

$T_{cable} = F_p/(SIN\ x) = 742.4/0.707 = 1050.1$

USE 1/8" CABLE, LRFD KIT CAPACITY = 1411 (SEE PG. 2.73)

→ DESIGN THE ANCHORAGE OF THE CABLE:

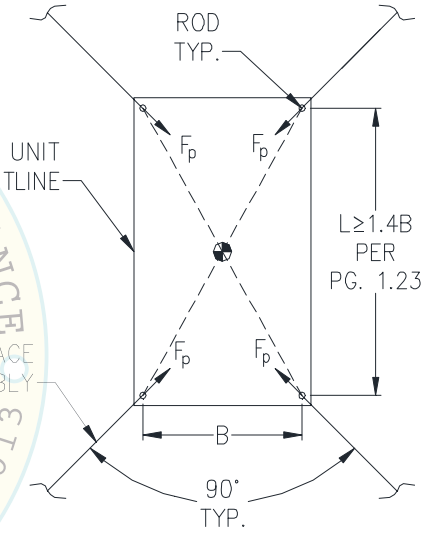
USING THE VALUE OF Tcable, SELECT AN APPLICABLE ATTACHMENT DETAIL IN SECTION 3. FIND THE VALUE OF Φ TO SELECT THE CORRECT ATTACHMENT TYPE

FOR 3" DECK W/ SAND LIGHTWEIGHT CONCRETE FILL:

FOR THIS EXAMPLE $\Phi = 45^o$ ($\Phi = 90^o - x = 45^o$)

USE ATTACHMENT TYPE 2TZD35 ON PAGE 3.1

(FOR ATTACHMENT MAX T_{cable} = 1553lbs FOR THE SELECTED CABLE ANGLE & > 1411 CAPACITY OF CABLE KIT. OKAY!)



→ DESIGN THE ANCHORAGE OF THE HANGERS TO THE STRUCTURE:

OVERTURNING OF THE UNIT MUST BE TAKEN INTO ACCOUNT, UNITS ARE IN INCHES…

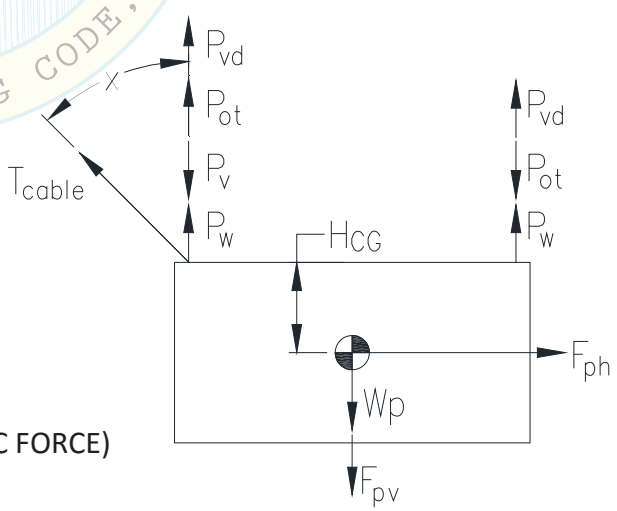
B = 20 (SHORT DIM. BTWN RODS)

L = 42 (LONG DIM. BTWN RODS) –

CHECK → 1.4B = 1.4*20 = 28 < 42 = L OK!

H_{CG} = 10 (DIST. TO C.G. FROM TOP[1] OF UNIT)

NOTE 1.: H_{CG} MUST BE TAKEN FROM THE THE HORIZONTAL PLANE IN WHICH THE RODS & CABLE ARE ATTACHED TO THE UNIT



$P_{ot} = \Omega_0 F_p H/[(L^2+B^2)^{1/2}] = 399$

$P_{vd} = F_{pv}/4 = 33.13$ (Ω_0 DOESN'T APPLY TO VERT. SEISMIC FORCE)

$P_w = Wp/4 = 66.25$

Vibrex® vibration & seismic control systems
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Civil Engineer: P.K. Sachdeva
California PE No. C59644

APPLYING EQUATIONS FROM §12.14.1.3 OF THE ASCE 7-10
5. $U = (1.2 + 0.2S_{DS})D + Q_E$ ~~$+ 0.2S$~~
7. $U = (0.9-0.2S_{DS})D + Q_E$ ~~$+ 1.6H$~~

$P\ MIN = P_{ot} + P_{vd} + 1.2P_w = 511.63$

USE AN EXPANSION ANCHOR TO INSTALL TO THE DECK. USE ATTACHMENT TYPE HDE31 ON PAGE 3.28 IN SECTION 3. $P_{capacity}$ = 695 lbs > P MIN = 511.63 lbs

CHECK THE ROD STIFFENER CLAMP RS-1 SPACING BASED ON THE MAXIMUM COMPRESSION IN THE ROD:

$P_v = T_{cable}COS\ x = 742.4$ (Ω_0 EXCLUDED, FORCE IS UPWARD)

$P\ MAX = P_{ot}/\Omega_0 + P_v + P_{vd} - 0.9P_w = 875.5$

$d_r = 0.417$ (DIAMETER OF THREADED ROD)
$r = d_r/4 = 0.1043$
L = 21 (STD. THREADED ROD RS-1 SPACING)
K = 1.0 (SET AS 1 FOR SIMPLIFIED ANALYSIS)
KL/r = 201.3
E = 29,000,000psi
F_y = 36,000psi
USING THE AISC 360-10, CHAPTER E
$4.71(E/F_y)^{1/2} = 134 < KL/r \rightarrow$ EQN. E3-3 OF AISC GOVERNS…
$F_{cr} = 0.877F_e = 6191.9$psi
WITH $F_e = \pi^2E / (KL/r)^2 = 7060.4$psi

$P_{cr} = 0.9F_{cr}d_r^2\pi/4 = 757.2 < P\ MAX = 875.5 \rightarrow$ STD. ROD RS-1 SPACING OF 21" IS INADEQUATE
TRY ABOVE ANALYSIS WITH RS-1 SPACING OF 19"…
$KL/r = 182.2$, $F_{cr} = 0.877\pi^2E / (KL/r)^2 = 7564.1$psi
$P_{cr} = 0.9F_{cr}d_r^2\pi/4 = 925.8 > P\ MAX \rightarrow$ USE A MAX. 19" RS-1 SPACING

CHECK THE CAPACITY OF THE CONNECTION OF THE UNIT TO THE ROD:

INTERNALLY THERE IS A NUT WELDED TO SHEET METAL THAT THE ROD CONNECTS TO. THE TENSION CAPACITY IS THE PUNCHING SHEAR OF THE SHEET METAL AND THE SHEAR CAPACITY IS THE BEARING STRENGTH OF THE HOLE IN THE SHEET METAL…

FIND THE PUNCHING SHEAR STRENGTH OF THE SHEET METAL (E5.1 OF AISI S100)
$P_{nt} = V_n = \phi 0.6F_uA_{nv}$
$A_{nv} = L*t$

t = 0.048" (SHEET METAL THICKNESS – 18 GAGE)

L = 3.04" (PERIMETER LENGTH AROUND STD. HVY NUT)

F_u = 45ksi (TENSILE STRENGTH OF Gr. 33 SHEET METAL)

ϕ = 0.65

$P_{nt} = V_n$ = 2560.9 lbs

FIND THE BEARING STRENGTH OF THE HOLE w/ CONSIDERATION OF DEFORMATION (E3.3.2-1)

$P_{nv} = \phi(4.64\alpha t+1.53)d_r t F_u$

d_r = 0.5" (ROD DIA.)

α = 1.0

ϕ = 0.65

P_{nv} = 1230.4 lbs

CHECK COMBINED LOADING OF CONNECTION:

T_u = P MIN = 511.63 lbs

$V_u = F_p$ = 742.4 lbs

$1.0 \geq V_u/P_{nv} + T_u/P_{nt}$ = 0.803 CONNECTION OKAY

C. CAPACITY

1. The RDP must select the necessary hardware based on the determined loads in part B of this example. See Section 3 for attachment details (i.e. concrete anchor bolt to deck) and Section 4 for component pieces of the cable kit.
2. The RDP must specify on the drawing the maximum design cable load specific to each unit so that the SEOR can verify the capacity of the local structure that the equipment is braced to and supported by.

D. DESIGN OF DISTRIBUTION SYSTEMS GOING TO AND FROM THE UNIT AS WELL AS THROUGHOUT THE STRUCTURE

1. The RDP must layout the bracing locations per Section 1 Part 5 in the relevant mechanical plans showing the systems (pipe, duct, and cable tray or raceways).
2. Based on the brace locations shown, the RDP must determine the linear weight of the system and calculate the maximum tributary seismic weight to a single transverse kit and a single transverse/longitudinal kit (or more depending on the variety of distribution system sizes or levels of the structure as the seismic forces can vary greatly).
3. Using the design equations and methods specified for the equipment the RDP must apply the tributary weight(s) determined in item 2 and design the cable kit and attachment methods accordingly. Geometric considerations (height to center of gravity, L, B, etc) need not be considered since there is only a single threaded rod per kit location for pipe, but should be accounted for with duct. See pages 1.36 through 1.41 for distribution system design examples.

TYPICAL SUSPENDED PIPE DESIGN EXAMPLE

A. GENERAL

1. The Registered Design Professional (RDP) reviews Section 1 – overview of this OPM.

B. DEMAND

1. The RDP determines the lateral and vertical acceleration "g" for the seismic forces F_p and F_{pv} using information provided in the project documents. In the example below, the maximum horizontal and vertical forces on the seismic braces are calculated for use anywhere within the State of California. Please note that these maximum values may be reduced for the site specific project location as well as for the location within the height of a building in order to obtain lower demand values if so required to meet bracing criteria.

ASCE 7-10 AS AMENDED BY THE 2013 CBC

The pipe being suspended is 5" diameter schedule 40 steel pipe filled with water and wrapped in insulation (Wp = 24.83plf). Pipe is assembled in accordance with ASME B31 and the joints are made by welding. The pipe system being braced is located in the same structure and level on page 1.32 as the equipment being suspended on the same page. Note: demand loads will increase at higher levels of the structure.

For simplified design, determine the maximum horizontal "g" value and select the necessary details for the cable kit and attachment to the structure for the cable and the rod. Cable must be at an angle range of $45^o \leq x < 60^o$ for this simplified design method to be applied, with x measured from the vertical axis. For this example use a specific angle of 45^o.

→ ALL FORCES ARE IN LBS & LENGTHS ARE IN INCHES

SECTION	13.3	HORIZONTAL SEISMIC FORCES FOR NON-STRUCTURAL COMPONENTS IN LRFD, UNO
EQUATION	13.3.1	$F_p = \frac{0.4 a_p S_{DS} Wp}{R_p / I_p}\left(1+2\frac{Z}{h_r}\right) = 0.78*Wp$ where g = 0.78
TABLE	13.6.1	a_p = 2.5 (pipe w/ welded joints & ASME B31 compliant)
		R_p = 9.0 (pipe w/ welded joints & ASME B31 compliant)
		Ω_0 = 2.5 (for anchorage to conc.)
		S_{DS} = 2.5 (short period design value)
SECTION	13.1.3	I_p = 1.5 (Located in a Hosp.)
		z = 59/136 (Attached to flr shown)
EQUATION	13.3.2	Max $F_p = 1.6 S_{DS} I_p Wp = 6.0*Wp$
EQUATION	13.3.3	Min $F_p = 0.3 S_{DS} I_p Wp = 1.13*Wp$
SECTION	13.3.1	$Fpv = +/- 0.2 S_{DS} Wp = 0.5*Wp$

GOVERNING EQN. IS 13.3.3 (THE LOWER BOUND), THEREFORE

$F_p = 1.13*Wp$ (LRFD)

AND THE SUPPLEMENTAL VERTICAL FORCE IS

$F_{pv} = 0.5*Wp$ (LRFD)

→ SELECT THE CORRECT TRANSVERSE AND TRANSVERSE & LONGITUDINAL CABLE BRACING KIT DETAILS BASED ON THE ANGLE RANGE SELECTED ON PAGE 1.36:
g = 1.13, SO ROUND UP TO 1.5. FROM THE TABLES ON PAGE D.1, USE DETAIL PAGES 2.25 & 2.26.

→ SELECT THE CORRECT CABLE BRACING ATTACHMENT TO THE STRUCTURE:
AGAIN, g = 1.5…
FROM THE TABLES ON PAGE D.2, USE ATTACHMENT DESIGNATION B7 AND SELECT A CORRESPONDING ATTACHMENT TYPE WITHIN THE TABLES ON PAGES D.8 TO D.11. FOR 3" CONCRETE FILLED DECK (PAGE D.9), USE 4TZD33 ON PAGE 3.1.1.

→ DETERMINE THE MAXIMUM BRACING KIT SPACING (FOR TRANSVERSE AND TRANSVERSE/LONGITUDINAL KITS):
ON PAGE D.2 IN THE LOWER TABLE, THE MAXIMUM SPACING IN FEET FOR THE TRANSVERSE BRACING KITS OF THE PIPE IS 11.0' O.C.
ON PAGE D.3 IN THE LOWER TABLE, THE MAXIMUM SPACING IN FEET FOR THE TRANSVERSE & LONGITUDINAL BRACING KITS OF THE PIPE IS 26.7' O.C.

- THIS RESULTS IN (2) TRANSVERSE KITS BETWEEN EACH TRANSVERSE AND LONGITUDINAL KIT.
- MAXIMUM TRANSVERSE Fp = 24.83plf * 11' * 1.13g = 309lbs ≤ 393lbs
    - NOTE: TO DETERMINE THE CABLE TENSION, Fp MUST BE MULTIPLIED BY THE η VALUE LISTED ON PAGE D.3.1. IN THIS CASE IT WOULD BE 6.04.

→ SELECT THE CORRESPONDING ROD ATTACHMENT DETAIL FOR THE TRANSVERSE KIT LOCATIONS:
ON PAGE D.2 FOR 5" PIPE TRANSERSE KITS, USE A ROD DESIGNATION OF R2 AND SELECT A CORRESPONDING ROD ATTACHMENT TYPE IN THE TABLES ON PAGES D.14 TO D.16. FOR 3" CONCRETE FILLED DECK AND 5/8" DIAMETER ROD (STANDARD FOR 5" DIAMETER PIPE), USE RDE33 ON PAGE 3.33 (5/8" DIA. KB-TZ WITH ROD COUPLING).
THE SAME METHOD APPLIES FOR THE TRANSVERSE AND LONGITUDINAL KITS ON PAGE D.3.

→<u>FOR MANUAL DESIGN OF PIPE BRACING:</u>

- THIS APPROACH IS FOR ANGLES OUTSIDE THE ANGLE RANGE OF THE SIMPLIFIED METHOD OR FOR DETERMINING MORE EXACT DESIGN VALUES FOR THE CABLE BRACING ASSEMBLY AND ATTACHMENTS.

1) CALCULATE THE EXACT FORCES PER KIT
   a. SELECT A TRIBUTARY SPACING FOR THE TRANSVERSE KIT WITH THE SPACING NOT TO EXCEED THE SPACING LIMITS LISTED IN THE TOP TABLE ON PAGE D.3.1.
   b. SELECT THE DESIRED CABLE BRACING ANGLE RANGE (BETWEEN $30^o \leq x \leq 70^o$).
   c. FIND Fp USING THE EQUATIONS AND THE TRIBUTARY WEIGHT PER TRANSVERSE CABLE KIT. NOTE: THIS LOAD APPLIES TO THE TRANSVERSE COMPONENT OF THE TRANSVERSE AND LONGTIDUTINAL KITS.
   d. FIND THE Fp FOR THE LONGITUDINAL PORTION OF THE TRANSVERSE AND LONGITUDINAL KITS USING A MAXIMUM SPACING OF 80'-0" O.C. (RECOMMENDED NOT TO EXCEED 2 TO 3 TIMES THE TRANSVERSE KIT SPACING).
2) APPLY THE η FACTOR LISTED ON D.3.1 FOR THE ANGLE RANGE TO GET THE CABLE TENSION T_{cable} FOR THE TRANSVERSE BRACING:
   $T_{cable} = F_p \eta$
3) APPLY PYTHAGOREAN THEOREM TO OBTAIN THE CABLE TENSION T_{cable} FOR THE LONGITDUINAL BRACING:
   $T_{cable} = F_p / SIN\ x$
4) SELECT THE APPROPRIATE BRACING KIT AND ATTACHMENT DETAILS FROM SECTIONS 2 & 3 RESPECTIVELY BASED ON THE VALUE OF T_{cable}.

C. CAPACITY

1. The RDP must select the necessary hardware based on the determined loads in part B of this example. See Section 3 for attachment details (i.e. concrete anchor bolt to deck) and Section 4 for component pieces of the cable kit.
2. The RDP must specify on the drawing the maximum design cable load specific to each bracing kit so that the SEOR can verify the capacity of the local structure that the pipe is braced to and supported by.

TYPICAL SUSPENDED DUCT (OR CABLE TRAY) DESIGN EXAMPLE

A. GENERAL

1. The Registered Design Professional (RDP) reviews Section 1 – overview of this OPM.

B. DEMAND

1. The RDP determines the lateral and vertical acceleration "g" for the seismic forces F_p and F_{pv} using information provided in the project documents. In the example below, the maximum horizontal and vertical forces on the seismic braces are calculated for use anywhere within the State of California & $z/h_r = 0.66$. Please note that these maximum values may be reduced for the site specific project location as well as for the location at a lower elevation within the height of a building in order to obtain lower demand values if so required to meet bracing criteria. Note: the demand loads in the example below will be even higher if the duct is at a higher elevation within the structure.

ASCE 7-10 AS AMENDED BY THE 2013 CBC

*For this example, a duct system will be used, however the same method applies for cable trays. The duct being suspended is 36x28 rectangular duct made of 20 gage sheet metal and is insulated, weighing 15.6lb/ft. The duct system being braced is located in the same structure on page 1.32, but on a higher level at 90' above grade (resulting in a $z/h_r = 0.66$). The ductwork has gravity supports at every 10'-0" o.c.

For simplified design, determine the maximum horizontal "g" value and select the necessary details for the cable kit and attachment to the structure for the cable and the rod. Cable must be at an angle range of $45^o \leq x < 60^o$ for this simplified design method to be applied. For this example, use 45^o specifically.

→ ALL FORCES ARE IN LBS & LENGTHS ARE IN INCHES

SECTION	13.3	HORIZONTAL SEISMIC FORCES FOR NON-STRUCTURAL COMPONENTS IN LRFD, UNO
EQUATION	13.3.1	$F_p = \frac{0.4 a_p S_{DS} Wp}{R_p/I_p}\left(1+2\frac{Z}{h_r}\right) = 1.45*Wp$ where g = 1.45
TABLE	13.6.1	$a_p = 2.5$ (suspended ductwork)
		$R_p = 6.0$ (suspended ductwork)
		$\Omega_0 = 2.5$ (for anchorage to conc.)
		$S_{DS} = 2.5$ (highest design value)
SECTION	13.1.3	$I_p = 1.5$ (Located in a Hosp.)
		z = 90/136 (Attached to a higher floor)
EQUATION	13.3.2	Max $F_p = 1.6 S_{DS} I_p Wp = 6.0*Wp$
EQUATION	13.3.3	Min $F_p = 0.3 S_{DS} I_p Wp = 1.13*Wp$
SECTION	13.3.1	Fpv = +/- $0.2 S_{DS} Wp = 0.5*Wp$

GOVERNING EQN. IS 13.3.1, THEREFORE

F_p = 1.45*Wp = 1.45*30*15.6plf = 679 lbs

= 1.45*60*15.6plf = 1357 lbs

AND THE SUPPLEMENTAL VERTICAL FORCE IS

F_{pv} = 0.5*Wp = 0.5*10*15.6 = 62 lbs

→ SELECT THE CORRECT CABLE BRACING KIT DETAIL:

g = 1.45, SO ROUND UP TO 1.5 AND ROUND UP THE DUCT LINEAR WEIGHT TO 20lb/ft. FROM THE TABLES ON PAGE D.4, USE DETAIL PAGE 2.37 FOR TRANSVERSE BRACING AND 2.38 FOR TRANSVERSE AND LONGITUDINAL BRACING.

→ SELECT THE CORRECT CABLE BRACING ATTACHMENT TO THE STRUCTURE:

AGAIN, g = 1.5 & DUCT IS 20lb/ft…

FROM THE TABLES ON PAGE D.6, USE ATTACHMENT DESIGNATION B6 AND SELECT A CORRESPONDING ATTACHMENT TYPE WITHIN THE TABLES ON PAGES D.9 TO D.12. FOR 3" CONCRETE FILLED DECK, USE 4TZD33 ON PAGE 3.1.1.

→ DETERMINE THE MAXIMUM BRACING KIT SPACING FOR TRANSVERSE KITS:

ON PAGE D.6 IN THE MIDDLE TABLE, THE MAXIMUM SPACING IN FEET FOR THE BRACING KITS OF THE DUCT IS 30' O.C.

→ DETERMINE THE MAXIMUM BRACING KIT SPACING FOR TRANSVERSE & LONGITUDINAL KITS (4-WAY KITS):

ON PAGE D.6 IN THE LOWER TABLE, THE MAXIMUM SPACING IN FEET FOR THE BRACING KITS OF THE PIPE IS 60' O.C.

IMPORTANT NOTE: TRANSVERSE KITS MUST BE UTILIZED IN CONJUNCTION WITH THE TRANSVERSE/LONGIDTUDINAL KITS SO THAT THE DUCT IS BRACED TRANSVERSELY EVERY 30' O.C. (THE MAXIMUM TRANSVERSE KIT SPACING)

→ SELECT THE CORRESPONDING ROD ATTACHMENT DETAIL:

T_{ROD} = 15.6*10 + F_{pv} = 218 lbs (MANUAL CALCULATION)

ON PAGES 2.37 & 2.38 FOR DUCT 30plf OR SMALLER THE ROD SIZE IS 3/8". USE A ROD DESIGNATION OF R1 AS LISTED ON PAGE D.6 AND SELECT A CORRESPONDING ROD ATTACHMENT TYPE IN THE TABLES ON PAGES D.14. FOR 3" CONCRETE FILLED DECK AND 3/8" DIAMETER ROD, USE RDE31 ON PAGE 3.33 (3/8" DIA. KB-TZ WITH ROD COUPLING). NOTE: IN CABLE T_{ROD} CALCULATIONS.

LOAD SUMMARY:

$z/h_r = 0.662$ $F_p = 679$ lbs (TRANSVERSE), 1357 lbs (LONG.) $T_{ROD} = 218$ lbs

→<u>FOR MANUAL DESIGN OF DUCT (OR CABLE TRAY) BRACING:</u>

- THIS APPROACH IS FOR ANGLES OUTSIDE THE ANGLE RANGE OF THE SIMPLIFIED METHOD OR FOR DETERMINING MORE EXACT DESIGN VALUES FOR THE CABLE BRACING ASSEMBLY AND ATTACHMENTS.

1) CALCULATE THE EXACT FORCES PER KIT
   a. SELECT A TRIBUTARY SPACING FOR THE TRANSVERSE KIT WITH THE SPACING NOT TO EXCEED 30'-0" FOR TRANSVERSE BRACING AND 60'-0" FOR TRANSVERSE & LONGITUDINAL BRACING, OR THE PREDETERMINED SPACING LIMITS OF THE PROJECT DEPENDING ON THE CAPACITY OF THE DUCT ITSELF.
   b. SELECT THE DESIRED CABLE BRACING ANGLE RANGE (BETWEEN $30^o \leq x \leq 70^o$).
   c. FIND F_p USING THE EQUATIONS AND THE TRIBUTARY WEIGHT PER TRANSVERSE CABLE KIT. NOTE: THIS LOAD APPLIES TO THE TRANSVERSE COMPONENT OF THE TRANSVERSE AND LONGTIDUTINAL KITS.
   d. FIND THE F_p FOR THE LONGITUDINAL PORTION OF THE TRANSVERSE AND LONGITUDINAL KITS USING A MAXIMUM SPACING OF 60'-0" O.C. (RECOMMENDED NOT TO EXCEED 2 TO 3 TIMES THE TRANSVERSE KIT SPACING).
2) APPLY PYTHAGOREAN THEOREM TO OBTAIN THE CABLE TENSION T_{cable} FOR THE TRANSVERSE BRACING:
   $T_{cable} = F_p/\text{SIN } x$
3) APPLY PYTHAGOREAN THEOREM TO OBTAIN THE CABLE TENSION T_{cable} FOR THE TRANSVERSE & LONGITDUINAL BRACING (IN THIS CASE x = 60 TO COVER THE RANGE):
   $T_{cable} = F_p/\text{SIN } x$
4) SELECT THE APPROPRIATE BRACING KIT AND ATTACHMENT DETAILS FROM SECTIONS 2 & 3 RESPECTIVELY BASED ON THE VALUE OF T_{cable}.

C. CAPACITY

1. The RDP must select the necessary hardware based on the determined loads in part B of this example. See Section 3 for attachment details (i.e. concrete anchor bolt to deck) and Section 4 for component pieces of the cable kit.
2. The RDP must specify on the drawing the maximum design cable load specific to each bracing kit so that the SEOR can verify the capacity of the local structure that the duct is braced to and supported by.

SECTION 2

CABLE BRACE DETAILS

Vibrex® vibration & seismic control systems
M.W. Saussé & Co., Inc.
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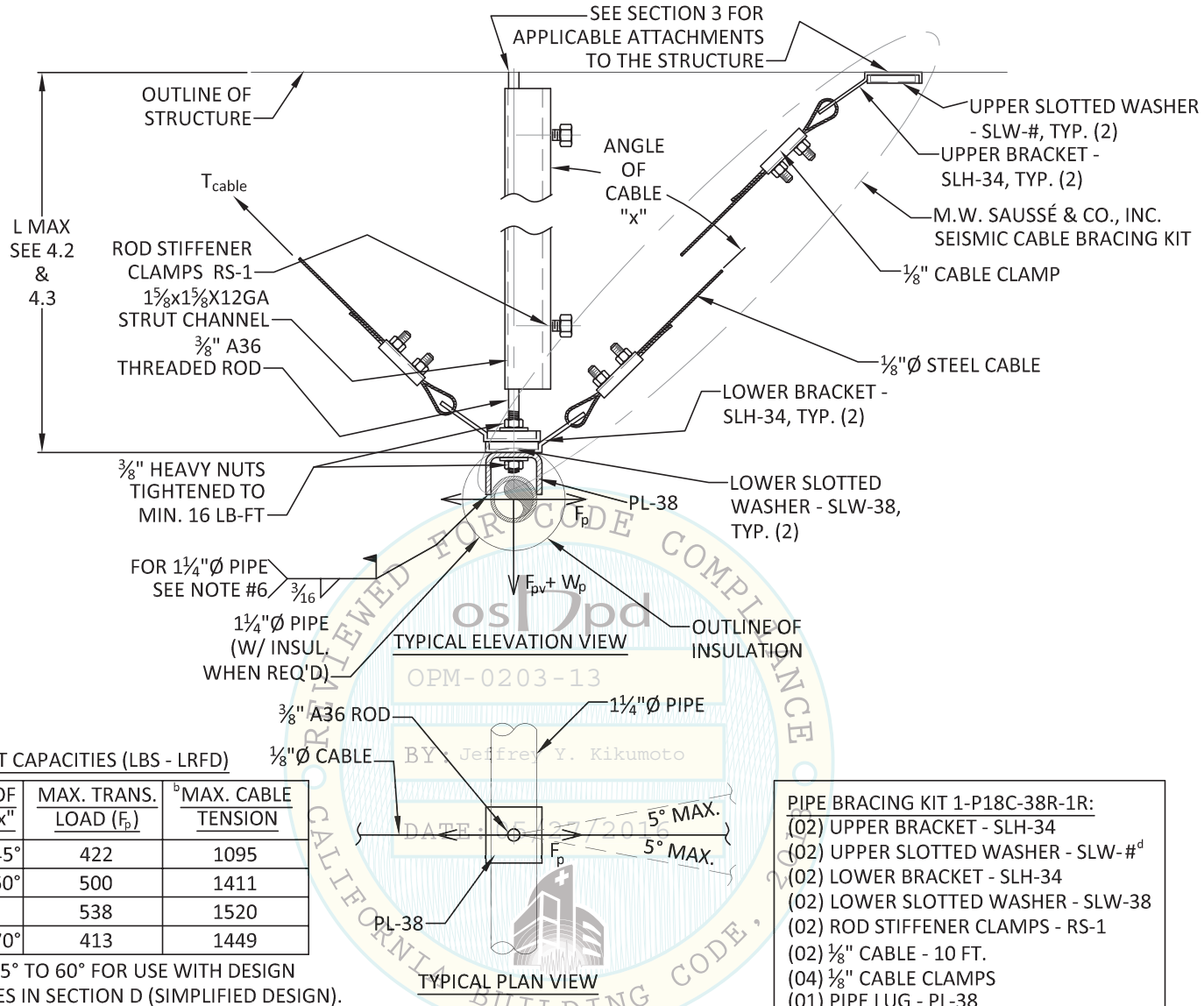
Civil Engineer: P.K. Sachdeva
California PE No. C59644

Page No.: 2.0

Date: May 9, 2016

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
1¼"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	422	1095
[a]45°≤ x <60°	500	1411
60°= x	538	1520
[c]60°< x ≤70°	413	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

PIPE BRACING KIT 1-P18C-38R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-38
(02) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS
(01) PIPE LUG - PL-38

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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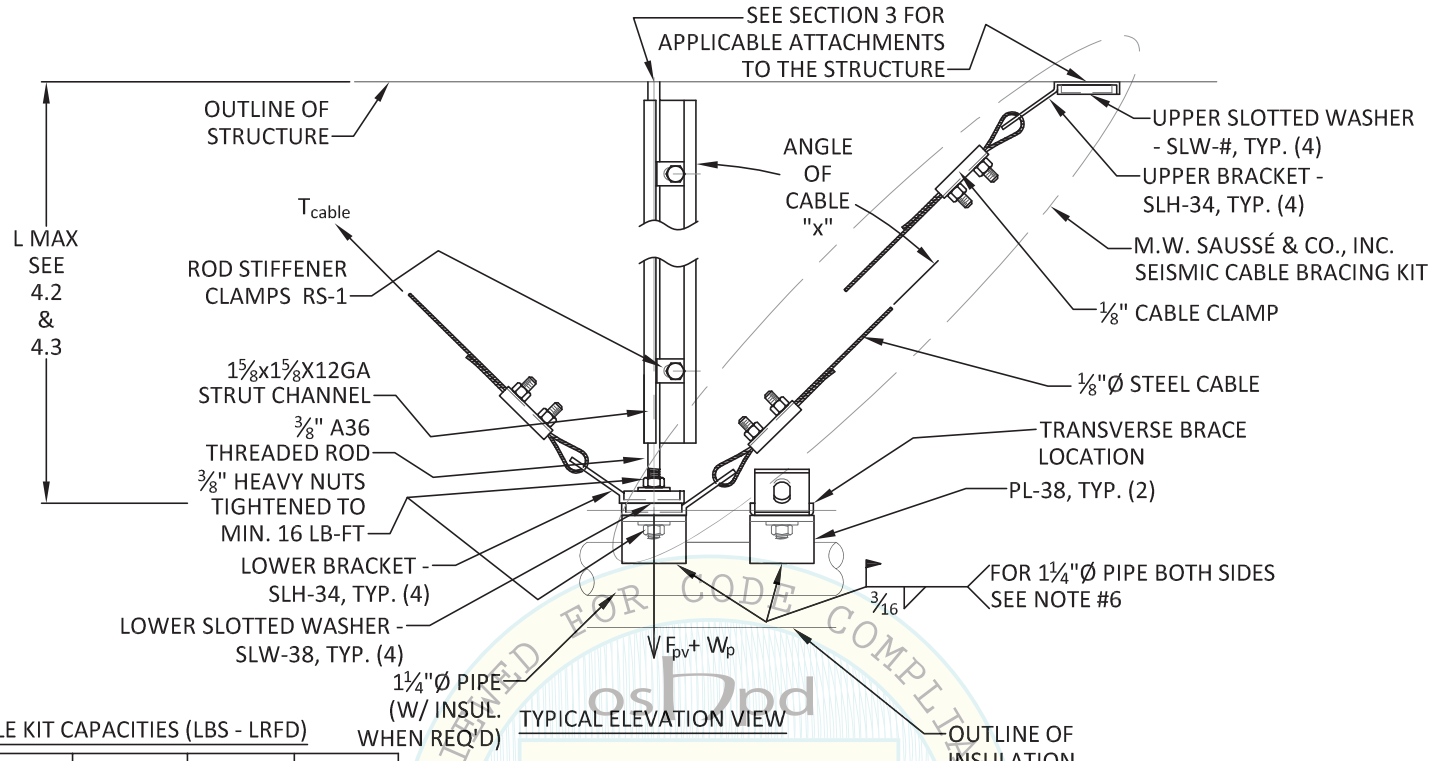
Civil Engineer: P.K. Sachdeva
California PE No. C59644

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
1¼"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)

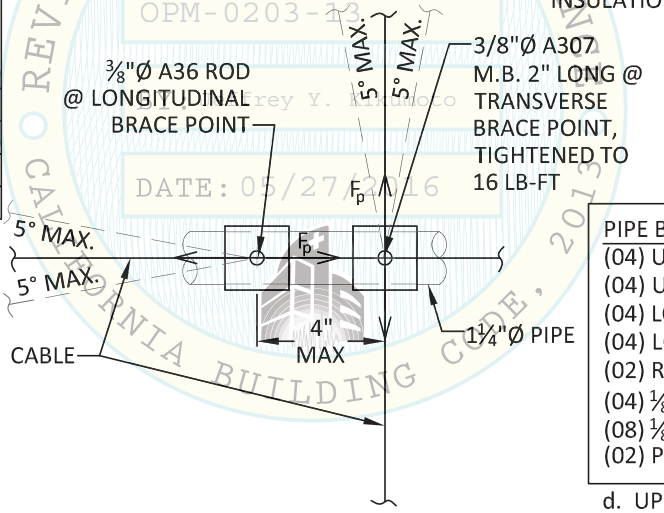


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30° ≤ x < 45°	422	547	1095
[a] 45° ≤ x < 60°	500	1001	1411
60° = x	538	1316	1520
[c] 60° < x ≤ 70°	413	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 2-P18C-38R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-38
(02) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS
(02) PIPE LUG - PL-38

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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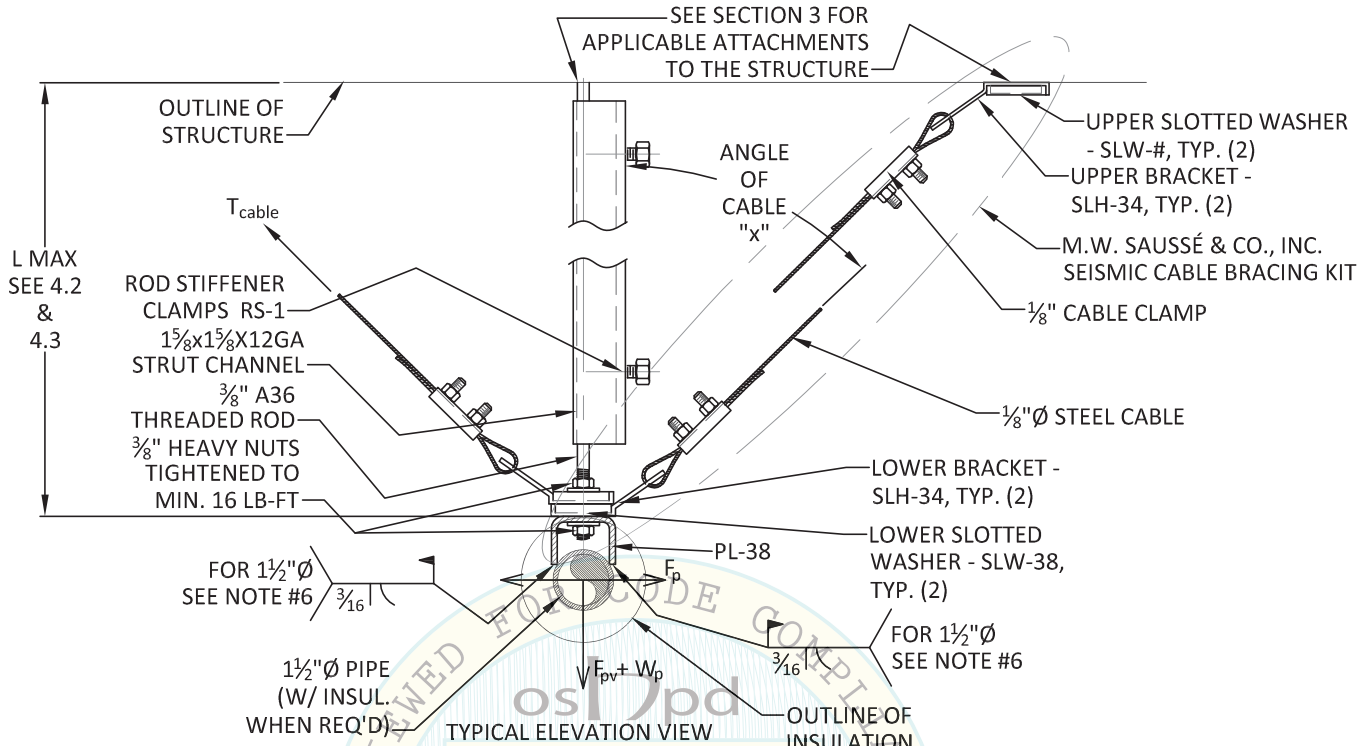
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
1½"Ø PIPE W/ WATER & INSULATION (⅛" CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	376	1095
[a]45°≤ x <60°	431	1411
60°= x	464	1520
[c]60°< x ≤70°	348	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

PIPE BRACING KIT 1-P18C-38R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-38
(02) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS
(01) PIPE LUG - PL-38

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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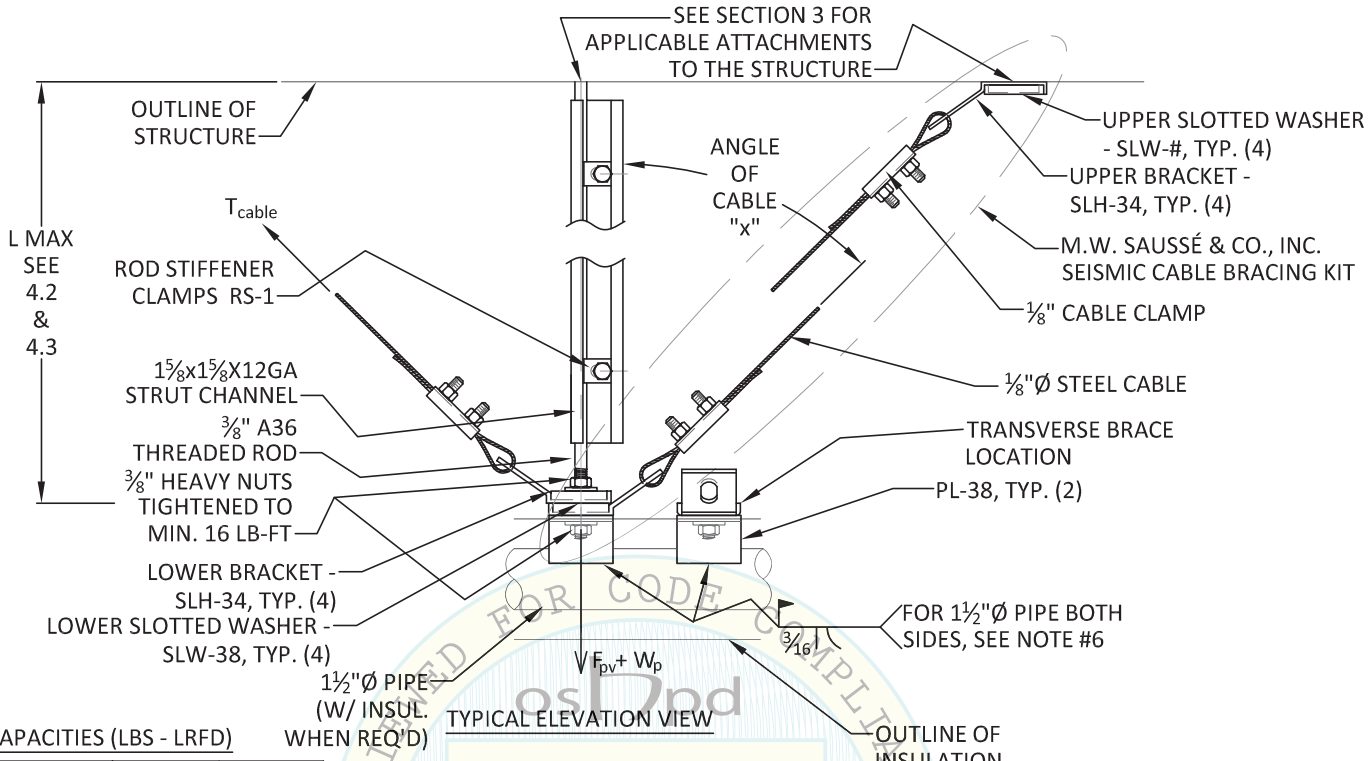
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
1½"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)

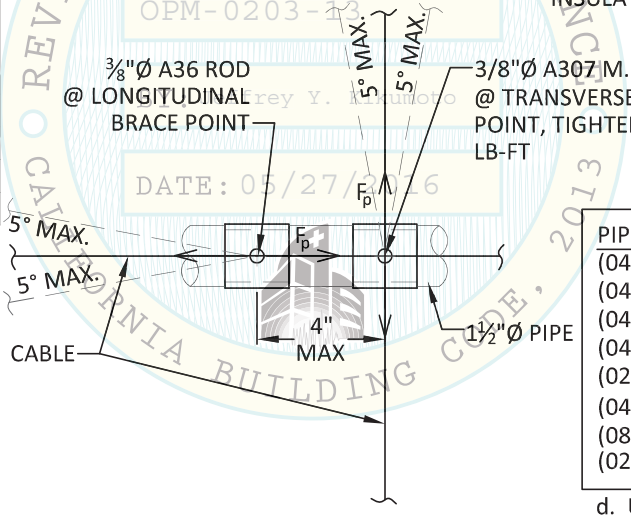


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	376	547	1095
[a]45°≤ x <60°	431	1001	1411
60°= x	464	1316	1520
[c]60°< x ≤70°	348	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 2-P18C-38R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-38
(02) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS
(02) PIPE LUG - PL-38

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
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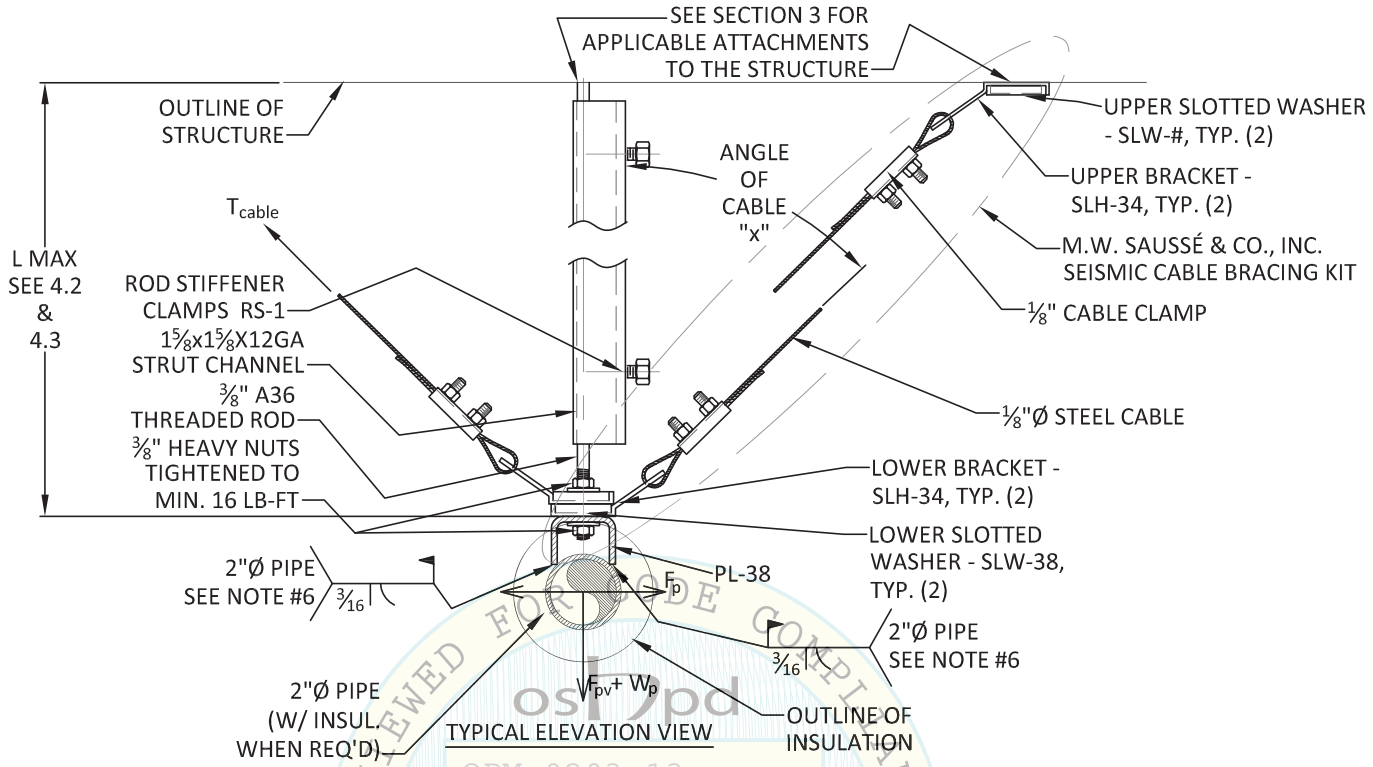
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
2"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	354	1095
[a]45°≤ x <60°	400	1411
60°= x	431	1520
[c]60°< x ≤70°	320	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

PIPE BRACING KIT 1-P18C-38R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-38
(02) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS
(01) PIPE LUG - PL-38

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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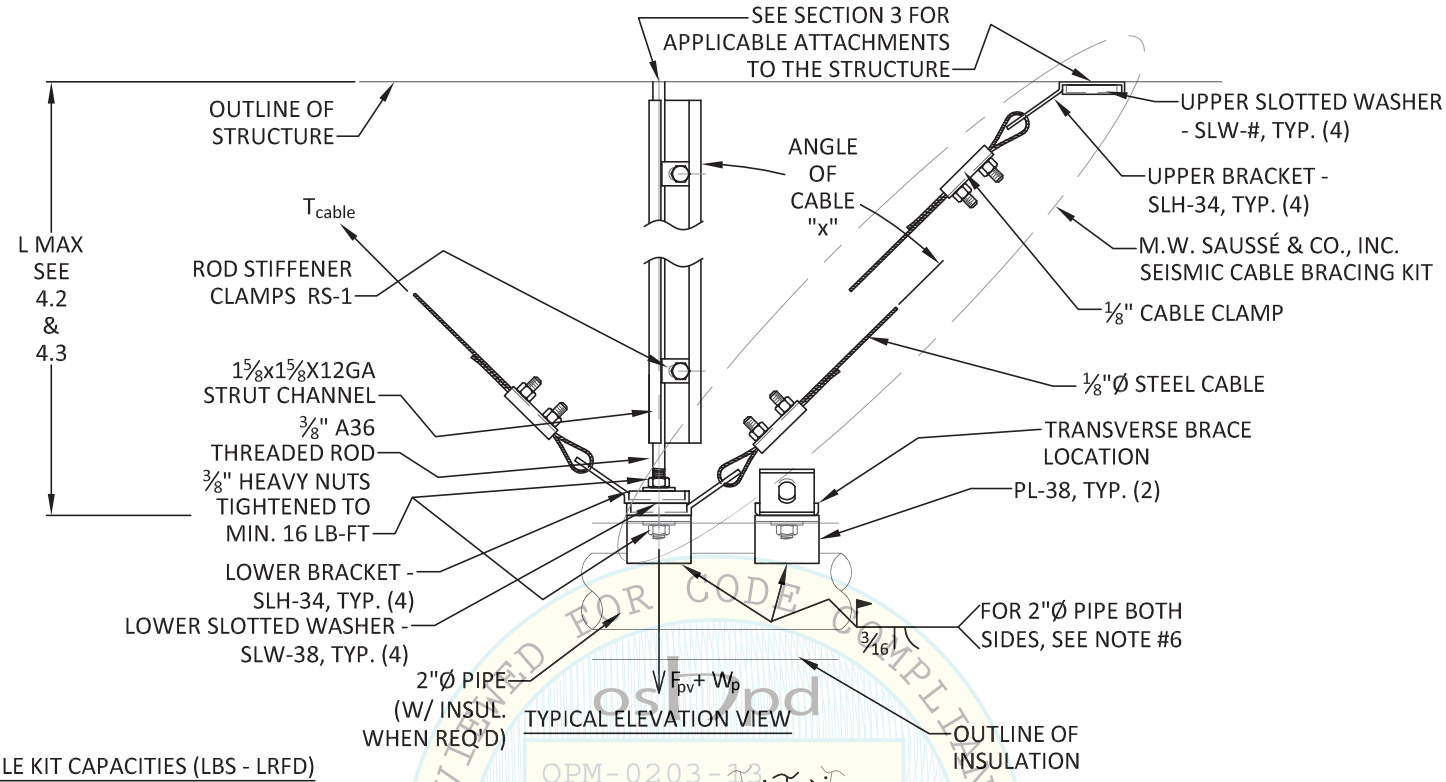
Date: May 9, 2016

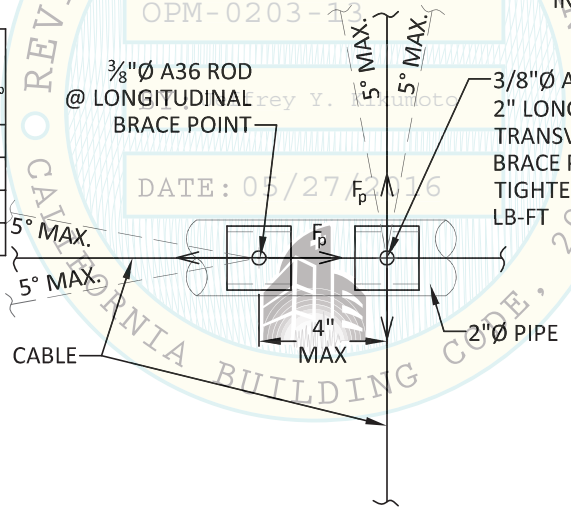
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
2"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	354	547	1095
[a]45°≤ x <60°	400	1001	1411
60°= x	431	1316	1520
[c]60°< x ≤70°	320	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 2-P18C-38R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-38
(02) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS
(02) PIPE LUG - PL-38

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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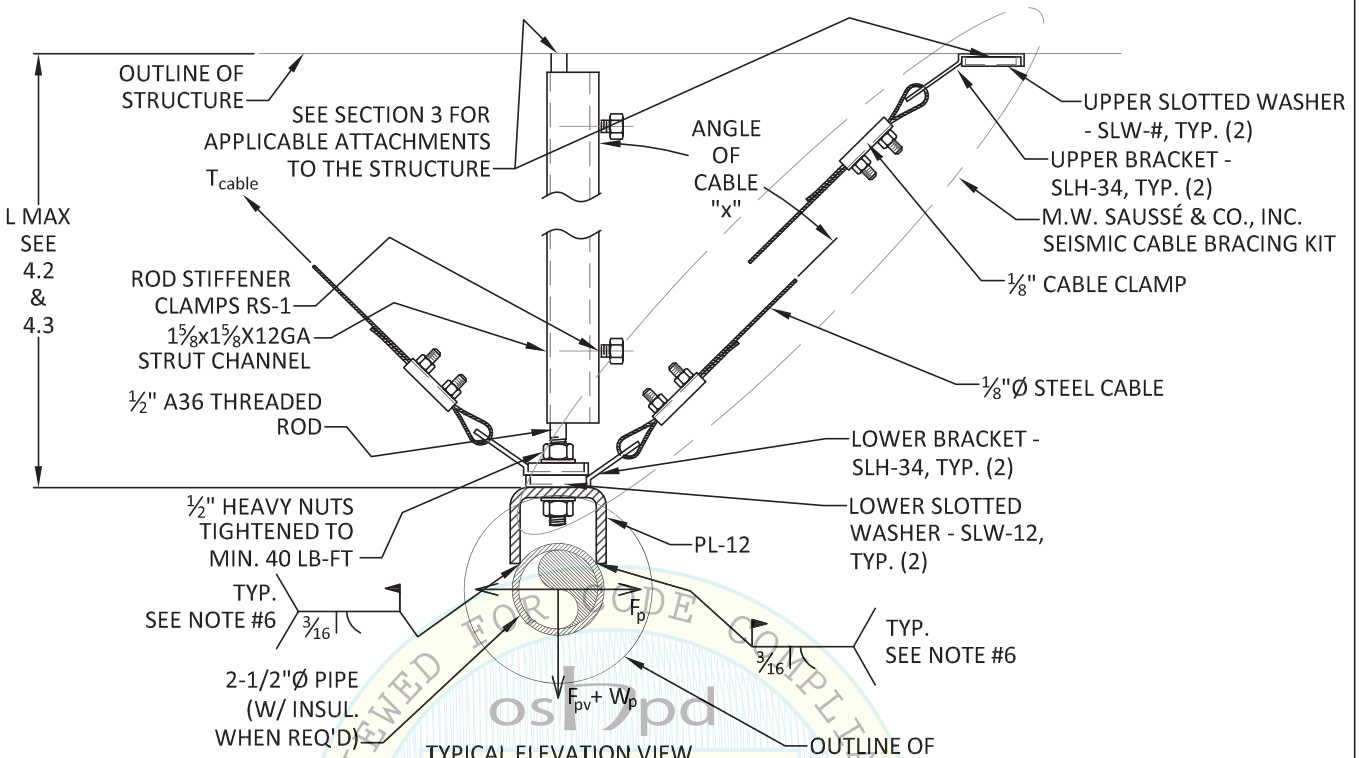
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
2½"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)

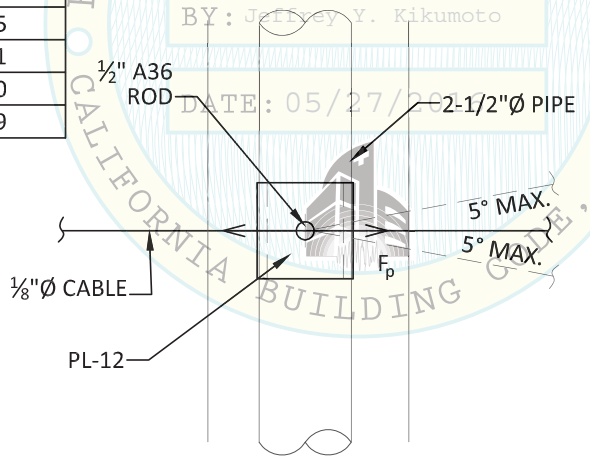


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	298	1095
[a]45°≤ x <60°	325	1411
60°= x	350	1520
[c]60°< x ≤70°	253	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 1-P18C-12R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS
(01) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
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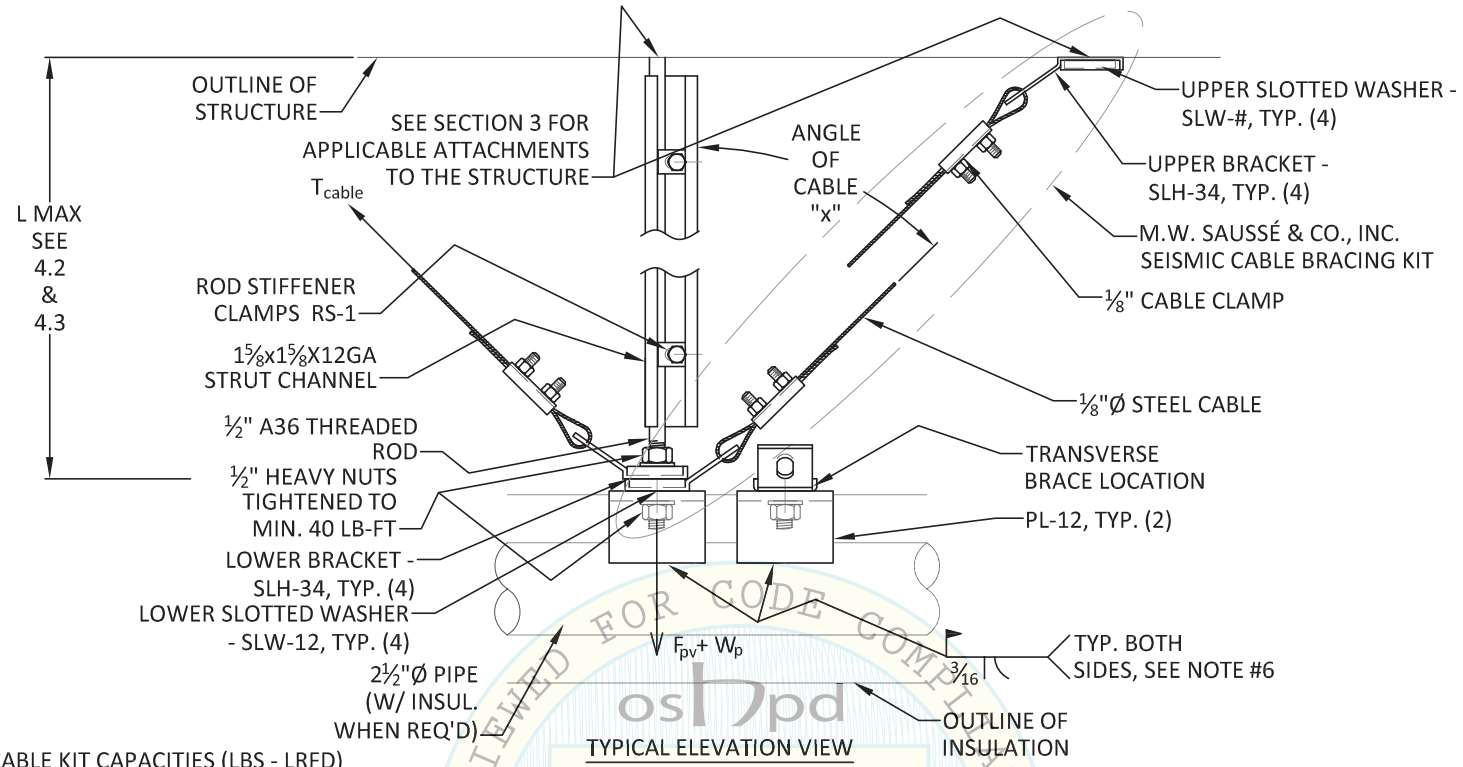
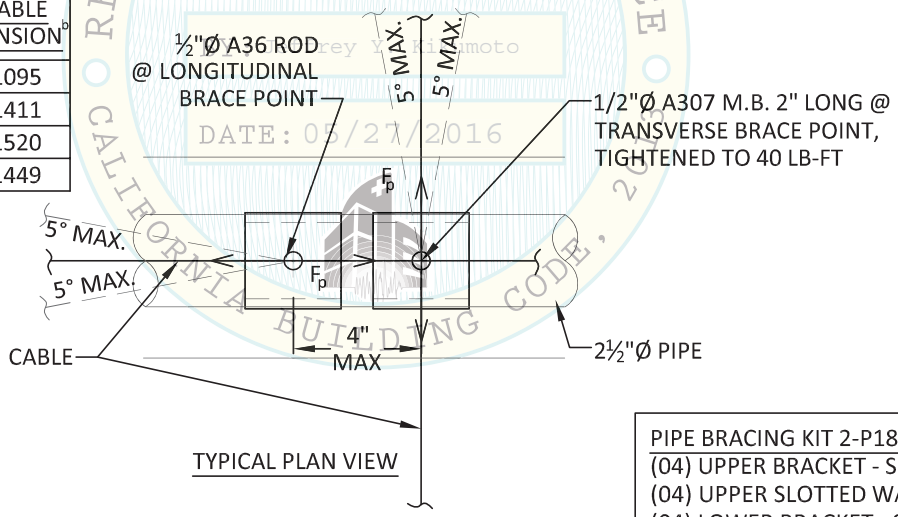
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
2½"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	298	547	1095
[a]45°≤ x <60°	325	1001	1411
60°= x	350	1316	1520
[c]60°< x ≤70°	253	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



PIPE BRACING KIT 2-P18C-12R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS
(02) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
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5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
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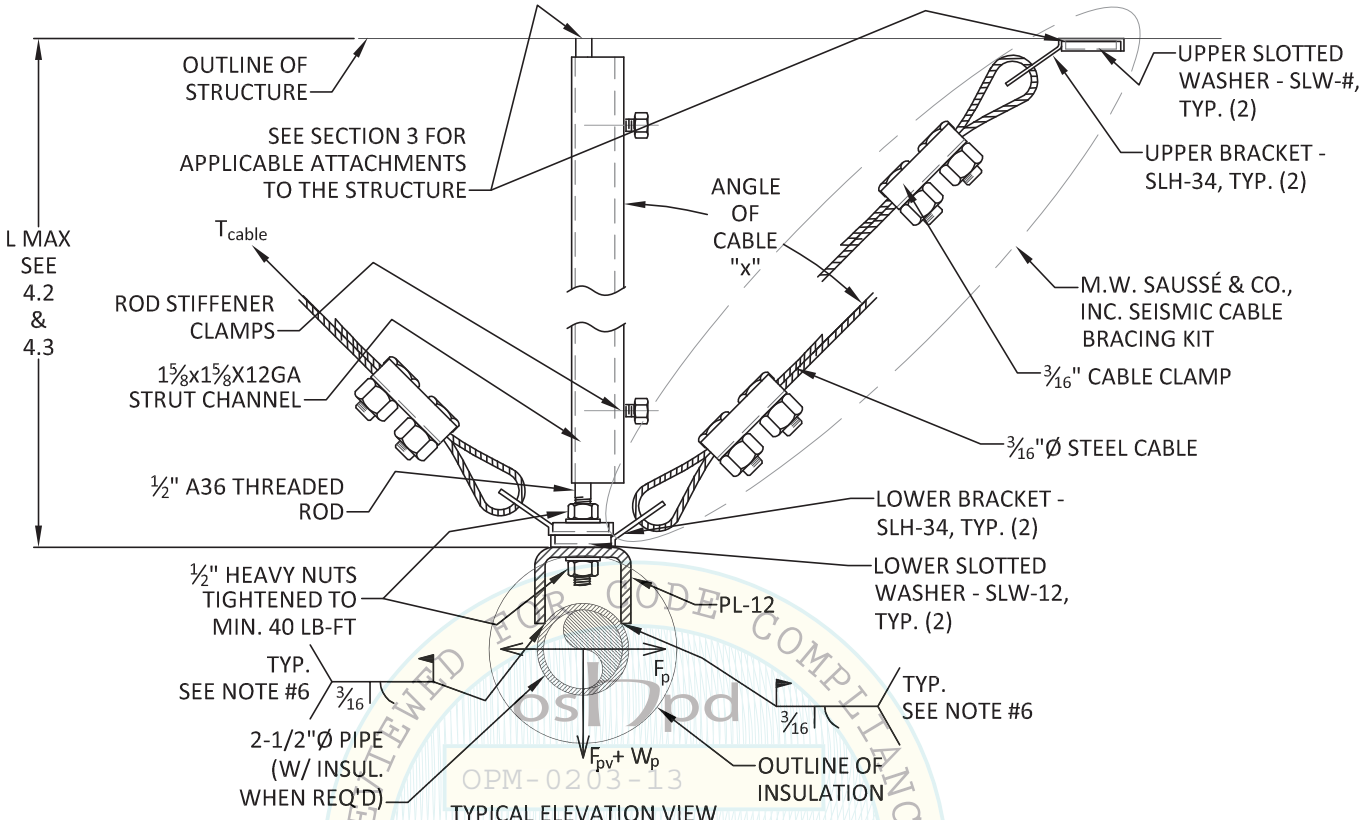
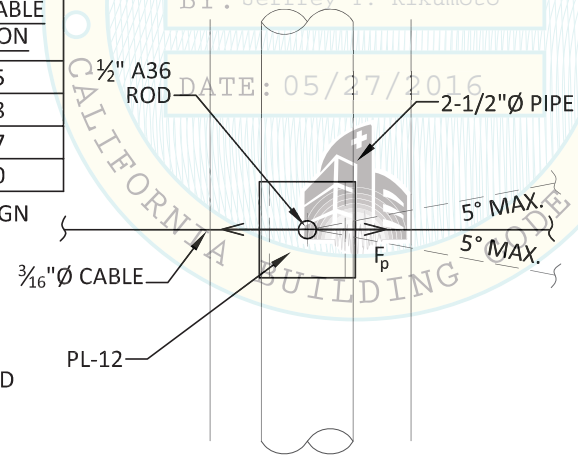
Date: May 9, 2016

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
2½"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)



TYPICAL ELEVATION VIEW



TYPICAL PLAN VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	522	1915
[a]45°≤ x <60°	458	1988
60°= x	646	2807
[c]60°< x ≤70°	449	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

PIPE BRACING KIT 1-P316C-12R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS
(01) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
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6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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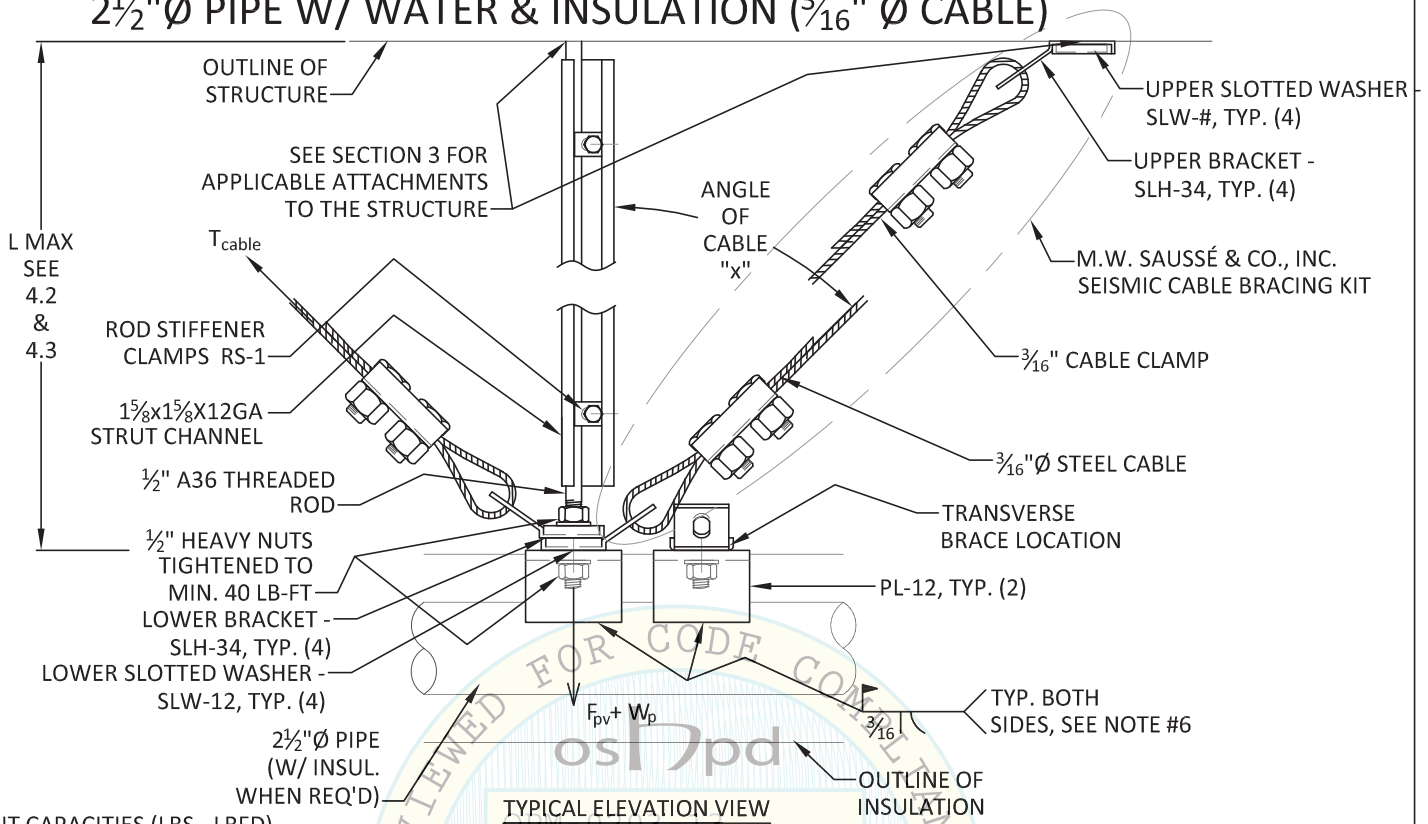
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
2½"Ø PIPE W/ WATER & INSULATION (3/16" Ø CABLE)

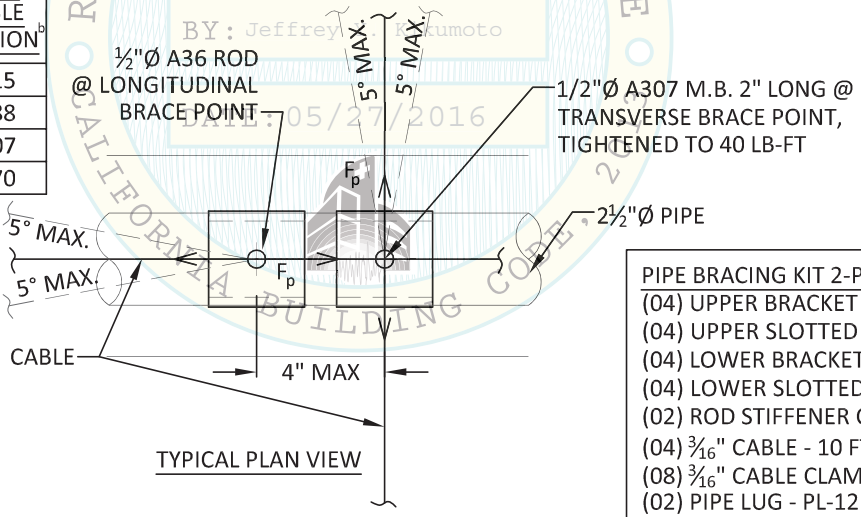


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	522	957	1915
[a]45°≤ x <60°	458	1411	1988
60°= x	646	2442	2807
[c]60°< x ≤70°	449	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 2-P316C-12R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(04) 3/16" CABLE - 10 FT.
(08) 3/16" CABLE CLAMPS
(02) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

Vibrex® vibration & seismic control systems
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California PE No. C59644

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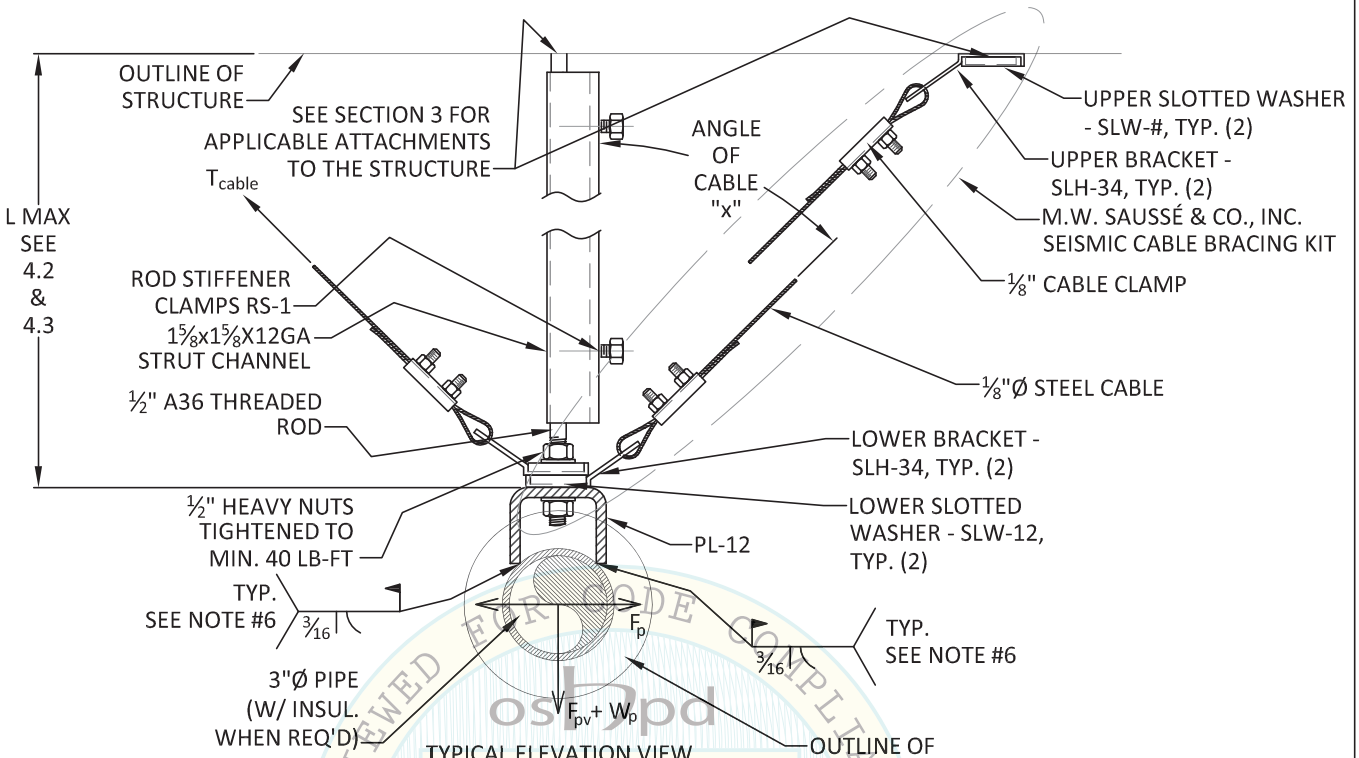
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
3"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)

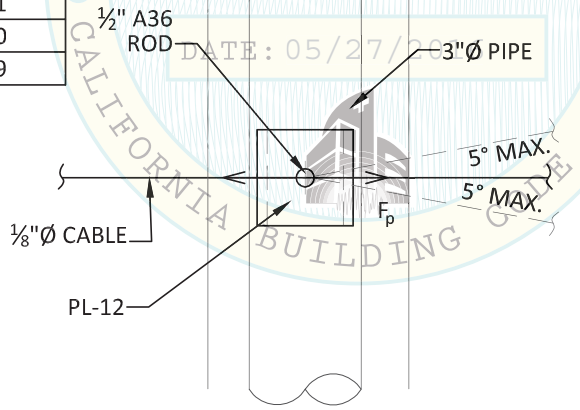


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	274	1095
[a]45°≤ x <60°	293	1411
60°= x	316	1520
[c]60°< x ≤70°	226	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 1-P18C-12R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS
(01) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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California PE No. C59644

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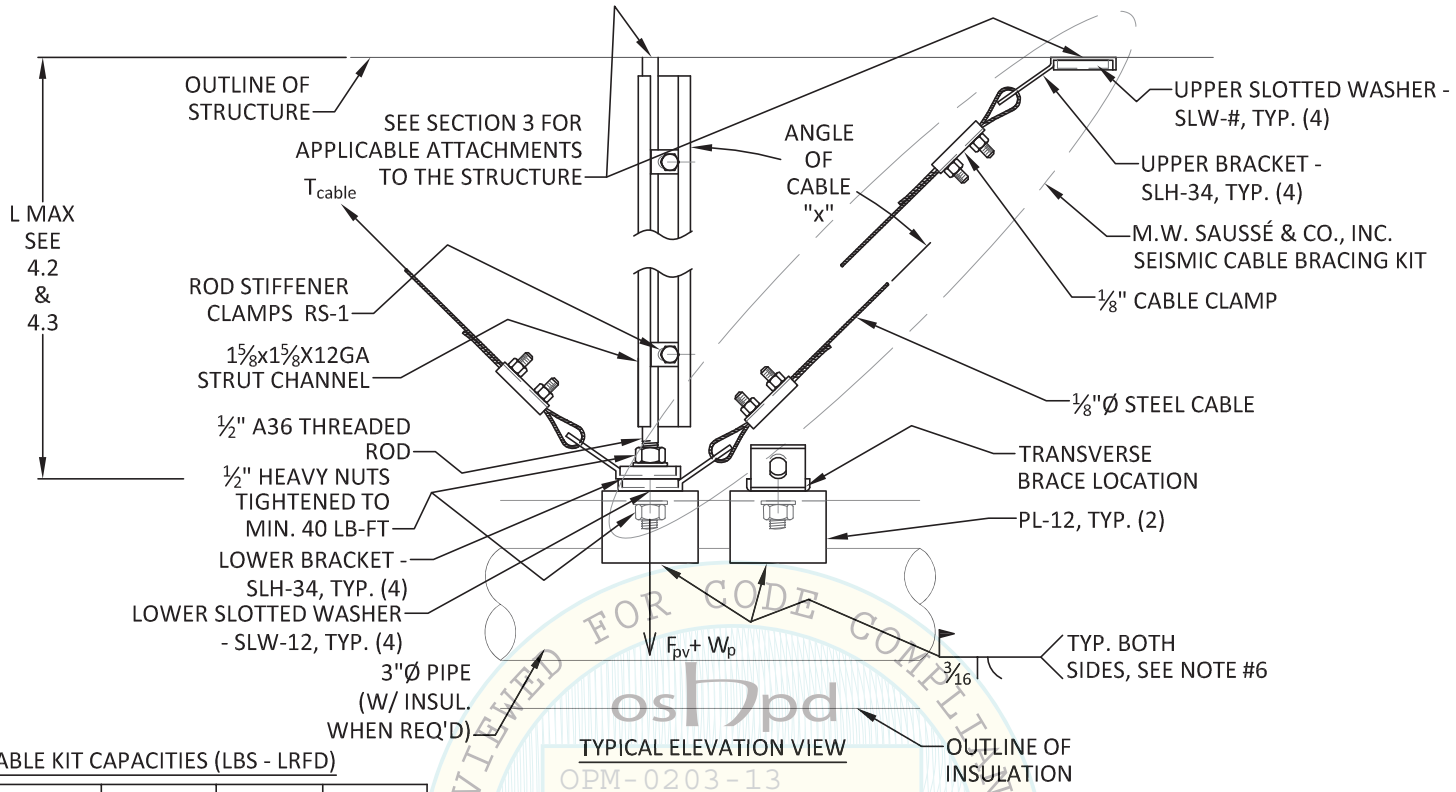
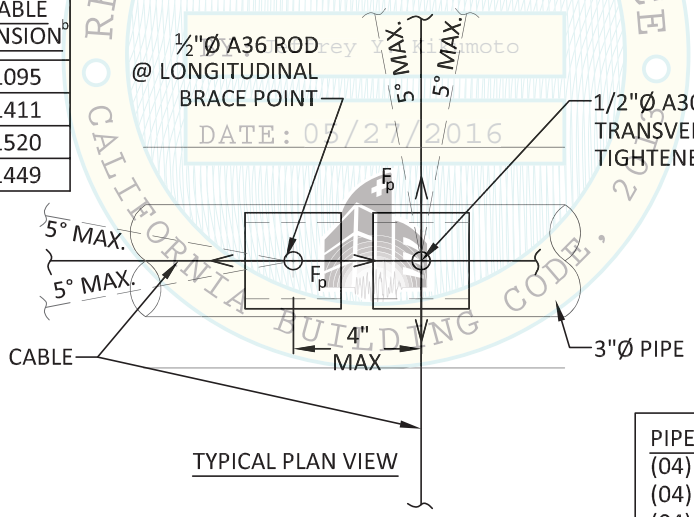
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
3"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	274	547	1095
[a]45°≤ x <60°	293	1001	1411
60°= x	316	1316	1520
[c]60°< x ≤70°	211	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



NOTES:
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2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 2-P18C-12R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS
(02) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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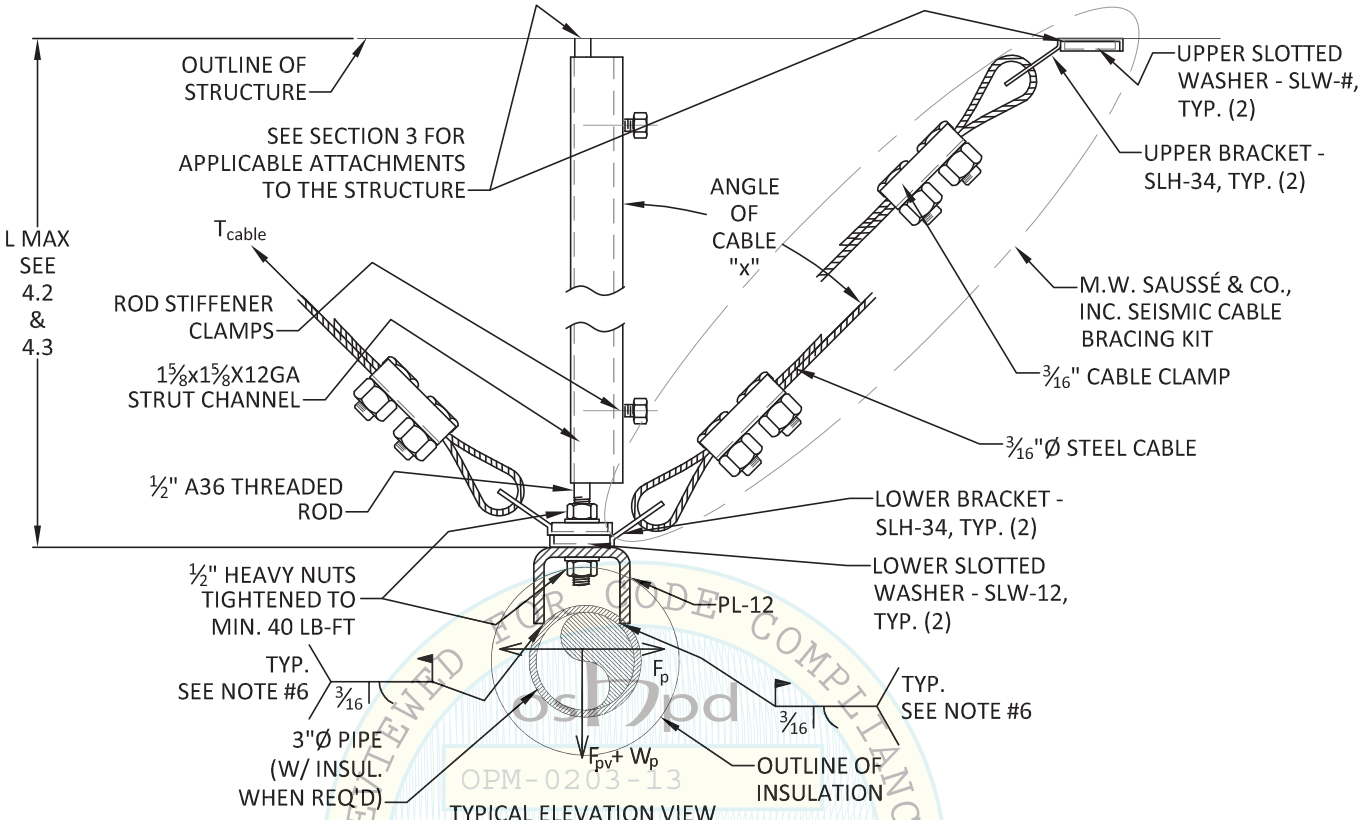
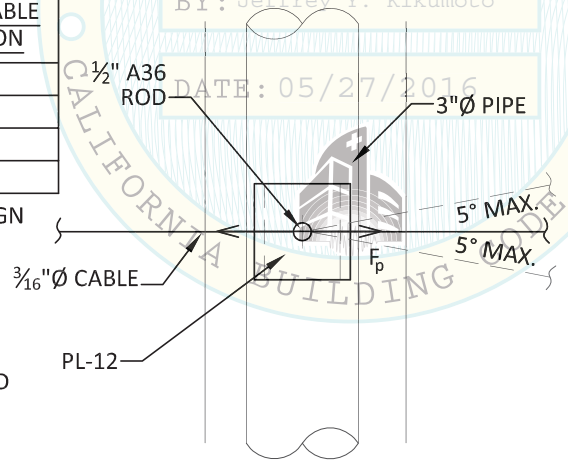
Date: May 9, 2016

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
3"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)



TYPICAL ELEVATION VIEW



TYPICAL PLAN VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30° ≤ x < 45°	478	1915
[a]45° ≤ x < 60°	413	1988
60° = x	583	2807
[c]60° < x ≤ 70°	401	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

PIPE BRACING KIT 1-P316C-12R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS
(01) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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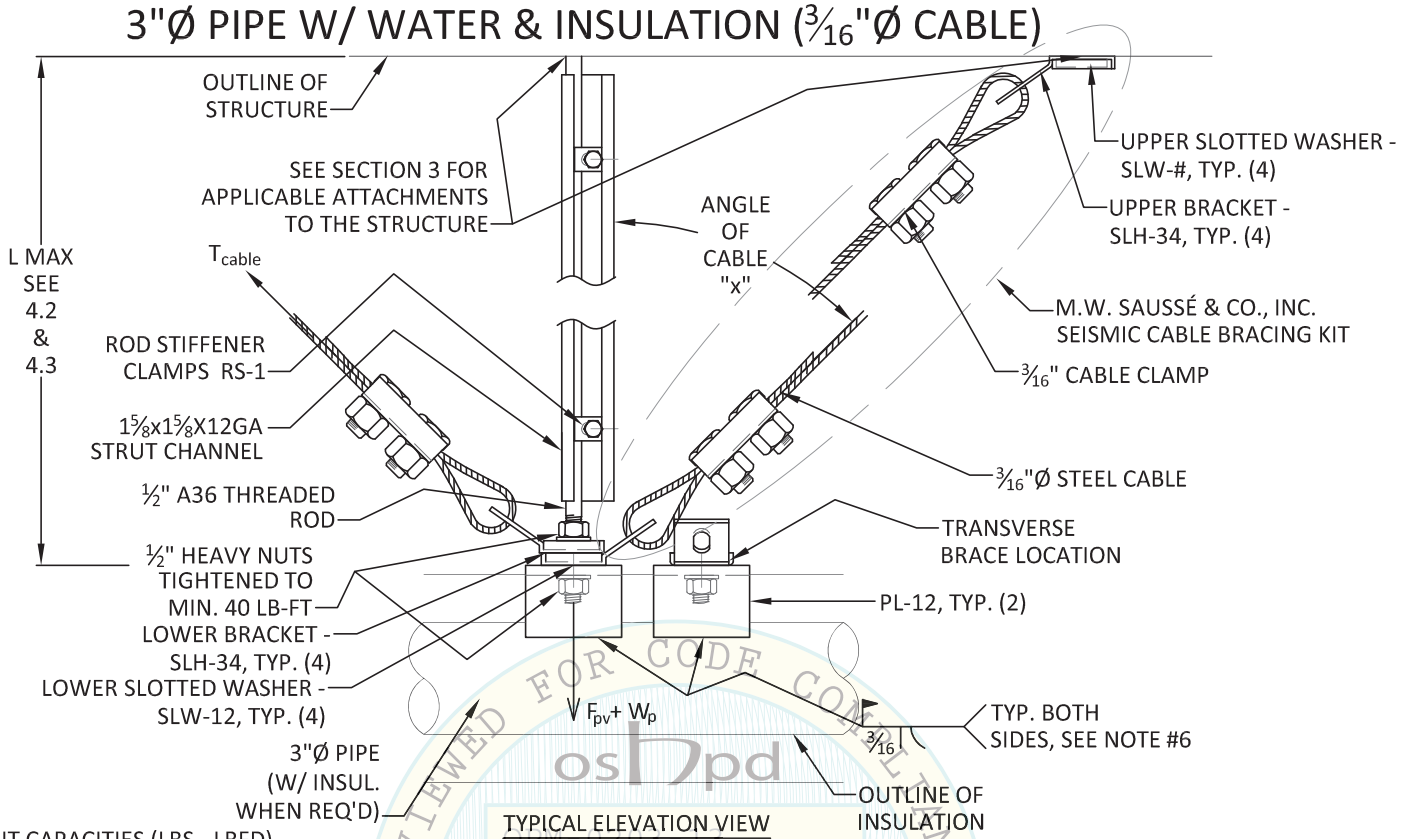
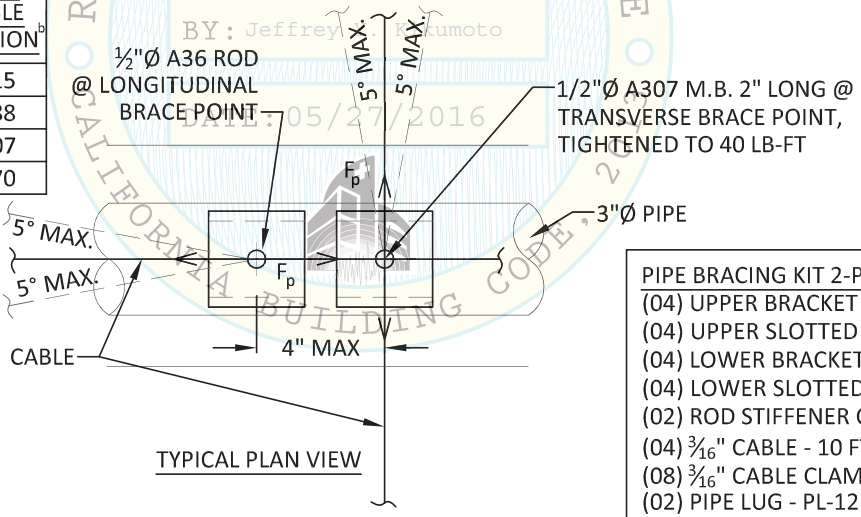
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
3"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	478	957	1915
[a]45°≤ x <60°	413	1411	1988
60°= x	583	2442	2807
[c]60°< x ≤70°	401	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



PIPE BRACING KIT 2-P316C-12R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(04) 3/16" CABLE - 10 FT.
(08) 3/16" CABLE CLAMPS
(02) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
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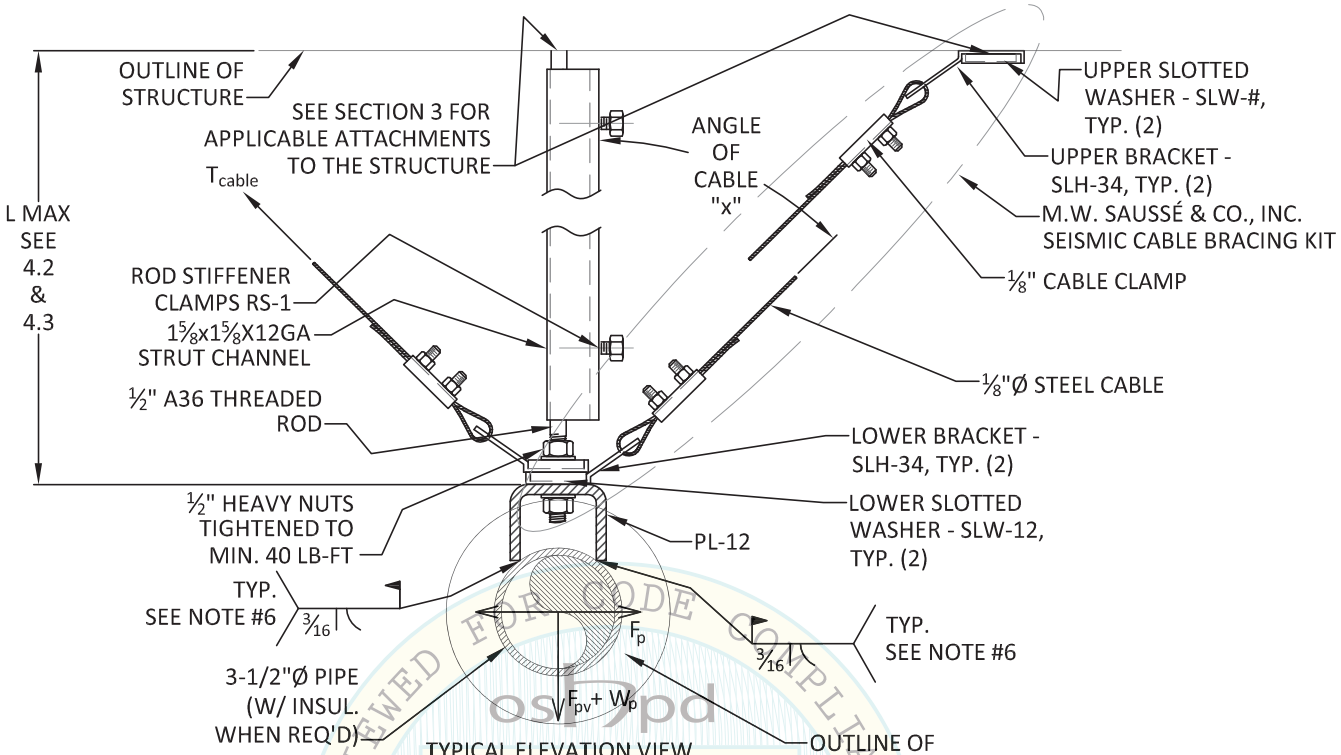
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
3½"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)

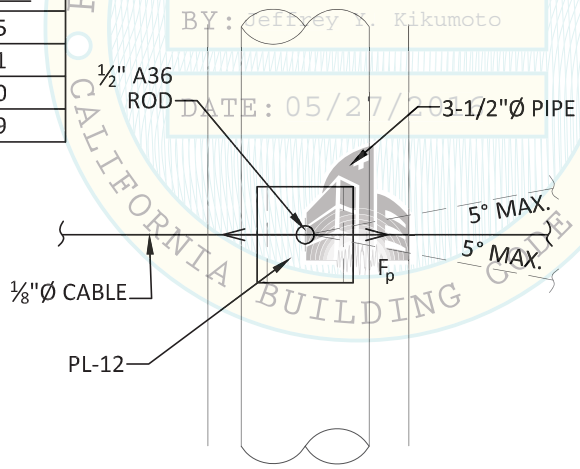


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	259	1095
[a]45°≤ x <60°	275	1411
60°= x	296	1520
[c]60°< x ≤70°	211	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 1-P18C-12R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS
(01) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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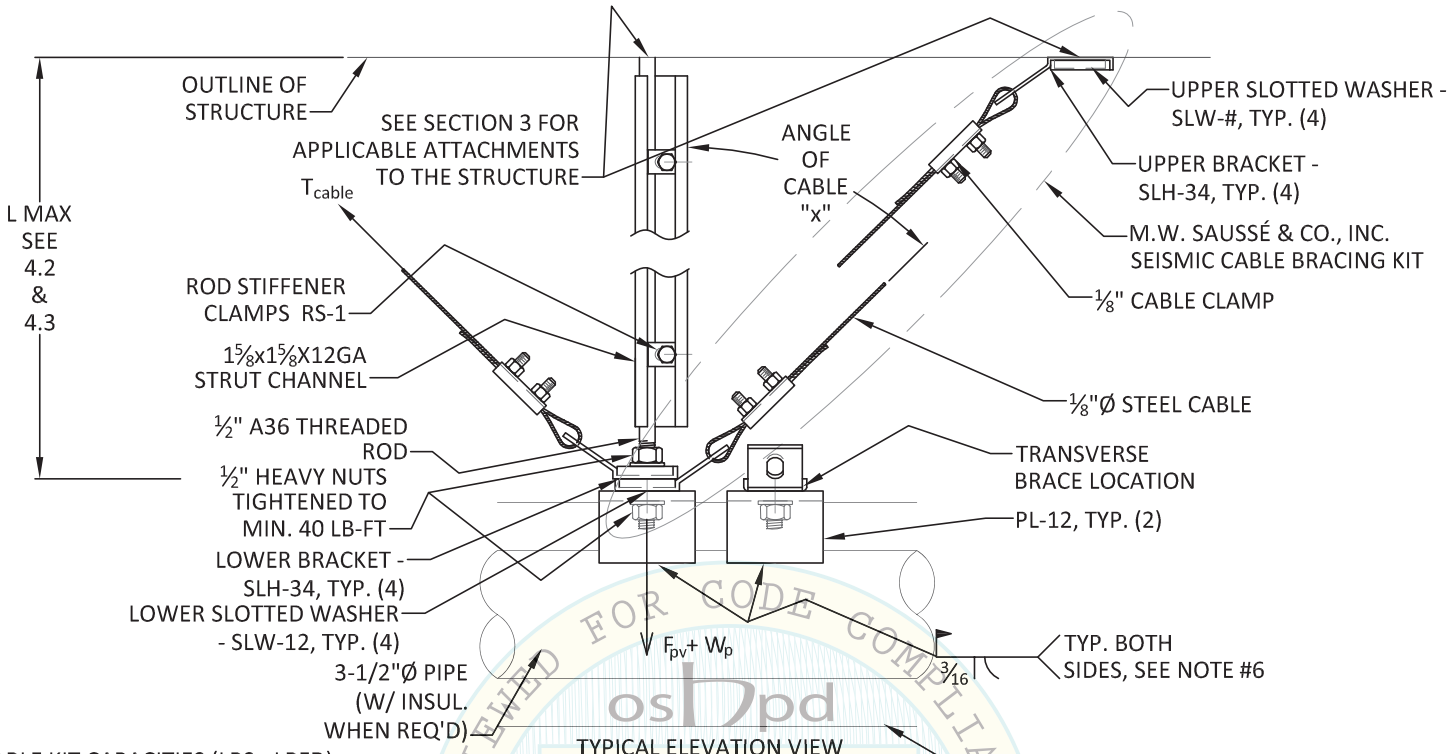
Civil Engineer: P.K. Sachdeva
California PE No. C59644

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
3½"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	259	547	1095
[a]45°≤ x <60°	275	1001	1411
60°= x	296	1316	1520
[c]60°< x ≤70°	211	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 2-P18C-12R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS
(02) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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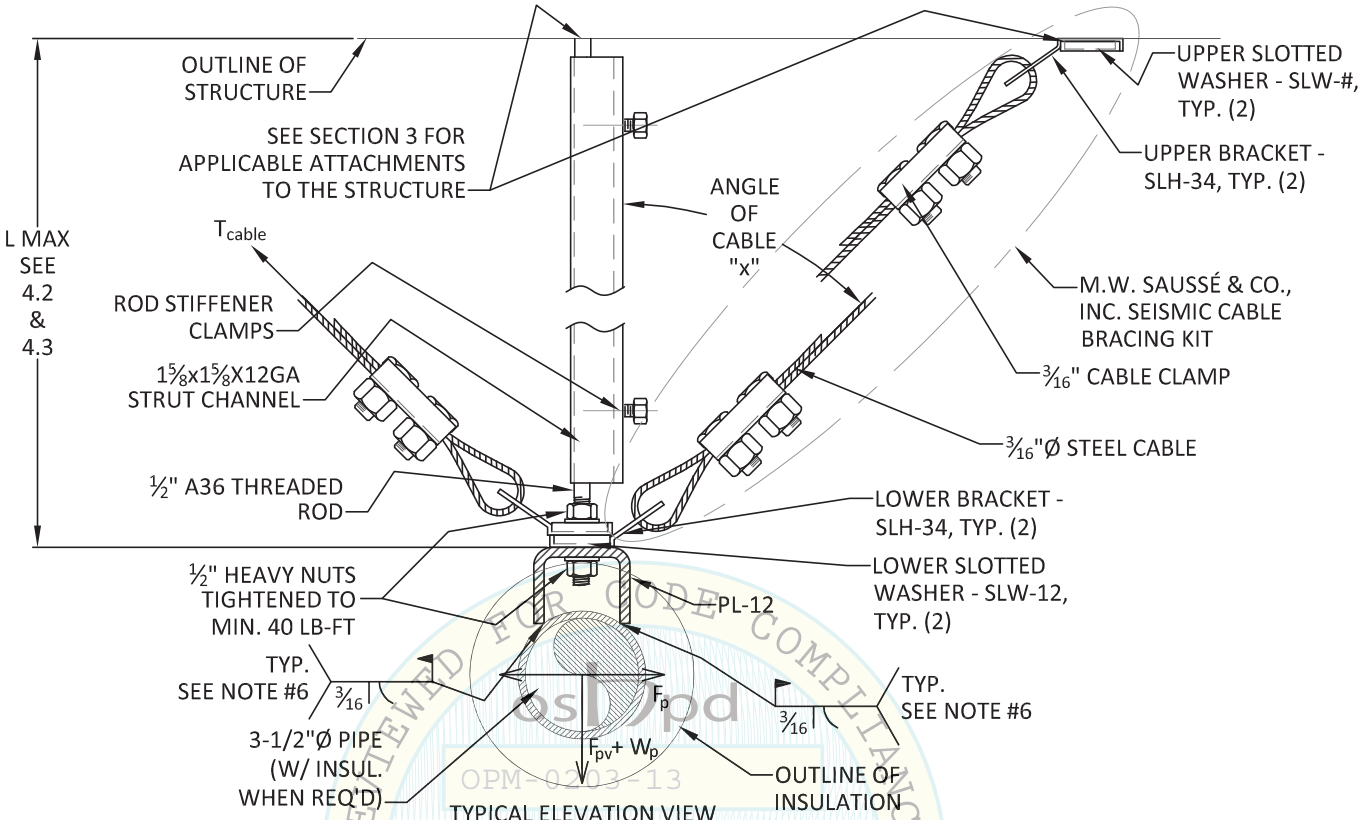
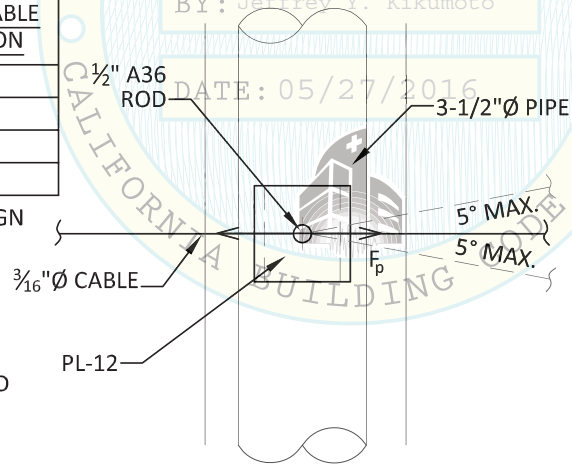
Date: May 9, 2016

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
3½"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)



TYPICAL ELEVATION VIEW



TYPICAL PLAN VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	453	1915
[a]45°≤ x <60°	387	1988
60°= x	547	2807
[c]60°< x ≤70°	373	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

PIPE BRACING KIT 1-P316C-12R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS
(01) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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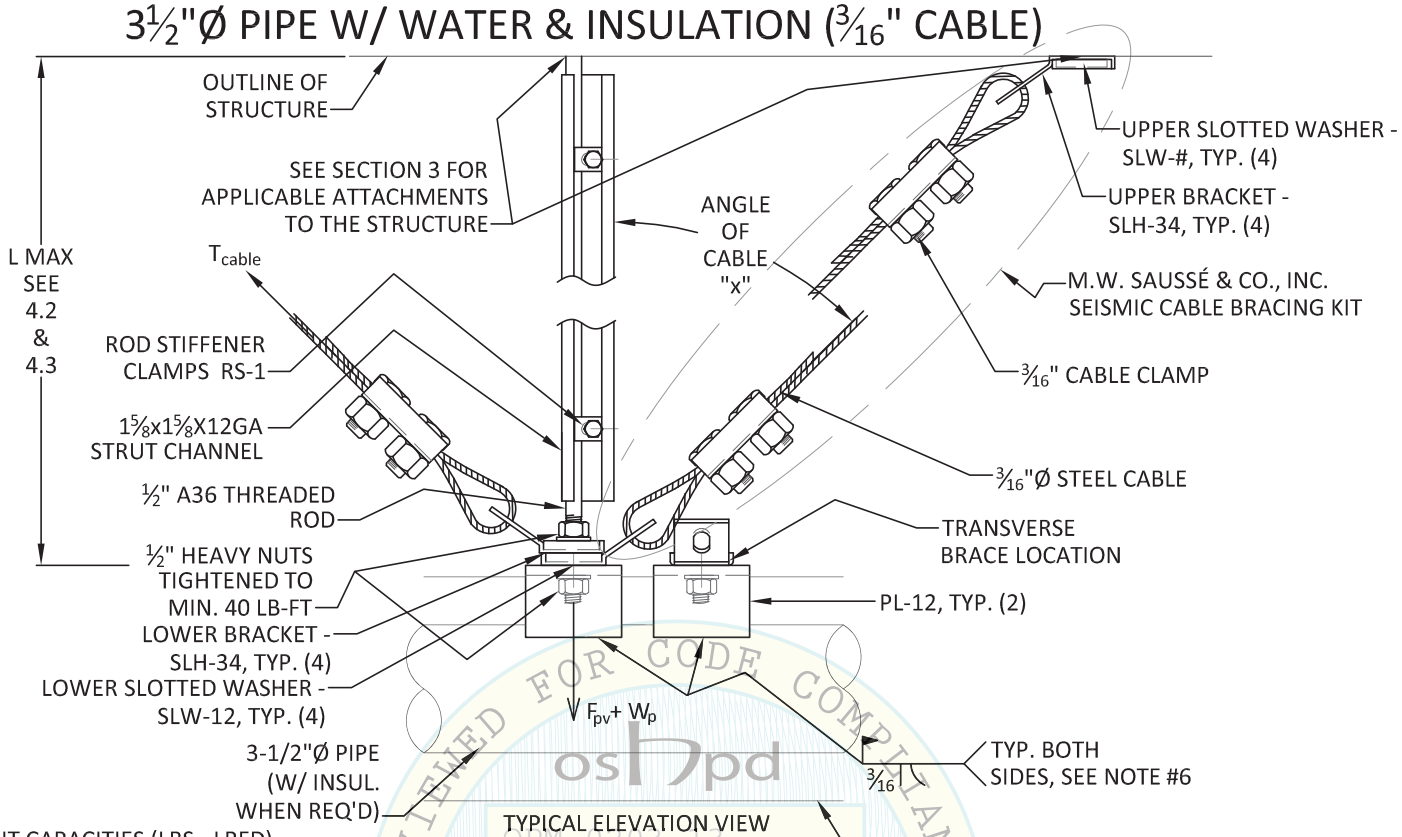
Civil Engineer: P.K. Sachdeva
California PE No. C59644

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE

3½"Ø PIPE W/ WATER & INSULATION (3/16" CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	453	957	1915
[a]45°≤ x <60°	387	1411	1988
60°= x	547	2442	2807
[c]60°< x ≤70°	373	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
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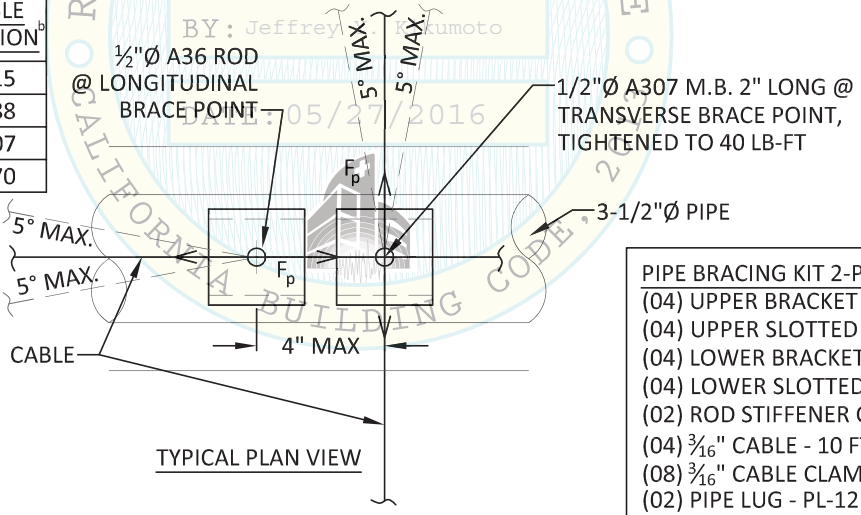

PIPE BRACING KIT 2-P316C-12R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-12
(02) ROD STIFFENER CLAMPS - RS-1
(04) 3/16" CABLE - 10 FT.
(08) 3/16" CABLE CLAMPS
(02) PIPE LUG - PL-12

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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California PE No. C59644

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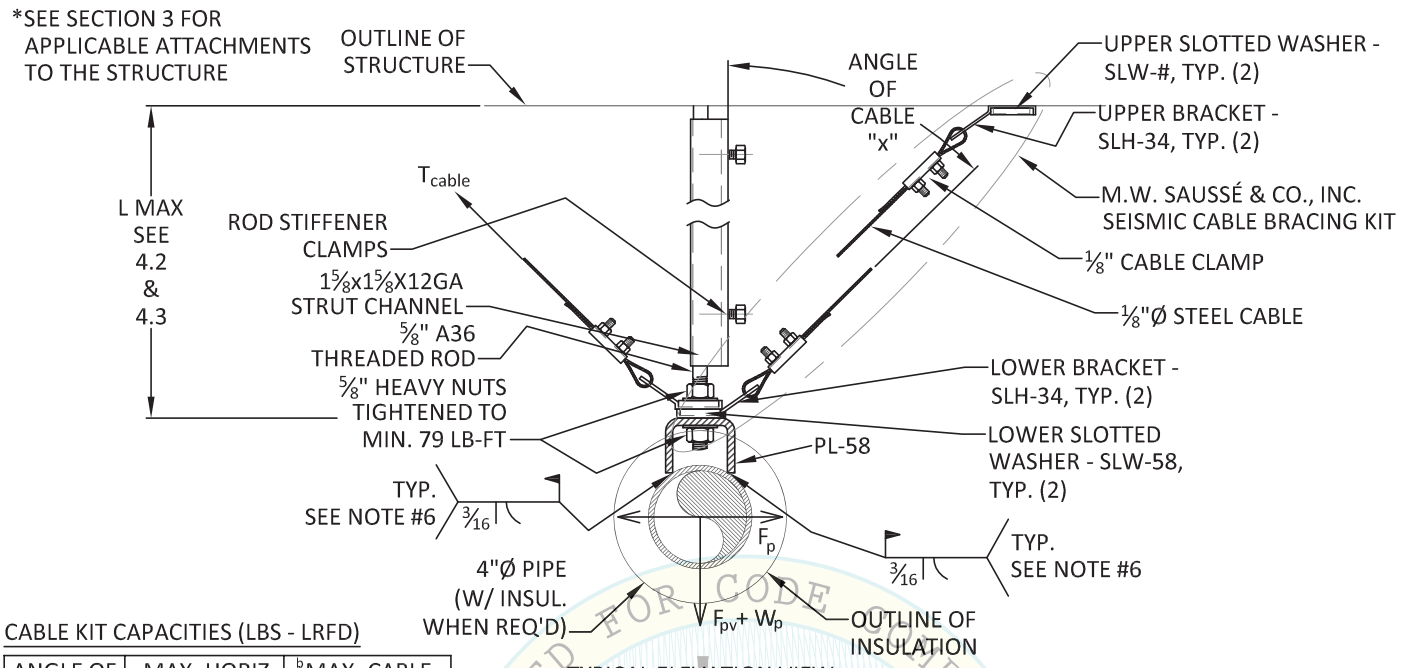
Date: May 9, 2016

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
4"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)

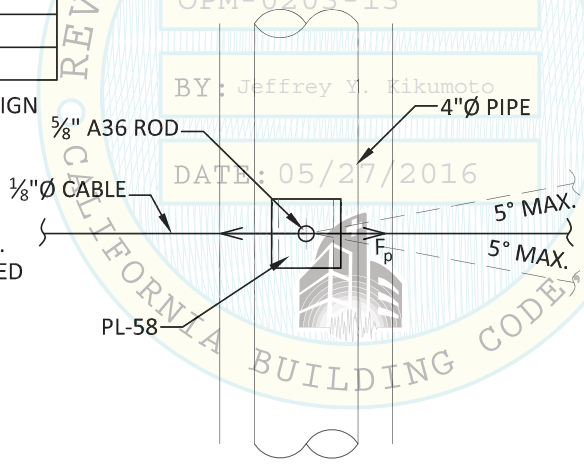


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	246	1095
[a]45°≤ x <60°	259	1411
60°= x	279	1520
[c]60°< x ≤70°	198	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 1-P18C-58R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-58
(02) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS
(01) PIPE LUG - PL-58

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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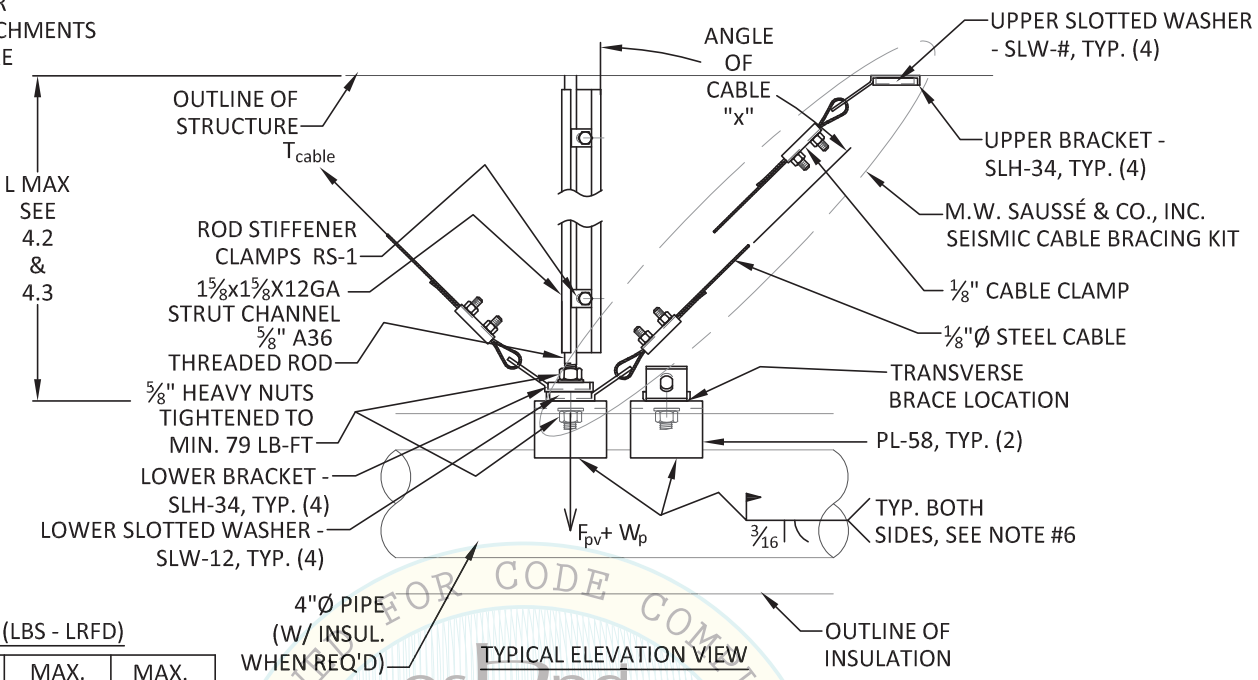
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
4"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)

*SEE SECTION 3 FOR APPLICABLE ATTACHMENTS TO THE STRUCTURE

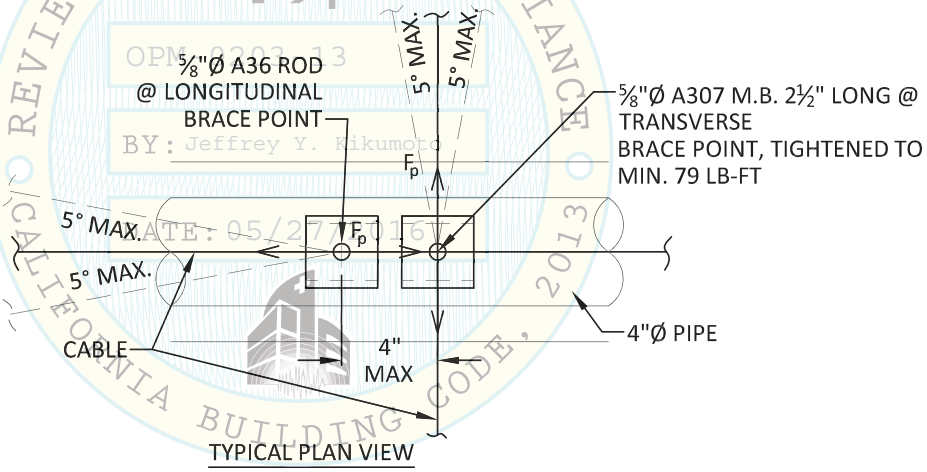


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	246	547	1095
[a]45°≤ x <60°	259	1001	1411
60°= x	279	1316	1520
[c]60°< x ≤70°	198	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 2-P18C-58R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-58
(02) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS
(02) PIPE LUG - PL-58

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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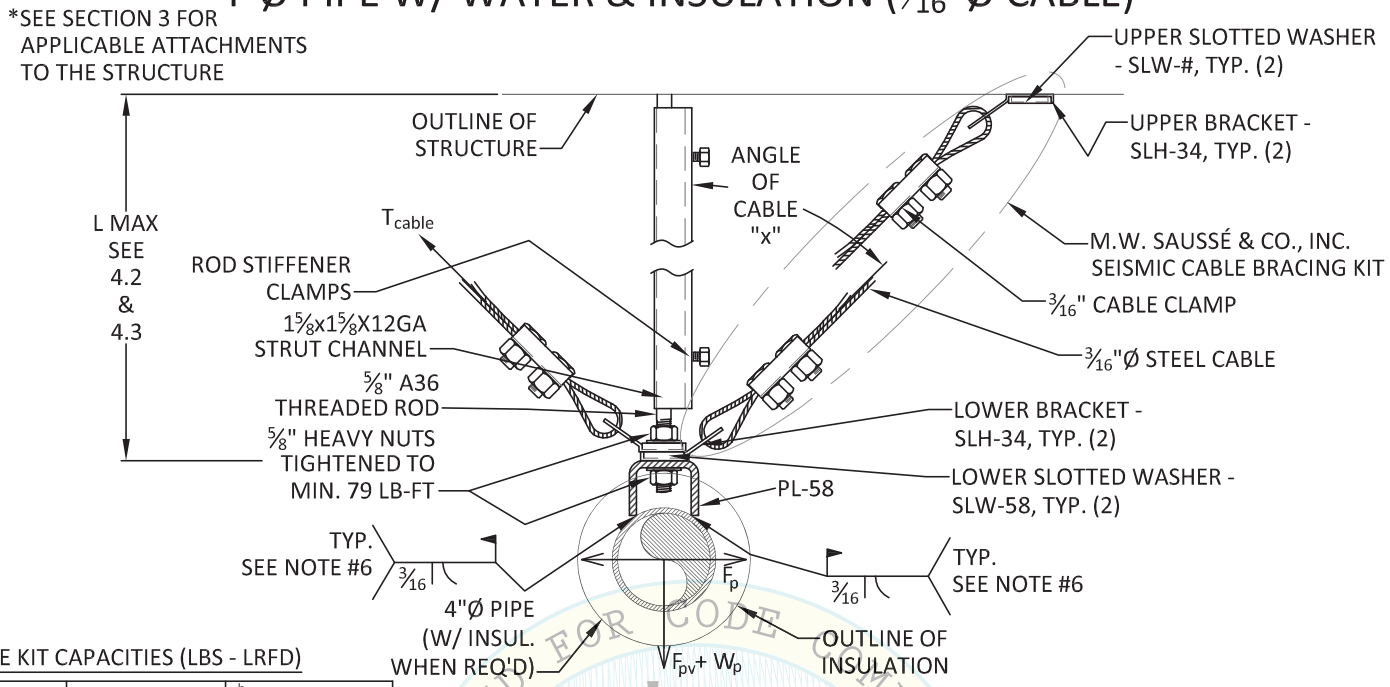
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
4"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)

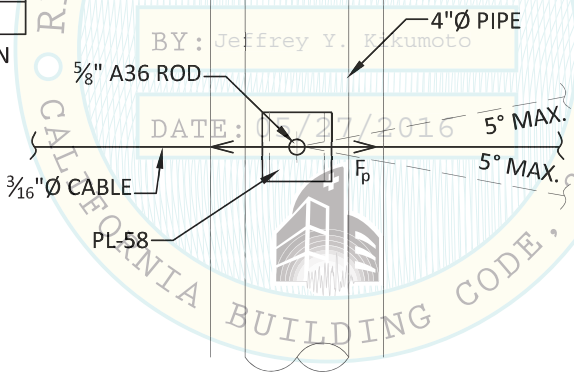


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	431	1915
[a]45°≤ x <60°	365	1988
60°= x	516	2807
[c]60°< x ≤70°	350	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 1-P316C-58R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-58
(02) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS
(01) PIPE LUG - PL-58

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
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5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
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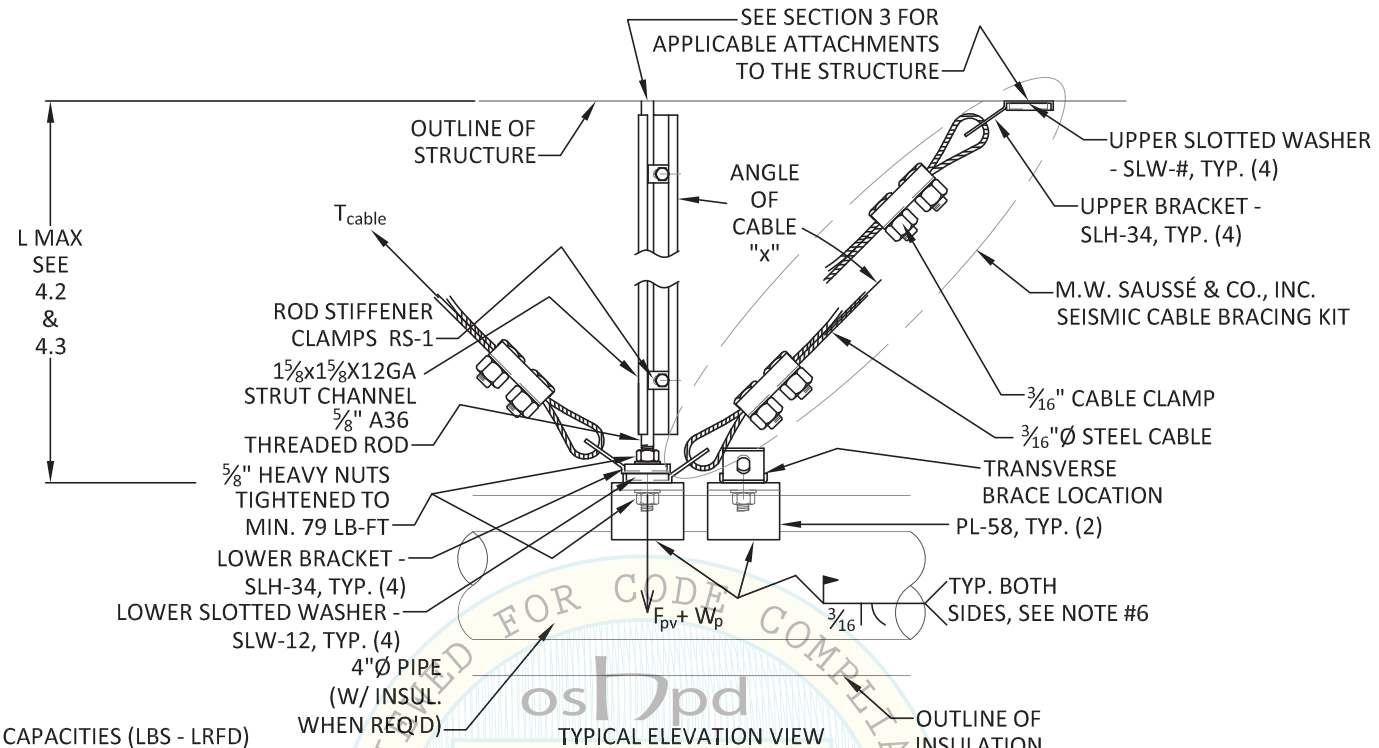
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
4"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)

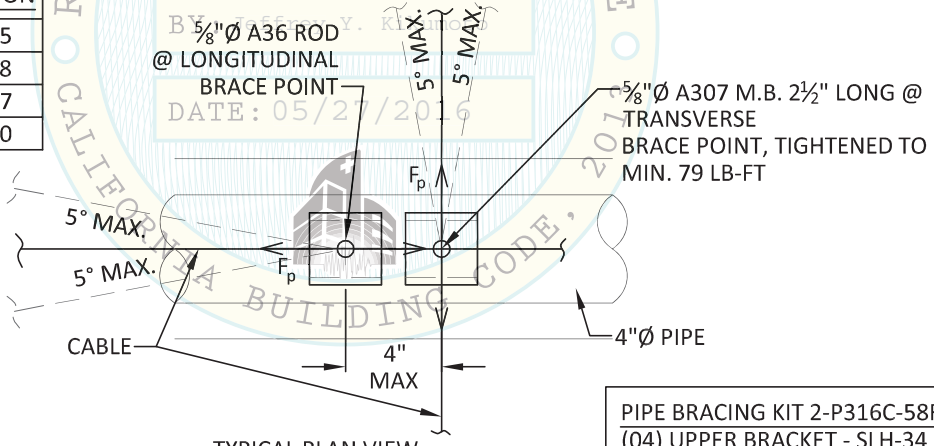


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	431	957	1915
[a]45°≤ x <60°	365	1411	1988
60°= x	516	2442	2807
[c]60°< x ≤70°	350	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 2-P316C-58R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-58
(02) ROD STIFFENER CLAMPS - RS-1
(04) 3/16" CABLE - 10 FT.
(08) 3/16" CABLE CLAMPS
(02) PIPE LUG - PL-58

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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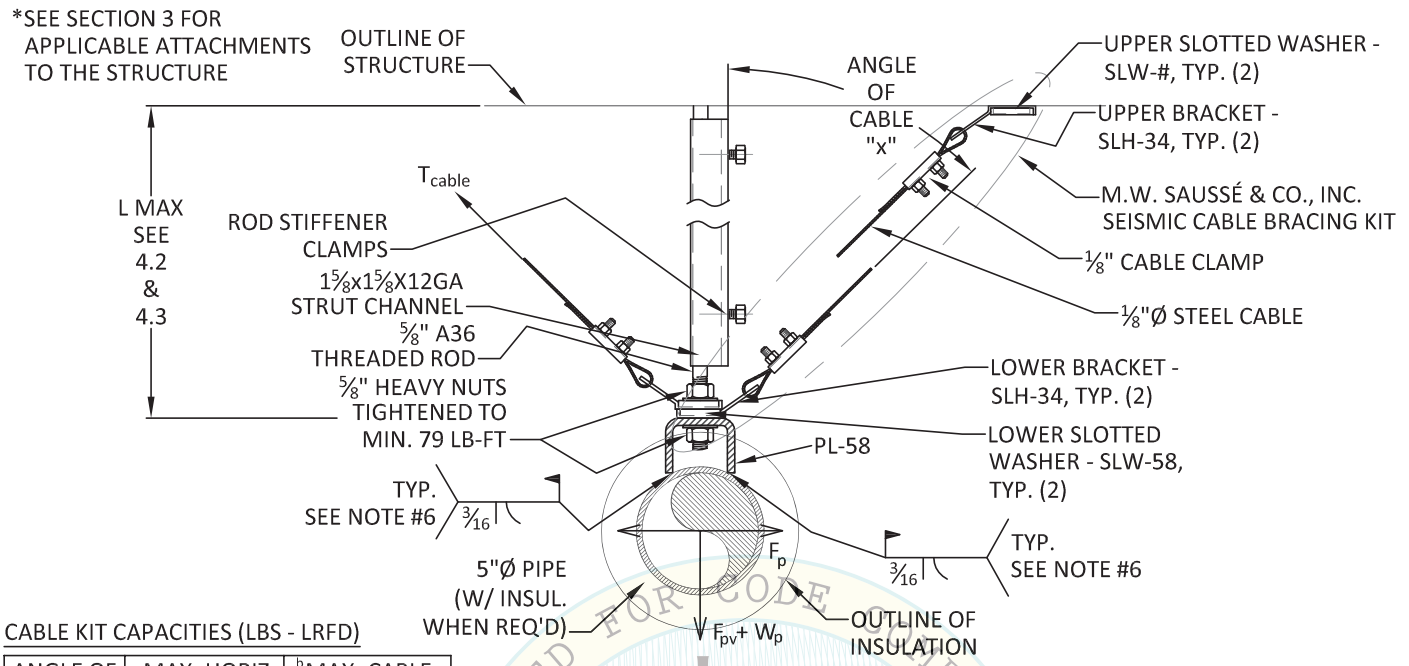
Date: May 9, 2016

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
5"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)

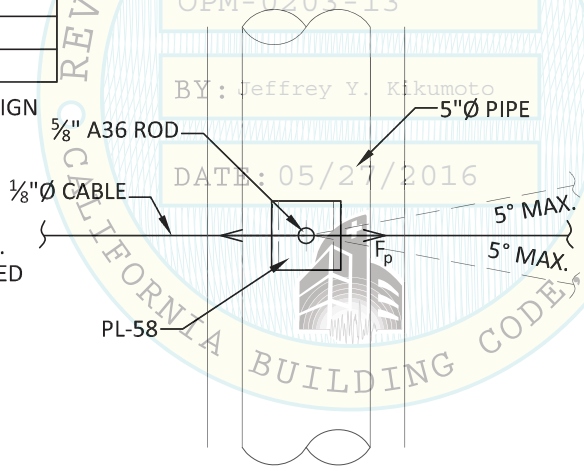


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	225	1095
[a]45°≤ x <60°	233	1411
60°= x	251	1520
[c]60°< x ≤70°	176	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 1-P18C-58R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-58
(02) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS
(01) PIPE LUG - PL-58

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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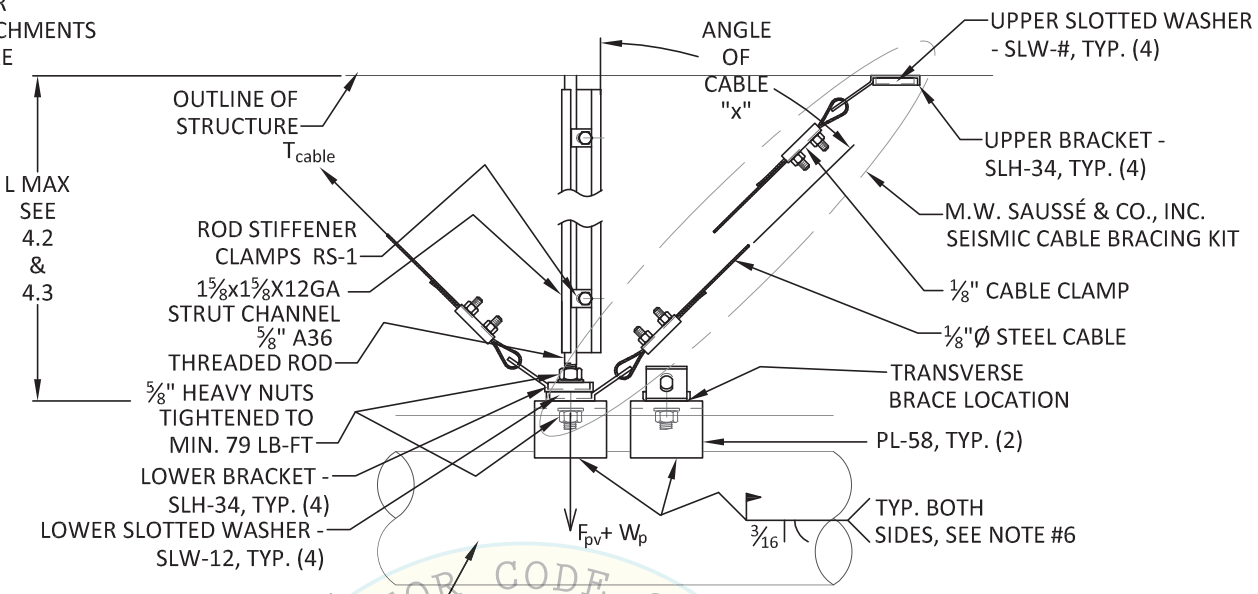
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
5"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)

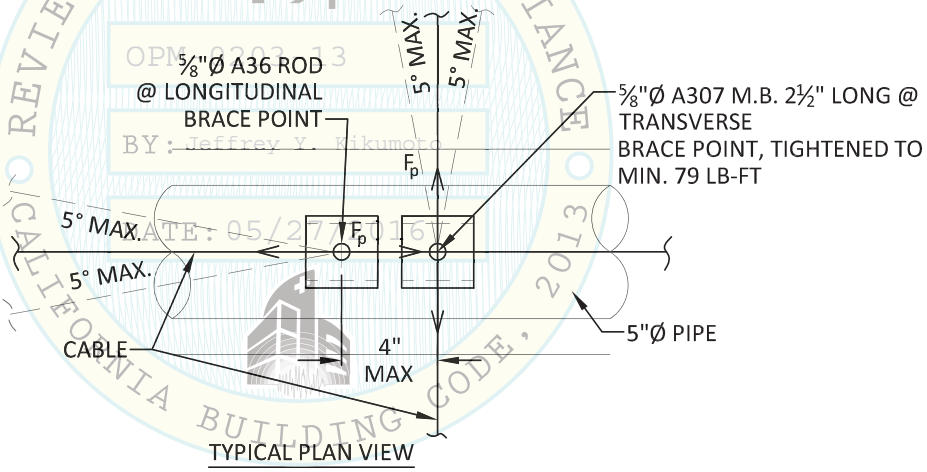
*SEE SECTION 3 FOR APPLICABLE ATTACHMENTS TO THE STRUCTURE



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	225	547	1095
[a]45°≤ x <60°	233	1001	1411
60°= x	251	1316	1520
[c]60°< x ≤70°	176	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 2-P18C-58R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-58
(02) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS
(02) PIPE LUG - PL-58

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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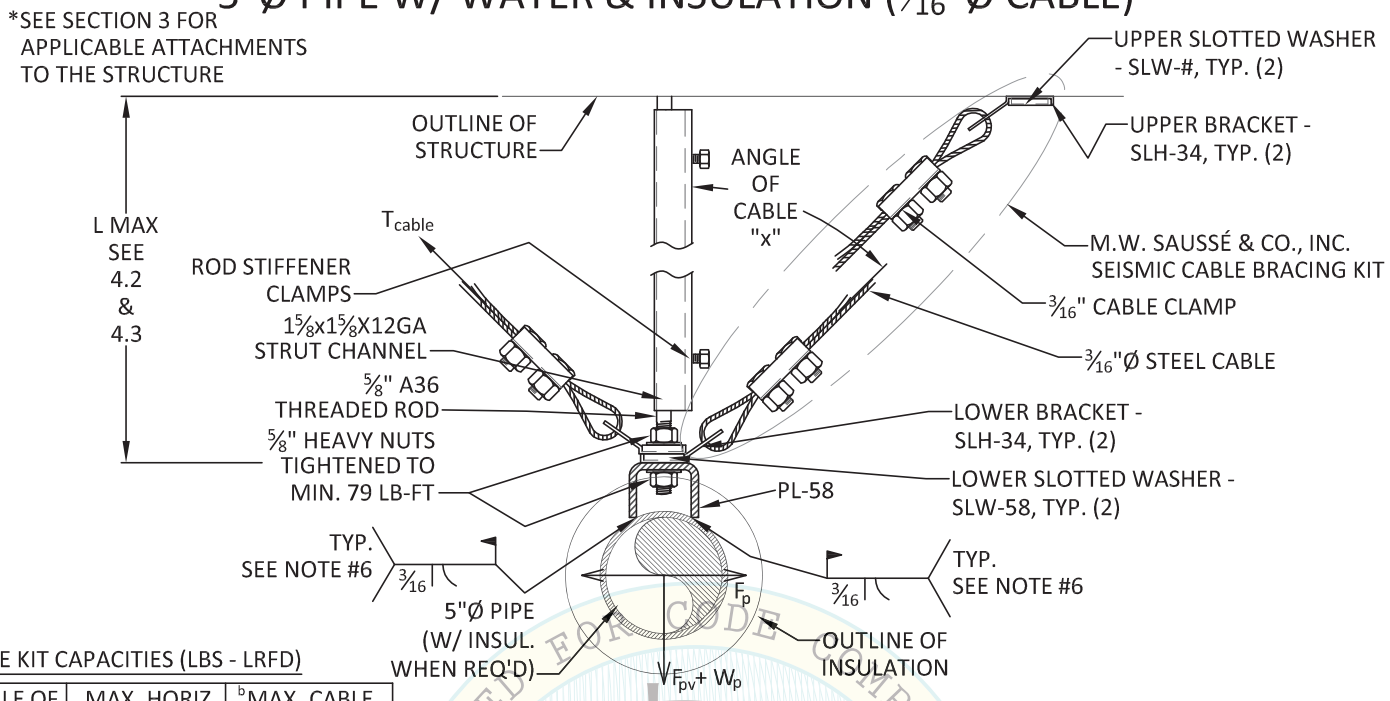
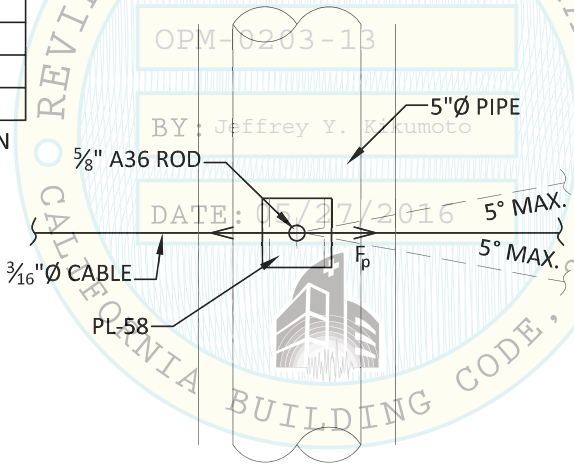
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
5"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)



TYPICAL ELEVATION VIEW



TYPICAL PLAN VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	393	1915
[a]45°≤ x <60°	329	1988
60°= x	464	2807
[c]60°< x ≤70°	313	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

PIPE BRACING KIT 1-P316C-58R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-58
(02) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS
(01) PIPE LUG - PL-58

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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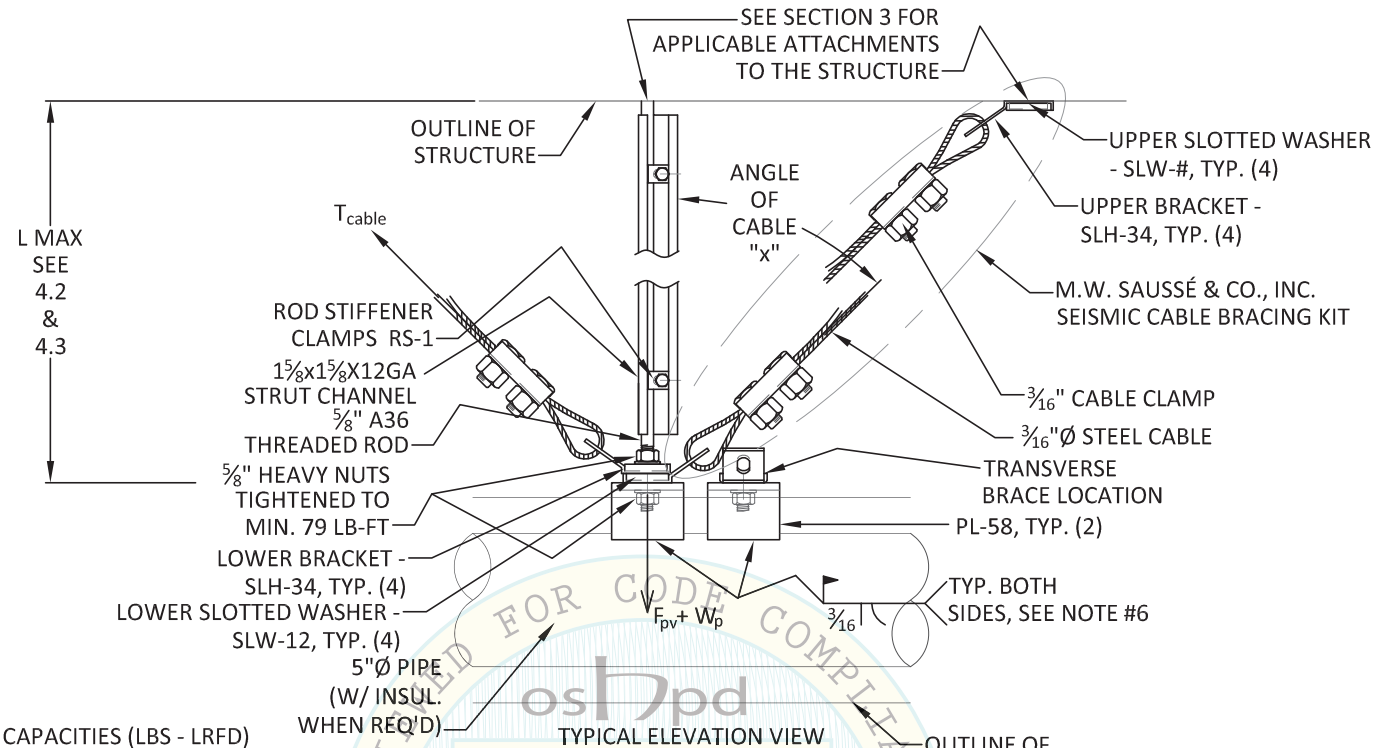
Date: May 9, 2016

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
5"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)

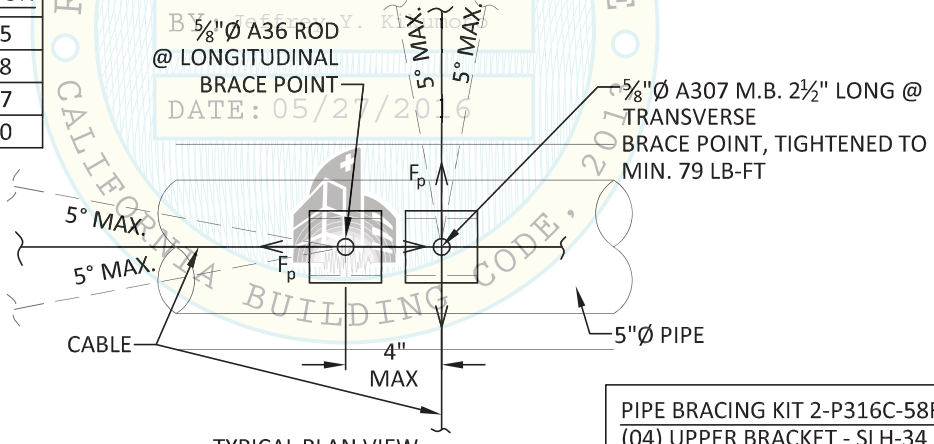


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
$30° \leq x < 45°$	393	957	1915
[a] $45° \leq x < 60°$	329	1411	1988
$60° = x$	464	2442	2807
[c] $60° < x \leq 70°$	313	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 2-P316C-58R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-58
(02) ROD STIFFENER CLAMPS - RS-1
(04) 3/16" CABLE - 10 FT.
(08) 3/16" CABLE CLAMPS
(02) PIPE LUG - PL-58

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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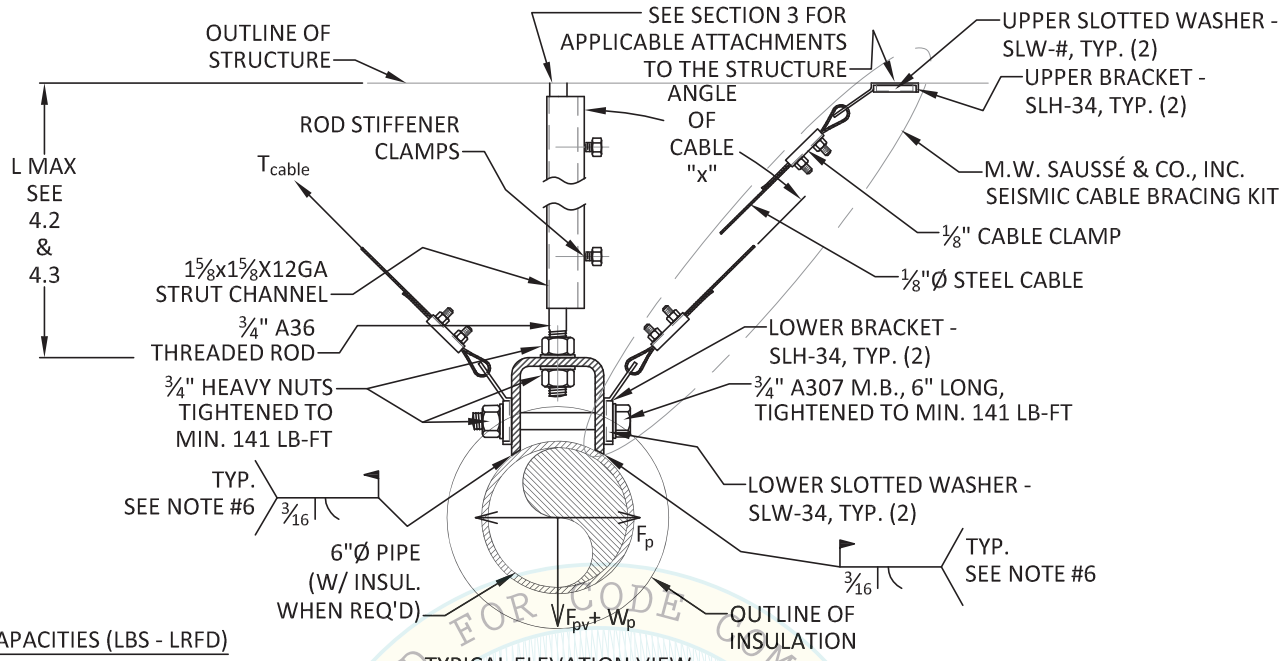
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
6"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)

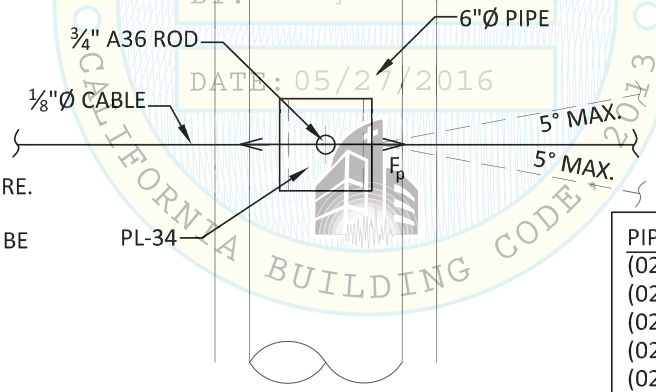


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	323	1095
[a]45°≤ x <60°	357	1411
60°= x	385	1520
[c]60°< x ≤70°	281	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

PIPE BRACING KIT 1-P18C-34R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-34
(02) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS
(01) PIPE LUG - PL-34

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

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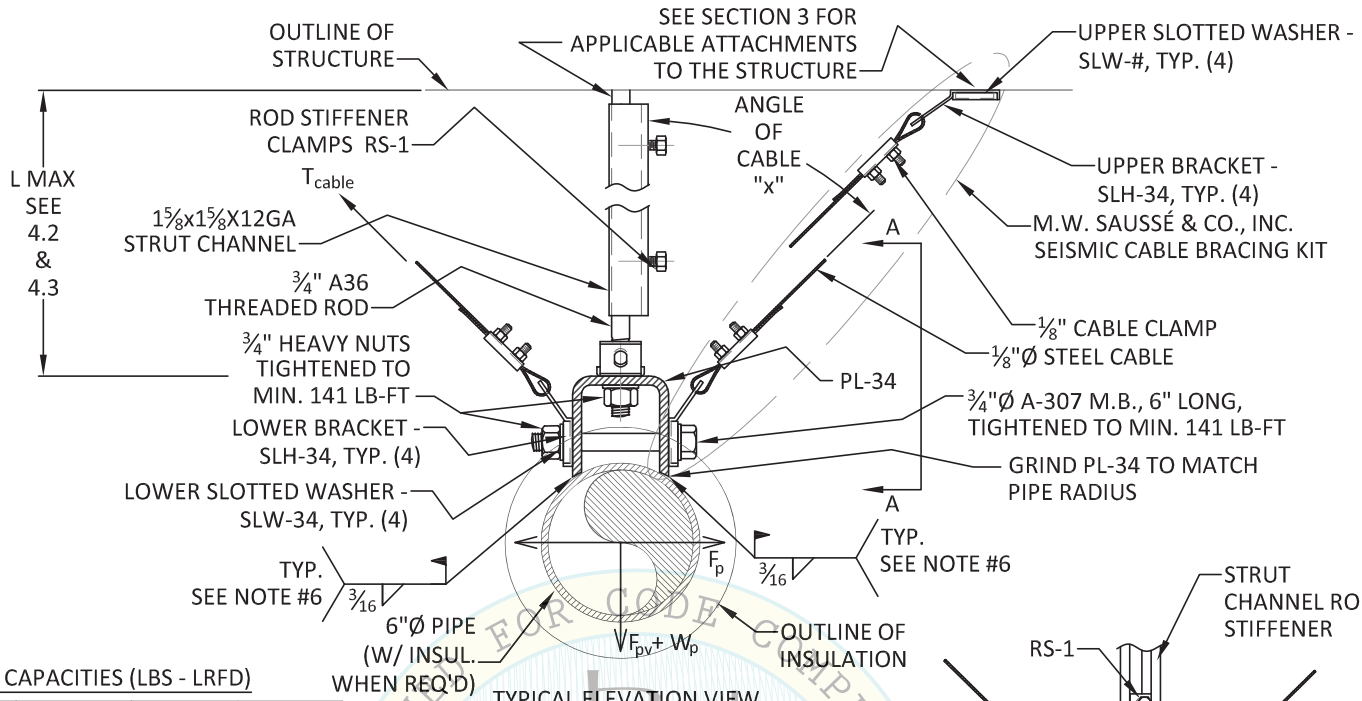
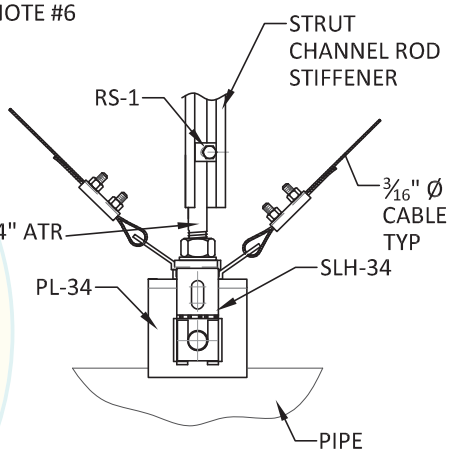
California PE No. C59644

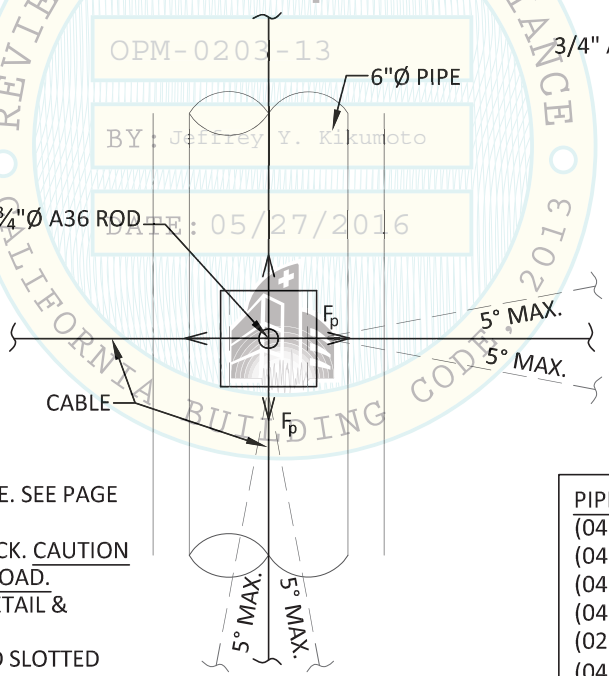
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
6"Ø PIPE W/ WATER & INSULATION (⅛"Ø CABLE)



TYPICAL ELEVATION VIEW



SECTION A-A



TYPICAL PLAN VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	323	547	1095
[a]45°≤ x <60°	357	1001	1411
60°= x	385	1316	1520
[c]60°< x ≤70°	281	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 2-P18C-34R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-34
(02) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS
(01) PIPE LUG - PL-34

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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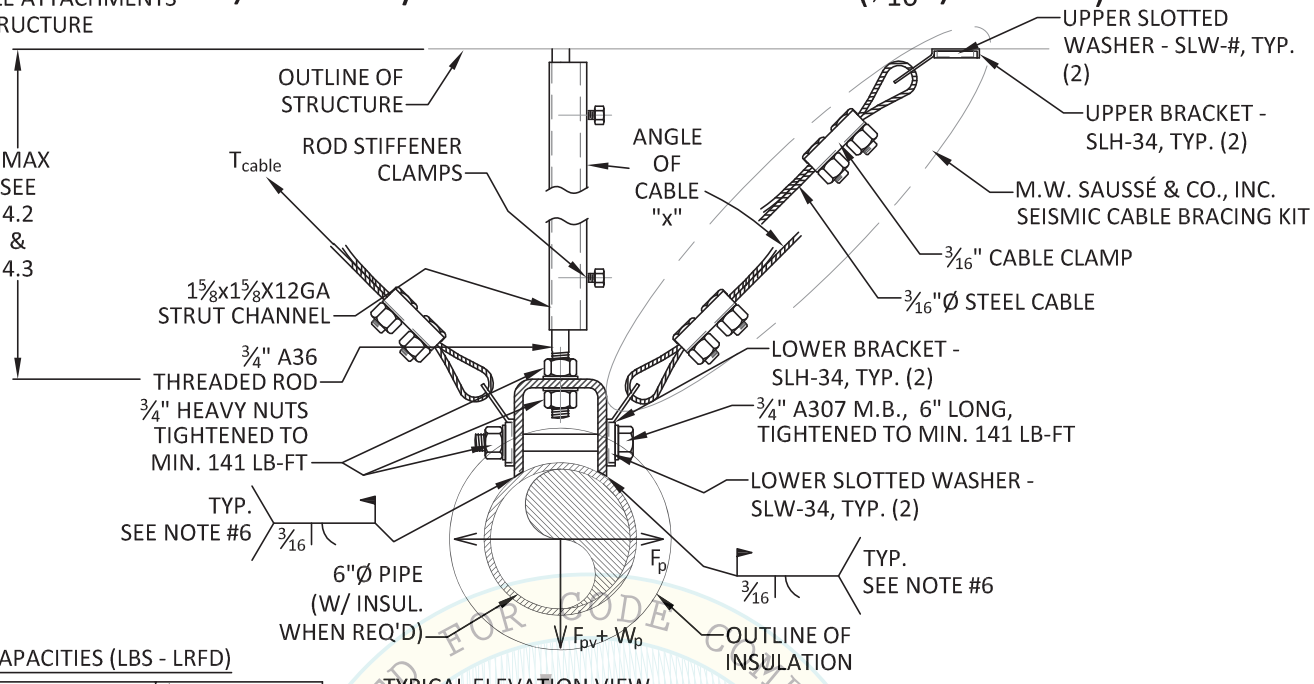
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE

6"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)

*SEE SECTION 3 FOR APPLICABLE ATTACHMENTS TO THE STRUCTURE

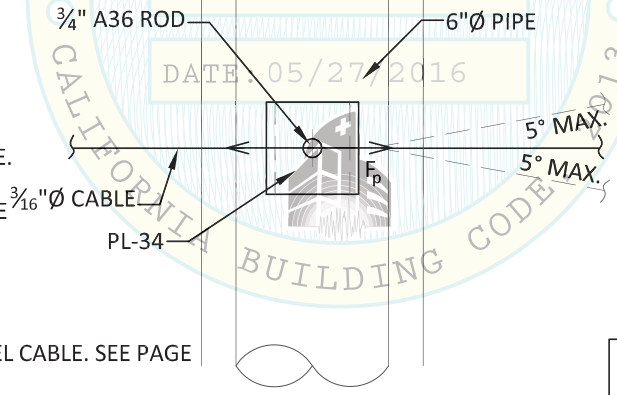


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	565	1915
[a]45°≤ x <60°	504	1988
60°= x	711	2807
[c]60°< x ≤70°	499	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 1-P316C-34R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-34
(02) ROD STIFFENER CLAMPS - RS-1
(02) 1/8" CABLE - 10 FT.
(04) 1/8" CABLE CLAMPS
(01) PIPE LUG - PL-34

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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California PE No. C59644

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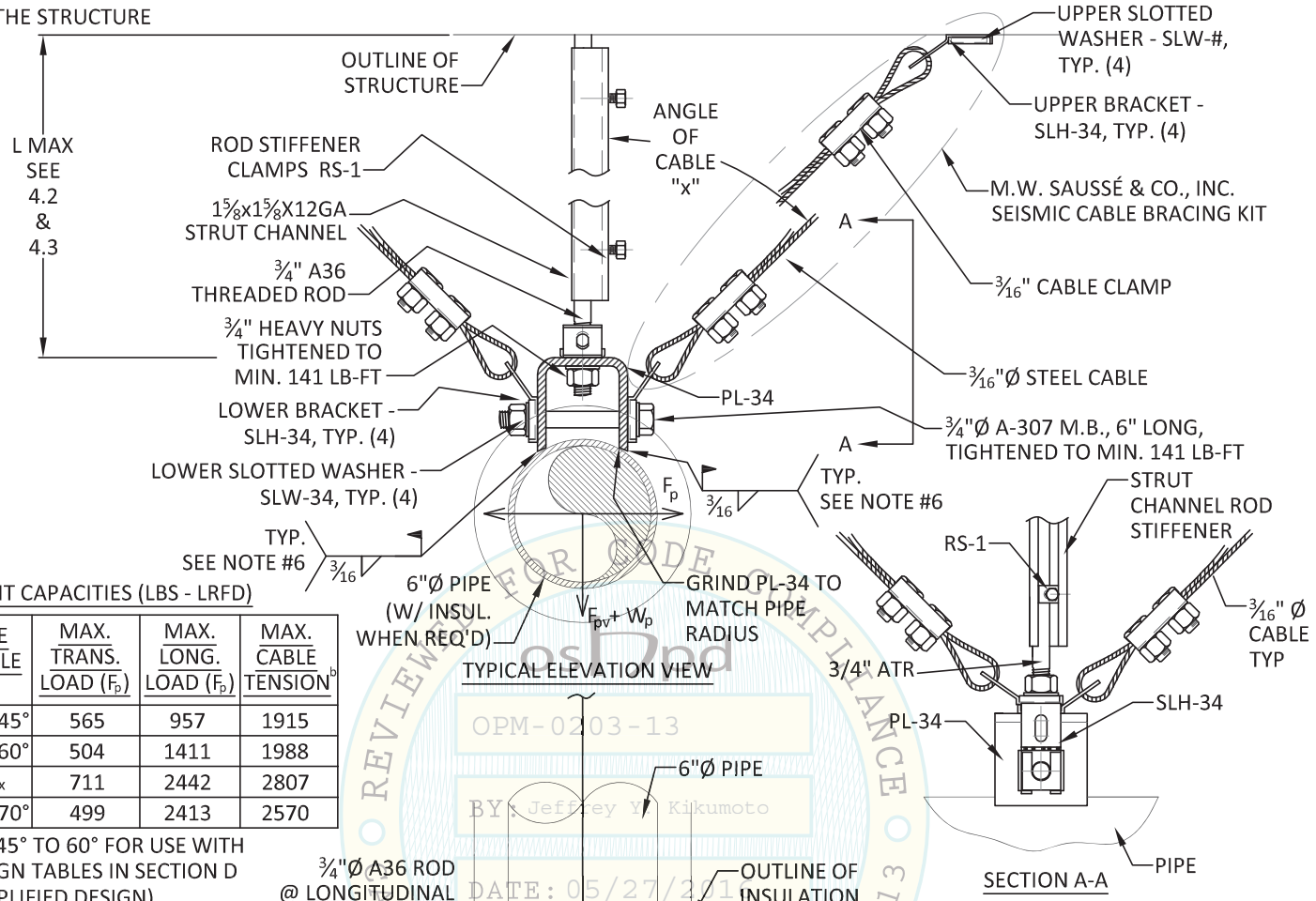
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE

6"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)

*SEE SECTION 3 FOR APPLICABLE ATTACHMENTS TO THE STRUCTURE



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30° ≤ x < 45°	565	957	1915
[a]45° ≤ x < 60°	504	1411	1988
60° = x	711	2442	2807
[c]60° < x ≤ 70°	499	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 2-P316C-34R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-34
(02) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS
(01) PIPE LUG - PL-34

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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California PE No. C59644

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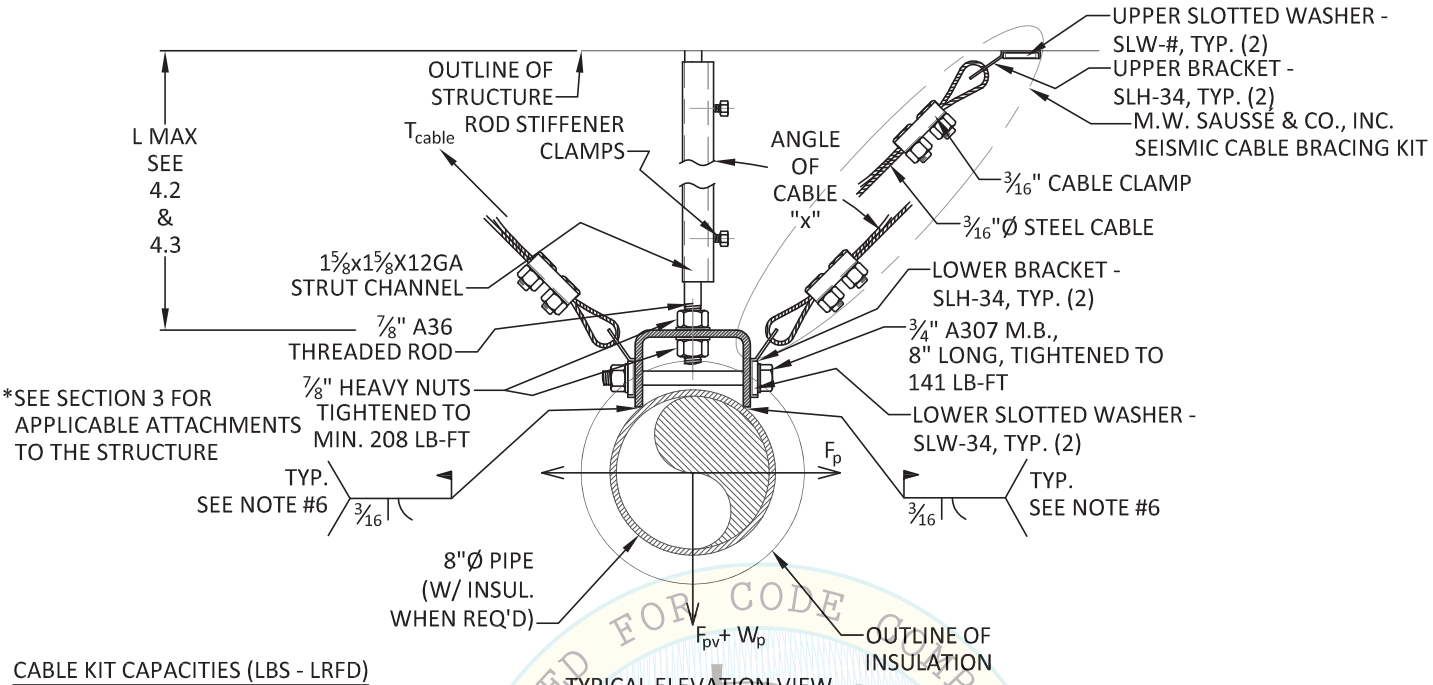
Date: May 9, 2016

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
8"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)

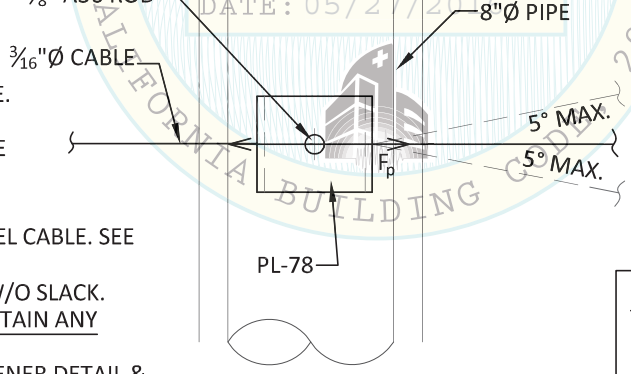


TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	607	1915
[a]45°≤ x <60°	550	1988
60°= x	777	2807
[c]60°< x ≤70°	551	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 1-P316C-78R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-34
(02) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS
(01) PIPE LUG - PL-78

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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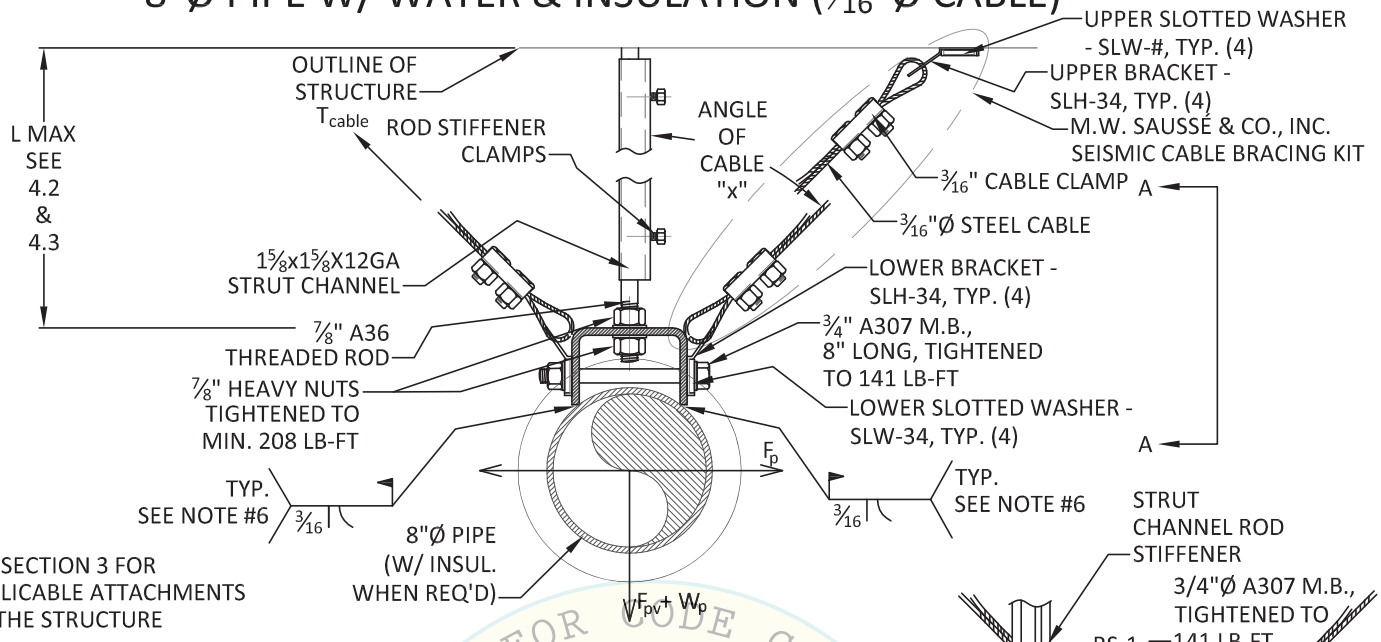
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
8"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)



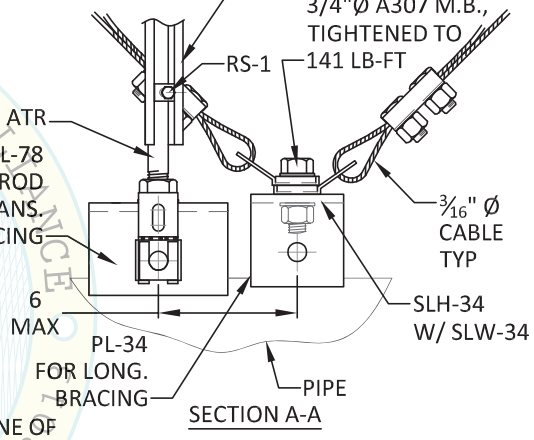
*SEE SECTION 3 FOR APPLICABLE ATTACHMENTS TO THE STRUCTURE

CABLE KIT CAPACITIES (LBS - LRFD)

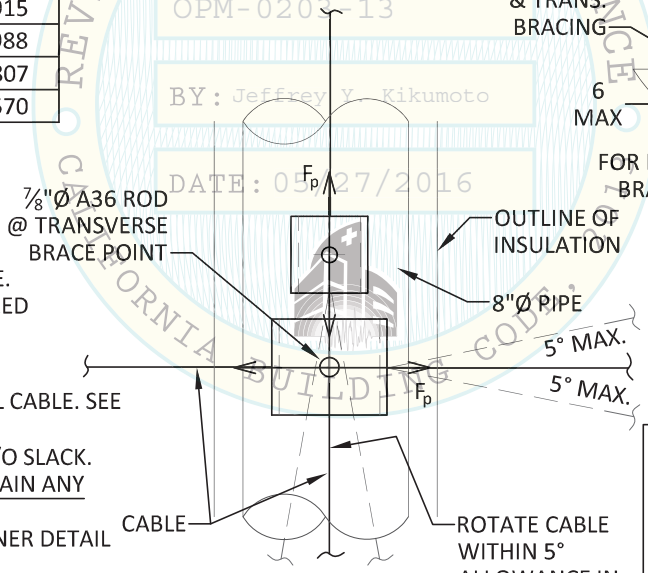
ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	607	957	1915
[a]45°≤ x <60°	550	1411	1988
60°= x	777	2442	2807
[c]60°< x ≤70°	551	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

TYPICAL ELEVATION VIEW



SECTION A-A



TYPICAL PLAN VIEW

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 2-P316C-78R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-34
(02) ROD STIFFENER CLAMPS - RS-1
(04) 3/16" CABLE - 10 FT.
(08) 3/16" CABLE CLAMPS
(01) PIPE LUG - PL-78
(01) PIPE LUG - PL-34

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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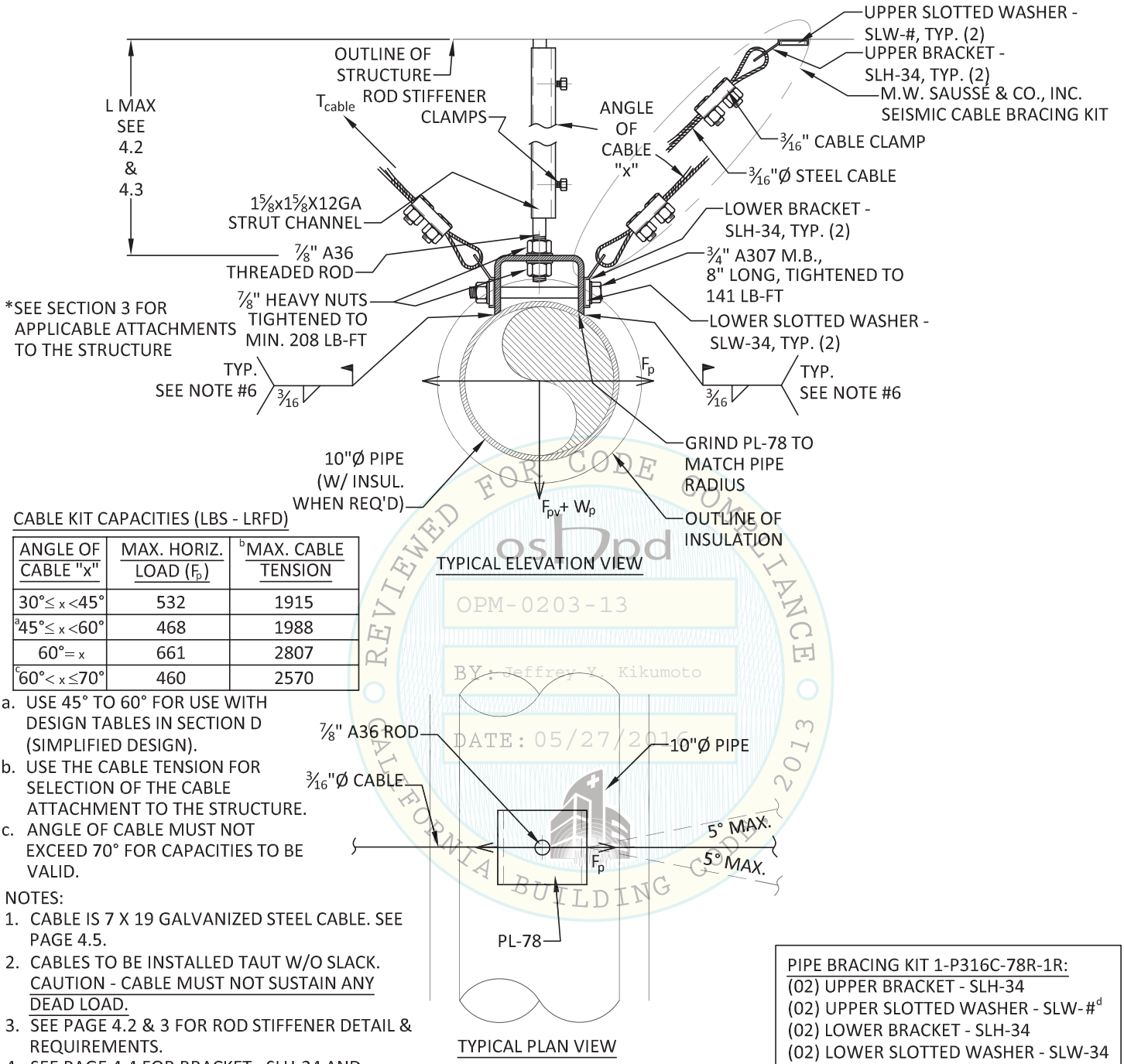
Date: May 9, 2016

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
10"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)



TYPICAL ELEVATION VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	532	1915
[a]45°≤ x <60°	468	1988
60°= x	661	2807
[c]60°< x ≤70°	460	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

TYPICAL PLAN VIEW

NOTES:
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5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 1-P316C-78R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-34
(02) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS
(01) PIPE LUG - PL-78

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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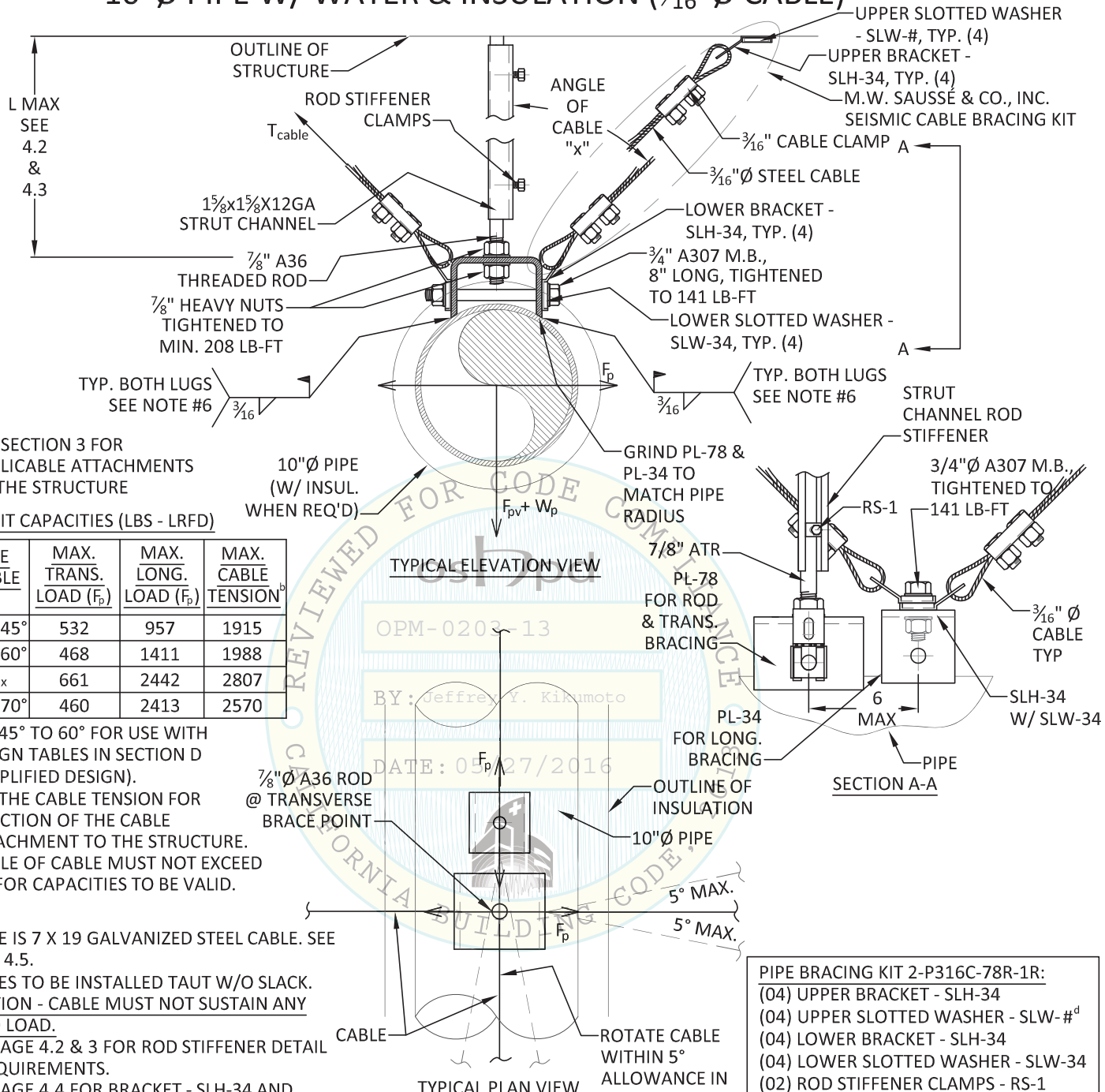
CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
10"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	532	957	1915
[a]45°≤ x <60°	468	1411	1988
60°= x	661	2442	2807
[c]60°< x ≤70°	460	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
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5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 2-P316C-78R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-34
(02) ROD STIFFENER CLAMPS - RS-1
(04) 3/16" CABLE - 10 FT.
(08) 3/16" CABLE CLAMPS
(01) PIPE LUG - PL-78
(01) PIPE LUG - PL-34

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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28744 Witherspoon Parkway | Valencia, CA 91355
Ph: (661) 257-3311 | Fax: (661) 257-6050
Civil Engineer: P.K. Sachdeva
California PE No. C59644

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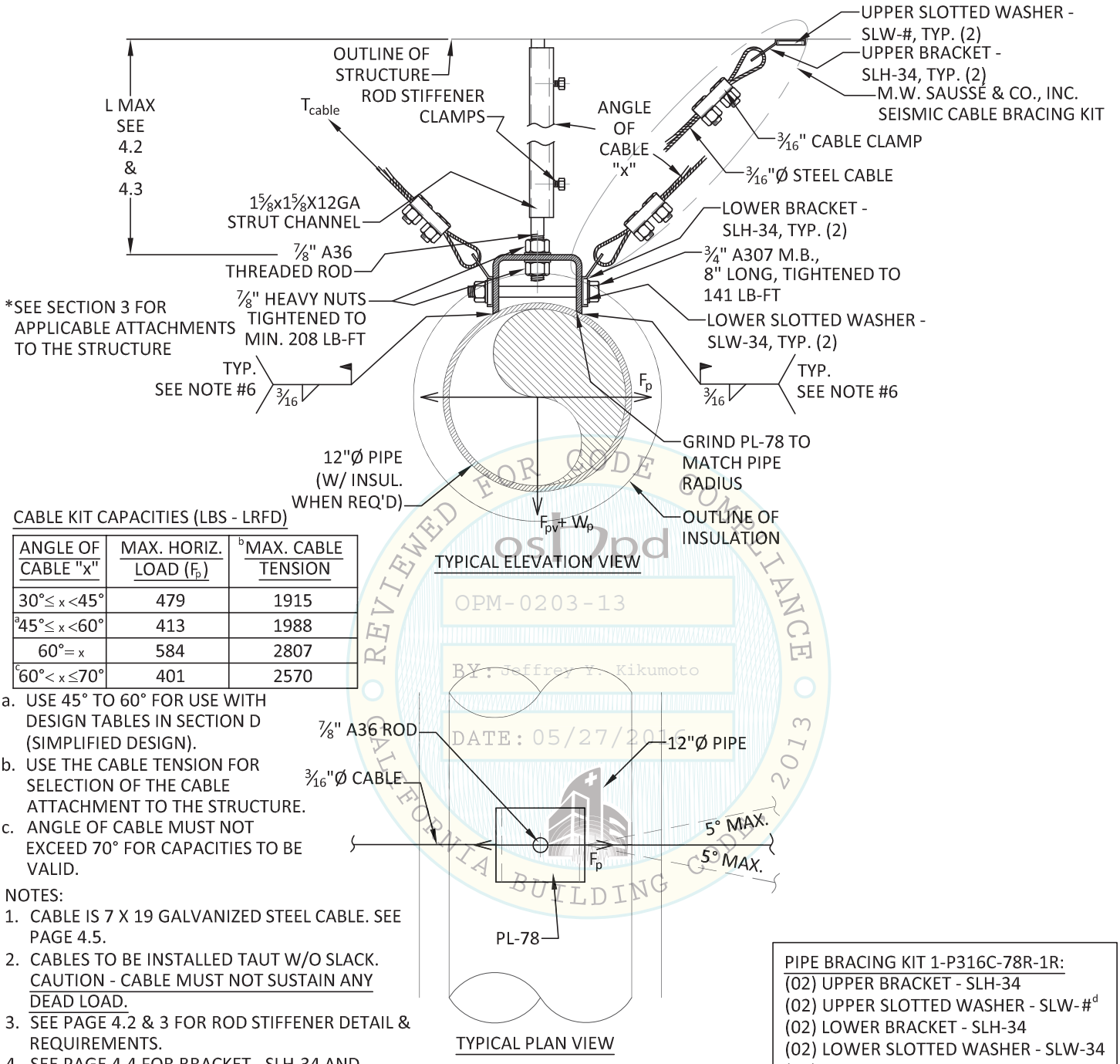
Date: May 9, 2016

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - TRANSVERSE
12"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	479	1915
[a]45°≤ x <60°	413	1988
60°= x	584	2807
[c]60°< x ≤70°	401	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 1-P316C-78R-1R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-34
(02) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS
(01) PIPE LUG - PL-78

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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California PE No. C59644

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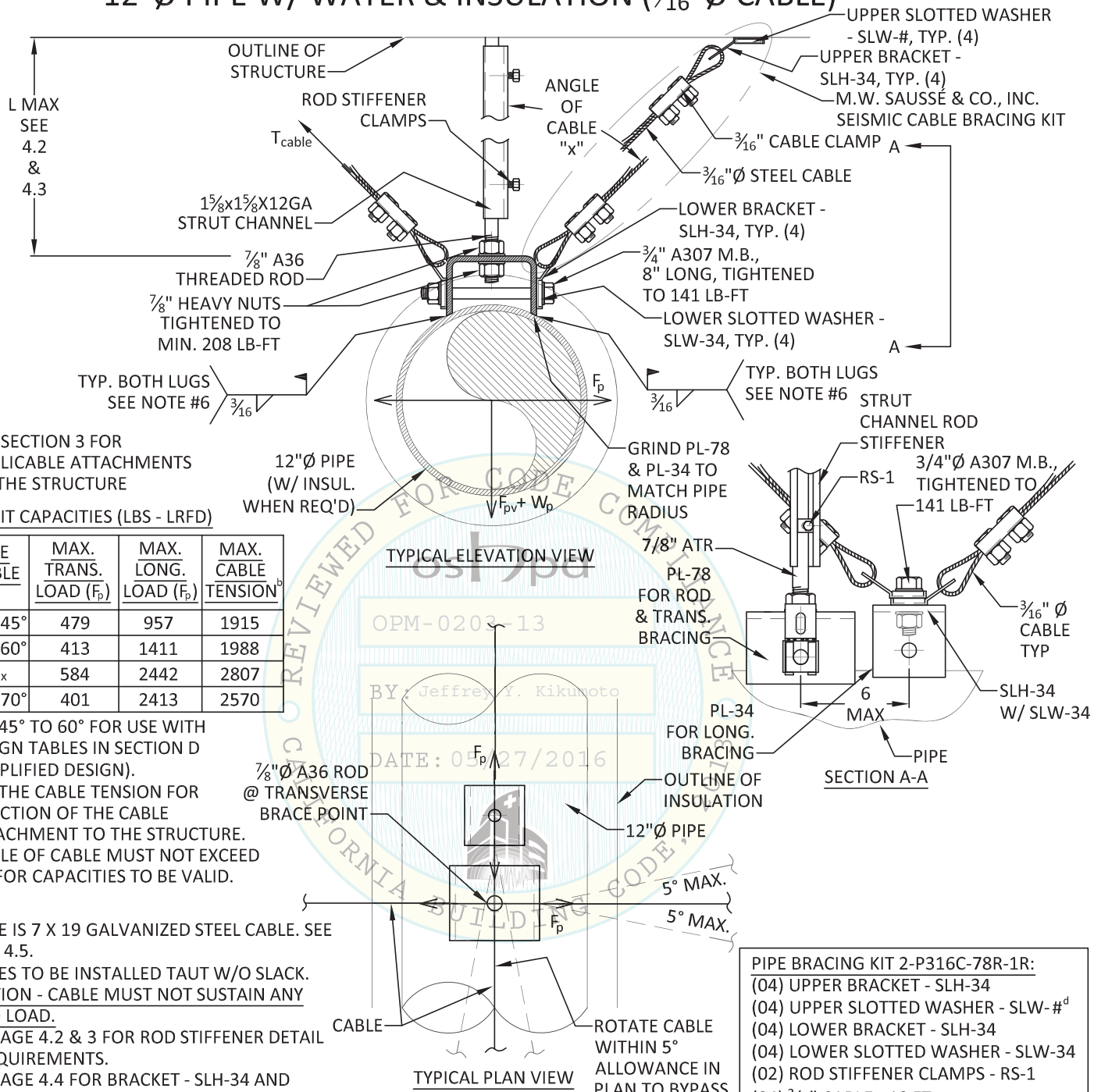
Date: May 9, 2016

CABLE BRACING SYSTEM - SINGLE HUNG PIPE - LONGITUDINAL & TRANSVERSE
12"Ø PIPE W/ WATER & INSULATION (3/16"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. TRANS. LOAD (F_p)	MAX. LONG. LOAD (F_p)	MAX. CABLE TENSION[b]
30°≤ x <45°	479	957	1915
[a]45°≤ x <60°	413	1411	1988
60°= x	584	2442	2807
[c]60°< x ≤70°	401	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. WELDING OF PIPE LUG MAY BE PERFORMED IN A SHOP. HOWEVER THE SPACING OF THE LUGS ALONG THE PIPE SECTIONS MUST BE COORDINATED WITH THE FINAL DESIGN SPACING.

PIPE BRACING KIT 2-P316C-78R-1R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW-#[d]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-34
(02) ROD STIFFENER CLAMPS - RS-1
(04) 3/16" CABLE - 10 FT.
(08) 3/16" CABLE CLAMPS
(01) PIPE LUG - PL-78
(01) PIPE LUG - PL-34

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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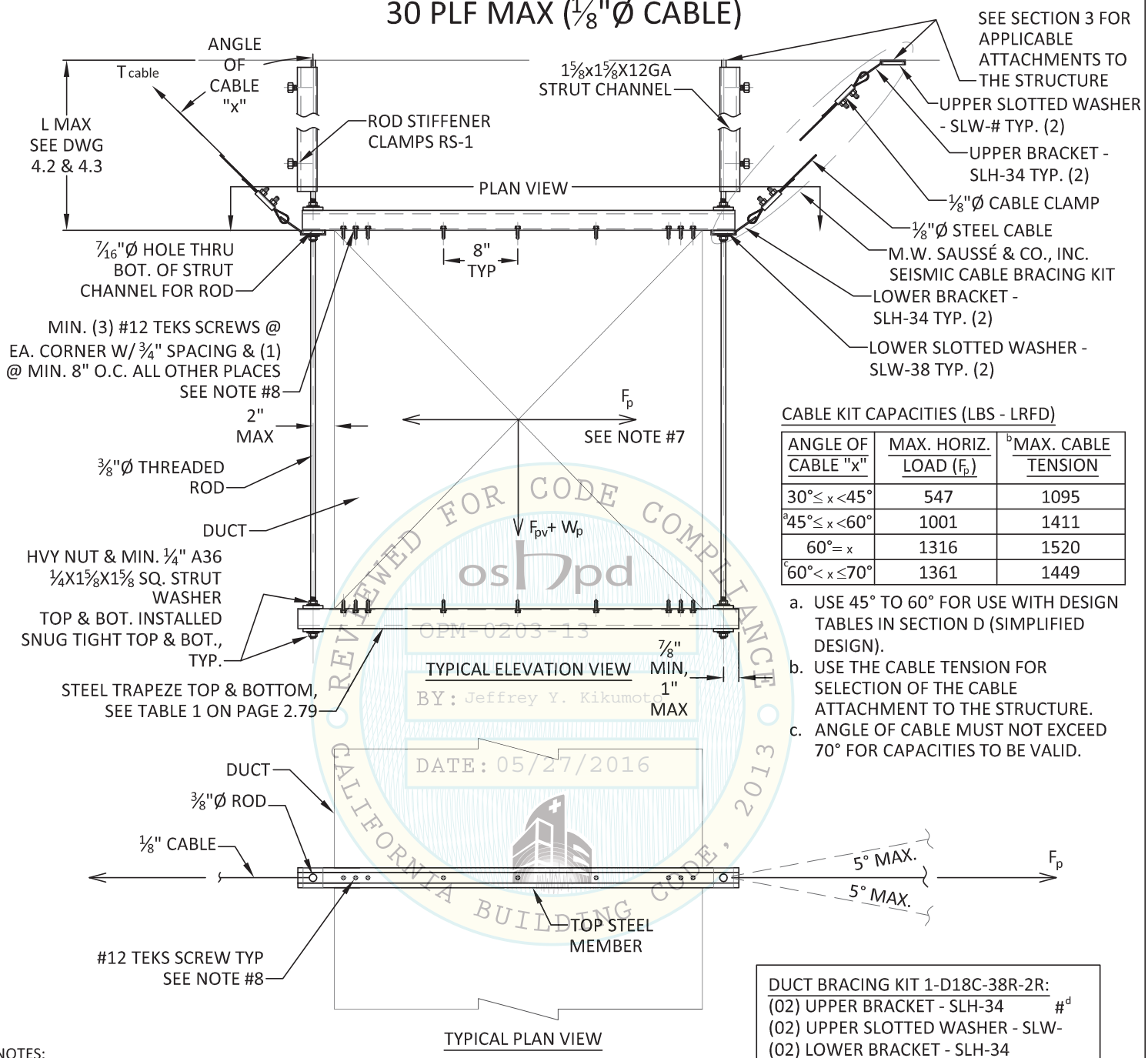
CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT - TRANSVERSE
30 PLF MAX (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[c]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 1-D18C-38R-2R:
(02) UPPER BRACKET - SLH-34 #[d]
(02) UPPER SLOTTED WASHER - SLW-
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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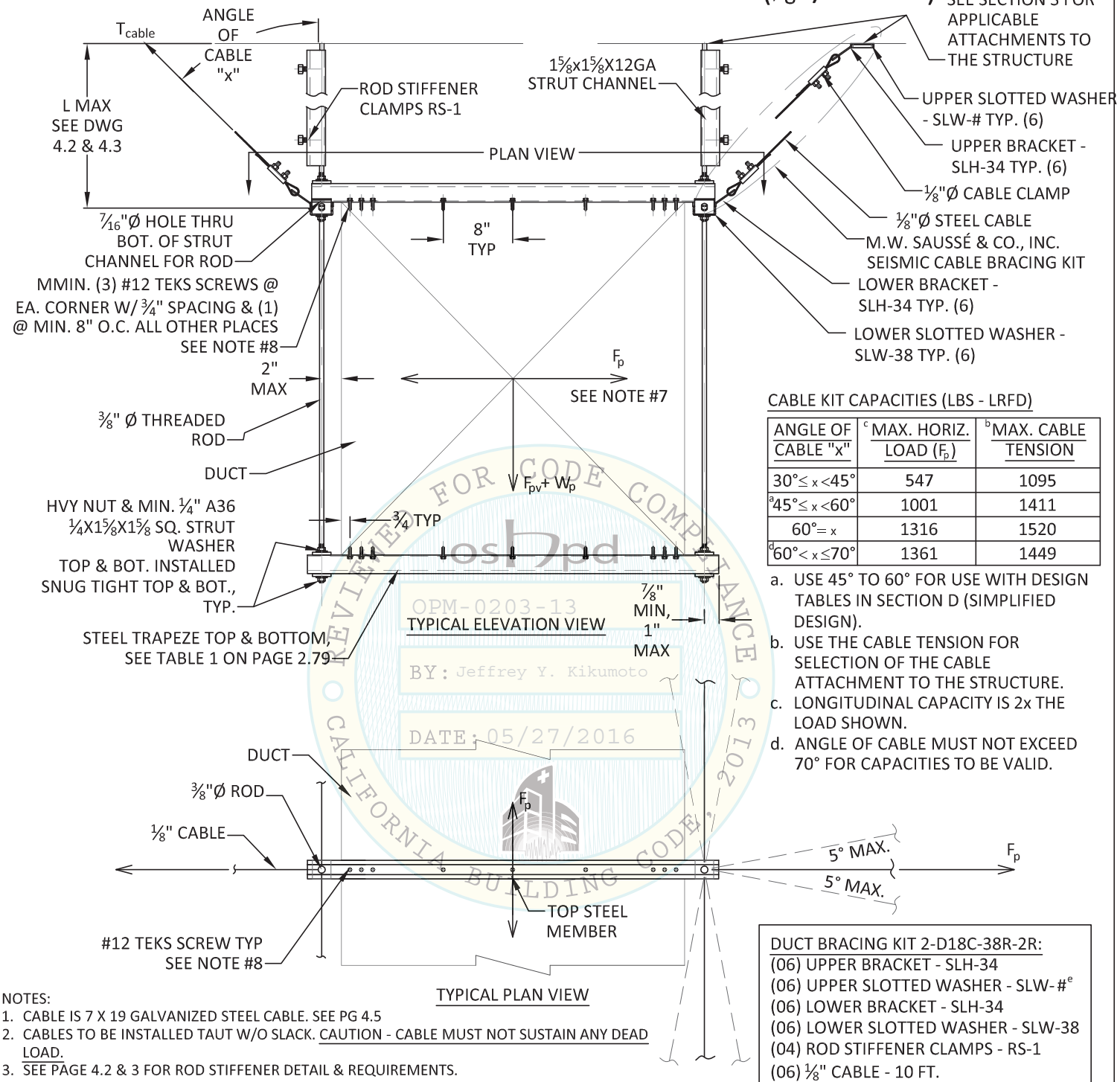
California PE No. C59644

CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT
TRANSVERSE & LONGITUDINAL - 30 PLF MAX (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c] MAX. HORIZ. LOAD (F_p)	[b] MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[d]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_P VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

DUCT BRACING KIT 2-D18C-38R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(06) ⅛" CABLE - 10 FT.
(12) ⅛" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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California PE No. C59644

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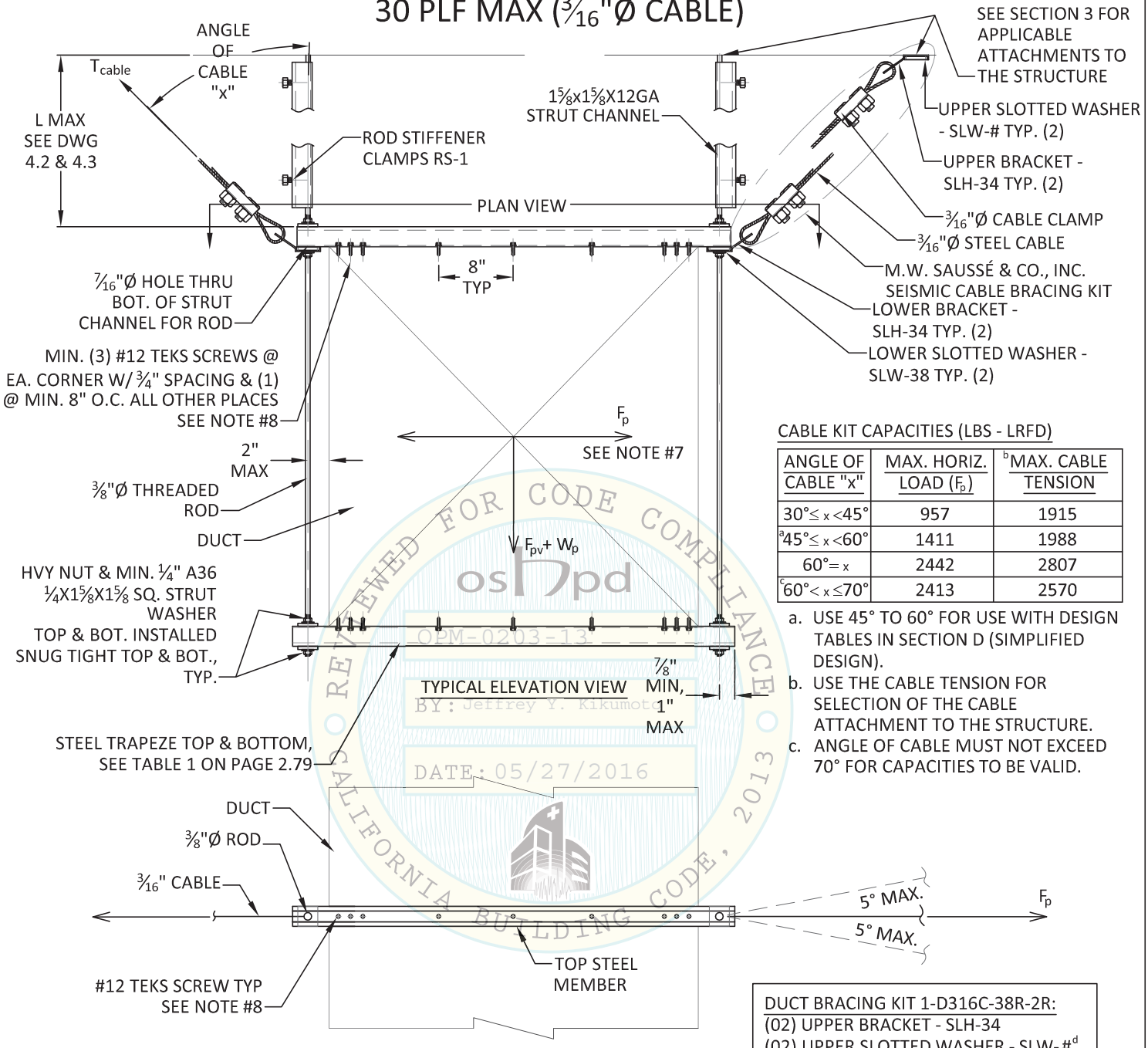
CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT - TRANSVERSE
30 PLF MAX (3/16"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[c]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 1-D316C-38R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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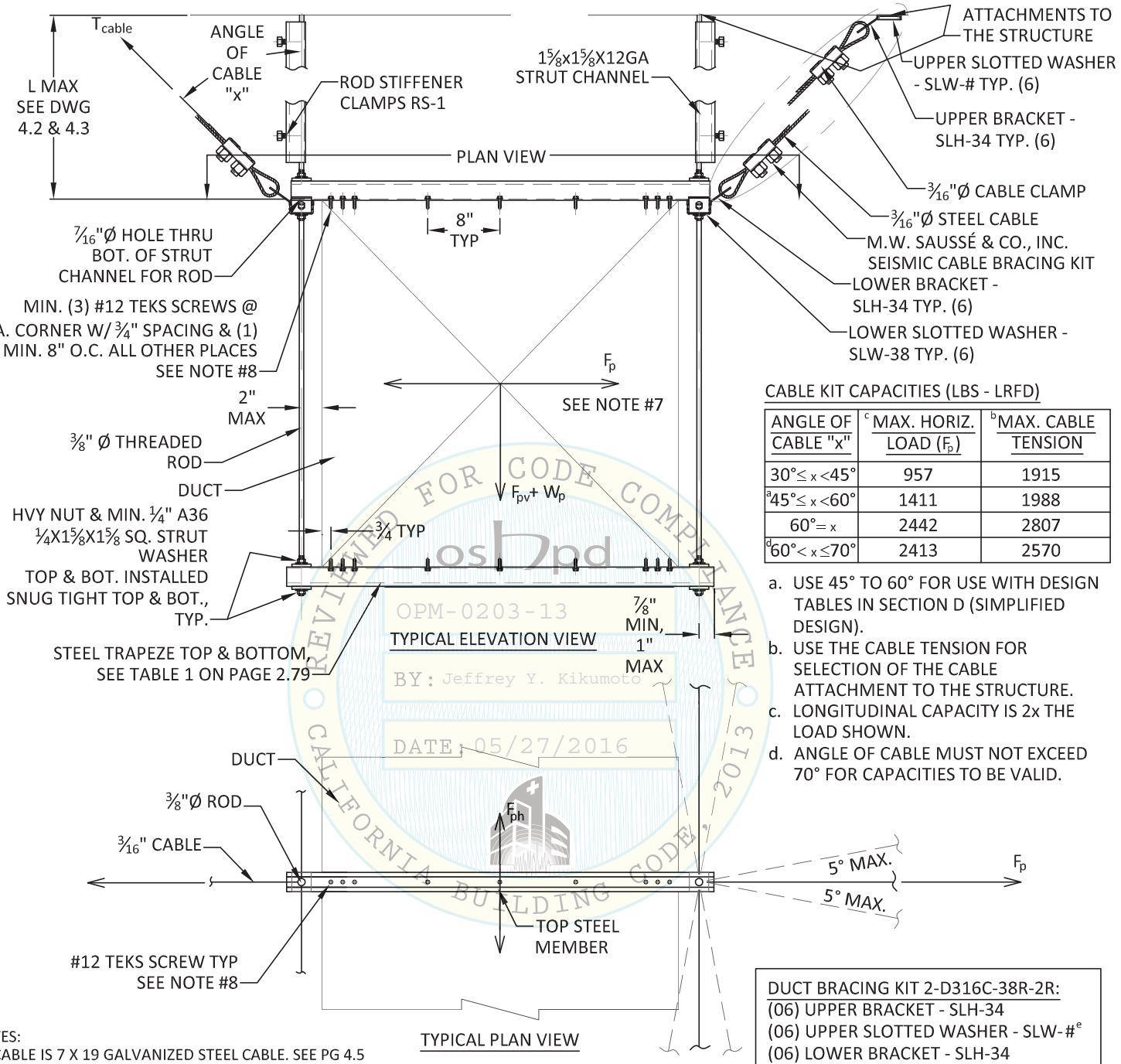
California PE No. C59644

CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT
TRANSVERSE & LONGITUDINAL - 30 PLF MAX (3/16"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c] MAX. HORIZ. LOAD (F_p)	[b] MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a] 45°≤ x <60°	1411	1988
60°= x	2442	2807
[d] 60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

DUCT BRACING KIT 2-D316C-38R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(06) 3/16" CABLE - 10 FT.
(12) 3/16" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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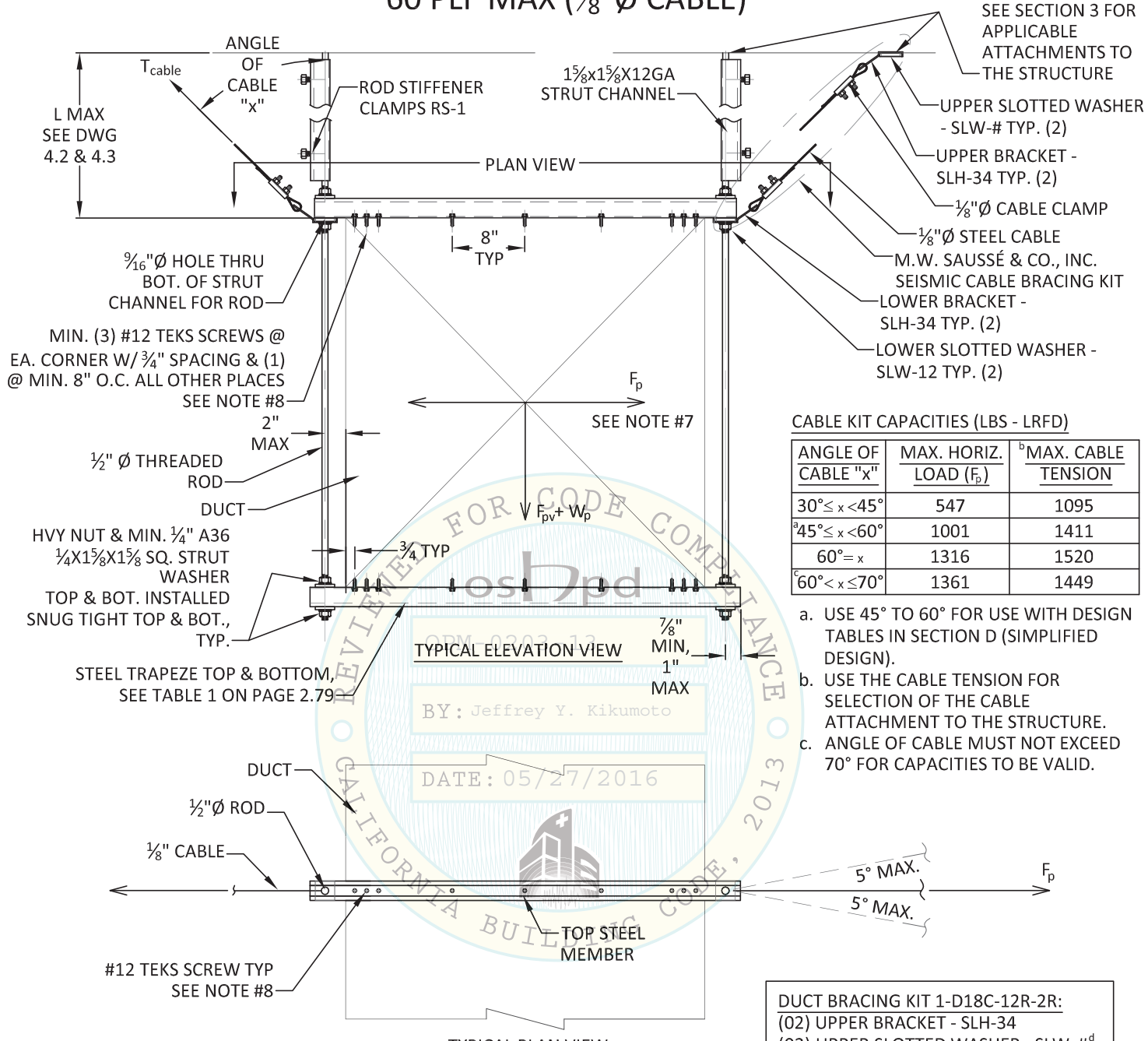
CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT - TRANSVERSE
60 PLF MAX (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[c]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 1-D18C-12R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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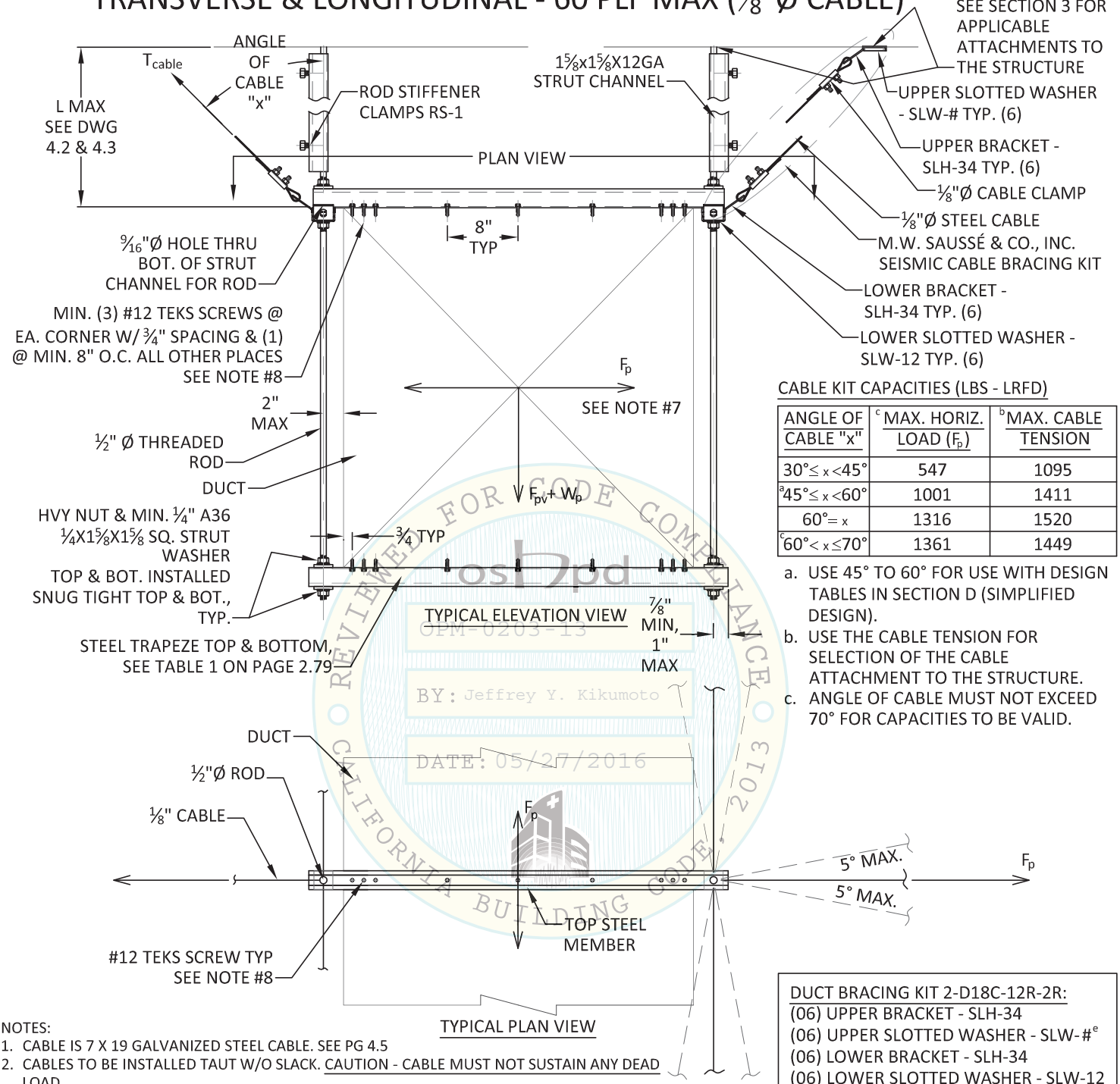
CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT
TRANSVERSE & LONGITUDINAL - 60 PLF MAX (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c] MAX. HORIZ. LOAD (F_p)	[b] MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a] 45°≤ x <60°	1001	1411
60°= x	1316	1520
[c] 60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 2-D18C-12R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(06) ⅛" CABLE - 10 FT.
(12) ⅛" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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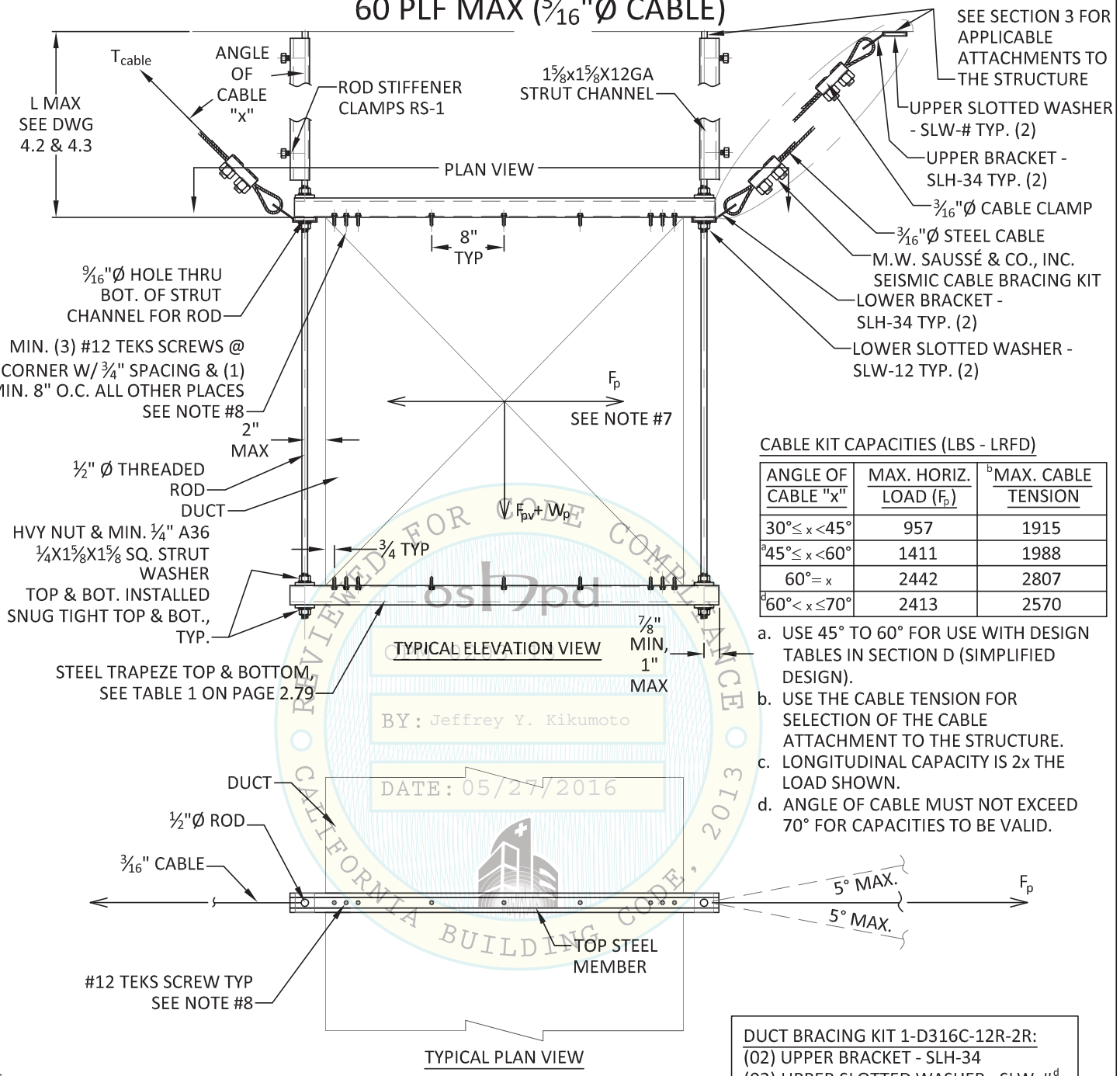
CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT - TRANSVERSE
60 PLF MAX (3/16"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[d]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 1-D316C-12R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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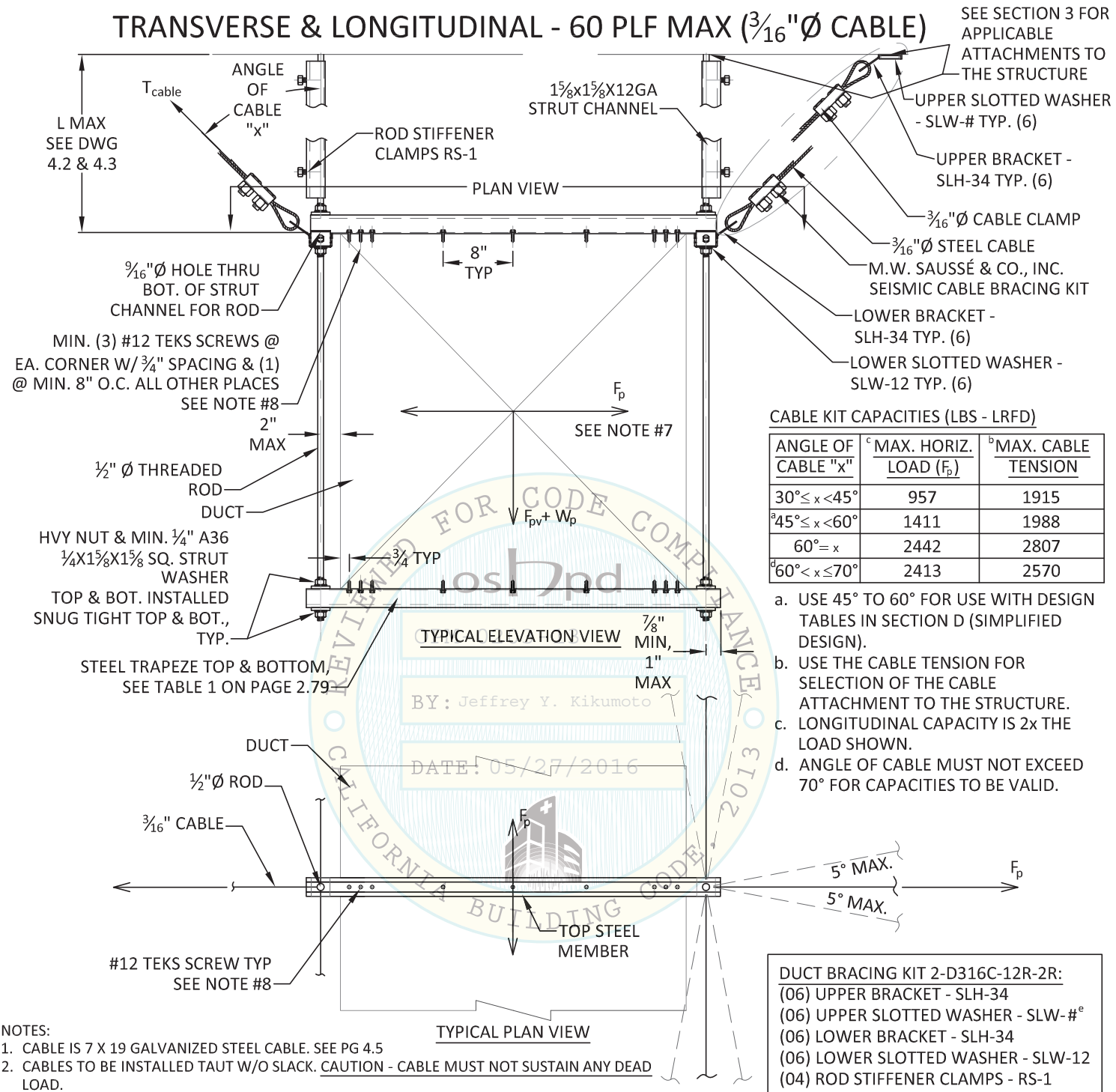
Civil Engineer: P.K. Sachdeva
California PE No. C59644

CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT
TRANSVERSE & LONGITUDINAL - 60 PLF MAX (3/16"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c] MAX. HORIZ. LOAD (F_p)	[b] MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a] 45°≤ x <60°	1411	1988
60°= x	2442	2807
[d] 60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 2-D316C-12R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(06) 3/16" CABLE - 10 FT
(12) 3/16" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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California PE No. C59644

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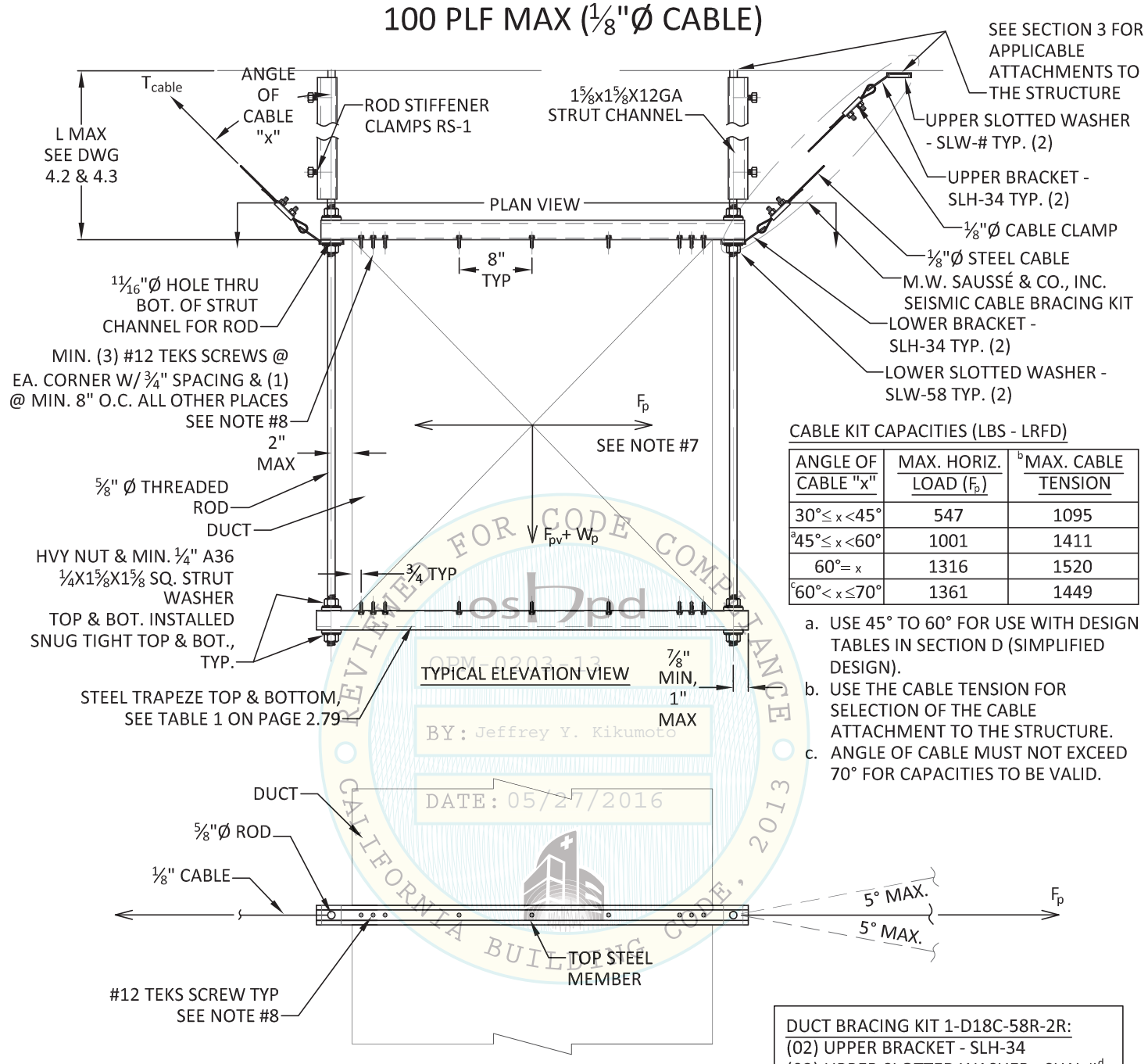
CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT - TRANSVERSE
100 PLF MAX (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[c]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 1-D18C-58R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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California PE No. C59644

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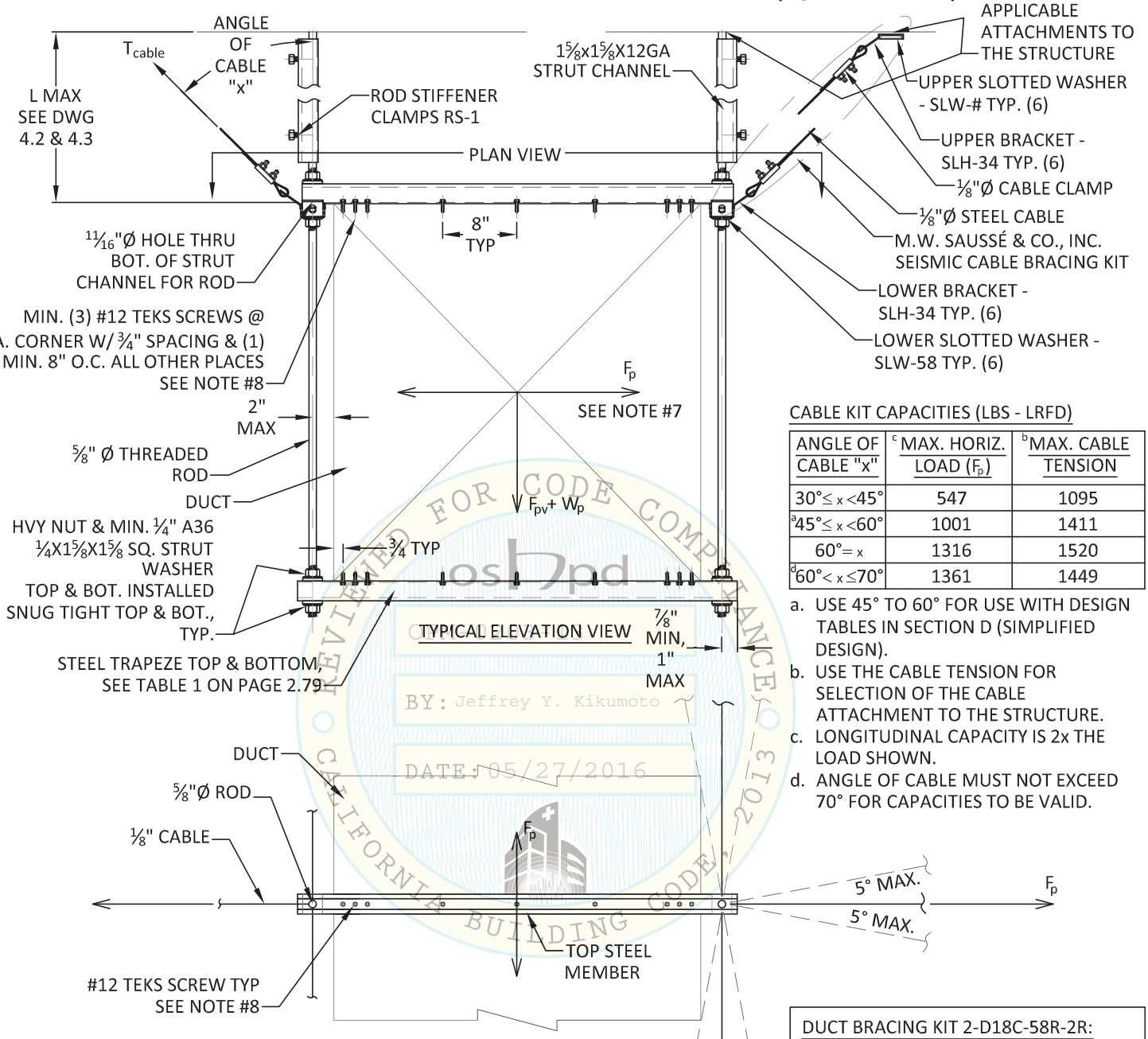
CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT
TRANSVERSE & LONGITUDINAL - 100 PLF MAX (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c] MAX. HORIZ. LOAD (F_p)	[b] MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[d]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 2-D18C-58R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(06) ⅛" CABLE - 10 FT.
(12) ⅛" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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California PE No. C59644

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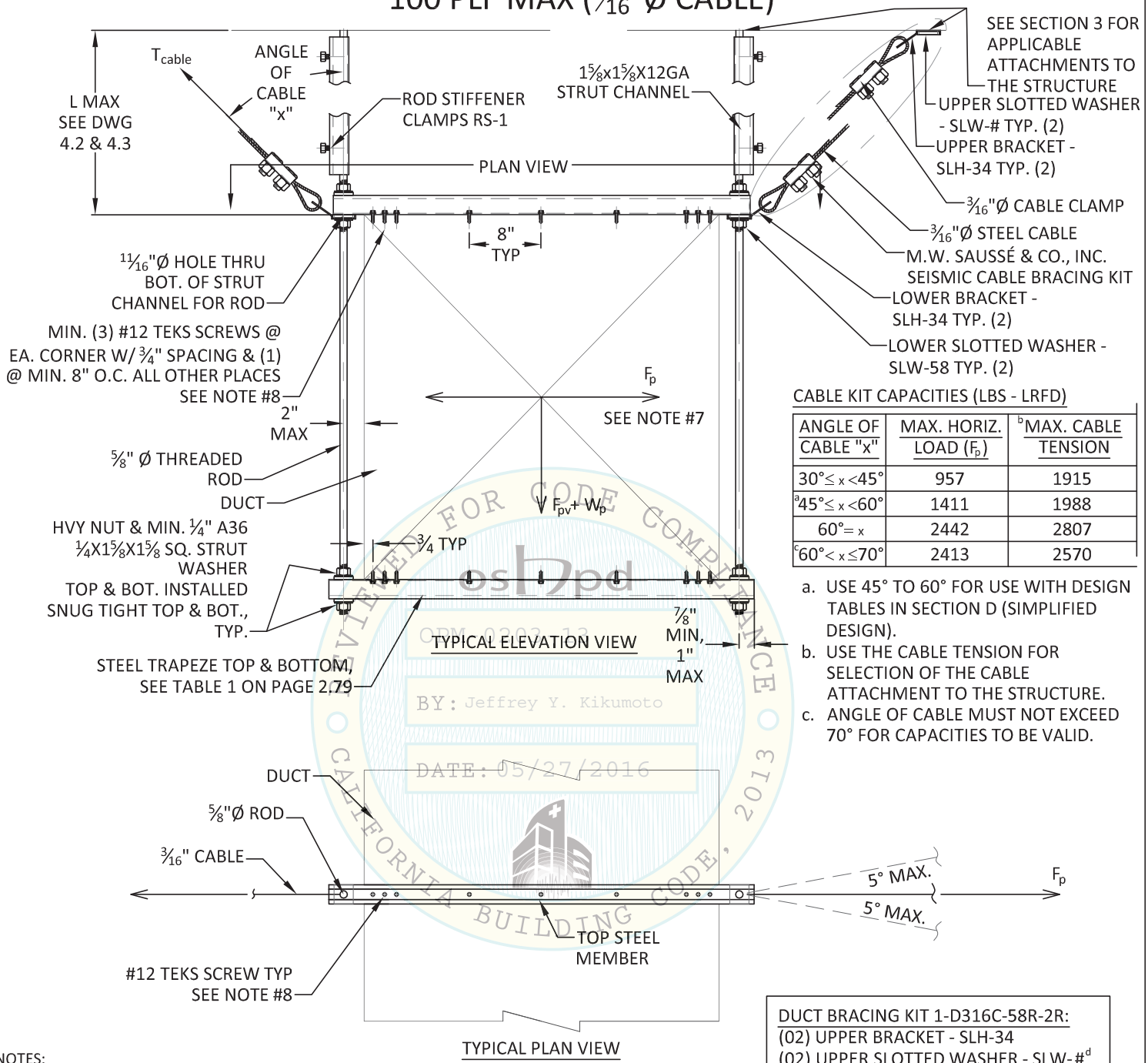
Date: May 9, 2016

CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT - TRANSVERSE
100 PLF MAX (3/16"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[c]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 1-D316C-58R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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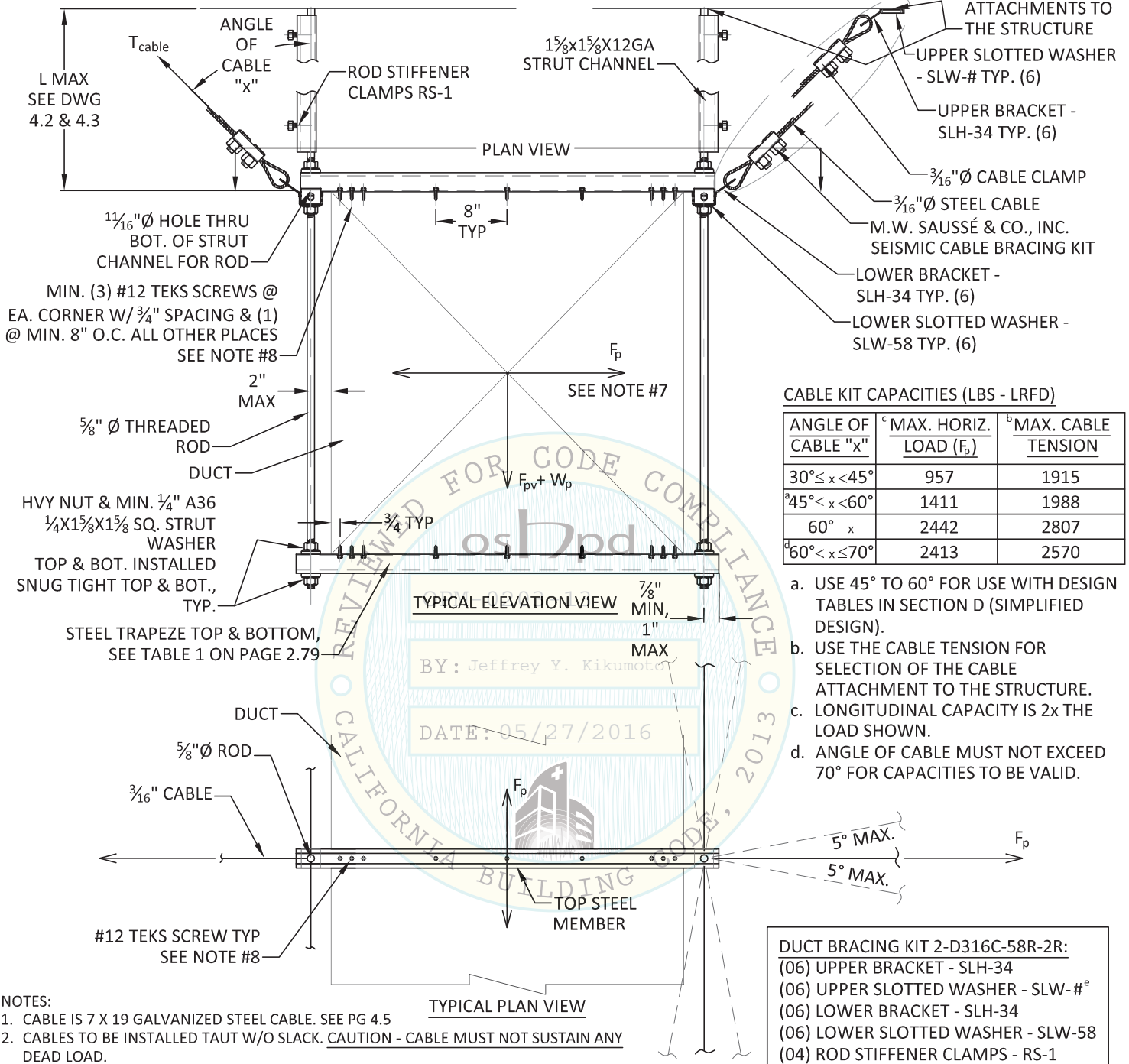
CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT
TRANSVERSE & LONGITUDINAL 100 PLF MAX (3/16"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c] MAX. HORIZ. LOAD (F_p)	[b] MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[d]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 2-D316C-58R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(06) 3/16" CABLE - 10 FT
(12) 3/16" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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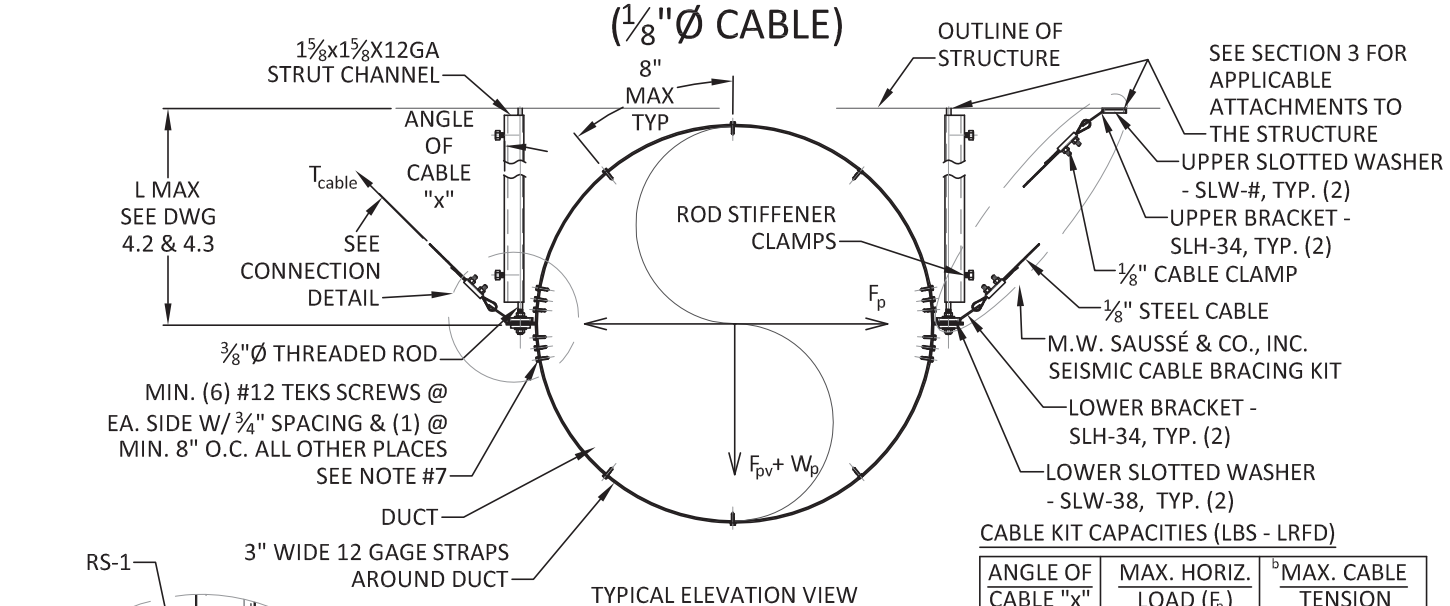
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE - 30 PLF MAX (⅛"Ø CABLE)

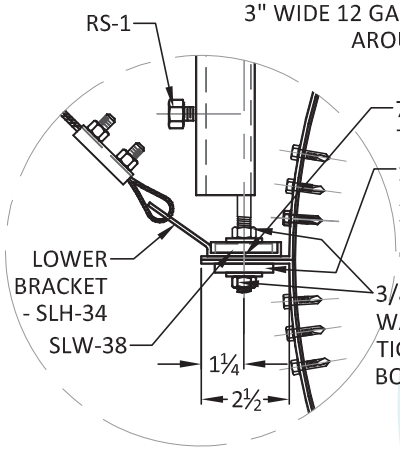


TYPICAL ELEVATION VIEW

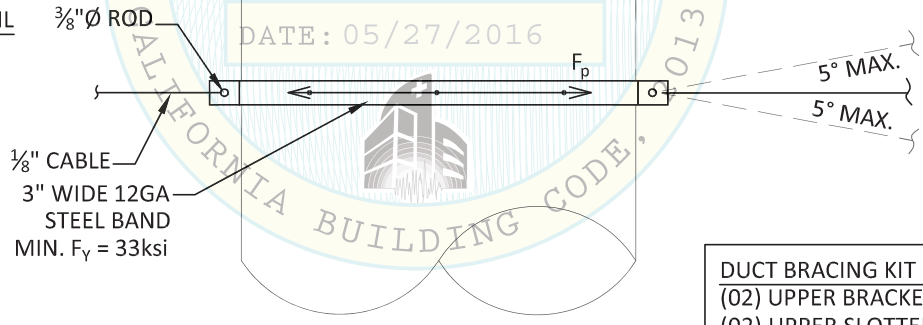
CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[c]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CONNECTION DETAIL



TYPICAL PLAN VIEW

DUCT BRACING KIT 1-D18C-38R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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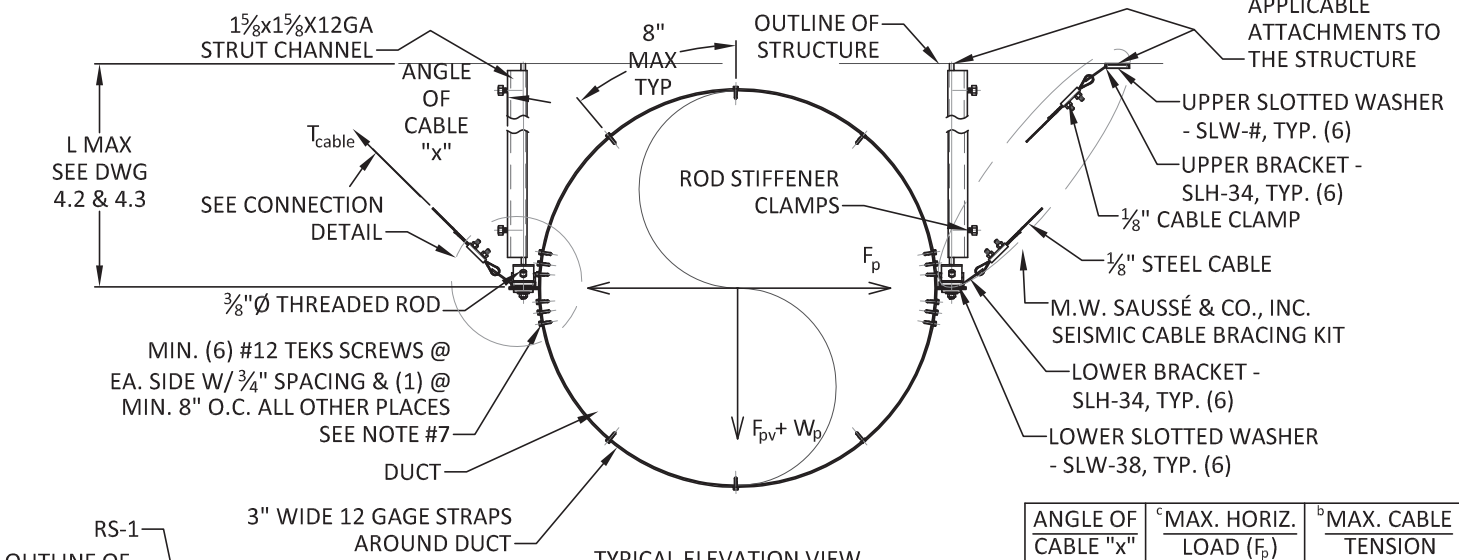
California PE No. C59644

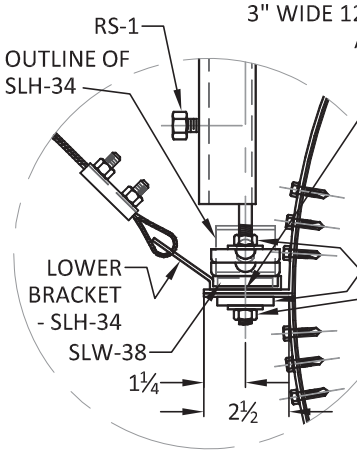
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE & LONGITUDINAL - 30 PLF MAX (⅛"Ø CABLE)



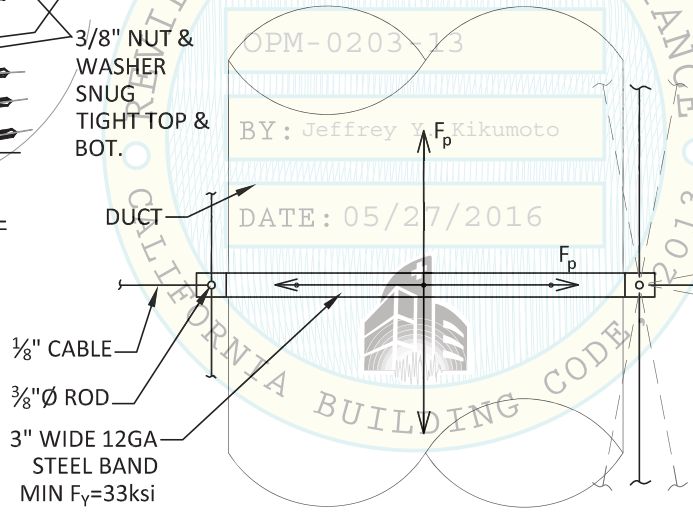
TYPICAL ELEVATION VIEW

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[d]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CONNECTION DETAIL



TYPICAL PLAN VIEW

DUCT BRACING KIT 2-D18C-38R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(06) ⅛" CABLE - 10 FT.
(12) ⅛" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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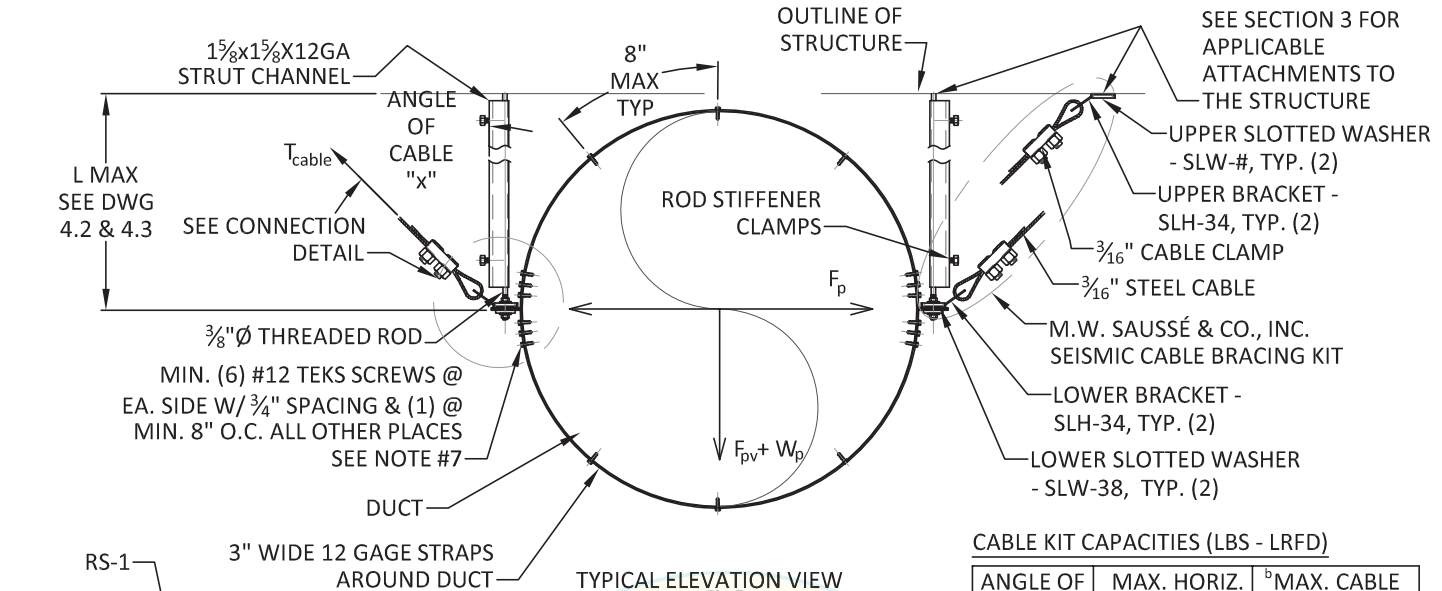
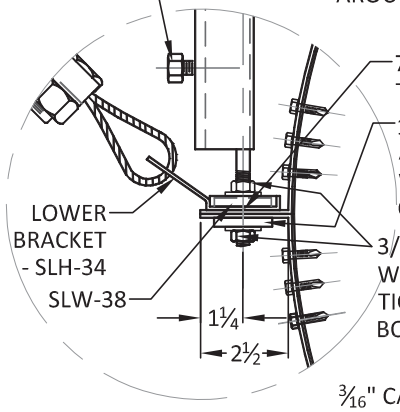
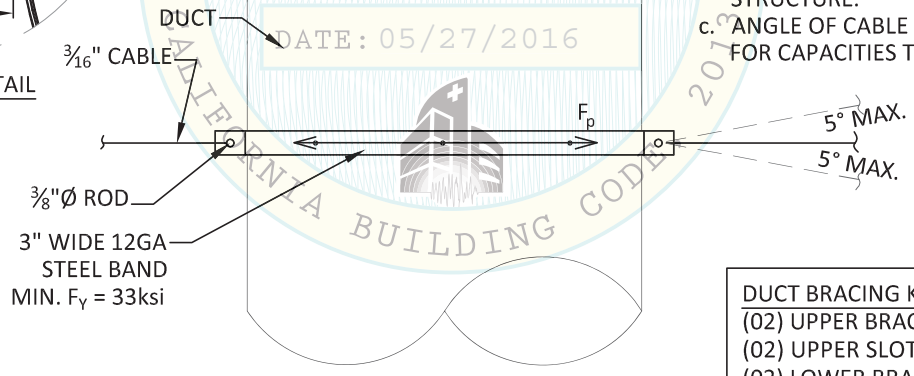
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE - 30 PLF MAX
(3/16"Ø CABLE)



TYPICAL ELEVATION VIEW



CONNECTION DETAIL



TYPICAL PLAN VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[c]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 1-D316C-38R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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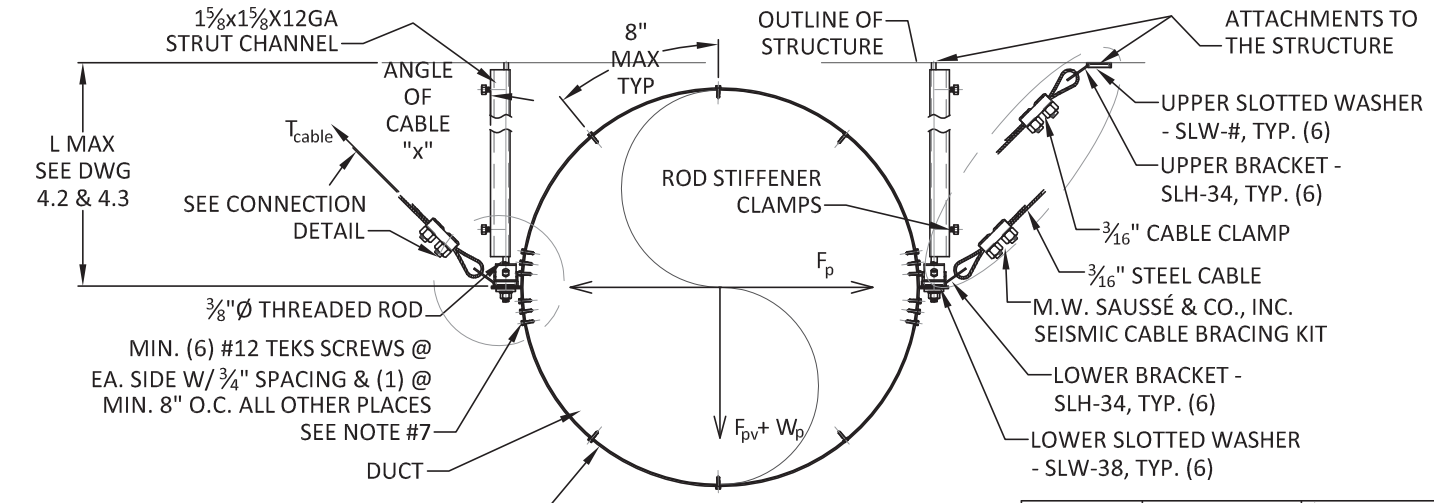
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE & LONGITUDINAL - 30 PLF MAX ($\frac{3}{16}$"Ø CABLE)

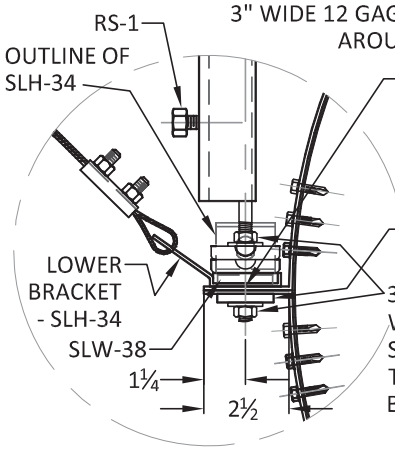
SEE SECTION 3 FOR APPLICABLE ATTACHMENTS TO THE STRUCTURE



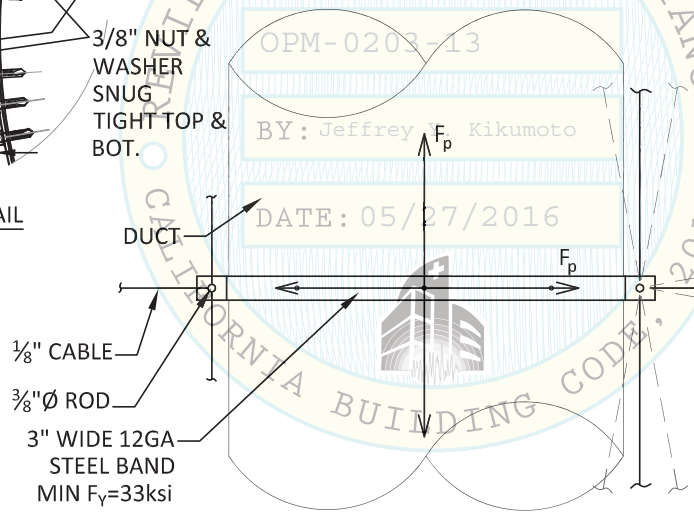
TYPICAL ELEVATION VIEW

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[d]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CONNECTION DETAIL



TYPICAL PLAN VIEW

DUCT BRACING KIT 2-D316C-38R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(06) ⅛" CABLE - 10 FT.
(12) ⅛" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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California PE No. C59644

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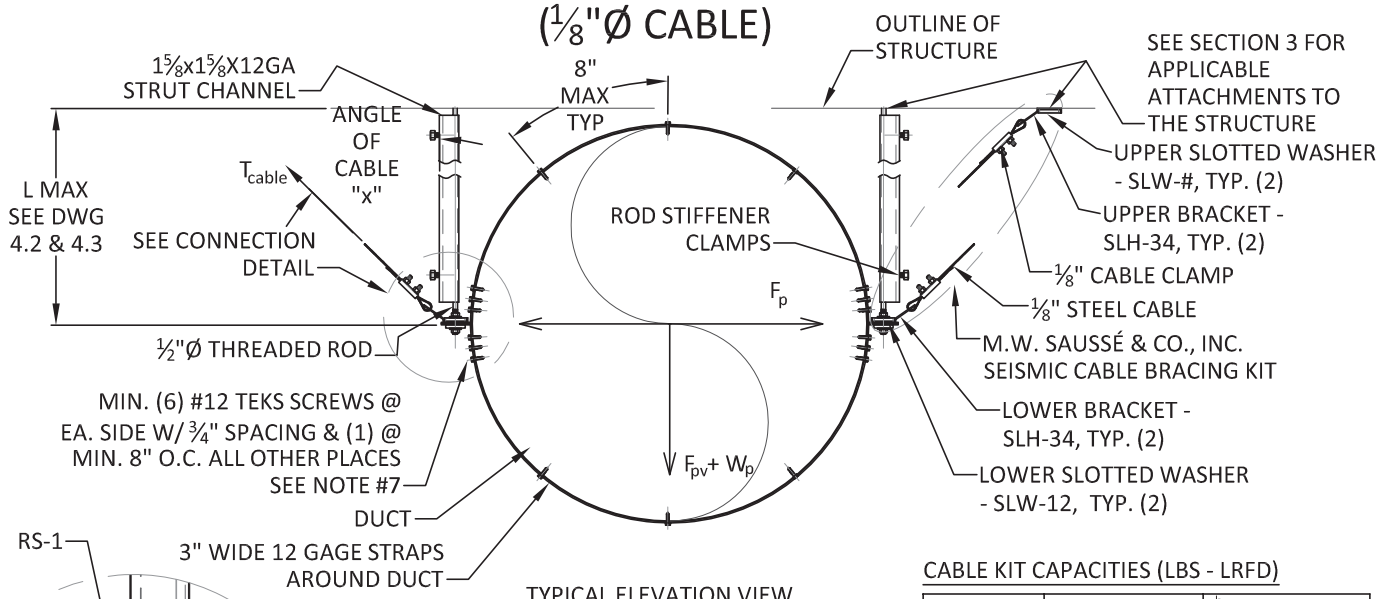
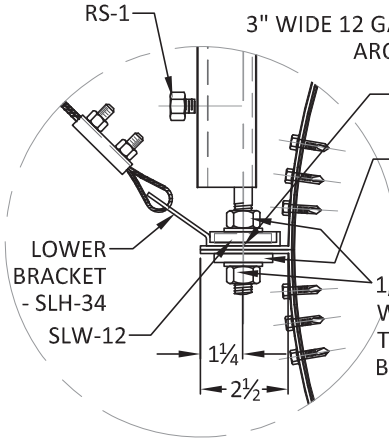
Date: May 9, 2016

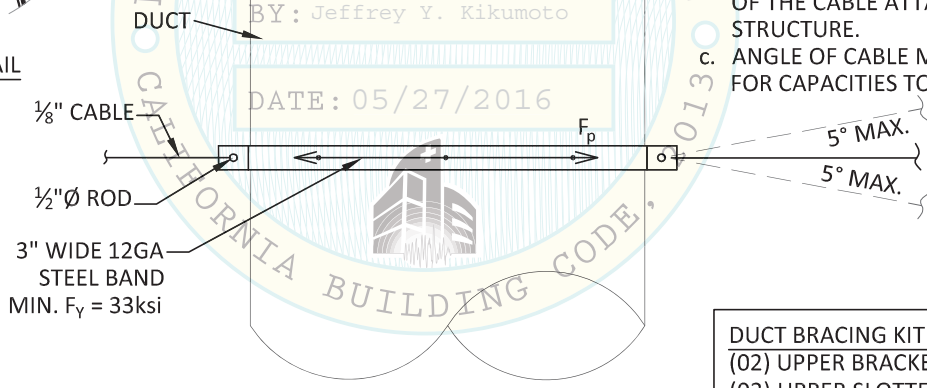
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE - 60 PLF MAX (⅛"Ø CABLE)



TYPICAL ELEVATION VIEW



CONNECTION DETAIL



TYPICAL PLAN VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[c]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 1-D18C-12R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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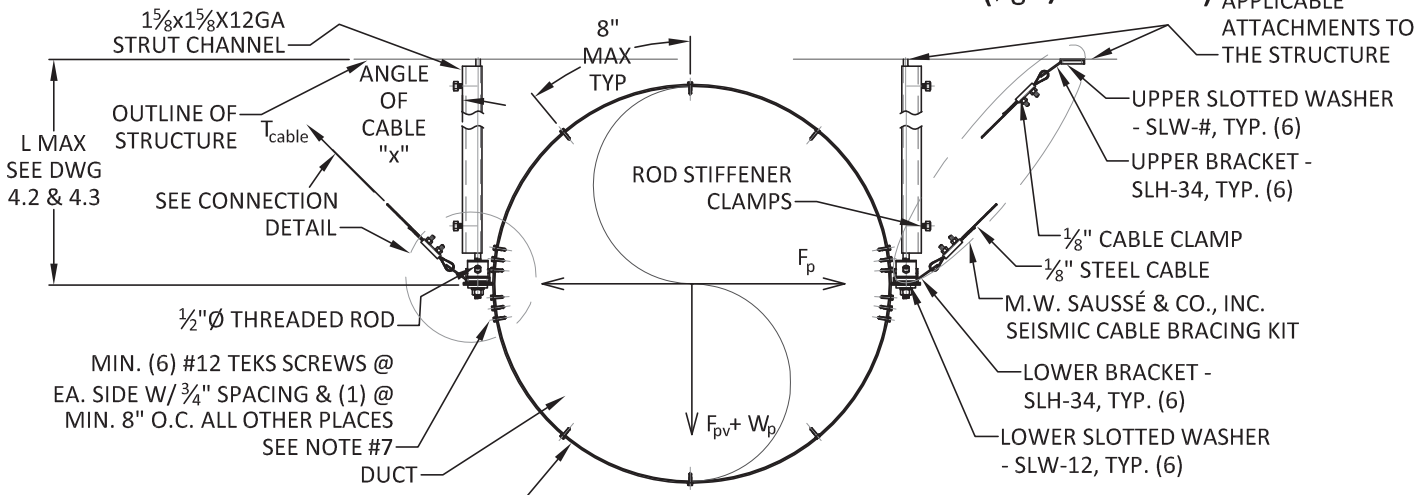
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE & LONGITUDINAL - 60 PLF MAX (⅛"Ø CABLE)

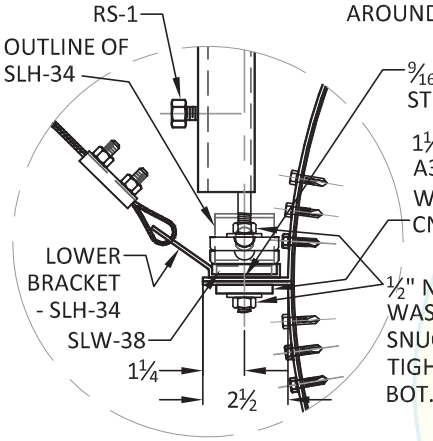
SEE SECTION 3 FOR APPLICABLE ATTACHMENTS TO THE STRUCTURE



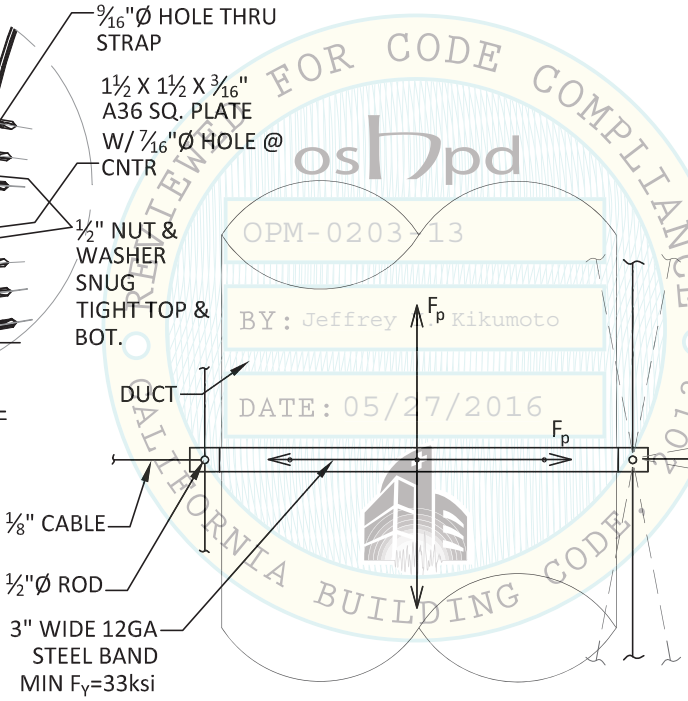
TYPICAL ELEVATION VIEW

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[d]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CONNECTION DETAIL



TYPICAL PLAN VIEW

DUCT BRACING KIT 2-D18C-12R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(06) ⅛" CABLE - 10 FT.
(12) ⅛" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
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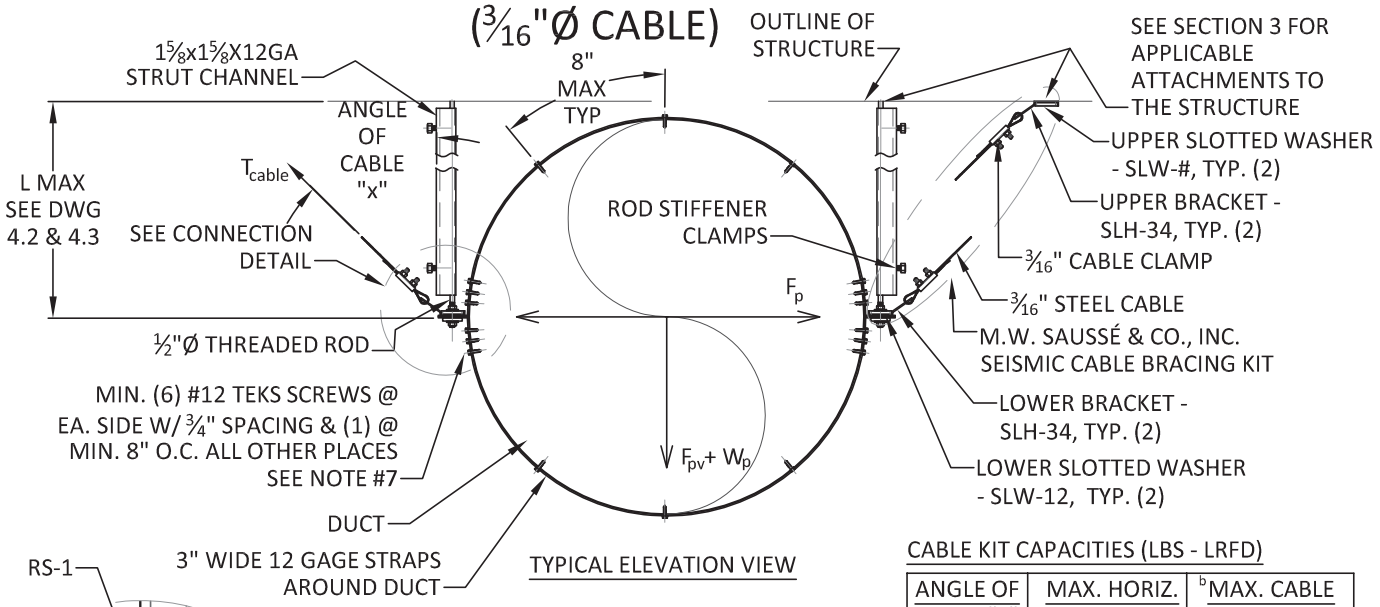
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE - 60 PLF MAX ($\frac{3}{16}$"Ø CABLE)

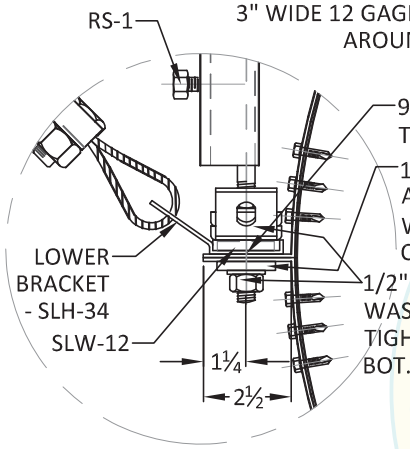


TYPICAL ELEVATION VIEW

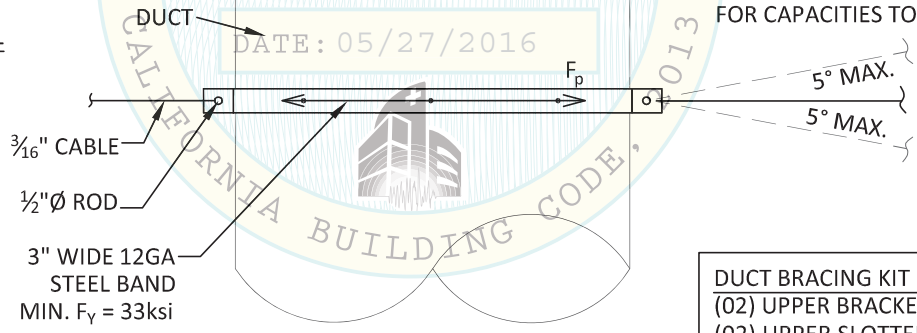
CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[c]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CONNECTION DETAIL



TYPICAL PLAN VIEW

DUCT BRACING KIT 1-D316C-12R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
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5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
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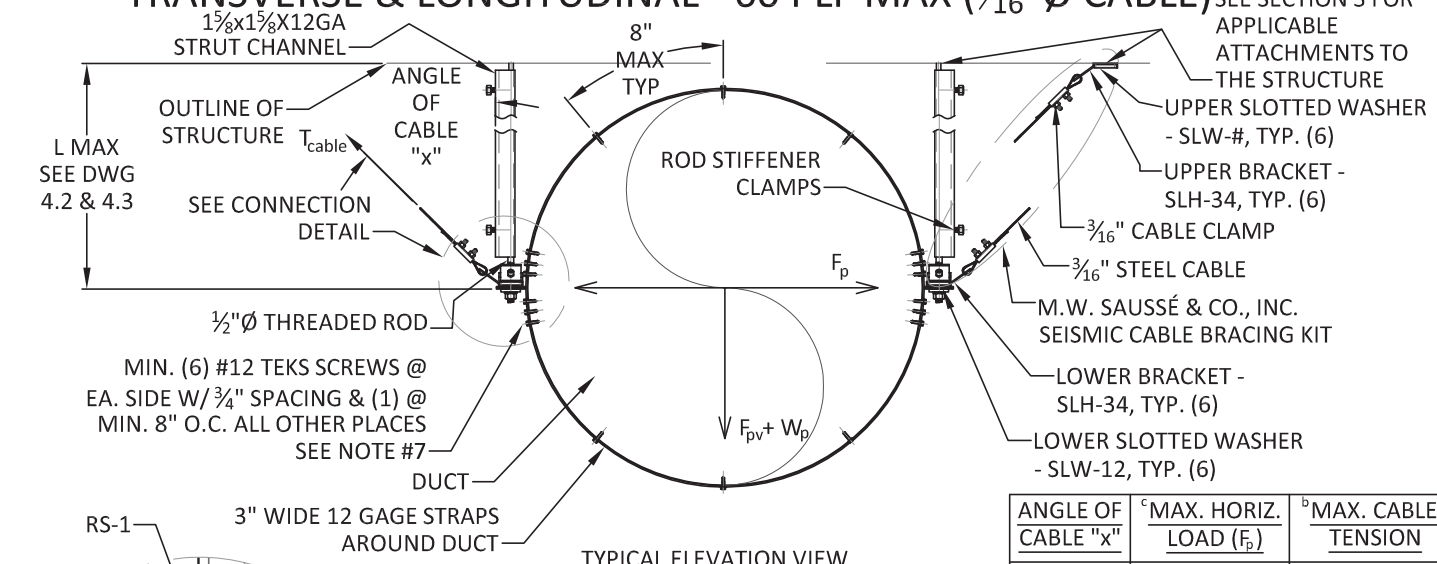
Date: May 9, 2016

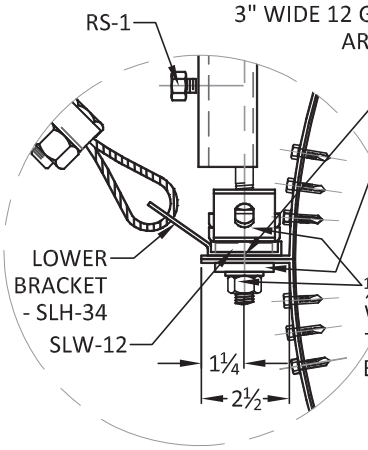
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE & LONGITUDINAL - 60 PLF MAX (3/16"Ø CABLE)



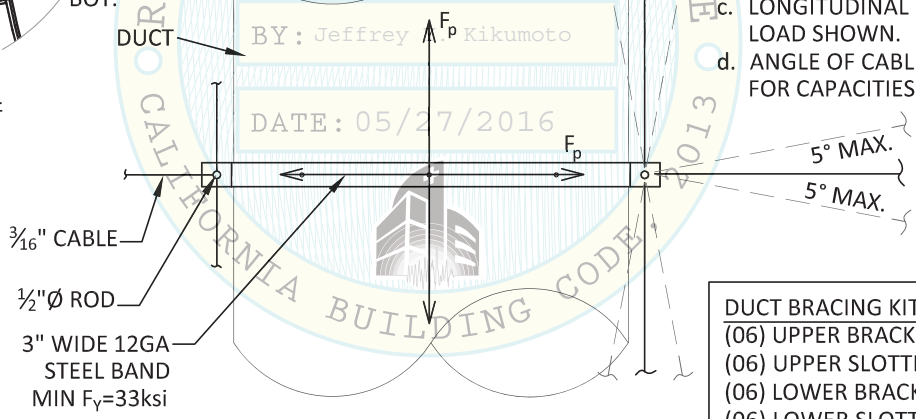
TYPICAL ELEVATION VIEW

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[c]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CONNECTION DETAIL



TYPICAL PLAN VIEW

DUCT BRACING KIT 2-D316C-12R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(06) 3/16" CABLE - 10 FT.
(12) 3/16" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
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5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
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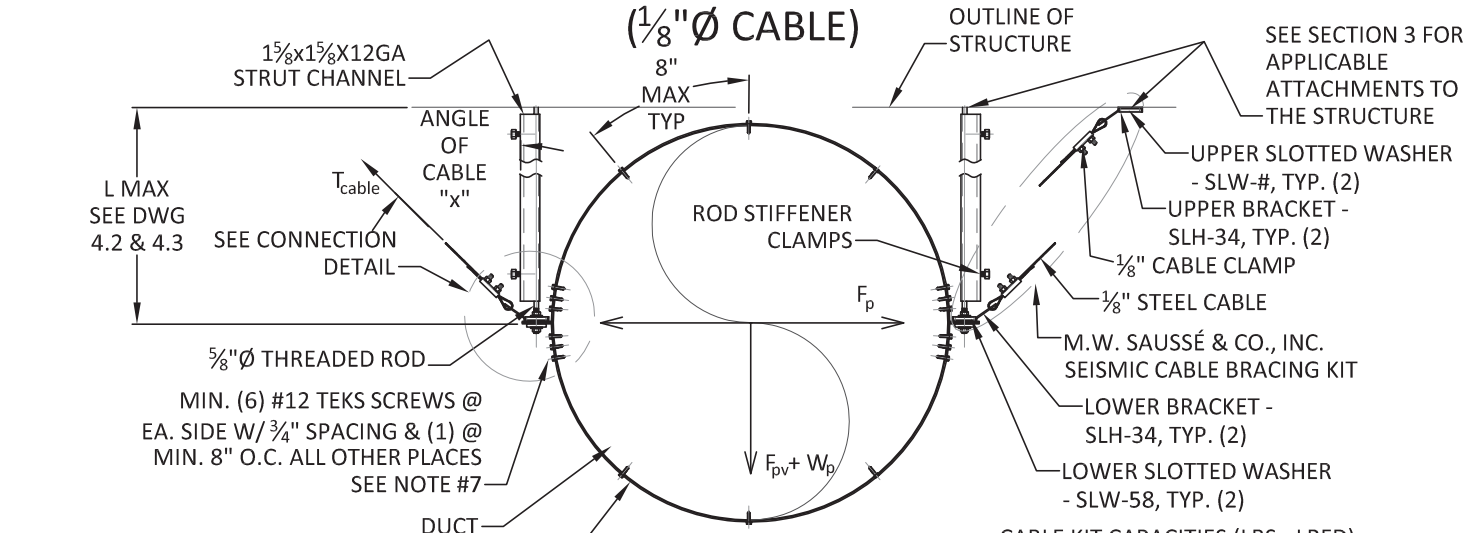
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE - 100 PLF MAX ($\frac{1}{8}$"Ø CABLE)

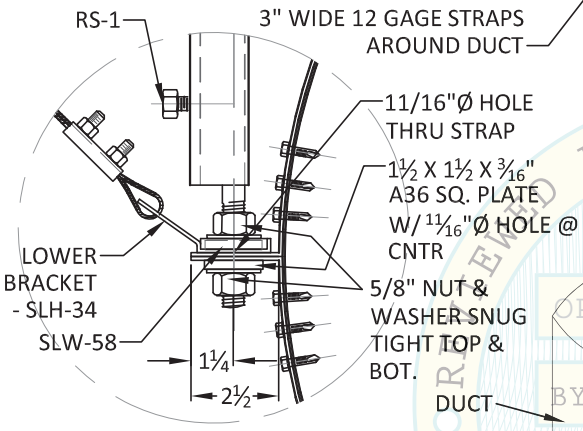


TYPICAL ELEVATION VIEW

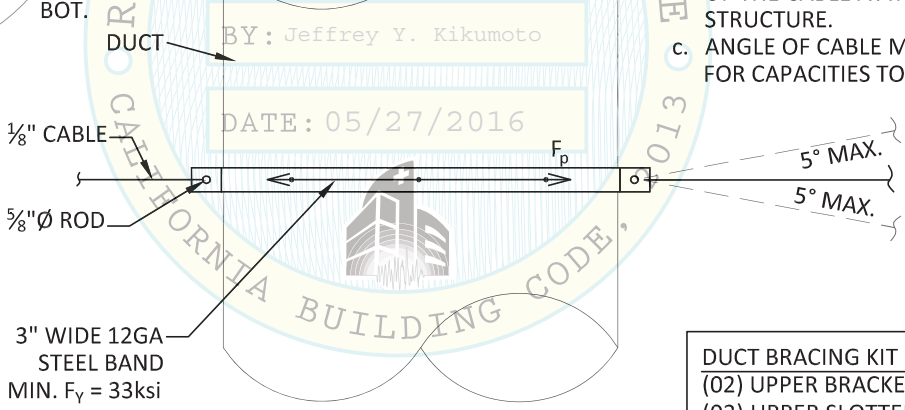
CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[c]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CONNECTION DETAIL



TYPICAL PLAN VIEW

DUCT BRACING KIT 1-D18C-58R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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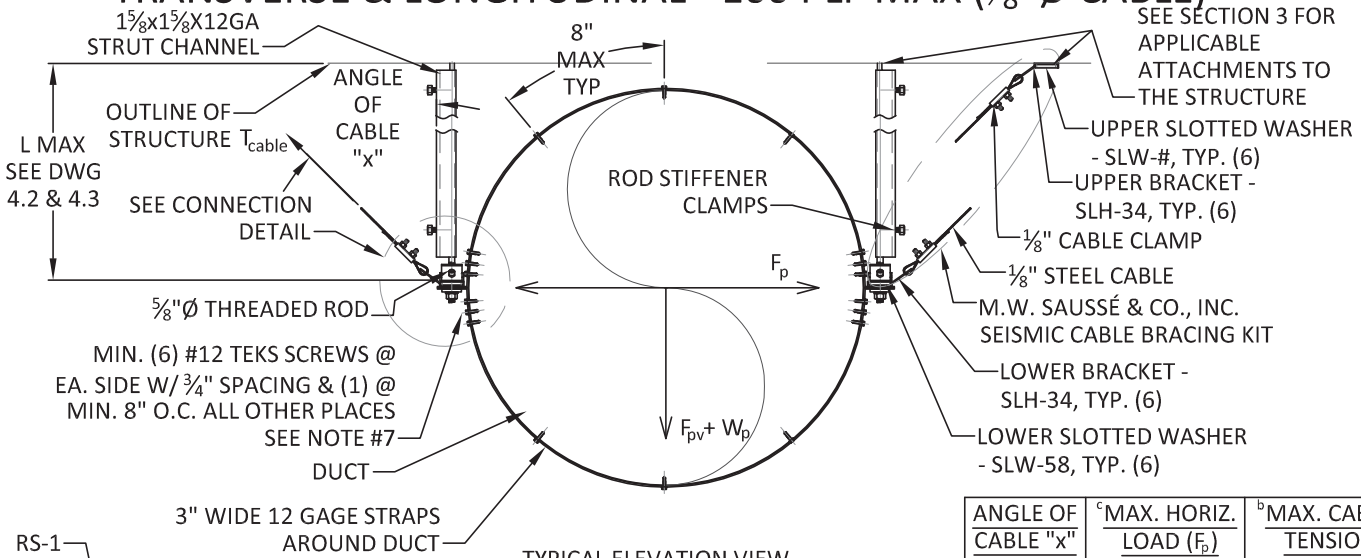
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE & LONGITUDINAL - 100 PLF MAX (⅛"Ø CABLE)



TYPICAL ELEVATION VIEW

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[c]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
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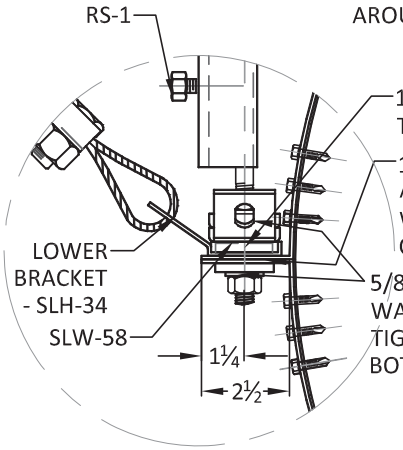
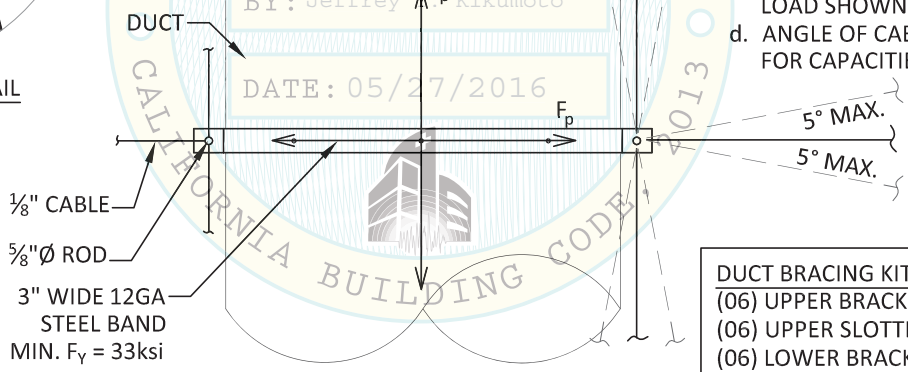
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CONNECTION DETAIL



TYPICAL PLAN VIEW

DUCT BRACING KIT 2-D18C-58R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(06) ⅛" CABLE - 10 FT.
(12) ⅛" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
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5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
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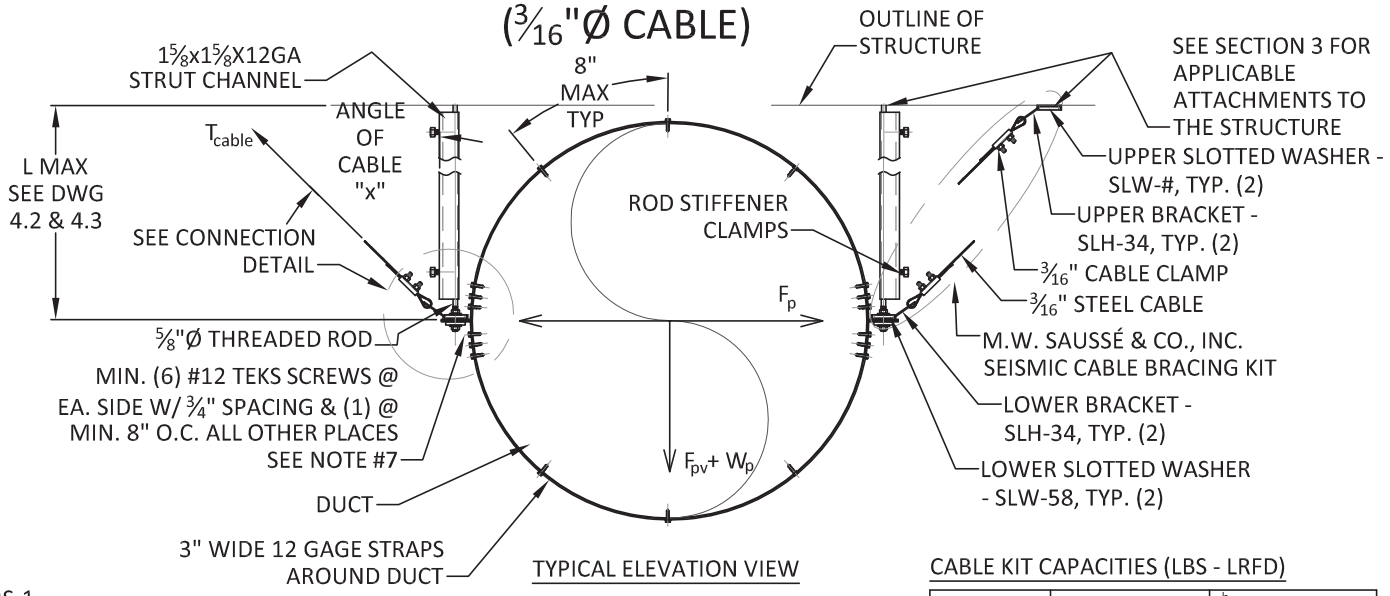
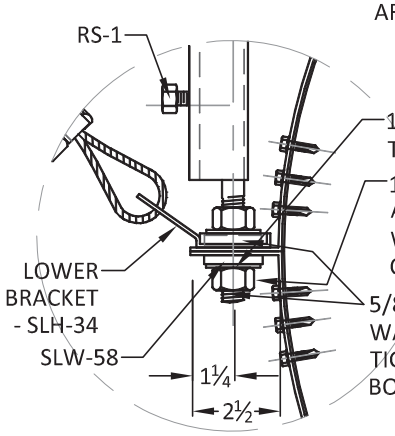
Date: May 9, 2016

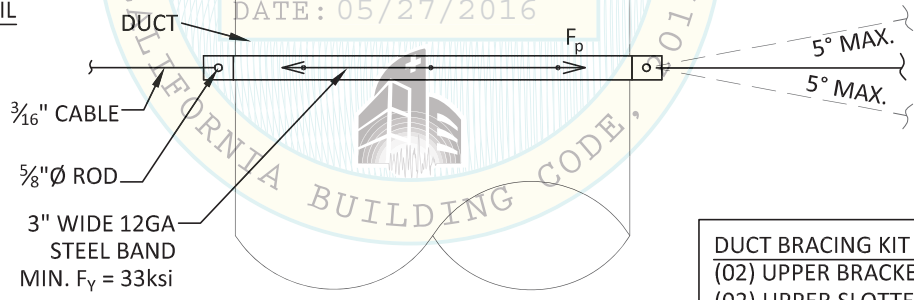
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE - 100 PLF MAX ($\frac{3}{16}$"Ø CABLE)



TYPICAL ELEVATION VIEW



CONNECTION DETAIL



TYPICAL PLAN VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[c]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 1-D316C-58R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
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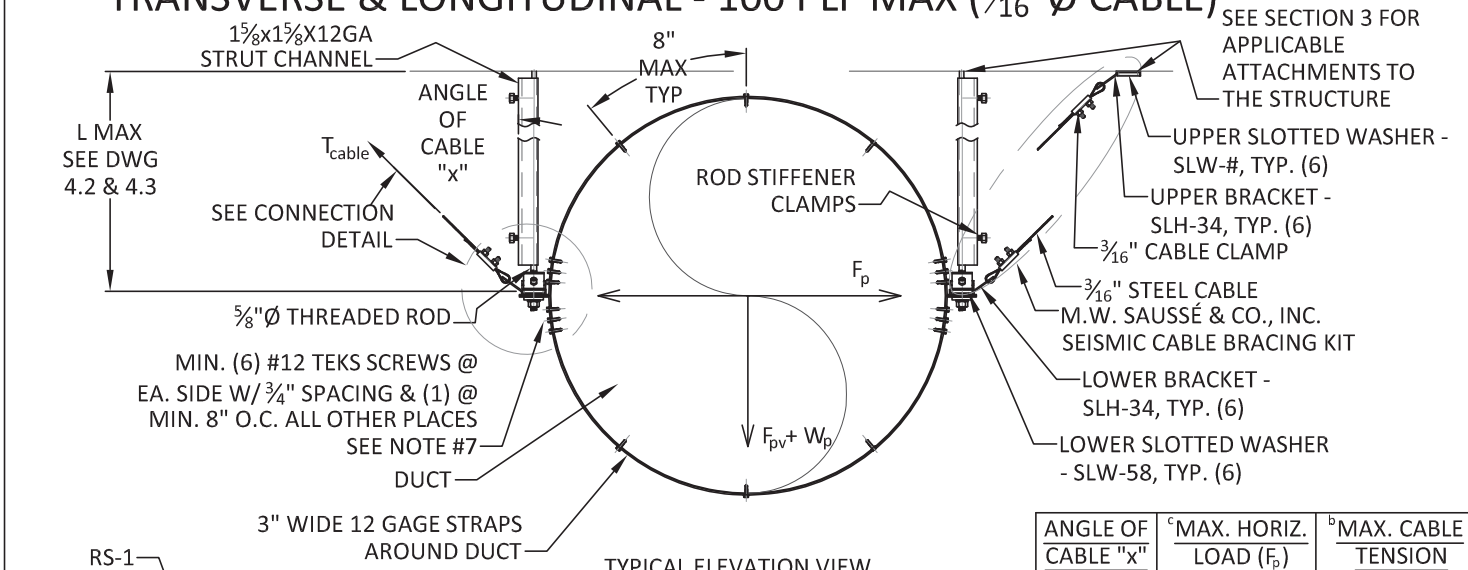
Civil Engineer: P.K. Sachdeva
California PE No. C59644

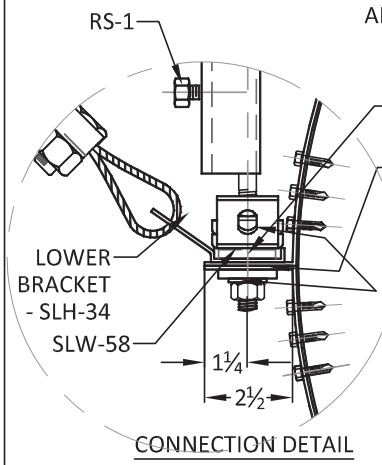
CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE & LONGITUDINAL - 100 PLF MAX ($\frac{3}{16}$"Ø CABLE)



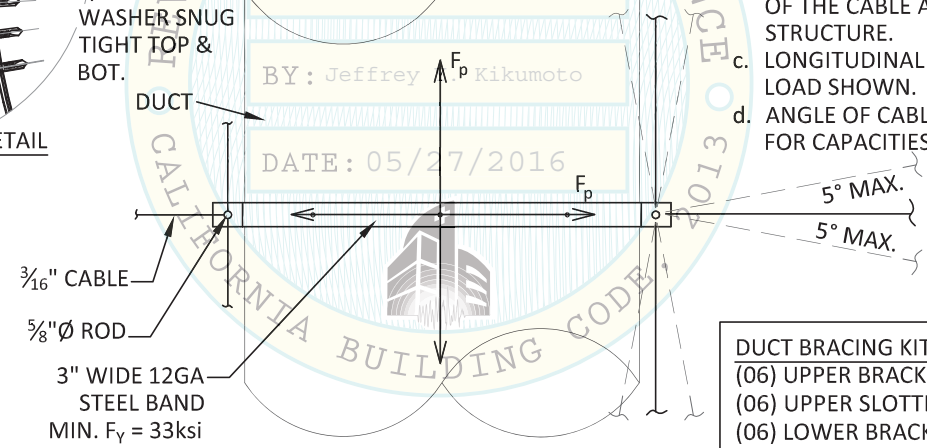
TYPICAL ELEVATION VIEW

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[d]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CONNECTION DETAIL



TYPICAL PLAN VIEW

DUCT BRACING KIT 2-D316C-58R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(06) $\frac{3}{16}$" CABLE - 10 FT.
(12) $\frac{3}{16}$" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

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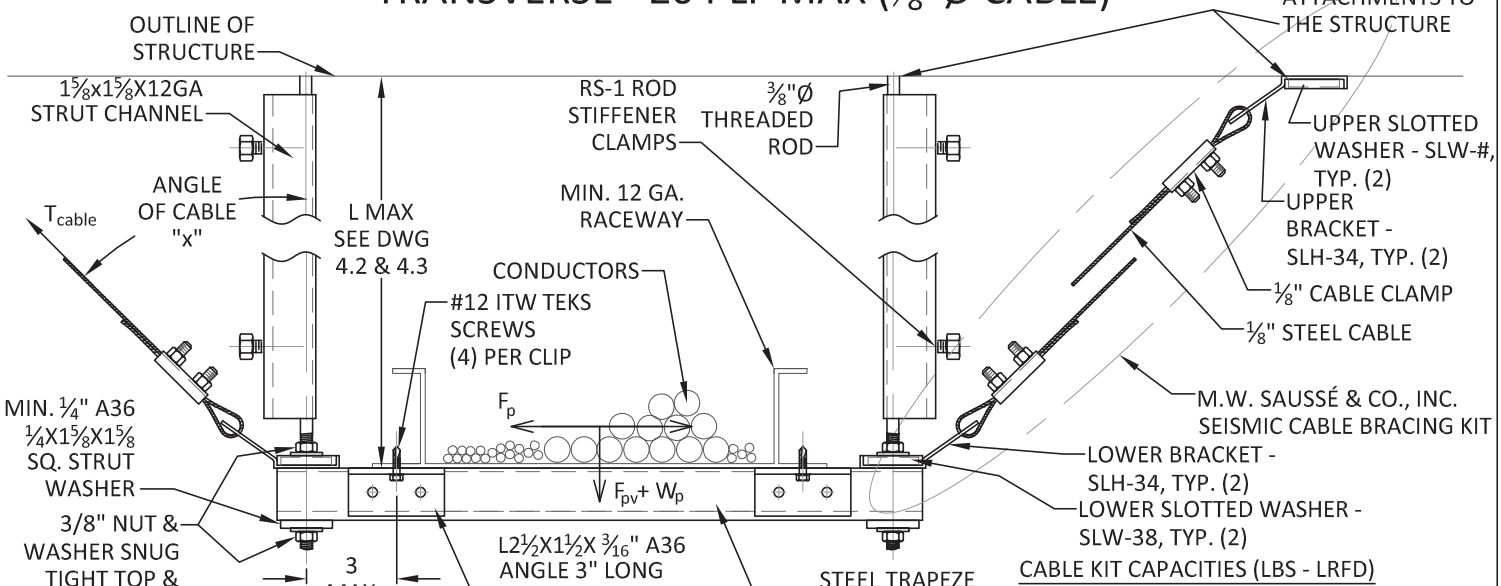
Date: May 9, 2016

CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY
TRANSVERSE - 20 PLF MAX (⅛"Ø CABLE)

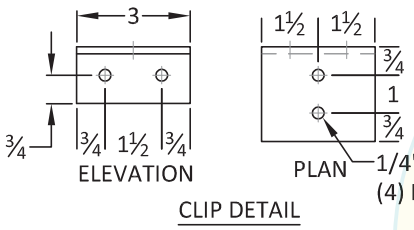


TYPICAL ELEVATION VIEW

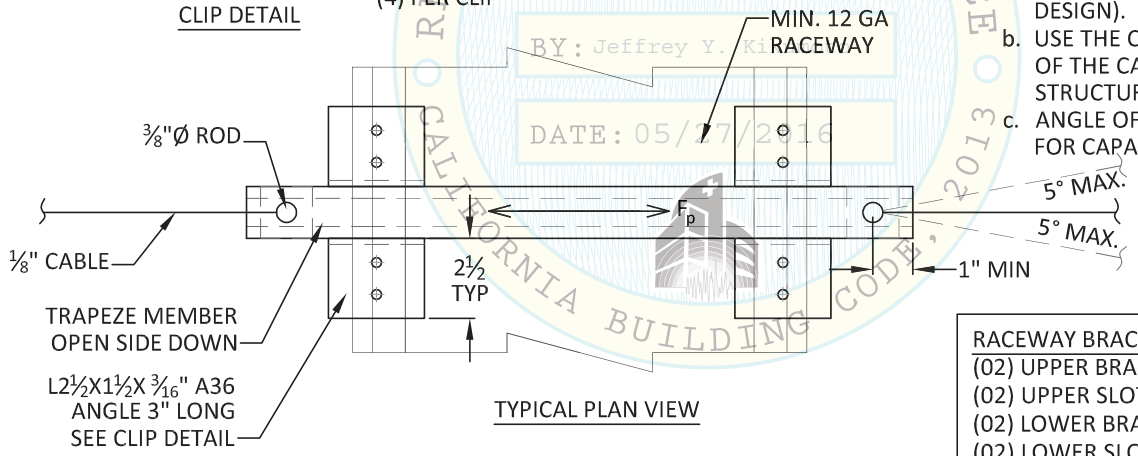
CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[c]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CLIP DETAIL



TYPICAL PLAN VIEW

RACEWAY BRACING KIT 1-R18C-38R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

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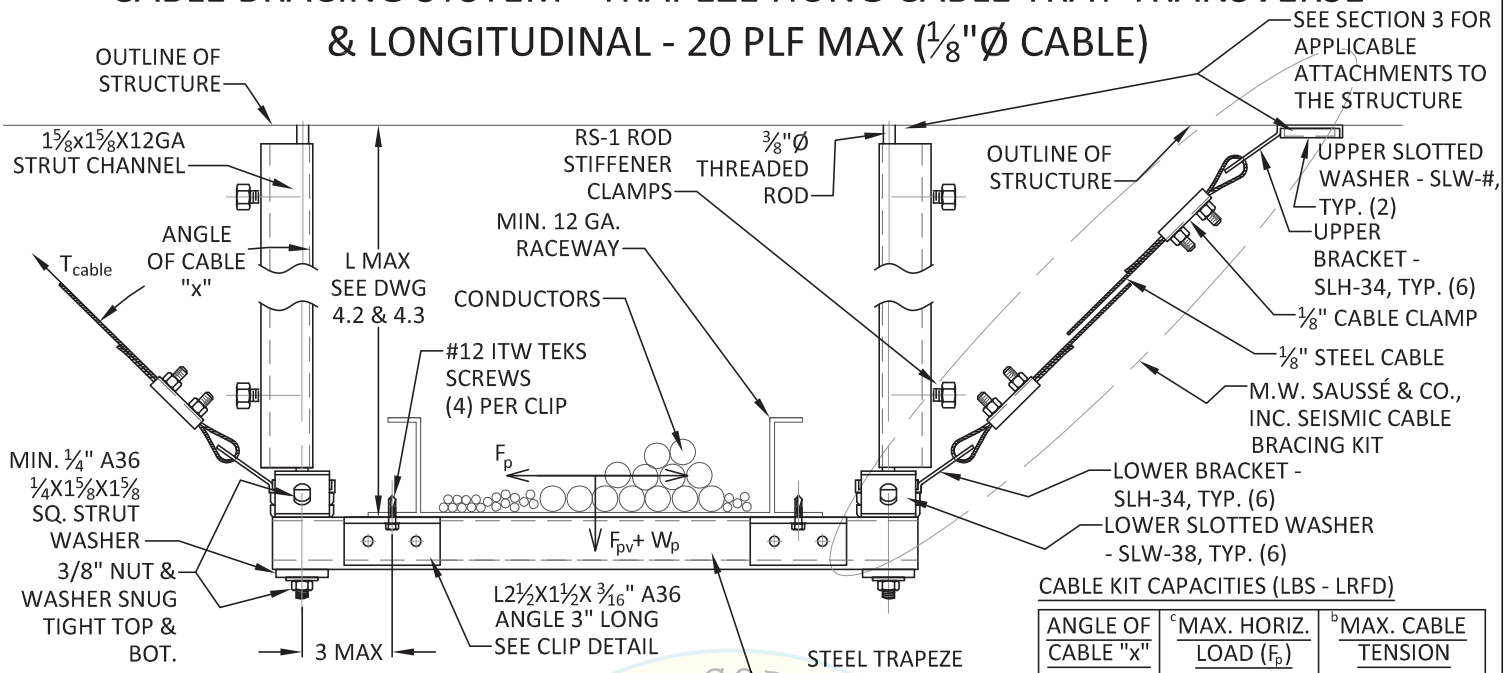
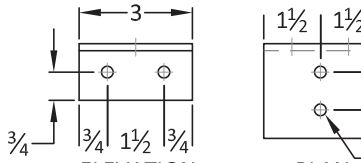
California PE No. C59644

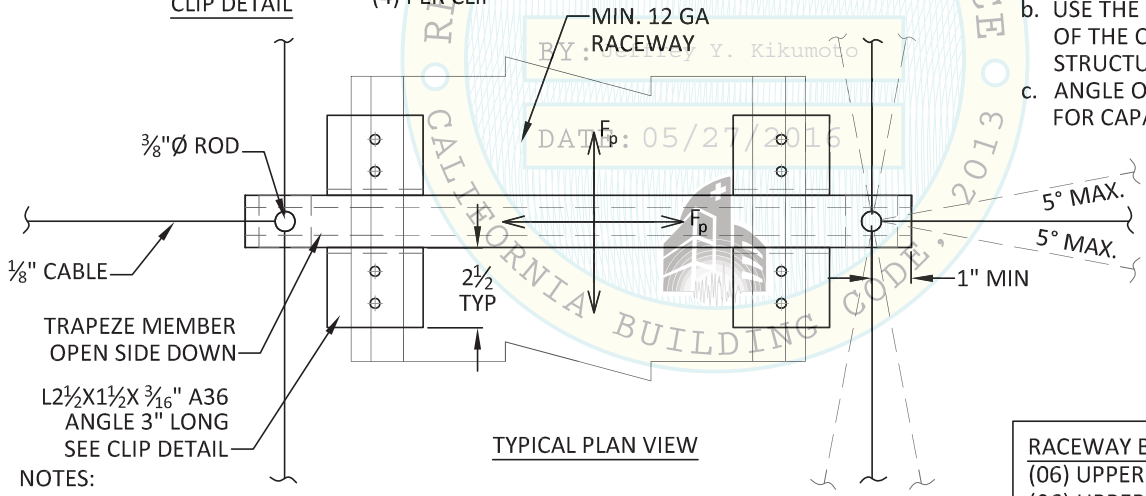
CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY TRANSVERSE & LONGITUDINAL - 20 PLF MAX (⅛"Ø CABLE)



TYPICAL ELEVATION VIEW



CLIP DETAIL



TYPICAL PLAN VIEW

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[c]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

RACEWAY BRACING KIT 1-R18C-38R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(06) ⅛" CABLE - 10 FT.
(12) ⅛" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

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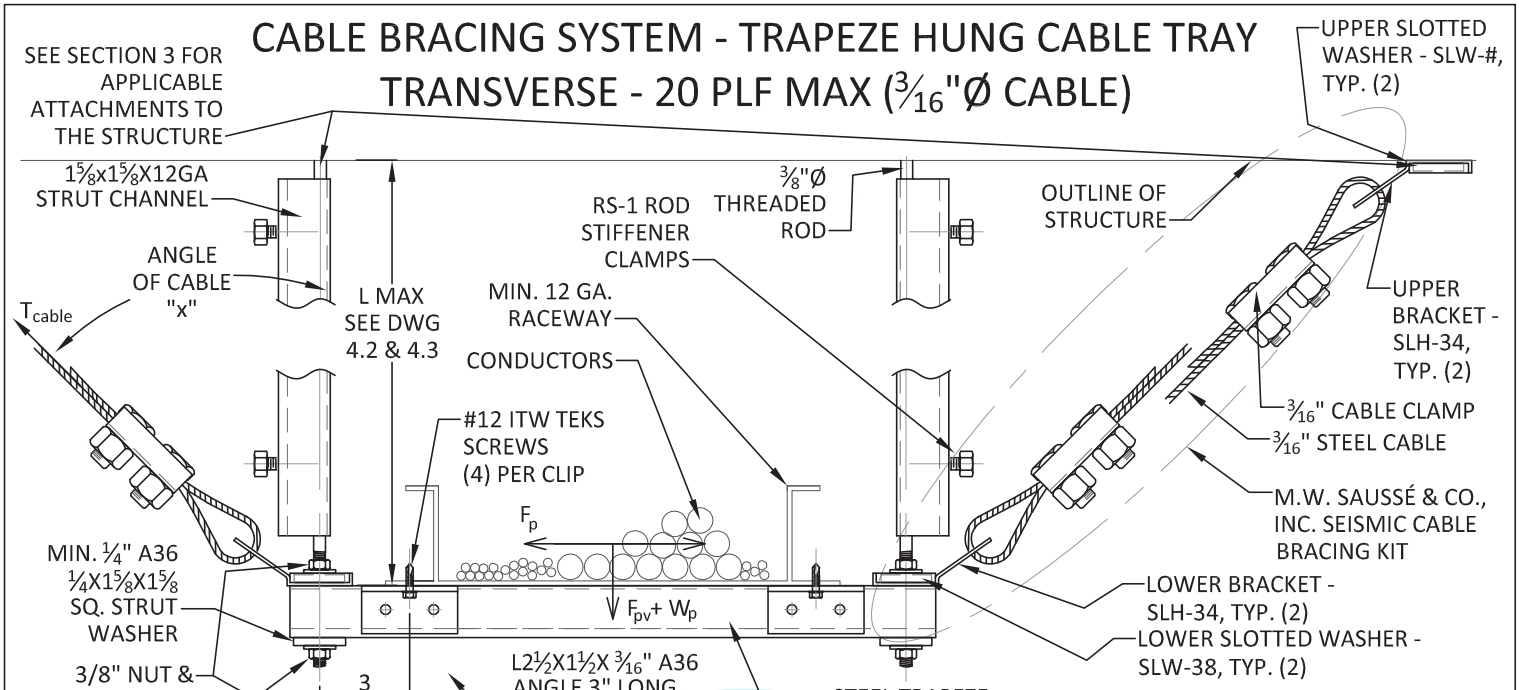
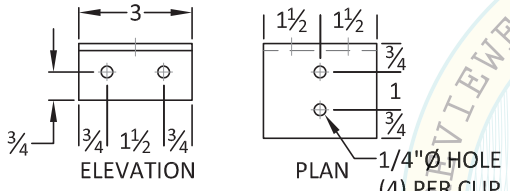
Date: May 9, 2016

CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY TRANSVERSE - 20 PLF MAX (3/16"Ø CABLE)



TYPICAL ELEVATION VIEW

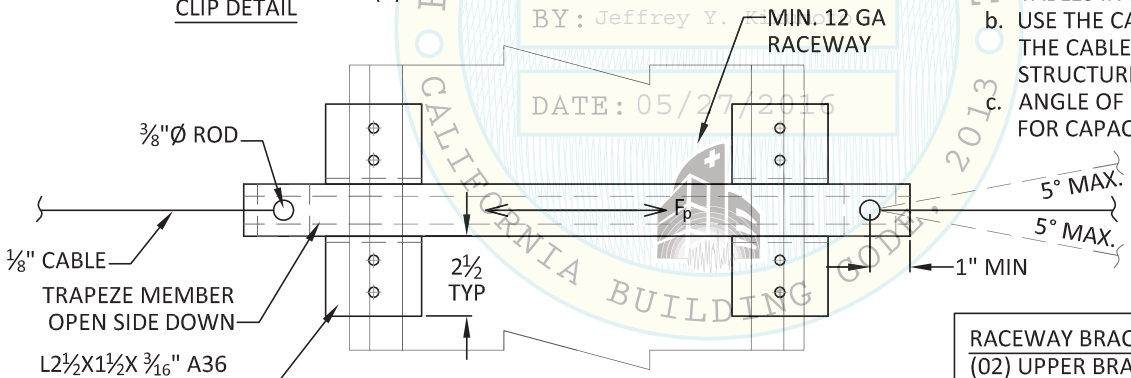


CLIP DETAIL

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[c]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

RACEWAY BRACING KIT 1-R316C-38R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

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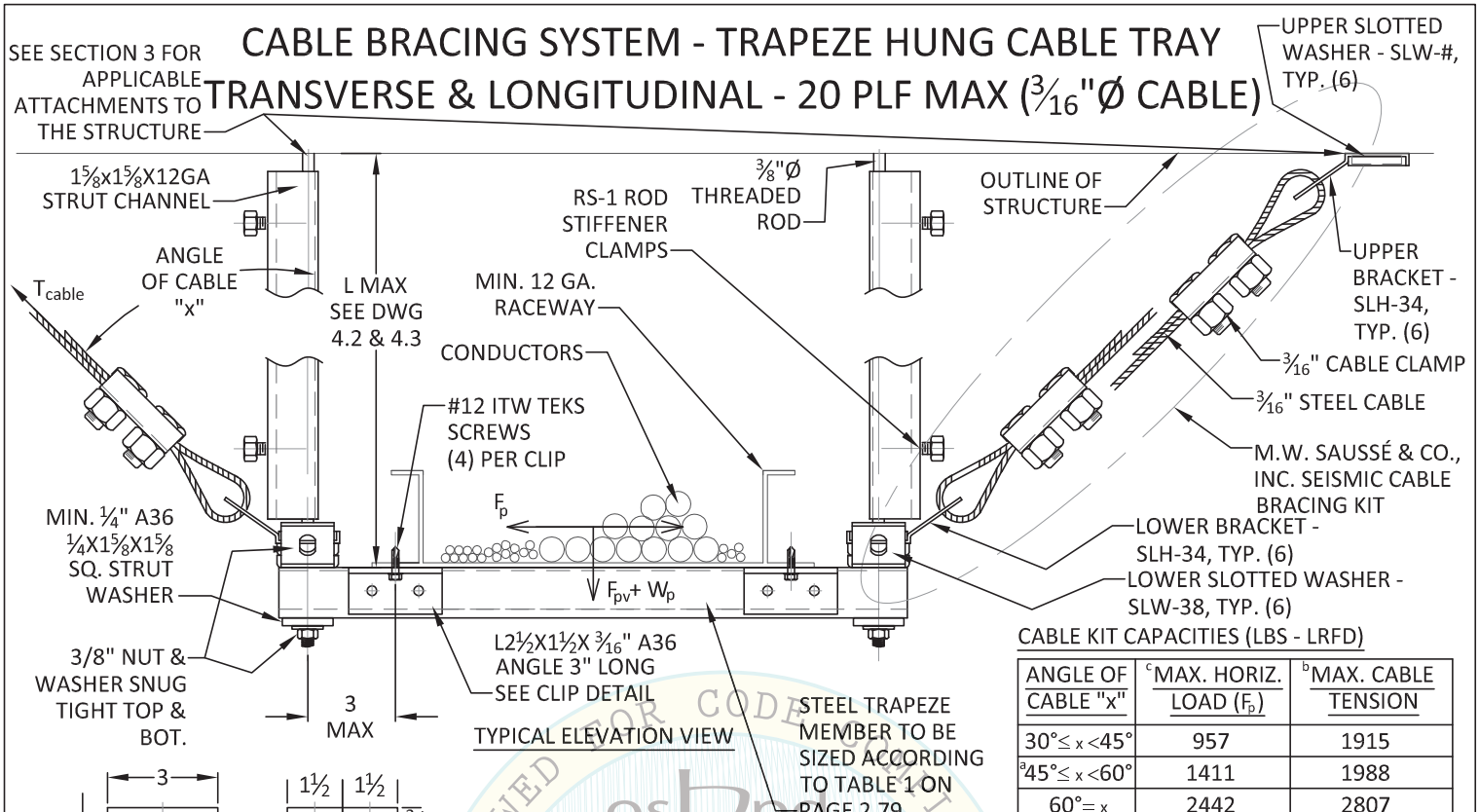
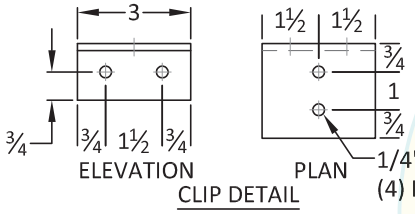
CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY TRANSVERSE & LONGITUDINAL - 20 PLF MAX (3/16"Ø CABLE)



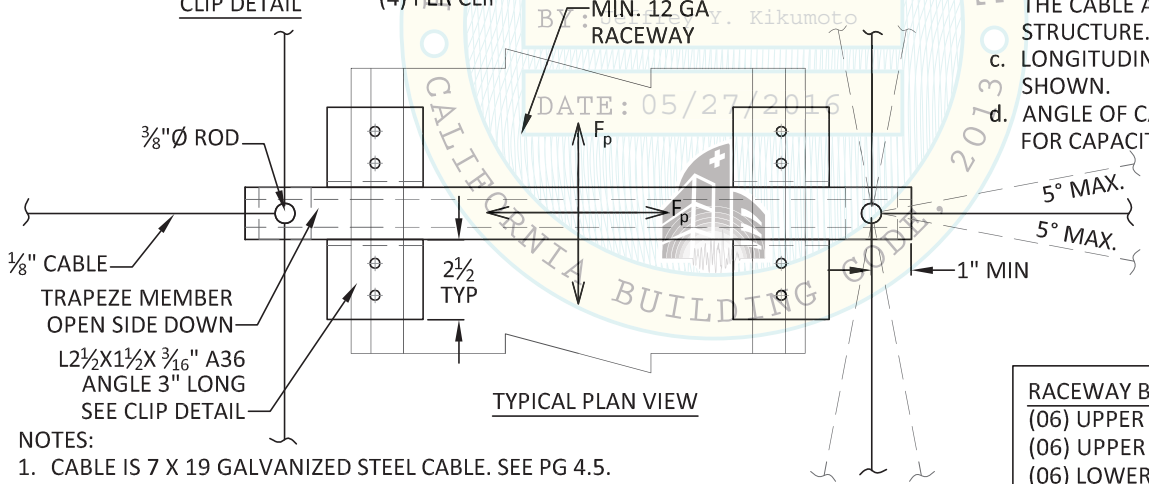


CLIP DETAIL

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[d]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

RACEWAY BRACING KIT 1-R316C-38R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(06) 3/16" CABLE - 10 FT.
(12) 3/16" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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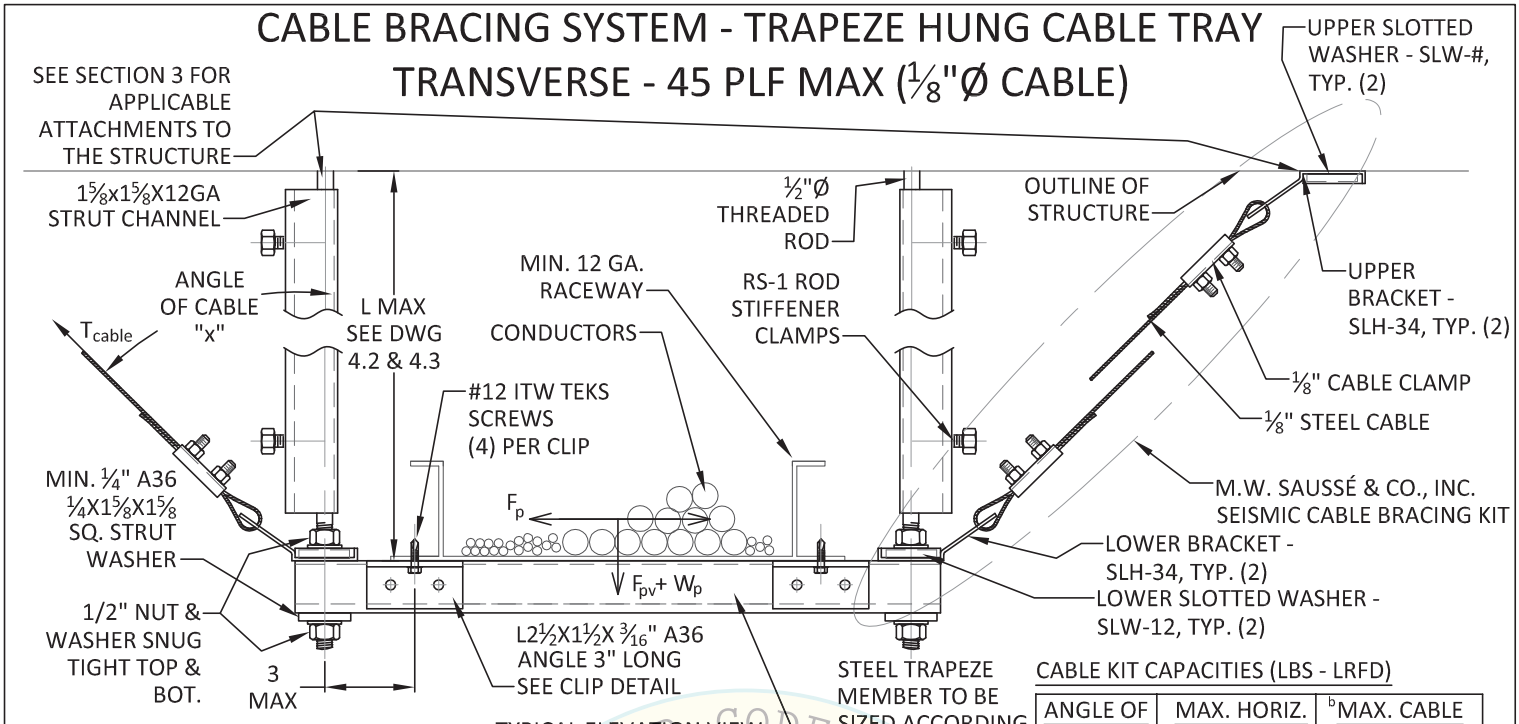
CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY
TRANSVERSE - 45 PLF MAX (⅛"Ø CABLE)

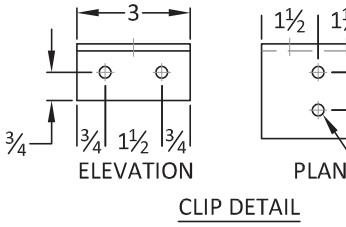


TYPICAL ELEVATION VIEW

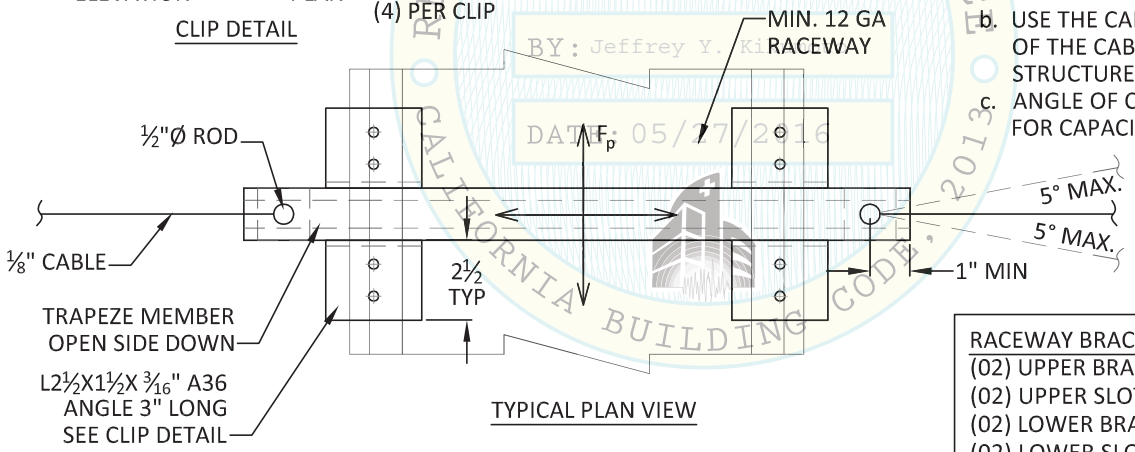
CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[c]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CLIP DETAIL



TYPICAL PLAN VIEW

RACEWAY BRACING KIT 1-R18C-12R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

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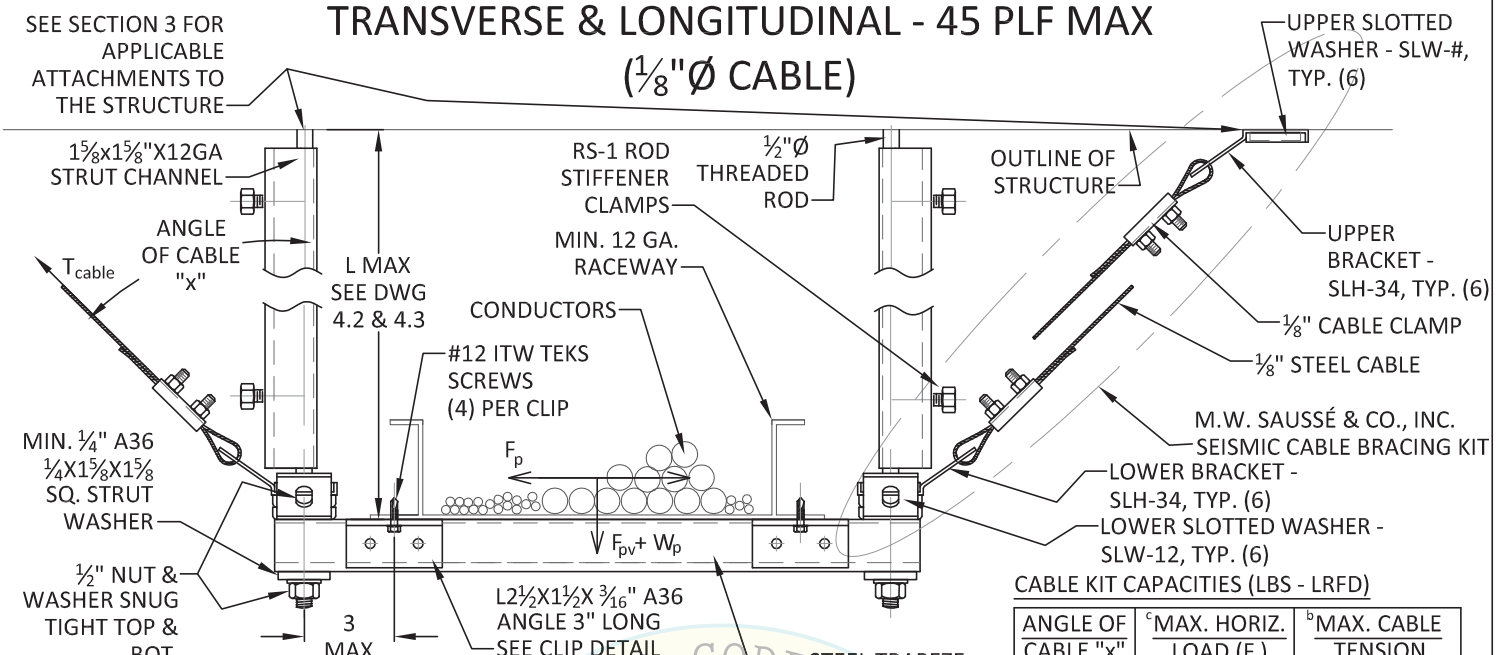
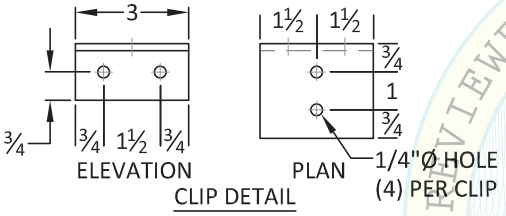
CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY
TRANSVERSE & LONGITUDINAL - 45 PLF MAX
(⅛"Ø CABLE)



TYPICAL ELEVATION VIEW

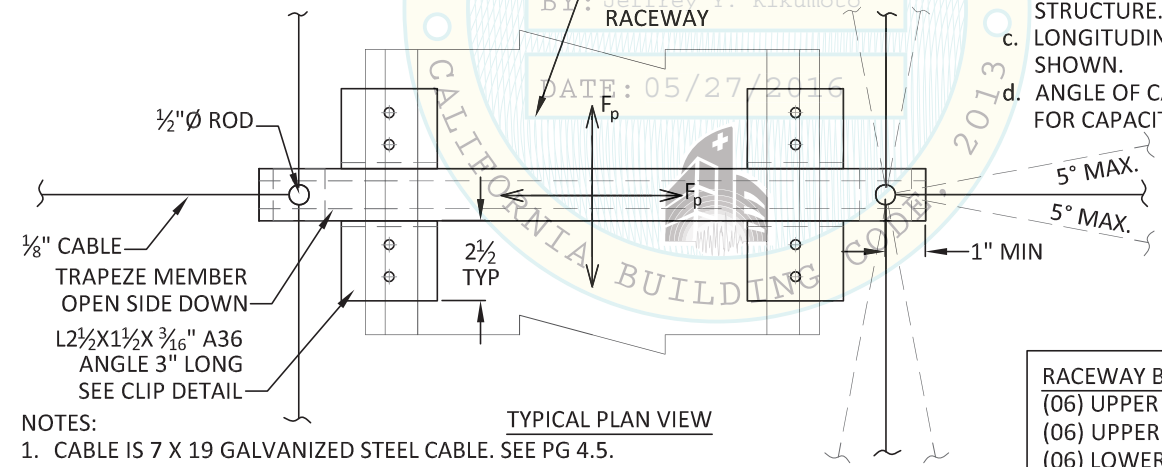


CLIP DETAIL

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[d]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

RACEWAY BRACING KIT 1-R18C-12R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(06) ⅛" CABLE - 10 FT.
(12) ⅛" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

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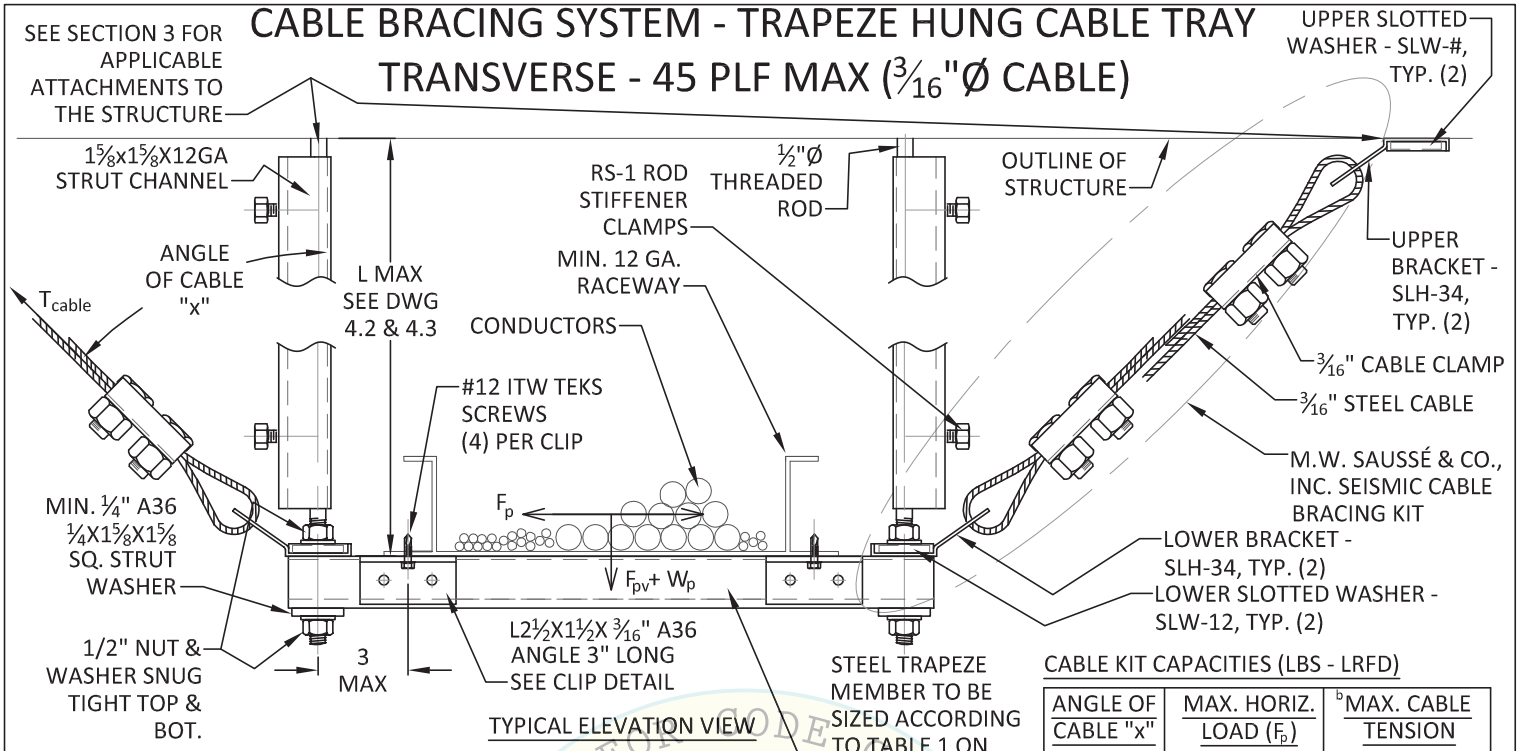
Date: May 9, 2016

CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY TRANSVERSE - 45 PLF MAX (3/16"Ø CABLE)

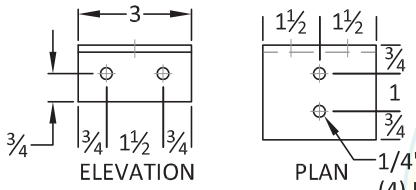


TYPICAL ELEVATION VIEW

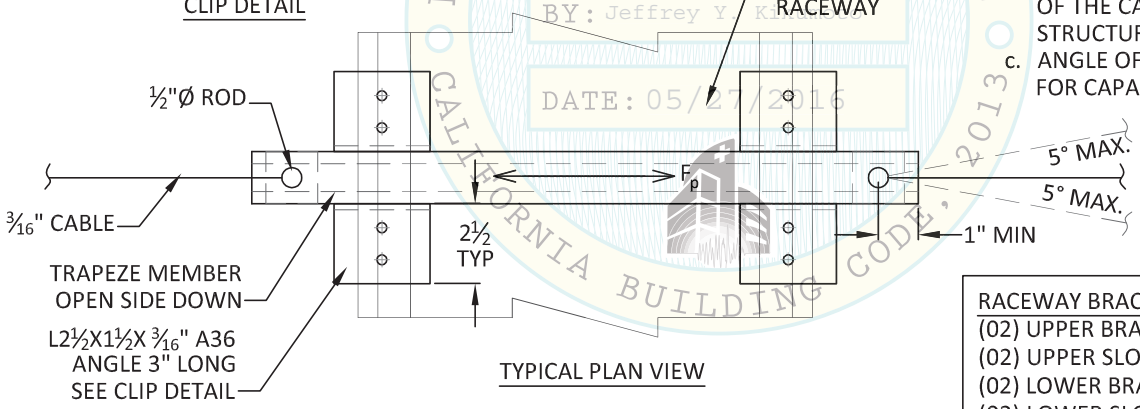
CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[c]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CLIP DETAIL



TYPICAL PLAN VIEW

RACEWAY BRACING KIT 1-R316C-12R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

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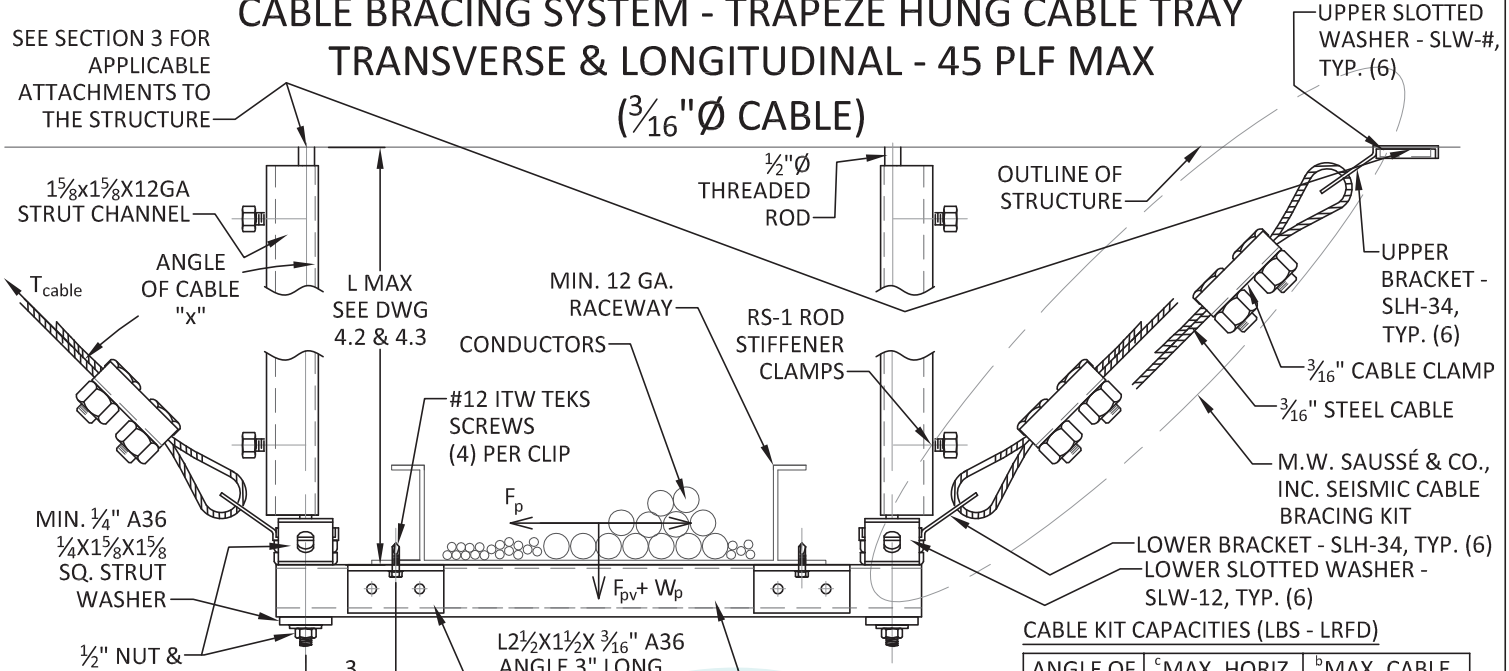
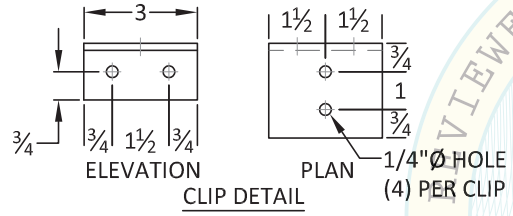
CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY TRANSVERSE & LONGITUDINAL - 45 PLF MAX ($\frac{3}{16}$"Ø CABLE)



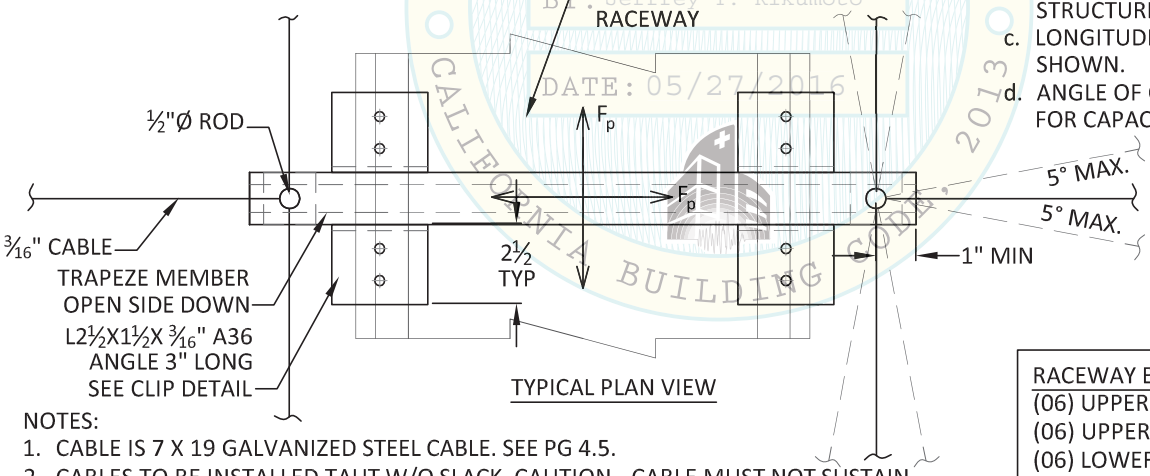


CLIP DETAIL

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[d]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



TYPICAL PLAN VIEW

RACEWAY BRACING KIT 2-R316C-12R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-12
(04) ROD STIFFENER CLAMPS - RS-1
(06) 3/16" CABLE - 10 FT.
(12) 3/16" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

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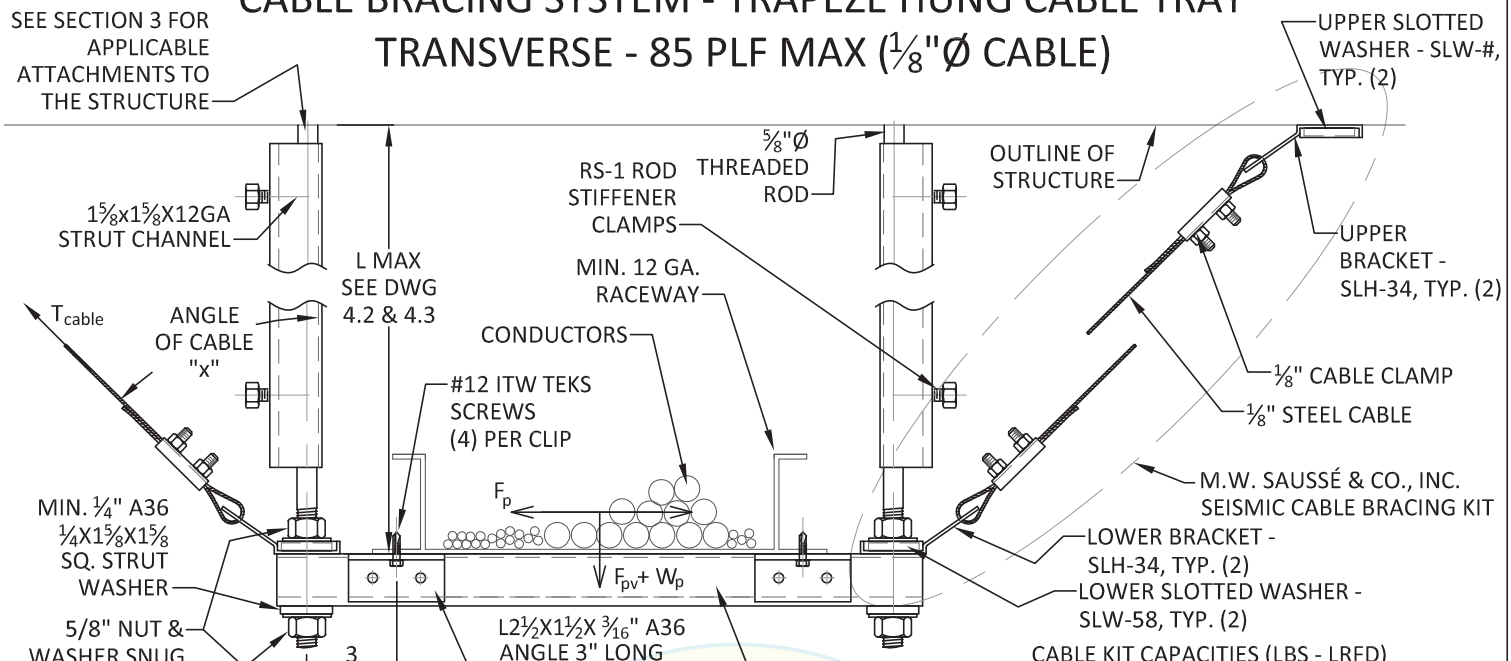
CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY TRANSVERSE - 85 PLF MAX (⅛"Ø CABLE)

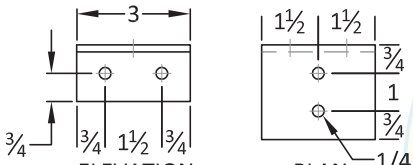


TYPICAL ELEVATION VIEW

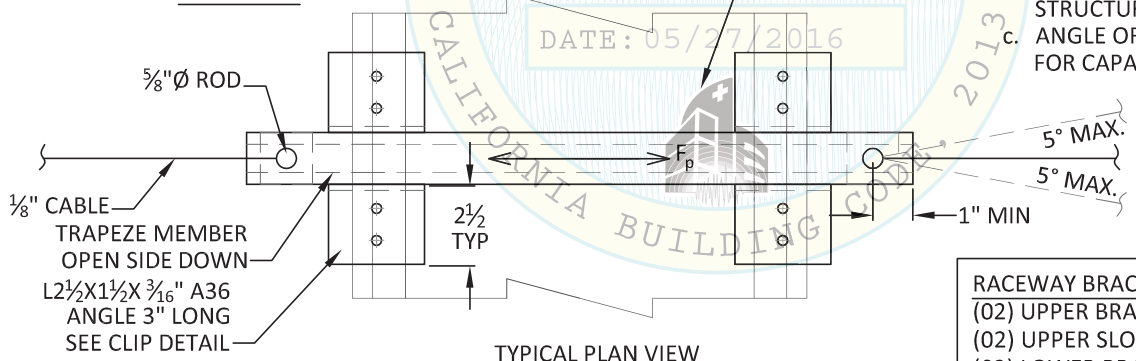
CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[c]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CLIP DETAIL



TYPICAL PLAN VIEW

RACEWAY BRACING KIT 1-R18C-58R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(02) ⅛" CABLE - 10 FT.
(04) ⅛" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

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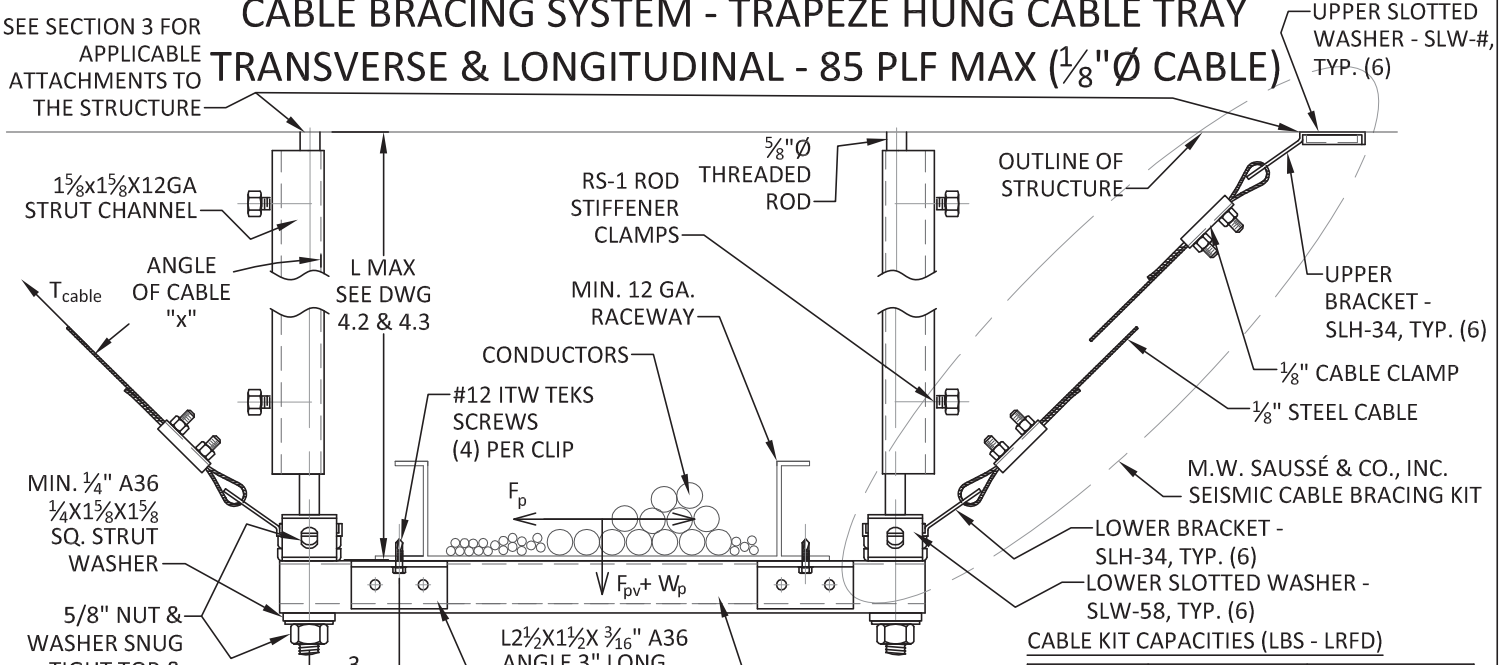
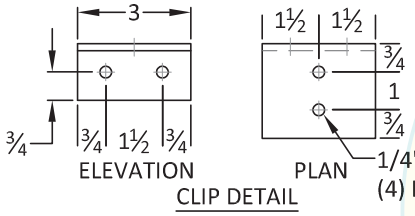
CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY
TRANSVERSE & LONGITUDINAL - 85 PLF MAX (⅛"Ø CABLE)



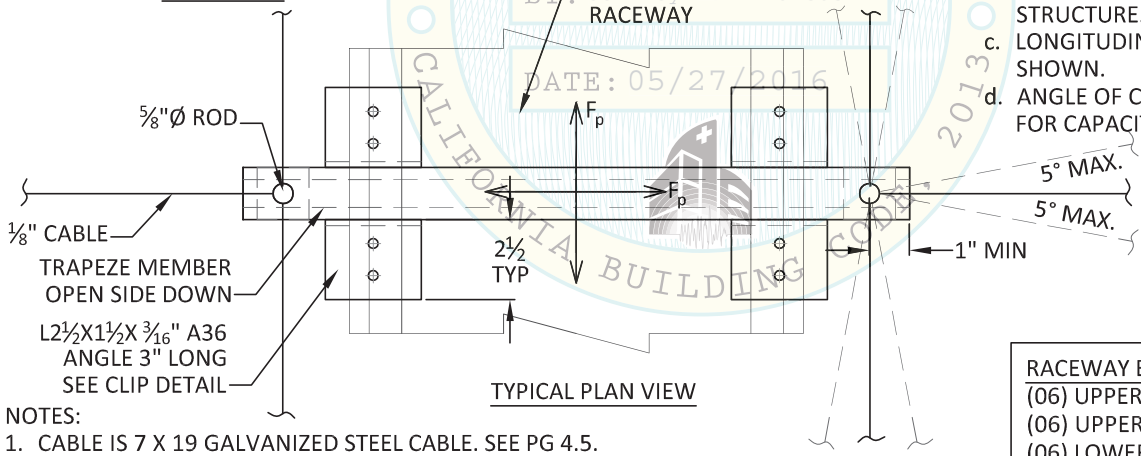
CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	547	1095
[a]45°≤ x <60°	1001	1411
60°= x	1316	1520
[d]60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CLIP DETAIL



TYPICAL PLAN VIEW

RACEWAY BRACING KIT 1-R18C-58R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(06) ⅛" CABLE - 10 FT.
(12) ⅛" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

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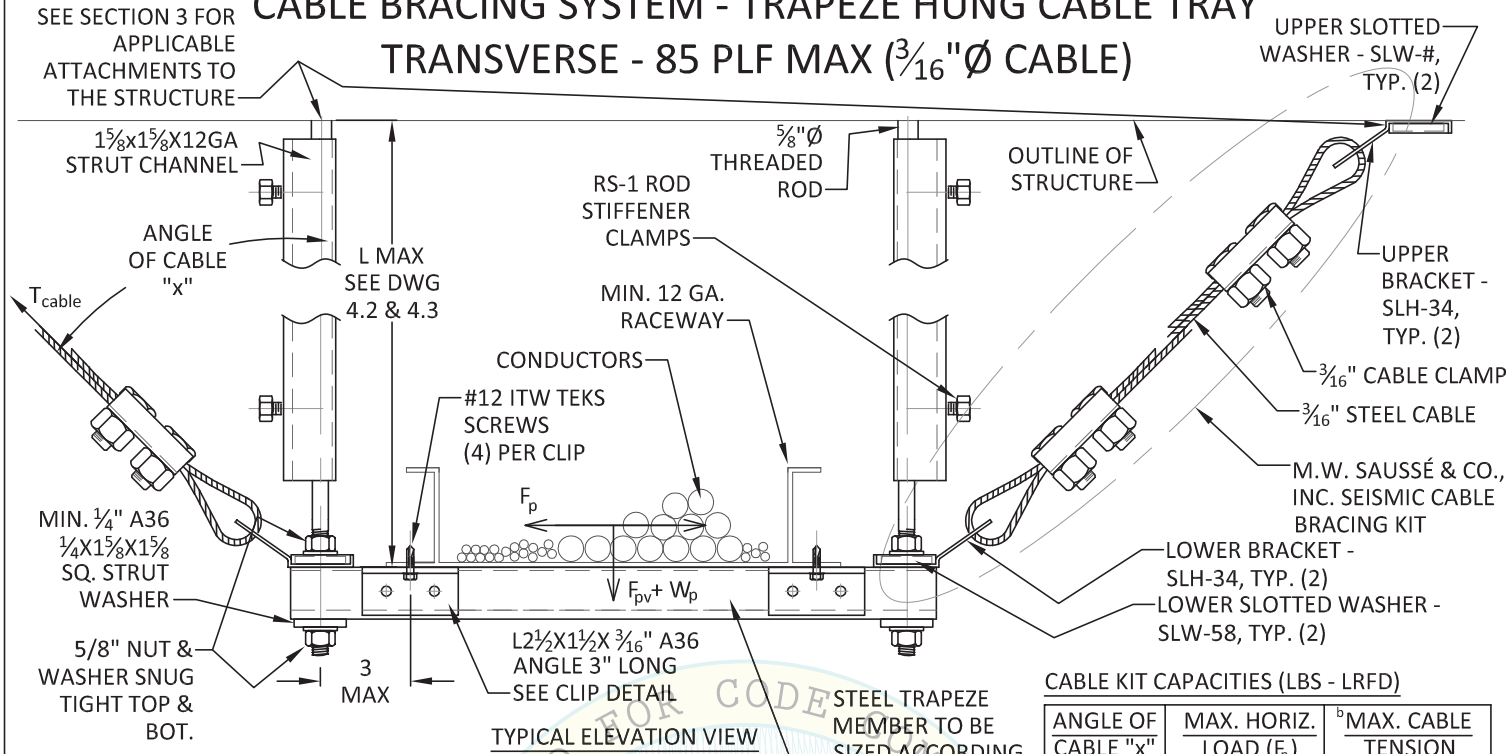
CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY TRANSVERSE - 85 PLF MAX (3/16"Ø CABLE)

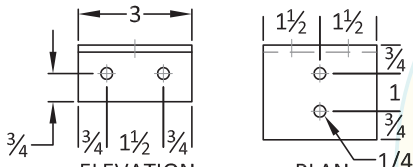


TYPICAL ELEVATION VIEW

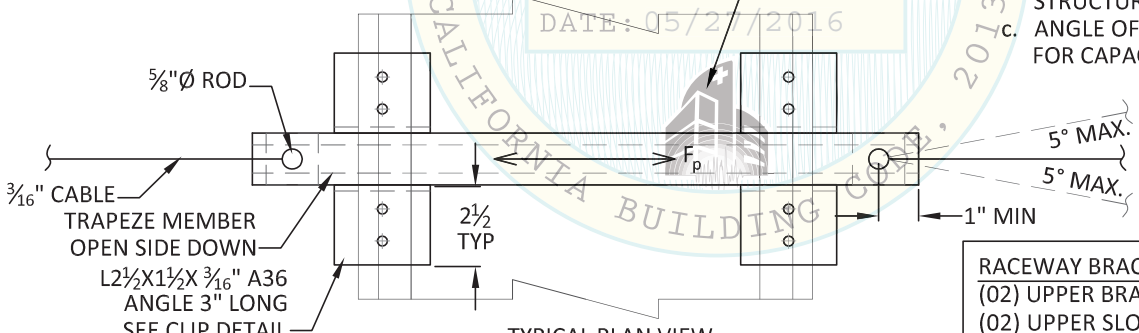
CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[c]60°< x ≤70°	2413	2570

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.



CLIP DETAIL



TYPICAL PLAN VIEW

RACEWAY BRACING KIT 1-R316C-58R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#[d]
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(02) 3/16" CABLE - 10 FT.
(04) 3/16" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

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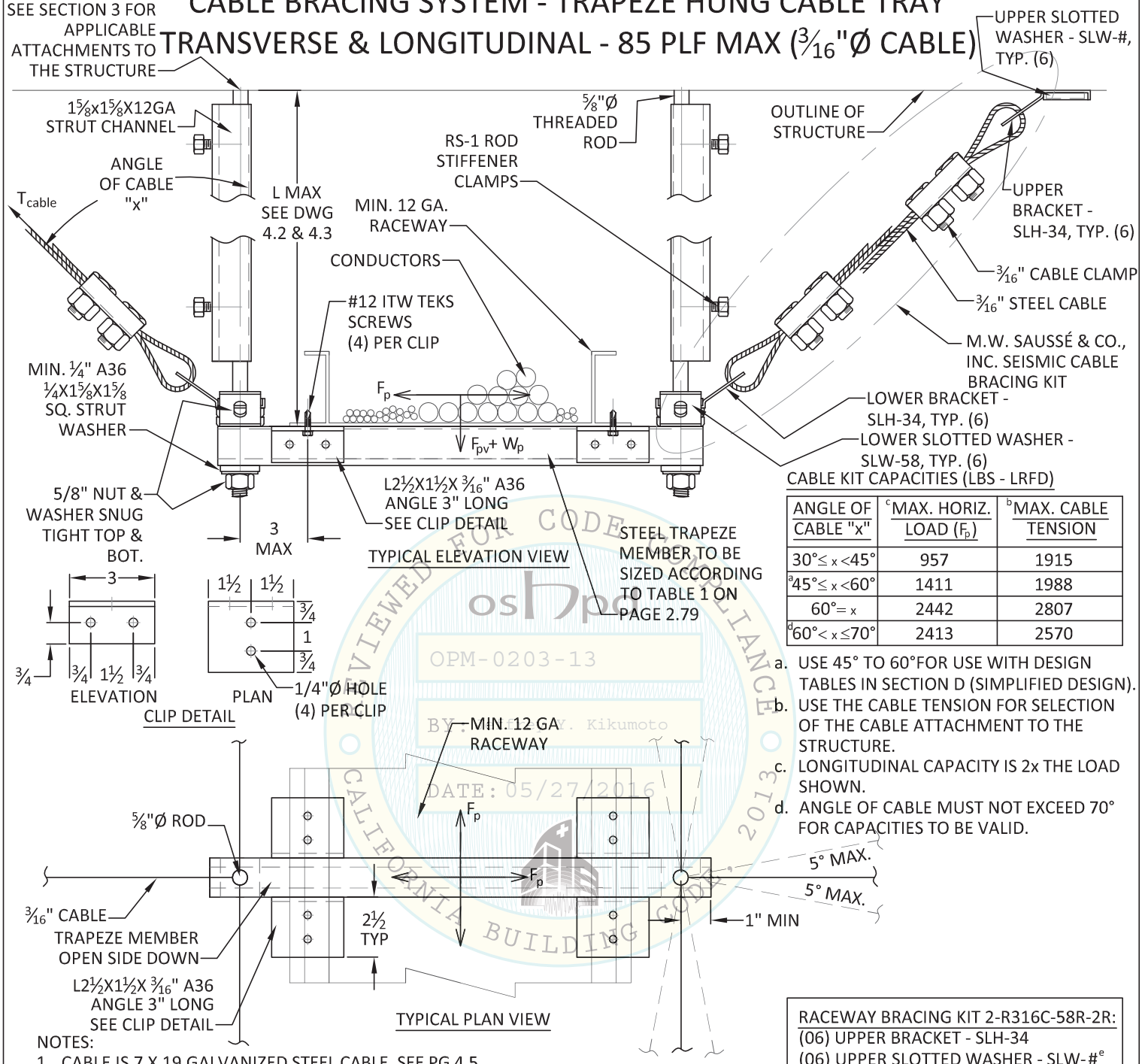
CABLE BRACING SYSTEM - TRAPEZE HUNG CABLE TRAY
TRANSVERSE & LONGITUDINAL - 85 PLF MAX (3/16"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	[c]MAX. HORIZ. LOAD (F_p)	[b]MAX. CABLE TENSION
30°≤ x <45°	957	1915
[a]45°≤ x <60°	1411	1988
60°= x	2442	2807
[d]60°< x ≤70°	2413	2570

a. USE 45° TO 60°FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

RACEWAY BRACING KIT 2-R316C-58R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#[e]
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-58
(04) ROD STIFFENER CLAMPS - RS-1
(06) 3/16" CABLE - 10 FT.
(12) 3/16" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. CABLE TRAY BRACING SPACING MUST BE APPROVED OR PRE-APPROVED BY OSHPD. LESSER SPACING VALUE OF CABLE TRAY BRACE SPACING OR KIT SPACING ON PAGE D.8 GOVERNS.

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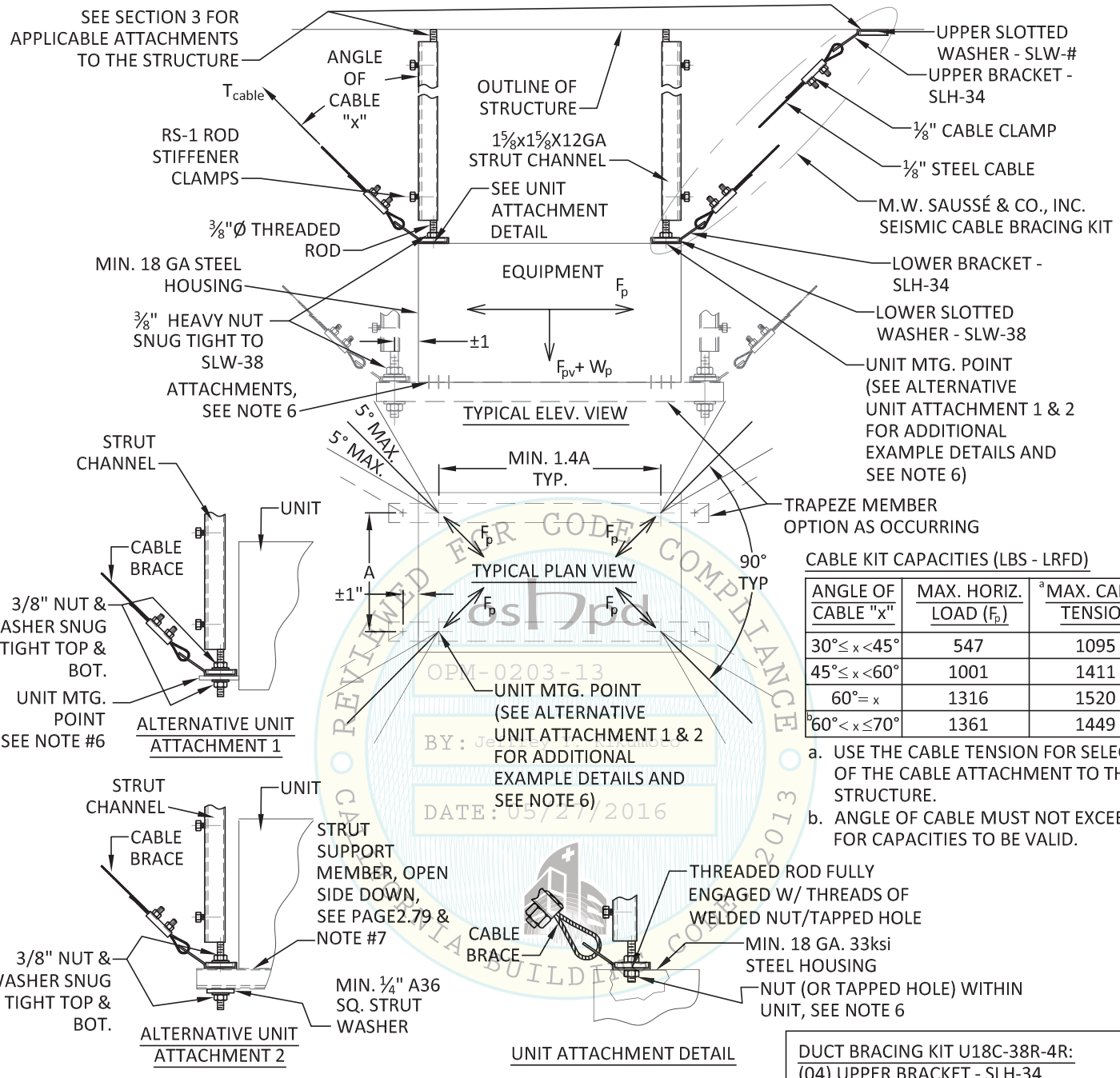
Date: May 9, 2016

TYPICAL EQUIPMENT CABLE BRACING SYSTEM - ⅜"Ø ROD, ⅛"Ø CABLE



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[a]MAX. CABLE TENSION
30°≤ x <45°	547	1095
45°≤ x <60°	1001	1411
60°= x	1316	1520
[b]60°< x ≤70°	1361	1449

a. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
b. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT U18C-38R-4R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW- #[c]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-38
(08) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS

c. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG. 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. SUPPORT MEMBERS UNDERNEATH AND THE CONNECTION TO THE EQUIPMENT MUST BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL. MINIMUM THICKNESS SHALL BE 12 GAGE WITH A MINIMUM YIELD STRENGTH OF 33ksi.

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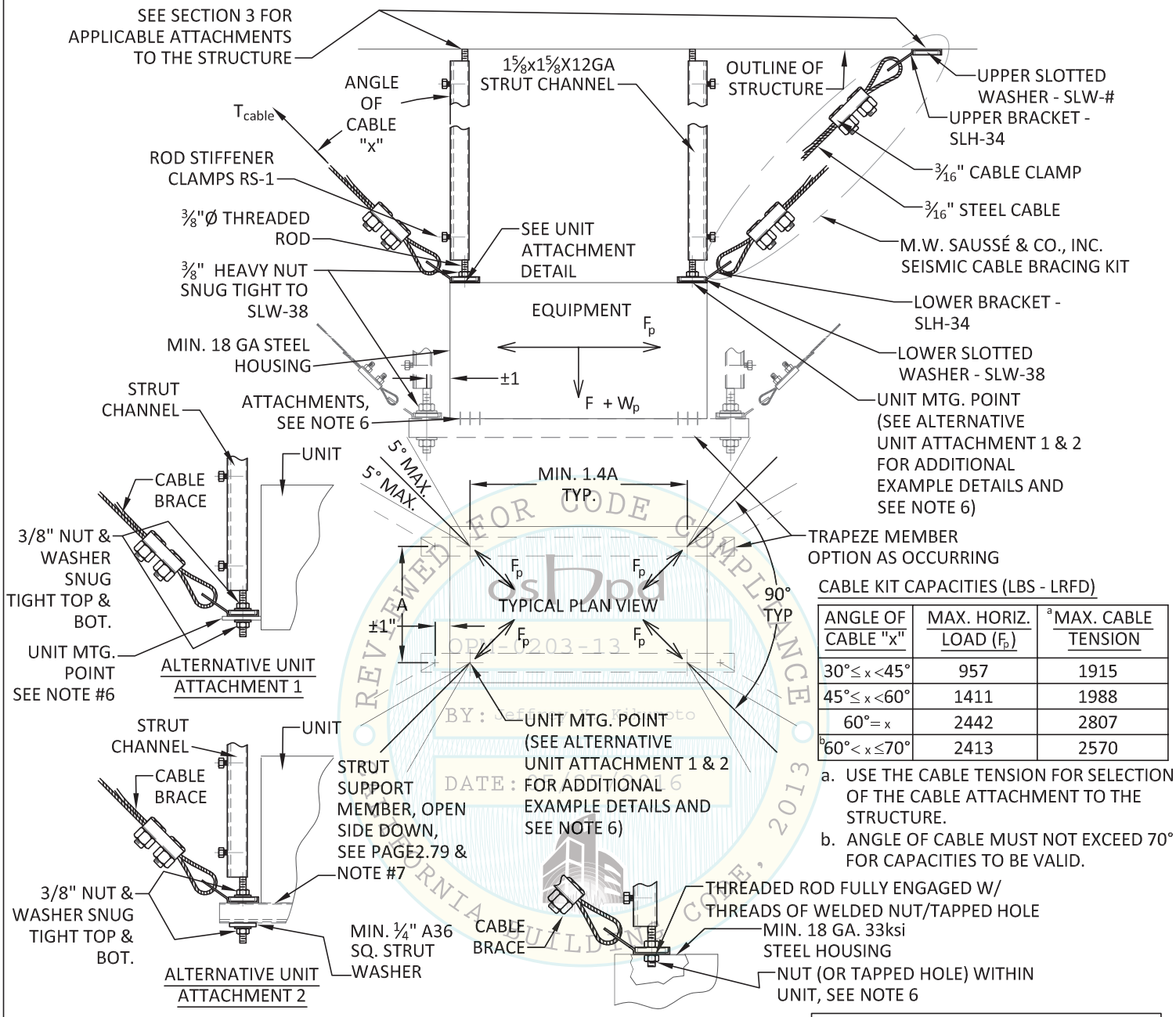
TYPICAL EQUIPMENT CABLE BRACING SYSTEM - ⅜"Ø ROD, ³⁄₁₆"Ø CABLE



UNIT ATTACHMENT DETAIL

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[a] MAX. CABLE TENSION
$30° \le x < 45°$	957	1915
$45° \le x < 60°$	1411	1988
$60° = x$	2442	2807
[b] $60° < x \le 70°$	2413	2570

a. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.

b. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG. 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. SUPPORT MEMBERS UNDERNEATH AND THE CONNECTION TO THE EQUIPMENT MUST BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL. MINIMUM THICKNESS SHALL BE 12 GAGE WITH A MINIMUM YIELD STRENGTH OF 33ksi.

DUCT BRACING KIT U316C-38R-4R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW- #[c]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-38
(08) ROD STIFFENER CLAMPS - RS-1
(04) ³⁄₁₆" CABLE - 10 FT.
(08) ³⁄₁₆" CABLE CLAMPS

c. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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California PE No. C59644

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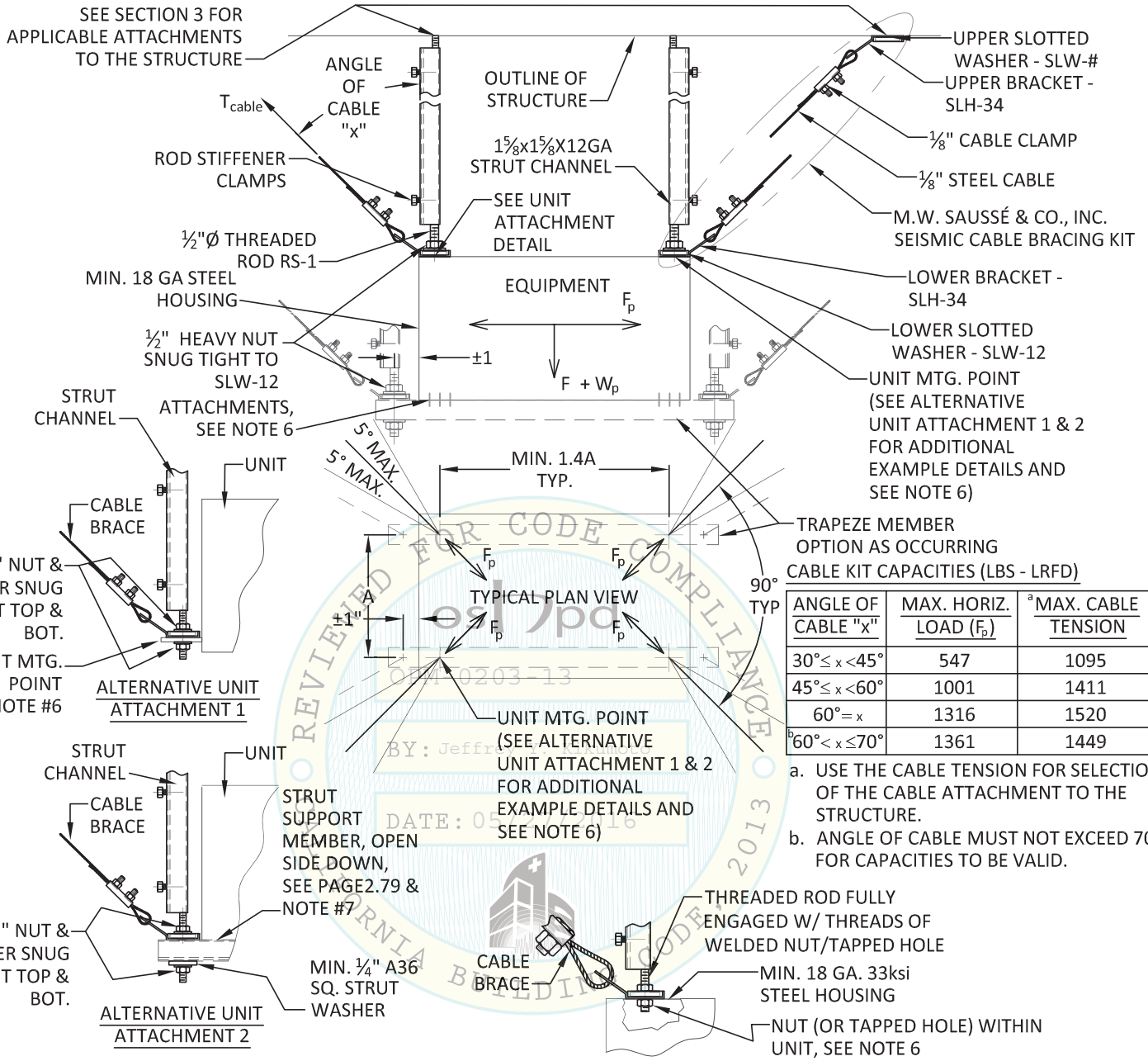
Date: **May 9, 2016**

TYPICAL EQUIPMENT CABLE BRACING SYSTEM - ½"Ø ROD, ⅛"Ø CABLE



UNIT ATTACHMENT DETAIL

CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[a] MAX. CABLE TENSION
30°≤ x <45°	547	1095
45°≤ x <60°	1001	1411
60°= x	1316	1520
[b] 60°< x ≤70°	1361	1449

a. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
b. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT U18C-12R-4R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW- #[c]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-12
(08) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS

c. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG. 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. SUPPORT MEMBERS UNDERNEATH AND THE CONNECTION TO THE EQUIPMENT MUST BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL. MINIMUM THICKNESS SHALL BE 12 GAGE WITH A MINIMUM YIELD STRENGTH OF 33ksi.

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California PE No. C59644

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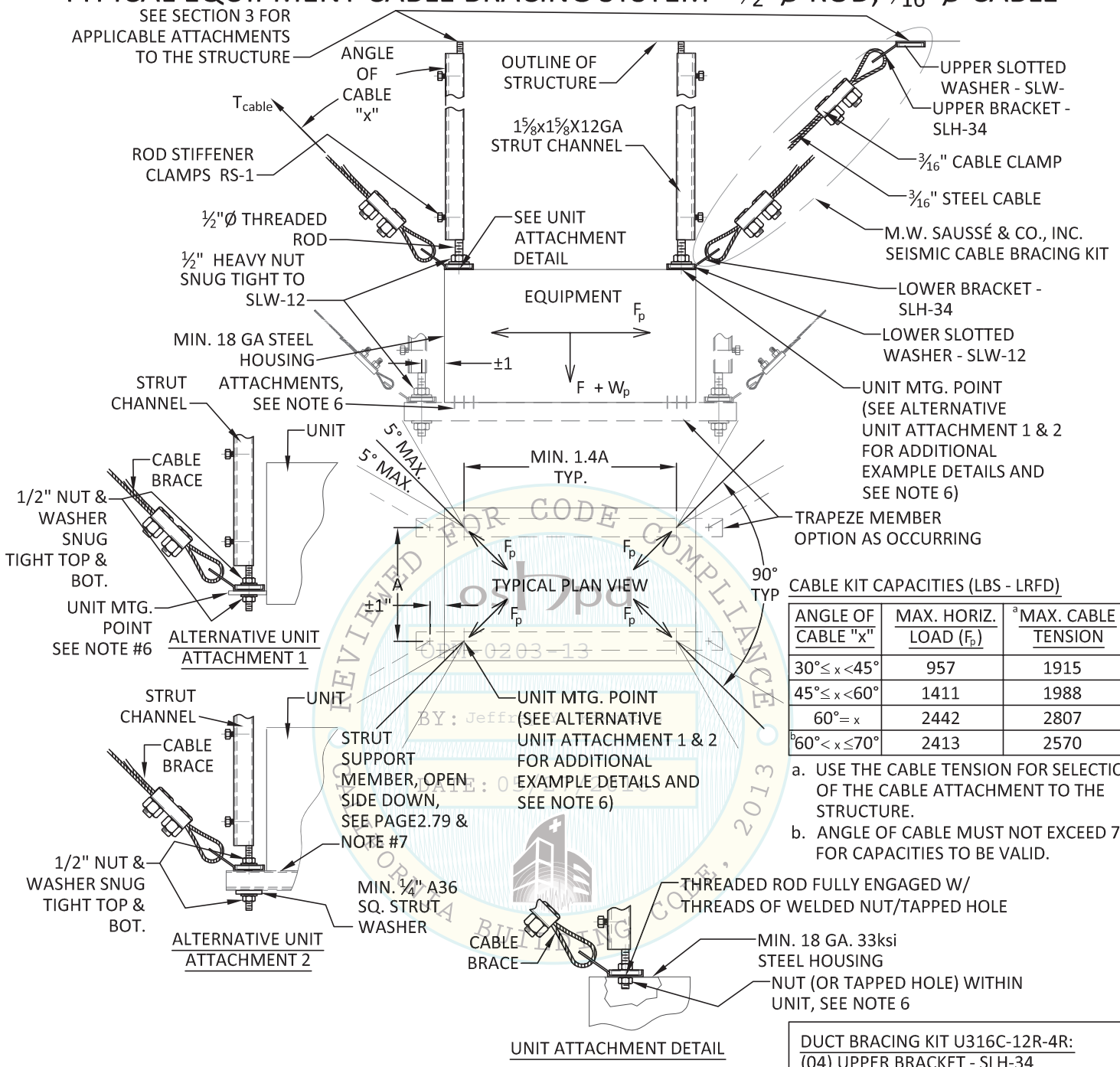
Date: May 9, 2016

TYPICAL EQUIPMENT CABLE BRACING SYSTEM - ½"Ø ROD, 3/16"Ø CABLE



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[a]MAX. CABLE TENSION
$30° \leq x < 45°$	957	1915
$45° \leq x < 60°$	1411	1988
$60° = x$	2442	2807
[b]$60° < x \leq 70°$	2413	2570

a. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
b. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT U316C-12R-4R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW- #[c]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-12
(08) ROD STIFFENER CLAMPS - RS-1
(04) 3/16" CABLE - 10 FT.
(08) 3/16" CABLE CLAMPS

c. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG. 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. SUPPORT MEMBERS UNDERNEATH AND THE CONNECTION TO THE EQUIPMENT MUST BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL. MINIMUM THICKNESS SHALL BE 12 GAGE WITH A MINIMUM YIELD STRENGTH OF 33ksi.

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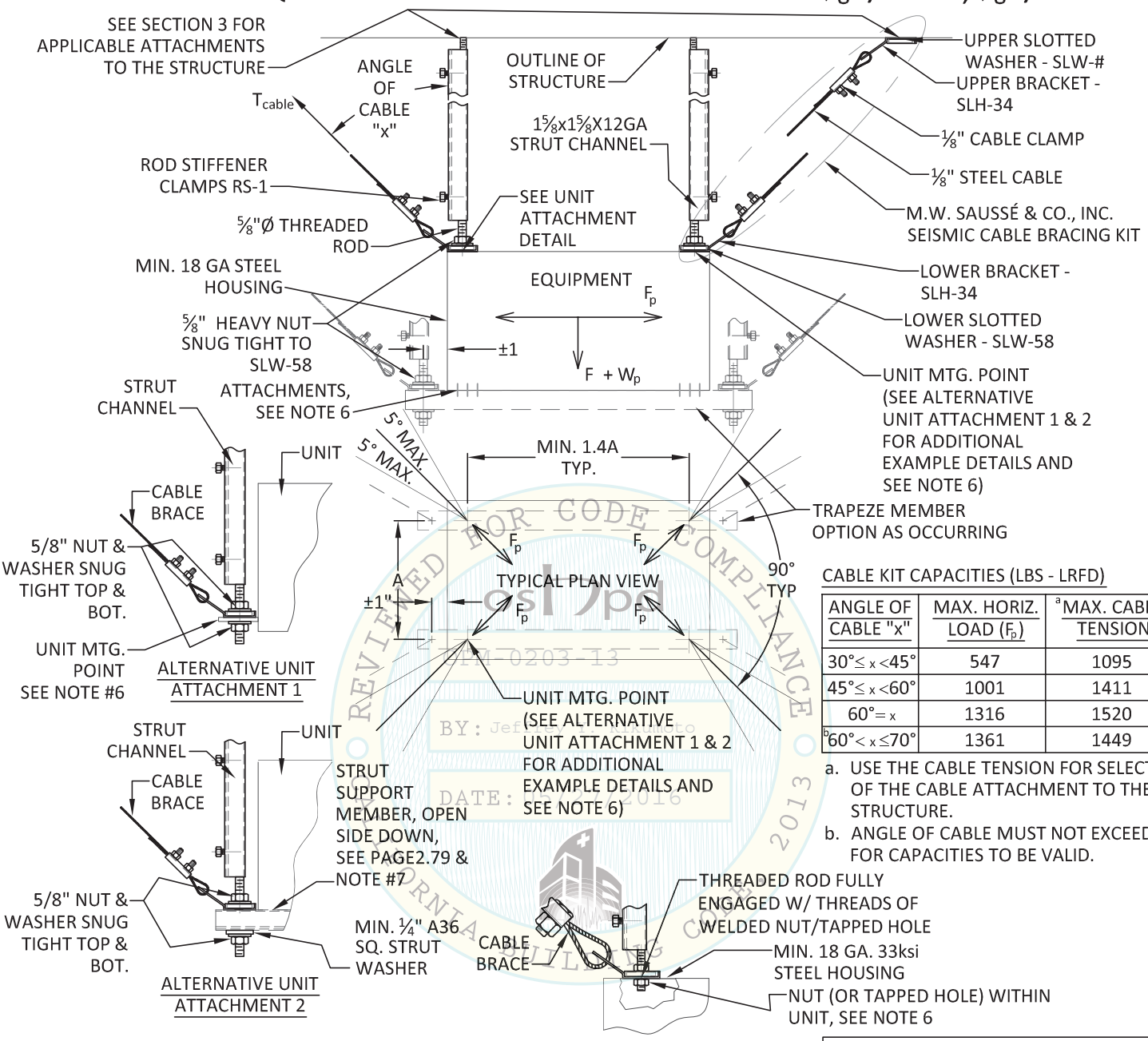
TYPICAL EQUIPMENT CABLE BRACING SYSTEM - ⅝"Ø ROD, ⅛"Ø CABLE



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[a] MAX. CABLE TENSION
30°≤ x <45°	547	1095
45°≤ x <60°	1001	1411
60°= x	1316	1520
[b] 60°< x ≤70°	1361	1449

a. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
b. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG. 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. SUPPORT MEMBERS UNDERNEATH AND THE CONNECTION TO THE EQUIPMENT MUST BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL. MINIMUM THICKNESS SHALL BE 12 GAGE WITH A MINIMUM YIELD STRENGTH OF 33ksi.

DUCT BRACING KIT U18C-58R-4R:
(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW- #[c]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-58
(08) ROD STIFFENER CLAMPS - RS-1
(04) ⅛" CABLE - 10 FT.
(08) ⅛" CABLE CLAMPS

c. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

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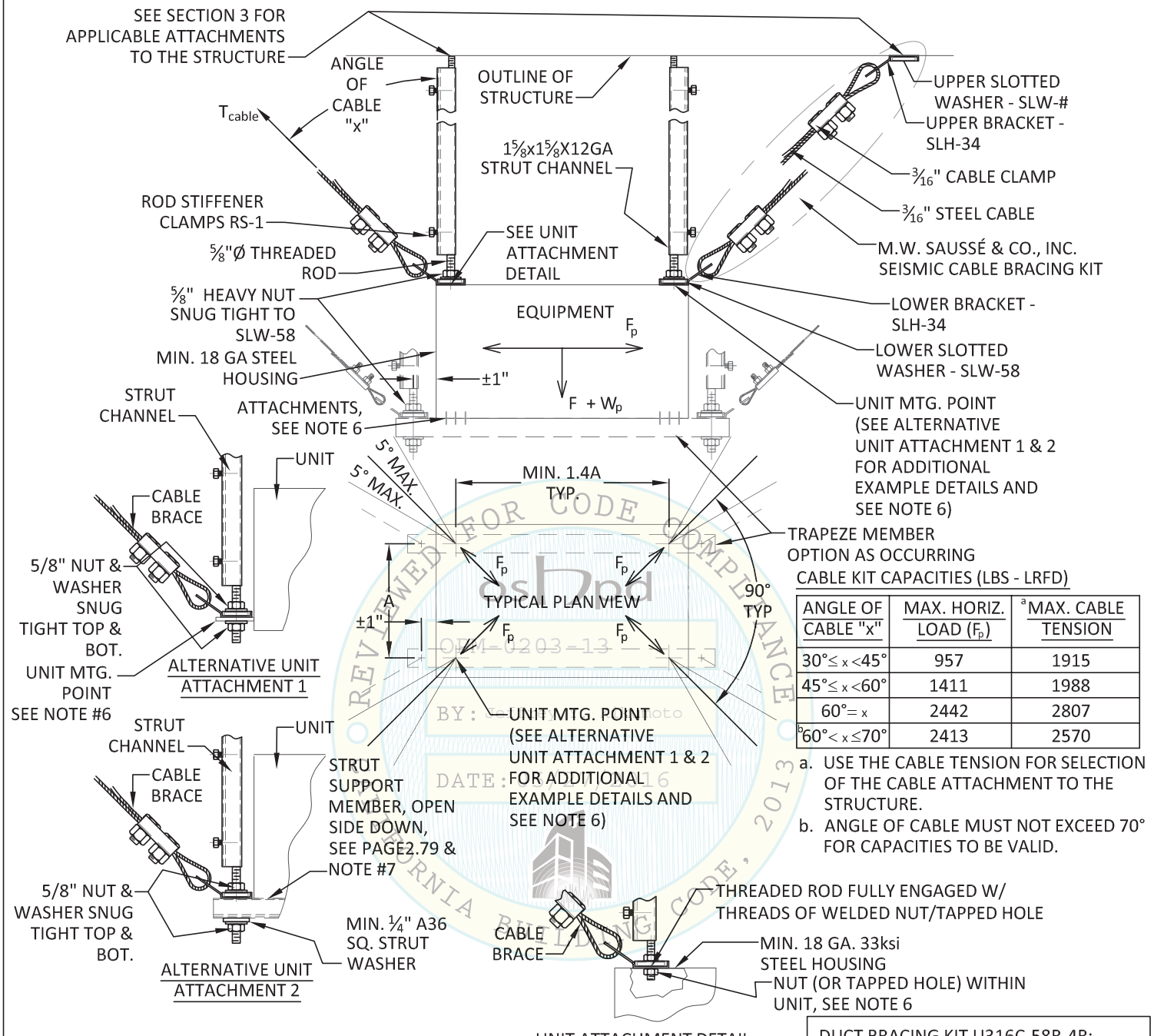
Date: May 9, 2016

TYPICAL EQUIPMENT CABLE BRACING SYSTEM - 5/8"Ø ROD, 3/16"Ø CABLE



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (F_p)	[a] MAX. CABLE TENSION
30° ≤ x <45°	957	1915
45° ≤ x <60°	1411	1988
60° = x	2442	2807
[b] 60° < x ≤70°	2413	2570

a. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.

b. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT U316C-58R-4R:

(04) UPPER BRACKET - SLH-34
(04) UPPER SLOTTED WASHER - SLW- #[c]
(04) LOWER BRACKET - SLH-34
(04) LOWER SLOTTED WASHER - SLW-58
(08) ROD STIFFENER CLAMPS - RS-1
(04) 3/16" CABLE - 10 FT.
(08) 3/16" CABLE CLAMPS

c. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:

1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG. 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. SUPPORT MEMBERS UNDERNEATH AND THE CONNECTION TO THE EQUIPMENT MUST BE DESIGNED AND SUBMITTED TO OSHPD FOR APPROVAL. MINIMUM THICKNESS SHALL BE 12 GAGE WITH A MINIMUM YIELD STRENGTH OF 33ksi.

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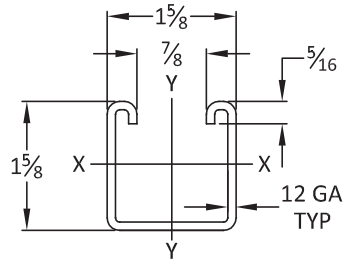
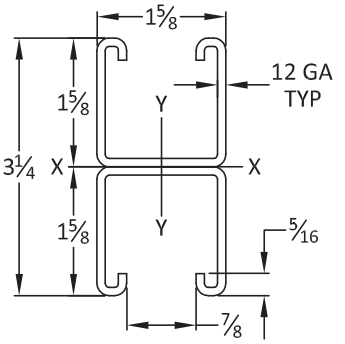
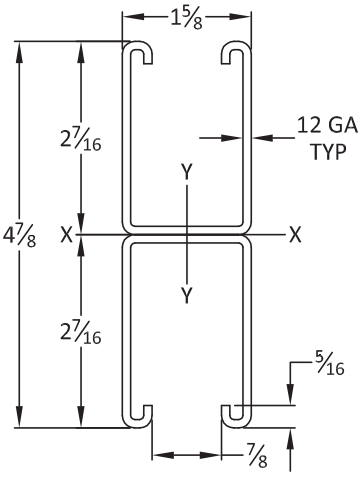
TRAPEZE MEMBER FOR ALL SYSTEMS



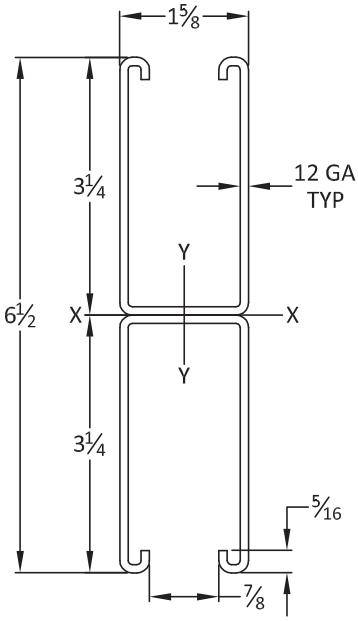
1-5/8 X 1-5/8 X 12GA STRUT



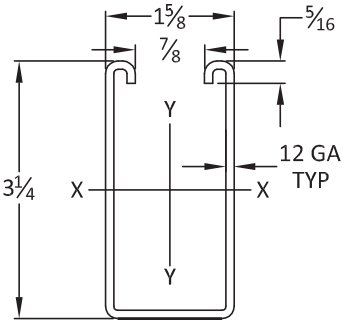
1-5/8 X 1-5/8 X 12GA DBL STRUT



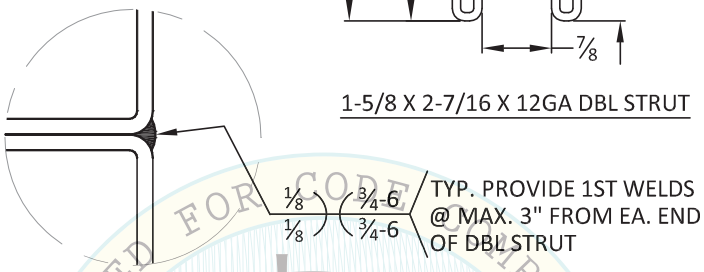
1-5/8 X 2-7/16 X 12GA DBL STRUT



1-5/8 X 6-1/2 X 12GA DBL STRUT



1-5/8 X 1-5/8 X 12GA DBL STRUT



TYP. DBL. STRUT WELD REQUIREMENT DETAIL

TABLE 1 - DESIGN LOAD CAPACITY OF TRAPEZE SUPPORT MEMBERS

MAX. SPAN	1⅝ X 1⅝ X 12GA STRUT		1⅝ X 3¼ X 12GA STRUT		1⅝ X 1⅝ X 12GA DBL STRUT		1⅝ X 4⅞ X 12GA DBL STRUT		1⅝ X 6½ X 12GA DBL STRUT	
	[3]DIST. LOAD	[4]POINT LOAD	[3]DIST. LOAD	[4]POINT LOAD	[3]DIST. LOAD	[4]POINT LOAD	[3]DIST. LOAD	[4]POINT LOAD	[3]DIST. LOAD	[4]POINT LOAD
18"	548	274	1178	589	1224	612	1893	946	2574	1287
24"	410	205	881	440	914	457	1415	707	1925	962
30"	326	163	702	351	728	364	1128	564	1535	767
36"	270	135	582	291	603	301	935	467	1273	636
48"	199	99	431	215	446	223	693	346	944	472
60"	156	78	339	169	350	175	545	272	745	372

TABLE 2 - MINIMUM GEOMETRIC PROPERTIES OF SECTIONS

1⅝ X 1⅝ X 12GA STRUT				1⅝ X 3¼ X 12GA STRUT				1⅝X3¼X12GA DBL STRUT				1⅝X4⅞X12GA DBL STRUT				1⅝X6½X12GA DBL STRUT			
I_x in^4	I_y in^4	S_x in^3	S_y in^3	I_x in^4	I_y in^4	S_x in^3	S_y in^3	I_x in^4	I_y in^4	S_x in^3	S_y in^3	I_x in^4	I_y in^4	S_x in^3	S_y in^3	I_x in^4	I_y in^4	S_x in^3	S_y in^3
0.185	0.236	0.202	0.290	1.098	0.433	0.627	0.533	0.928	0.471	0.571	0.580	2.805	0.669	1.151	0.823	6.227	0.866	1.916	1.066

NOTES:
1. ALL STRUT MEMBERS MUST BE MADE OF MIN. A1011 SS Gr. 33 STEEL.
2. ALL STRUT MUST BE SOLID. SLOTTED OR HOLED STRUT NOT PERMITTED.
3. TO MEET THE DIST. LOADING REQUIREMENT THE LOAD MUST BE SPREAD EVENLY OVER 90% OF THE SPAN OF THE MEMBER.
4. TO MEET THE POINT LOAD REQUIREMENT THE LOAD MUST BE WITHIN THE MIDDLE THIRD OF THE SPAN OF THE MEMBER.

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SECTION 3

STRUCTURAL ATTACHMENTS

TESTING REQUIREMENTS OF POST-INSTALLED ANCHOR BOLTS

TESTING REQUIREMENTS FOR POST-INSTALLED ANCHOR BOLTS

1. EXPANSION ANCHORS IN THIS SECTION SHALL BE TORQUE TESTED USING THE VALUES LISTED BELOW IN THE EXPANSION ANCHOR TORQUE TEST VALUES TABLE.
2. SCREW-TYPE ANCHORS IN THIS SECTION SHALL BE TENSION TESTED USING THE VALUES LISTED BELOW IN THE SCREW ANCHOR TENSION TEST VALUES TABLE.
3. TESTING OF THE ANCHORS IS NOT PERMITTED WITHIN THE FIRST 24 HOURS AFTER THE ANCHOR BOLTS ARE INSTALLED.
4. TESTING FREQUENCY IS AS FOLLOWS:
   - 4.1. A MINIMUM OF 50% OR ALTERNATE BOLTS IN A GROUP, INCLUDING AT LEAST ½ OF THE ANCHORS IN EACH GROUP.
   - 4.2. IF AN ANCHOR SHOULD FAIL THE TEST, CONTINUOUS TESTING IS REQUIRED UNTIL (20) CONSECUTIVE ANCHORS PASS, THEN THE TESTING FREQUENCY PER 4.1 ABOVE SHALL RESUME.
5. TESTING SHALL BE DONE IN THE PRESENCE OF THE SPECIAL INSPECTOR & A REPORT OF THE TEST RESULTS SHALL BE SUBMITTED TO OSHPD.

ACCEPTANCE CRITERIA FOR POST-INSTALLED ANCHOR BOLTS

1. FOR DIRECTION TENSION TESTS → THE ANCHOR SHOULD HAVE NO OBSERVABLE MOVEMENT AT THE TEST LOAD (WASHER SHOULD NOT BECOME LOOSE).

TORQUE TEST → THE SPECIFIED TORQUE MUST BE ACHIEVER WITHIN THE FOLLOWING LIMIT: ½ TURN OF THE NUT

GENERAL NOTE

ALL TENSION TEST AND TORQUE TEST VALUES LISTED ARE SPECIFIC ONLY TO THE ANCHOR DESIGNS SHOWN IN SECTION 3. APPLICATION OF THESE VALUES TO ANY OTHER CASE IS OUTSIDE THE SCOPE OF THIS OPM AND WILL REQUIRE REVIEW AND APPROVAL BY OSHPD.

EXPANSION ANCHOR TORQUE TEST VALUES

MAKE & MODEL	ANCHOR DIAMETER (in)	REQUIRED TORQUE (lb-ft)
HILTI[1] KB-TZ PER PGS. 3.1, 3.2, 3.11 & 3.12	3/8	25
	1/2	40
	5/8	60
	3/4	110
POWERS[2] SD2 PER PAGES 3.4, 3.5, 3.15 & 3.16	3/8	20
	1/2	40
	5/8	60
	3/4	110
POWERS[3] SD1	7/8	175
	---	---
SIMPSON[4] SB2 (STRONG BOLT 2)	3/8	30
	1/2	60
	5/8	80
	3/4	150

SCREW ANCHOR TENSION TEST VALUES

MAKE & MODEL	ANCHOR DIAMETER (in)	NOMINAL EMBED. "h_{nom}" (in)		EFFECTIVE EMBED. "h_{ef}" (in)		TENSION TEST VALUES (lbs)[8]		
		SLAB	DECK	SLAB	DECK	TO DECK	SINGLE TO SLAB	DOUBLE TO SLAB
HILTI[5] KH-EZ	3/8	1 5/8	1 5/8	1 1/8	1 1/8	494	484	484
	3/8	2 1/2	2 1/2	1 7/8	1 7/8	969	1439	1439
	3/8	3 1/4	3 1/4	2 1/2	2 1/2	1694	2243	2243
	1/2	2 1/4	2 1/4	1 9/16	1 9/16	500	1064	1064
	1/2	3	3	2 3/16	2 3/16	1176	1801	1801
	1/2	4 1/4	4 1/4	3 1/4	3 1/4	2057	3279	2996
	5/8	3 1/4	3 1/4	2 3/8	2 3/8	1602	2094	2094
	5/8	5	5	3 7/8	3 7/8	3644	4329	3654
	3/4	4	4	2 15/16	2 15/16	1603	2831	2709
	3/4	6 1/4	6 1/4	4 7/8	4 7/8	n/a	6041	4685
POWERS WEDGE-BOLT+[6]	3/8	2 1/8	2 1/8	1 7/16	1 7/16	649	724	724
	1/2	2 1/2	2 1/2	1 11/16	1 11/16	798	901	901
	1/2	3 1/2	3 1/2	2 1/2	2 1/2	798	1683	1683
	5/8	3 1/4	3 1/4	2 3/16	2 3/16	1856	1784	1784
	5/8	4 3/8	4 3/8	3 1/8	3 1/8	1624	2864	2864
	3/4	4 3/8	4 3/8	2 15/16	2 15/16	n/a	2815	2698
SIMPSON TITEN HD[7]	3/8	1 7/8	1 7/8	1 1/4	1 1/4	229	1336	1336
	3/8	2 1/2	2 1/2	1 3/4	1 3/4	530[9]	1803	1803
	1/2	3 1/4	2	2 3/8	1 3/4	552[9]	2044	2044
	1/2	4	3 1/2	3	2 9/16	1243	2934	2775
	5/8	4	n/a	3	n/a	n/a	2029	2029
	5/8	5 1/2	n/a	4 1/4	n/a	n/a	3719	3719
	3/4	5 1/2	n/a	4 1/4	n/a	n/a	4053	4014
	3/4	6 1/4	n/a	4 7/8	n/a	n/a	4803	4708

MAKE & MODEL	ANCHOR DIA. (in)	NOM. EMBED.(in)	EFF. EMBED.(in)	TO DECK UPPER FLUTE	TO DECK LOWER FLUTE	SOLID SLAB	TYPE "B" DECK
HILTI KH-EZ I ROD HANGER[10]	1/4	2-1/2	1-15/16	566	593	750	n/a
POWERS VERTIGO+[10]	3/8	2-1/8	1-7/16	646	646	723	646
SIMPSON TITEN HD HANGER[10]	3/8	2-1/2	1-3/4	n/a	530	753	n/a

NOTES:

1. SEE PAGES 3.1, 3.1.1, 3.2, 3.2.1, 3.11, 3.12, 3.28, 3.29, 3.31, 3.33, 3.34, & 3.35 FOR DETAILS USING THE HILTI KB-TZ EXPANSION ANCHOR.
2. SEE PAGES 3.4, 3.4.1, 3.5, 3.5.1, 3.15, 3.16, 3.28, 3.29, 3.31, 3.33, 3.34, & 3.35 FOR DETAILS USING THE POWERS SD2 EXPANSION ANCHOR.
3. SEE PAGE 3.35 FOR DETAIL USING THE POWERS SD1 EXPANSION ANCHOR.
4. SEE PAGES 3.7, 3.8, 3.8.1, 3.19, 3.20, 3.28, 3.31, 3.33, & 3.35 FOR DETAILS USING THE SIMPSON STRONG-BOLT 2 (SB2) EXPANSION ANCHORS.
5. SEE PAGES 3.3, 3.3.1, 3.13, 3.14, & 3.30 FOR DETAILS USING THE HILTI KH-EZ SCREW ANCHOR.
6. SEE PAGES 3.6, 3.6.1, 3.17, 3.18, & 3.30 FOR DETAILS USING THE POWERS WEDGE-BOLT+ SCREW ANCHOR.
7. SEE PAGES 3.9, 3.10, 3.10.1, 3.21, 3.22, & 3.30 FOR DETAILS USING THE SIMPSON STRONG-TIE TITEN HD SCREW ANCHOR.
8. TENSION TESTS SHOWN ARE 125% OF THE MAXIMUM DESIGN CAPACITIES OF EACH ANCHOR. INSTALLATION OF THE ANCHORS IS INTO THE LOWER FLUTE OF THE DECK AS SHOWN IN ALL REFERENCED DETAILS (SEE NOTES 5 THRU 7 ABOVE), WITH THE EXCEPTION OF THE ANCHOR BOLTS ADDRESSED IN NOTE 9 BELOW.
9. FOR THE 3/8" AND 1/2" SIMPSON TITEN HD ANCHORS INSTALLED IN THE UPPER FLUTE THE TEST CAPACITIES ARE AS FOLLOWS:
   - 9.1. FOR THE 3/8" ANCHOR: 305 lbs
   - 9.2. FOR THE 1/2" ANCHOR: 1036 lbs
10. FOR SCREW-TYPE ROD HANGER ANCHORS, SEE PAGE 3.37.

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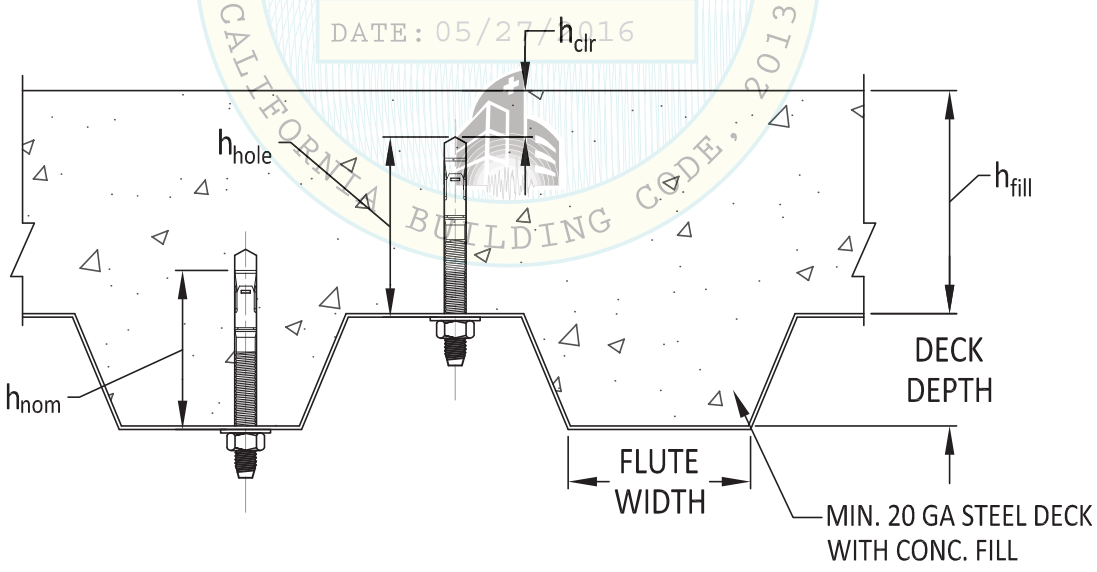
Page No.: 3.0.1

Date: May 9, 2016

MINIMUM COMPOSITE DECK DIMENSIONS FOR POST-INSTALLED EXPANSION ANCHORS

MAKE & MODEL	ANCHOR DIAMETER (in)	NOMINAL EMBED. "h_{nom}" (in)	EFFECTIVE EMBED. "h_{ef}" (in)	HOLE DEPTH "h_o" (in)	3" DECK W/ 4½" WIDE FLUTES			3" DECK W/ 3⅞" WIDE FLUTES			1-1/2" DECK W/ 1¾" WIDE FLUTES		
					CLEARANCE ABOVE HOLE "h_{clr}" (in)	MIN. FILL THICKNESS "h_{fill}" (in)		CLEARANCE ABOVE HOLE "h_{clr}" (in)	MIN. FILL THICKNESS "h_{fill}" (in)		CLEARANCE ABOVE HOLE "h_{clr}" (in)	MIN. FILL THICKNESS "h_{fill}" (in)	
						TO LOWER FLUTE	TO UPPER FLUTE		TO LOWER FLUTE	TO UPPER FLUTE		TO LOWER FLUTE	TO UPPER FLUTE
HILTI KB-TZ	3/8	2-5/16	2	2-5/8	5/8	1-1/2	3-1/4	5/8	2-1/2	3-1/4	5/8	2-1/4	3-1/4
	1/2	2-3/8	2	2-5/8	5/8	1-1/2	3-1/4	5/8	2-1/2	3-1/4	5/8	2-1/4	3-1/4
	1/2	3-5/8	3-1/4	4	5/8	1-5/8	4-5/8	5/8	2-1/2	4-5/8	5/8	3-1/8	4-5/8
	5/8	3-9/16	3-1/8	3-3/4	5/8	1-1/2	4-3/8	5/8	2-1/2	4-3/8	5/8	2-7/8	4-3/8
	5/8	4-7/16	4	4-3/4	5/8	2-3/8	5-3/8	5/8	3-1/4	5-3/8	5/8		
	3/4	4-5/16	3-3/4	4-1/2	5/8	2-1/8	5-1/8	5/8	3-1/4	5-1/8	5/8		
POWERS SD2	3/8	2-3/8	2	2-5/8	3/4	3-1/4	3-3/8	1	2-1/2	3-5/8	1	2-1/4	3-5/8
	1/2	2-1/2	2	2-3/4	3/4	3-1/4	3-1/2	1	2-1/2	3-3/4	1	2-1/4	3-3/4
	1/2	3-3/4	3-1/4	4	3/4	3-1/4	4-3/4	1	2-1/2	5			
	5/8	3-7/8	3-1/4	4-1/4	3/4	3-1/4	5						
	5/8	4-7/8	4-1/4	4-3/4	3/4	3-1/4	5-1/2						
	3/4	4-1/2	3-3/4	5	3/4	3-1/4	5-3/4						
SIMPSON STRONG-BOLT 2	3/8	2	1-5/8	2-1/8	1/2	1-1/2	2-5/8						
	3/8	3-3/8	3	3-1/2	1/2	1-1/2							
	1/2	2-3/4	2-1/4	3	1/2	1-1/2	3-1/2						
	1/2	4-1/2	4	4-3/4	1/2	2-1/4							
	5/8	3-3/8	2-3/4	3-5/8	1/2	1-1/2							
	5/8	5-5/8	5	5-7/8	1/2	3-3/8							
	3/4	4-1/8	3-3/8	4-3/8	1/2	1-7/8							

NOTES:
1. FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 IN THE APPENDIX.
2. ANCHOR CENTERLINE OFFSETS FROM THE FLUTE CENTERLINE ARE SHOWN IN THE SPECIFIC DETAILS WITHIN SECTION 3.



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California PE No. C59644

Page No.: 3.0.2

Date: May 9, 2016

MINIMUM COMPOSITE DECK DIMENSIONS FOR POST-INSTALLED EXPANSION ANCHORS

MAKE & MODEL	ANCHOR DIAMETER (in)	NOMINAL EMBED. "h_{nom}" (in)	EFFECTIVE EMBED. "h_{ef}" (in)	HOLE DEPTH "h_o" (in)	3" DECK W/ 4½" WIDE FLUTES: CLEARANCE ABOVE HOLE "h_{clr}" (in)	3" DECK W/ 4½" WIDE FLUTES: MIN. FILL THICKNESS "h_{fill}" (in) TO LOWER FLUTE	3" DECK W/ 4½" WIDE FLUTES: MIN. FILL THICKNESS "h_{fill}" (in) TO UPPER FLUTE
HILTI KH-EZ	3/8	1-5/8	1-1/8	1-7/8	1-1/4	3-1/4	3-1/4
	3/8	2-1/2	1-7/8	2-3/4	1-1/4	3-1/4	4
	3/8	3-1/4	2-1/2	3-1/2	1-1/4	3-1/4	4-3/4
	1/2	2-1/4	1-1/2	2-5/8	1-1/4	3-1/4	3-7/8
	1/2	3	2-3/16	3-3/8	1-1/4	3-1/4	4-5/8
	1/2	4-1/4	3-1/4	4-5/8	1-1/4	3-1/4	5-7/8
	5/8	3-1/4	2-3/8	3-5/8	1-1/4	3-1/4	4-7/8
	5/8	5	3-7/8	5-3/8	1-1/4	3-5/8	3-5/8
	3/4	4	2-15/16	4-3/8	1-1/4	3-1/4	5-5/8
HILTI KH-EZ I (ROD HANGER)	1/4	2-1/2	1-15/16	2-7/8	1-1/4	2-1/2	4-1/8
POWERS WEDGE-BOLT+	3/8	2-1/8	1-7/16	2-1/4	3/4	3-1/4	3-1/4
	1/2	2-1/2	1-11/16	2-3/4	3/4	3-1/4	3-1/2
	1/2	3-1/2	2-1/2	4	3/4	3-1/4	4-3/4
	5/8	3-1/4	2-3/16	4	3/4	3-1/4	4-3/4
	5/8	4-3/8	3-1/8	5	3/4	3-1/4	5-3/4
POWERS VERTIGO+ (ROD HANGER)	3/8	2-1/8	1-7/16	2-1/2	3/4	3-1/4	3-1/4
SIMPSON TITEN HD	3/8	1-7/8	1-1/4	2-1/8	3/4	1-1/2	3-1/4
	3/8	2-1/2	1-3/4	2-3/4	3/4	1-1/2	
	1/2	2	1-5/16	2-1/2	3/4	1-1/2	3-1/4
	1/2	3-1/2	2-9/16	4	3/4	1-3/4	
SIMPSON TITEN HD (ROD HANGER)	3/8	2-1/2	1-3/4	3	3/4	1-1/2	

3" DECK W/ 3⅞" WIDE FLUTES		
CLEARANCE ABOVE HOLE "h_{clr}" (in)	MIN. FILL THICKNESS "h_{fill}" (in) TO LOWER FLUTE	MIN. FILL THICKNESS "h_{fill}" (in) TO UPPER FLUTE
1-1/4	2-1/2	4-1/8

1-1/2" DECK W/ 1¾" WIDE FLUTES		
CLEARANCE ABOVE HOLE "h_{clr}" (in)	MIN. FILL THICKNESS "h_{fill}" (in) TO LOWER FLUTE	MIN. FILL THICKNESS "h_{fill}" (in) TO UPPER FLUTE
3/4	2-1/4	

NOTES:
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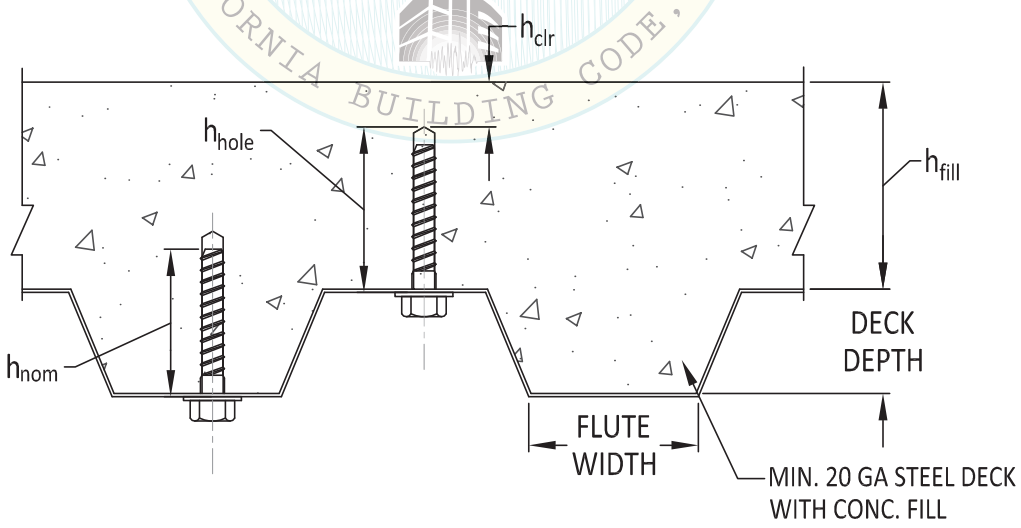

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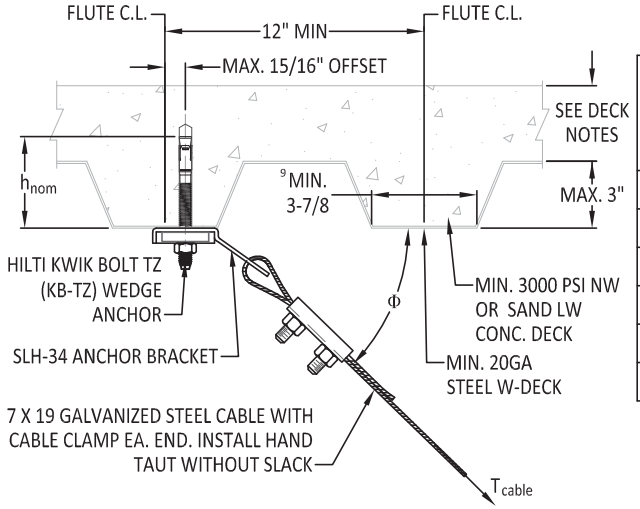
Page No.: 3.0.3

Date: May 9, 2016

HILTI KWIK BOLT TZ (KB-TZ) WEDGE ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK

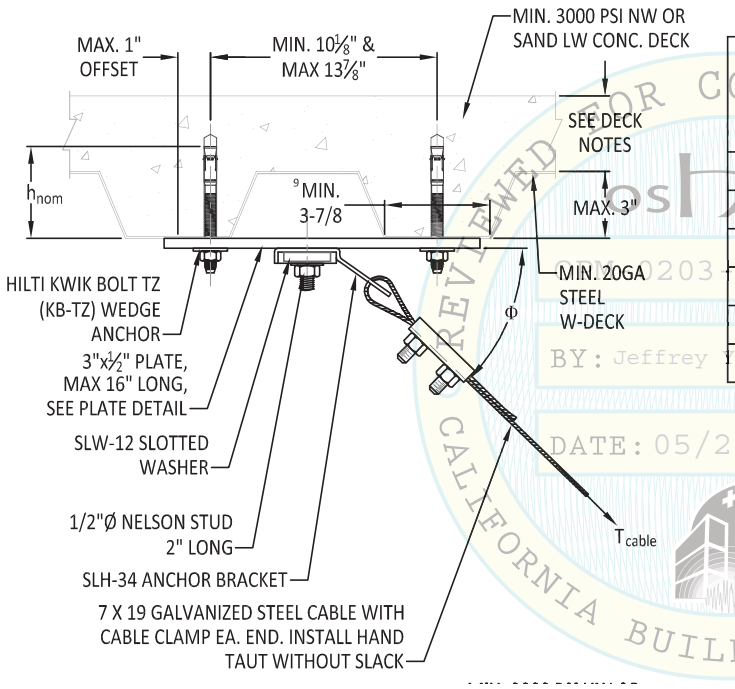


ATTACHMENT WITH (1) ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE (lbs), "T_{cable}", @ ANGLE "Φ"[8]		
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
TZD31	3/8"	SLW-38	2-5/16"	2"	6-3/4"	263	173	135
TZD32	1/2"	SLW-12	2-3/8"	2"	6-3/4"	263	173	135
TZD33	1/2"	SLW-12	3-5/8"	3-1/4"	9-3/4"	582	349	262
TZD34	5/8"	SLW-58	3-9/16"	3-1/8"	9-3/8"	501	282	206
TZD35	5/8"	SLW-58	4-7/16"	4"	12"	816	503	382
TZD36	3/4"	SLW-34	4-5/16"	3-3/4"	11-1/4"	726	429	319

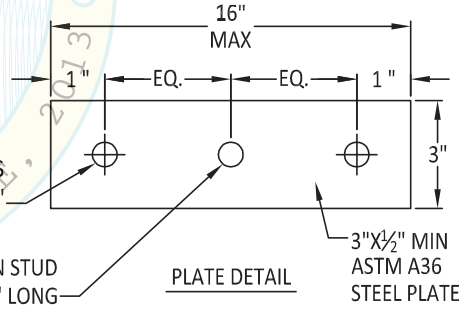
DECK NOTES:

- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.2.



ATTACHMENT WITH (2) ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE (lbs), "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
2TZD31	3/8"	2-5/16"	2"	6-3/4"	621	515	467
2TZD32	1/2"	2-3/8"	2"	6-3/4"	621	515	467
2TZD33	1/2"	3-5/8"	3-1/4"	9-3/4"	1428	1095	940
2TZD34	5/8"	3-9/16"	3-1/8"	9-3/8"	1263	915	757
2TZD35	5/8"	4-7/16"	4"	12"	1977	1553	1355
2TZD36	3/4"	4-5/16"	3-3/4"	11-1/4"	1793	1356	1154



NOTES:

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2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-1917 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.
9. FOR THE ⅝" ANCHOR WITH 4-7/16" NOMINAL EMBEDMENT AND THE ¾" ANCHOR, THE MIN. FLUTE WIDTH IS 4-1/2". SEE PAGE 3.0.2 FOR ALL MINIMUM REQUIRED DIMENSIONS OF THE DECK.

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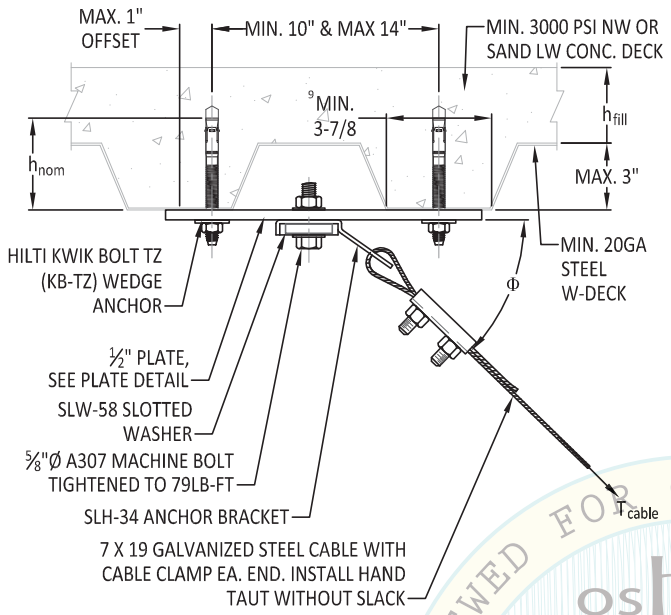
Page No.: 3.1

Date: May 9, 2016

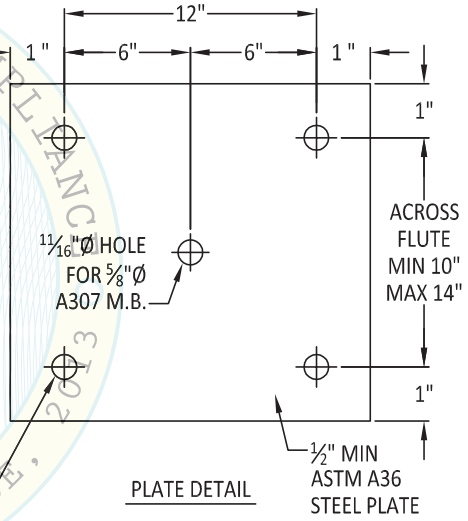
HILTI KWIK BOLT TZ (KB-TZ) WEDGE ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK



ATTACHMENT WITH (4) ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE (lbs), "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
4TZD31	3/8"	2-5/16"	2"	6-3/4"	1242	1030	934
4TZD32	1/2"	2-3/8"	2"	6-3/4"	1242	1030	934
4TZD33	1/2"	3-5/8"	3-1/4"	9-3/4"	2855	2190	1880
4TZD34	5/8"	3-9/16"	3-1/8"	9-3/8"	2527	1829	1515
4TZD35	5/8"	4-7/16"	4"	12"	3954	3107	2711
4TZD36	3/4"	4-5/16"	3-3/4"	11-1/4"	3585	2712	2307

DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.2.



NOTES:
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2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-1917 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
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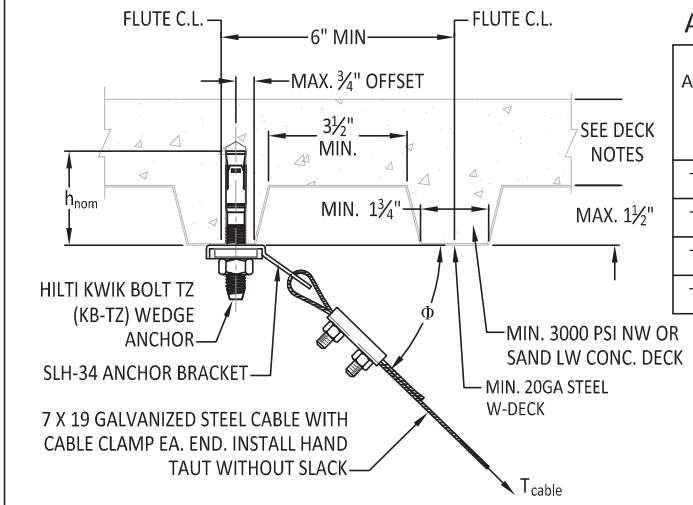
HILTI KWIK BOLT TZ (KB-TZ) WEDGE ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 1½" DEEP MIN. 20GA METAL DECK



ATTACHMENT WITH (1) ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
TZD1.51	3/8"	SLW-38	2-5/16"	2"	6-3/4"	314	204	159
TZD1.52	1/2"	SLW-12	2-3/8"	2"	6-3/4"	321	184	135
TZD1.53	1/2"	SLW-12	3-5/8"	3-1/4"	9-3/4"	623	387	295
TZD1.54	5/8"	SLW-58	3-9/16"	3-1/8"	9-3/8"	761	489	379

DECK NOTES:
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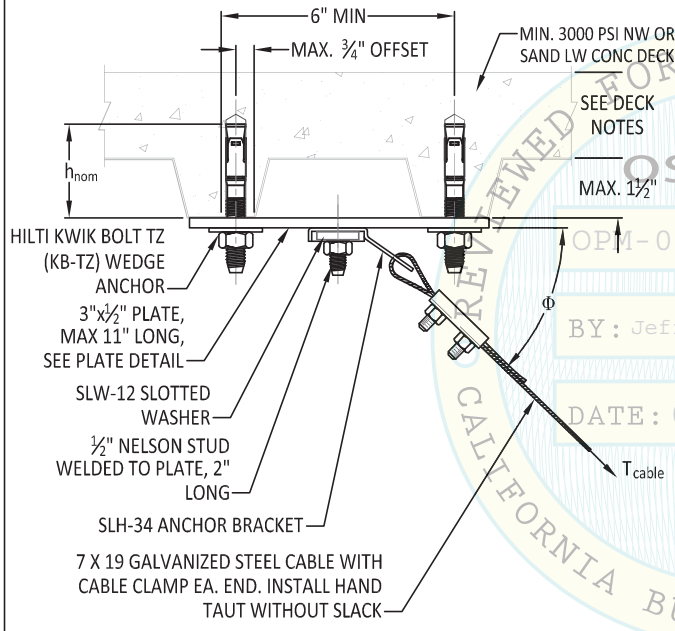
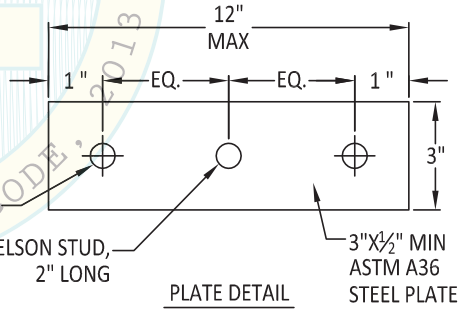


ATTACHMENT WITH (2) ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
2TZD1.51	3/8"	2-5/16"	2"	6-3/4"	745	612	551
2TZD1.52	1/2"	2-3/8"	2"	6-3/4"	802	591	494
2TZD1.53	1/2"	3-5/8"	3-1/4"	9-3/4"	1504	1190	1043
2TZD1.54	5/8"	3-9/16"	3-1/8"	9-3/8"	1810	1476	1321



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5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
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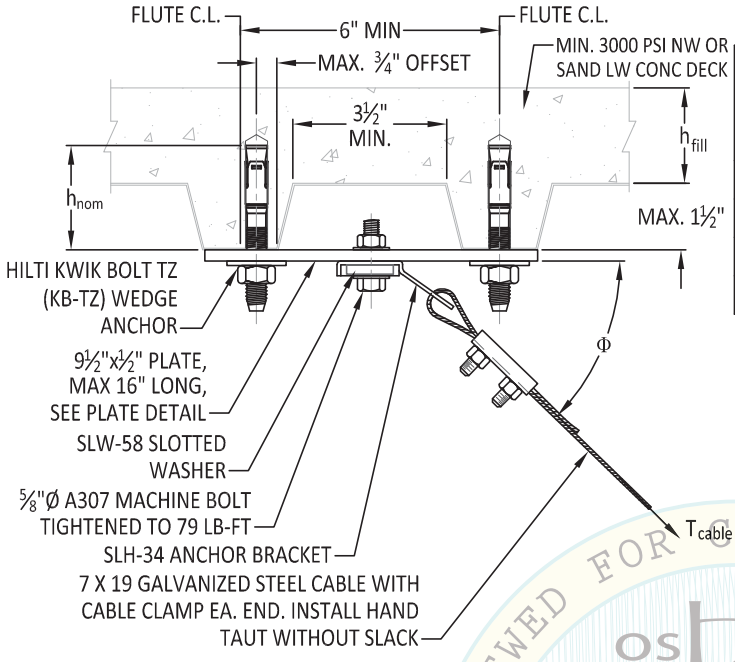

ATTACHMENT WITH (4) ANCHORS

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					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
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4TZD1.52	1/2"	2-3/8"	2"	6-3/4"	1604	1182	988
4TZD1.53	1/2"	3-5/8"	3-1/4"	9-3/4"	3008	2380	2086
4TZD1.54	5/8"	3-9/16"	3-1/8"	9-3/8"	3620	2951	2643

DECK NOTES:
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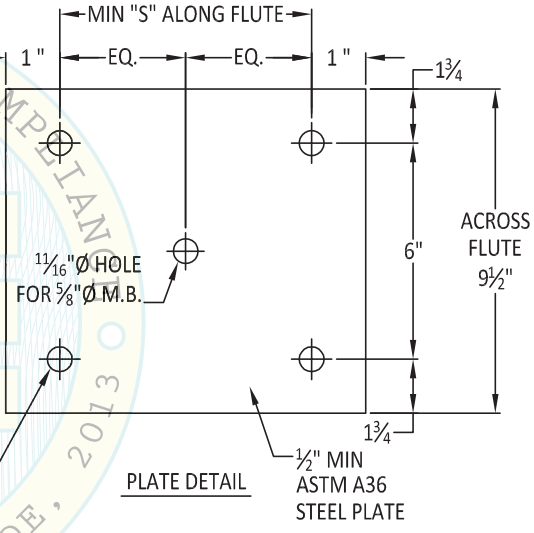

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6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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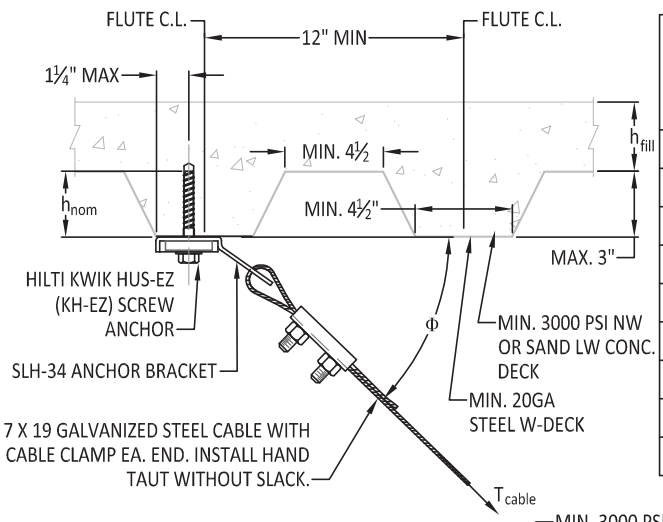
Civil Engineer: P.K. Sachdeva
California PE No. C59644

Page No.: **3.2.1**

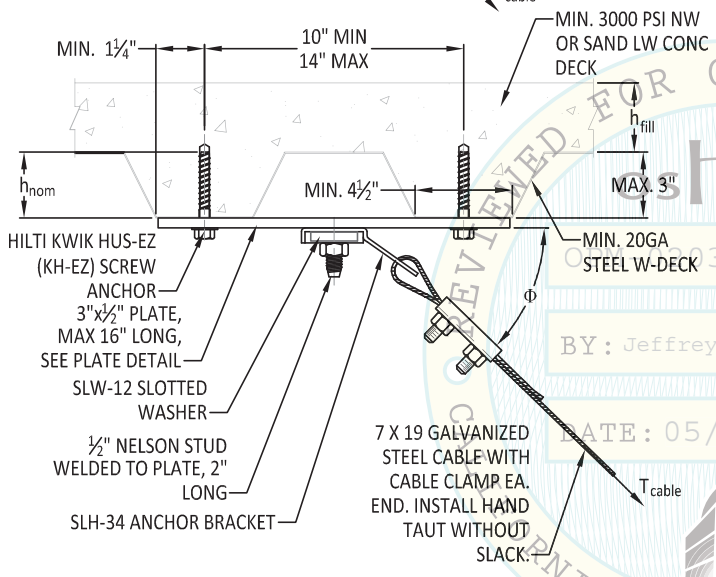
Date: May 9, 2016

HILTI KWIK HUS-EZ (KH-EZ) SCREW ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK



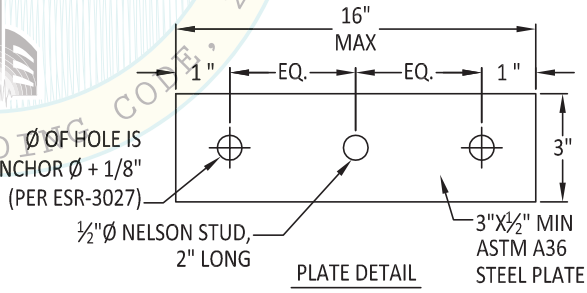
ATTACHMENT WITH (1) SCREW ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
KHD31	3/8"	SLW-38	1-5/8"	1-1/8"	6-3/4"	150	98	77
KHD32	3/8"	SLW-38	2-1/2"	1-7/8"	6-3/4"	199	154	132
KHD33	3/8"	SLW-38	3-1/4"	2-1/2"	7-1/2"	423	302	248
KHD34	1/2"	SLW-12	2-1/4"	1-1/2"	6-3/4"	156	101	79
KHD35	1/2"	SLW-12	3"	2-3/16"	6-3/4"	320	221	177
KHD36	1/2"	SLW-12	4-1/4"	3-1/4"	9-11/16"	455	341	289
KHD37	5/8"	SLW-58	3-1/4"	2-3/8"	7-3/16"	404	287	236
KHD38	5/8"	SLW-58	5"	3-7/8"	11-11/16"	607	503	457
KHD39	3/4"	SLW-34	4"	2-15/16"	8-13/16"	458	309	245



ATTACHMENT WITH (2) SCREW ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
2KHD31	3/8"	1-5/8"	1-1/8"	6-3/4"	354	293	266
2KHD32	3/8"	2-1/2"	1-7/8"	6-3/4"	444	416	419
2KHD33	3/8"	3-1/4"	2-1/2"	7-1/2"	968	858	821
2KHD34	1/2"	2-1/4"	1-1/2"	6-3/4"	370	303	273
2KHD35	1/2"	3"	2-3/16"	6-3/4"	743	640	598
2KHD36	1/2"	4-1/4"	3-1/4"	9-11/16"	1024	942	930
2KHD37	5/8"	3-1/4"	2-3/8"	7-3/16"	926	818	781
2KHD38	5/8"	5"	3-7/8"	11-11/16"	1324	1305	1380
2KHD39	3/4"	4"	2-15/16"	8-13/16"	1071	907	836



DECK NOTES:

- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH SCREW ANCHOR SIZE SEE PAGE 3.0.3.

NOTES:

1. THE OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN THE DESIGN LOAD ON THE ANCHORS MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-3027 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
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7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
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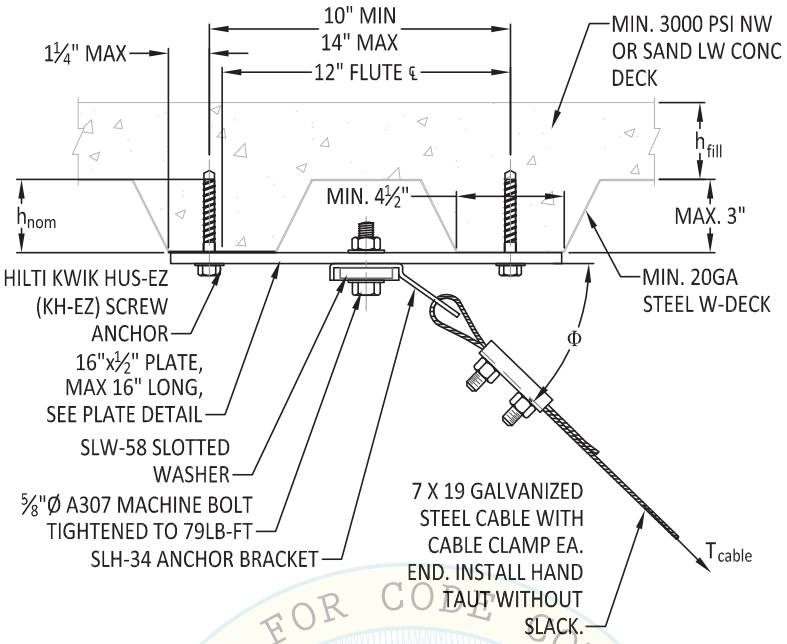
Civil Engineer: P.K. Sachdeva
California PE No. C59644

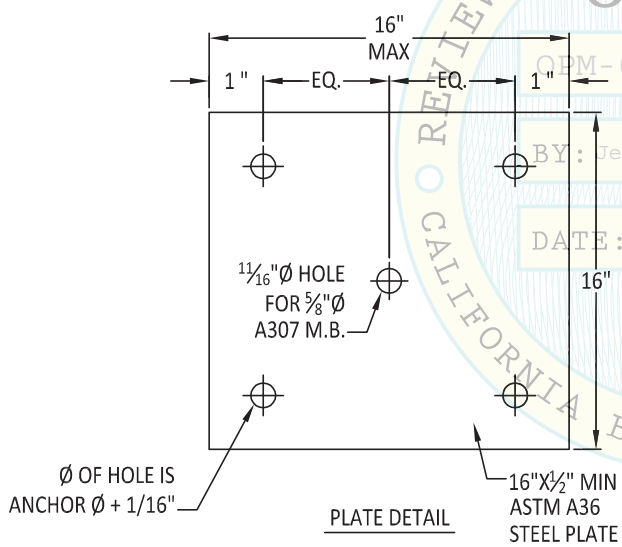
Page No.: 3.3

Date: May 9, 2016

HILTI KWIK HUS-EZ (KH-EZ) SCREW ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK



ATTACHMENT WITH (4) SCREW ANCHORS



ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
4KHD31	3/8"	1-5/8"	1-1/8"	6-3/4"	709	587	532
4KHD32	3/8"	2-1/2"	1-7/8"	6-3/4"	888	833	838
4KHD33	3/8"	3-1/4"	2-1/2"	7-1/2"	1936	1717	1643
4KHD34	1/2"	2-1/4"	1-1/2"	6-3/4"	739	606	545
4KHD35	1/2"	3"	2-3/16"	6-3/4"	1485	1280	1196
4KHD36	1/2"	4-1/4"	3-1/4"	9-11/16"	2048	1883	1860
4KHD37	5/8"	3-1/4"	2-3/8"	7-3/16"	1851	1636	1562
4KHD38	5/8"	5"	3-7/8"	11-11/16"	2649	2611	2759
4KHD39	3/4"	4"	2-15/16"	8-13/16"	2142	1814	1673

DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH SCREW ANCHOR SIZE SEE PAGE 3.0.3.

NOTES:
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4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
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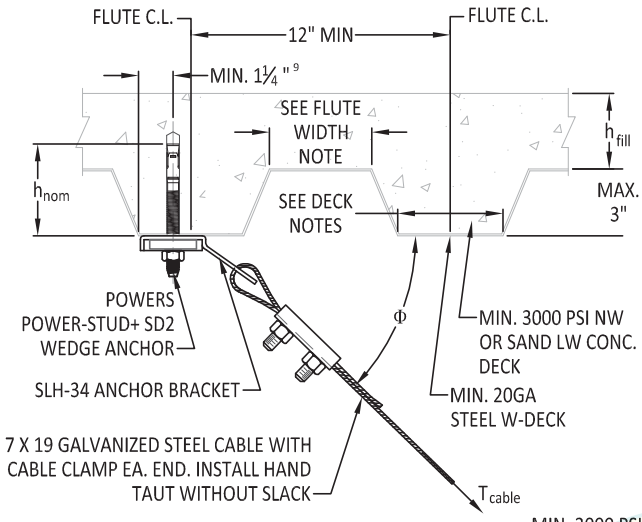
Civil Engineer: P.K. Sachdeva
California PE No. C59644

Page No.: **3.3.1**

Date: May 9, 2016

POWERS POWER-STUD+ SD2 WEDGE ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK



ATTACHMENT WITH (1) ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" [8]		
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
SD2D31	3/8"	SLW-38	2-3/8"	2"	6-3/4"	286	182	140
SD2D32	1/2"	SLW-12	2-1/2"	2"	6-3/4"	346	201	149
SD2D33	1/2"	SLW-12	3-3/4"	3-1/4"	9-3/4"	623	359	265
SD2D34	5/8"	SLW-58	3-7/8"	3-1/4"	9-3/8"	538	374	302
SD2D35	5/8"	SLW-58	4-7/8"	4-1/4"	12"	874	599	481
SD2D36	3/4"	SLW-34	4-1/2"	3-3/4"	11-1/4"	567	393	317

DECK NOTES:

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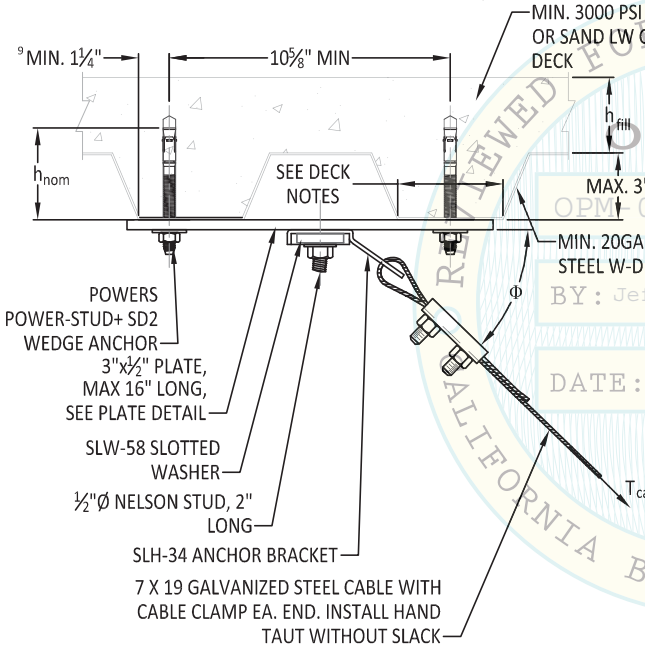
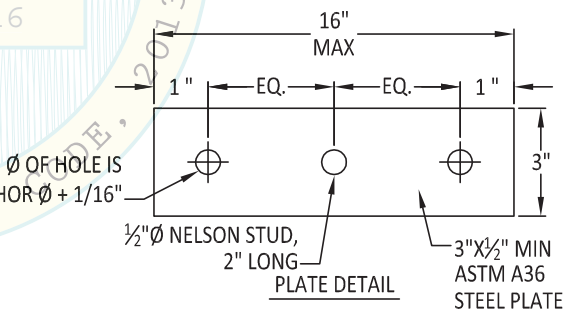
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.2.



ATTACHMENT WITH (2) ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" [8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
2SD2D31	3/8"	2-3/8"	2"	6-3/4"	685	552	491
2SD2D32	1/2"	2-1/2"	2"	6-3/4"	861	642	541
2SD2D33	1/2"	3-3/4"	3-1/4"	9-3/4"	1555	1151	966
2SD2D34	5/8"	3-7/8"	3-1/4"	9-3/8"	1245	1079	1014
2SD2D35	5/8"	4-7/8"	4-1/4"	12"	2030	1743	1624
2SD2D36	3/4"	4-1/2"	3-3/4"	11-1/4"	1310	1135	1066



NOTES:

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2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2502 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.
9. EDGE OF FLUTE DISTANCE FOR 3-7/8" WIDE FLUTES IS 1" AND IS APPLICABLE TO THE ⅜" AND ½" DIA. ANCHORS ONLY.

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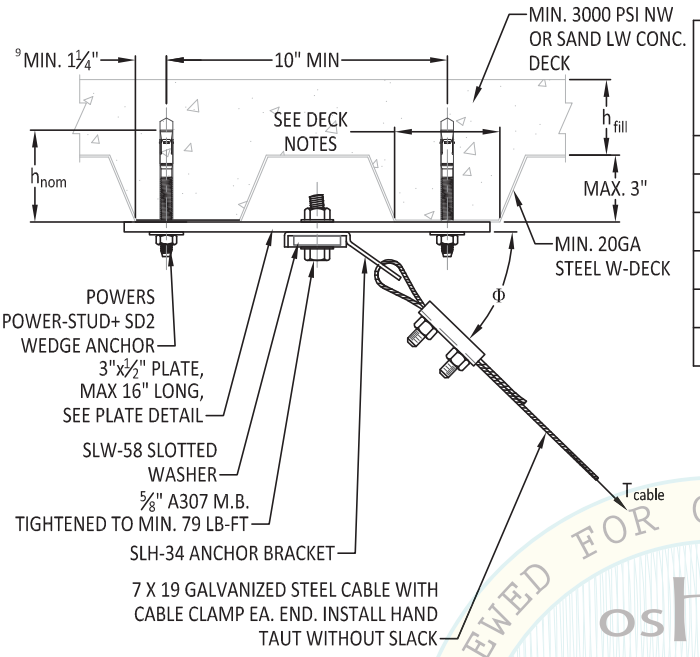
Page No.: 3.4

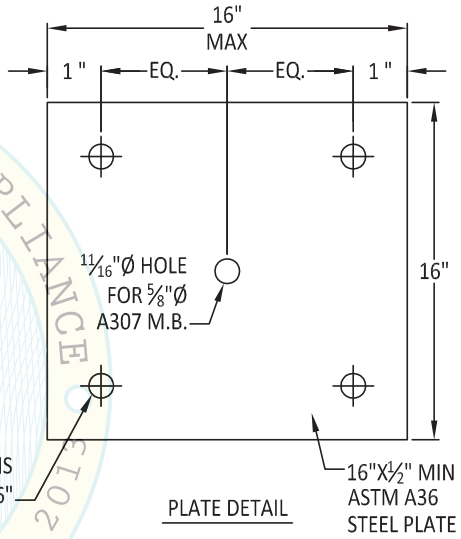
Date: May 9, 2016

POWERS POWER-STUD+ SD2 WEDGE ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK



ATTACHMENT WITH (4) ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[9]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
4SD231	3/8"	2-3/8"	2"	6-3/4"	1370	1104	981
4SD232	1/2"	2-1/2"	2"	6-3/4"	1723	1284	1082
4SD233	1/2"	3-3/4"	3-1/4"	9-3/4"	3109	2301	1931
4SD234	5/8"	3-7/8"	3-1/4"	9-3/8"	2489	2159	2028
4SD235	5/8"	4-7/8"	4-1/4"	12"	4060	3487	3249
4SD236	3/4"	4-1/2"	3-3/4"	11-1/4"	2621	2271	2131



DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.2.

NOTES:
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5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
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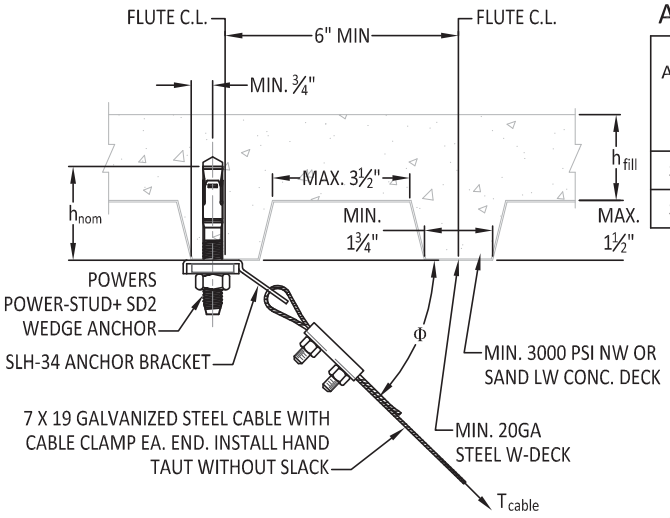
Page No.: **3.4.1**

Date: May 9, 2016

POWERS POWER-STUD+ SD2 WEDGE ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 1½" DEEP MIN. 20GA METAL DECK



ATTACHMENT WITH (1) ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" [8]		
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
SD21.51	3/8"	SLW-38	2-5/16"	2"	6-3/4"	278	167	125
SD21.52	1/2"	SLW-12	2-3/8"	2"	6-3/4"	351	200	147

DECK NOTES:
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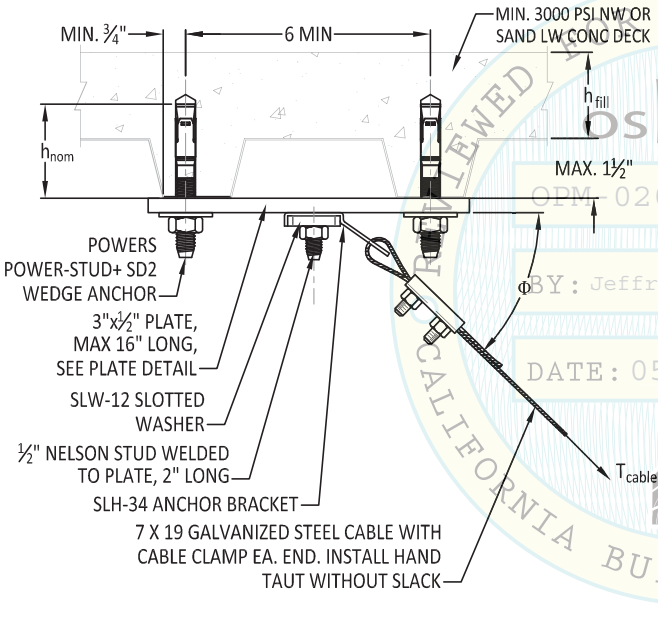
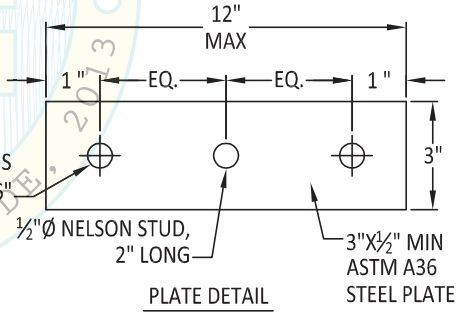


ATTACHMENT WITH (2) ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
2SD21.51	3/8"	2-5/16"	2"	6-3/4"	681	523	449
2SD21.52	1/2"	2-3/8"	2"	6-3/4"	879	644	538



NOTES:
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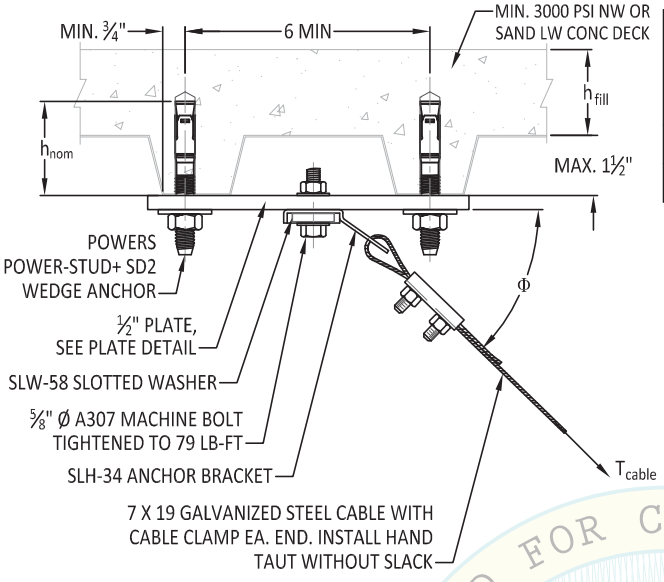
Page No.: 3.5

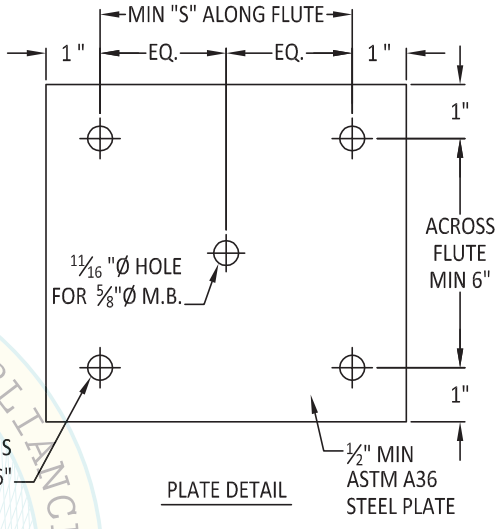
Date: May 9, 2016

POWERS POWER-STUD+ SD2 WEDGE ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 1½" DEEP MIN. 20GA METAL DECK



ATTACHMENT WITH (4) ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
4SD2D1.51	3/8"	2-5/16"	2"	6-3/4"	1363	1045	897
4SD2D1.52	1/2"	2-3/8"	2"	6-3/4"	1758	1289	1075



DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.2.

NOTES:
1. THE OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN THE DESIGN LOAD ON THE ANCHORS MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2502 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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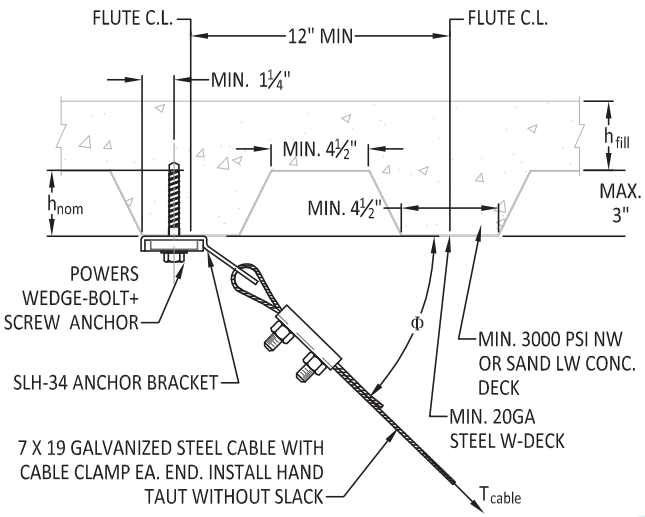
Civil Engineer: P.K. Sachdeva
California PE No. C59644

Page No.: **3.5.1**

Date: May 9, 2016

POWERS WEDGE-BOLT+ SCREW ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK



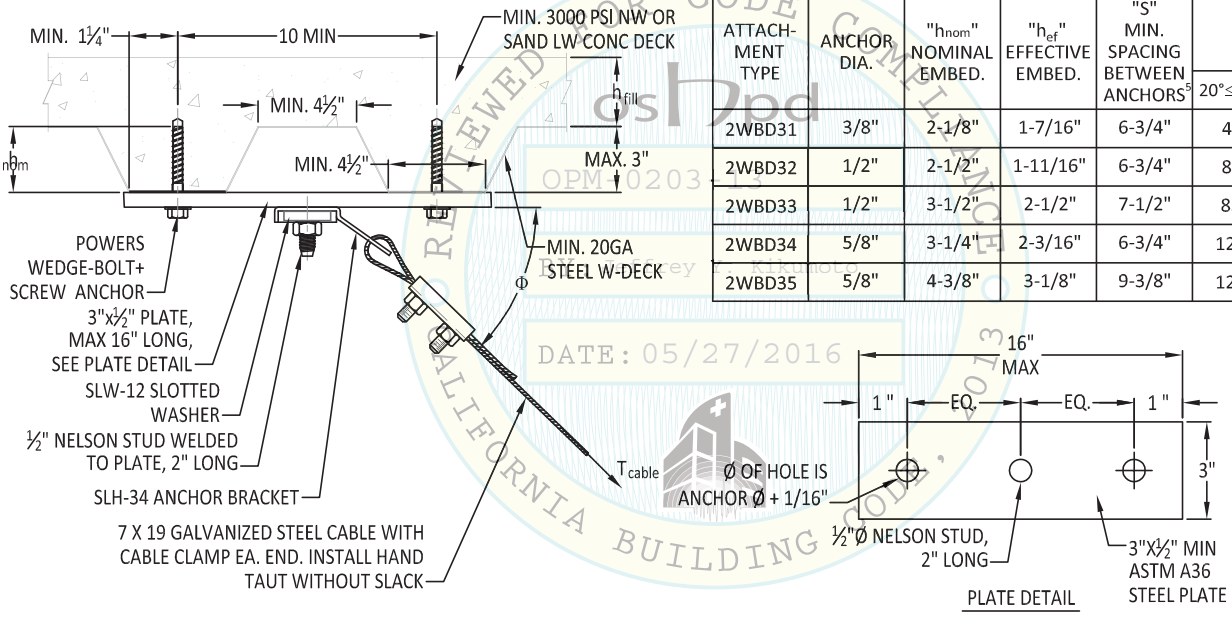
ATTACHMENT WITH (1) SCREW ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
WBD31	3/8"	SLW-38	2-1/8"	1-7/16"	6-3/4"	202	131	102
WBD32	1/2"	SLW-12	2-1/2"	1-11/16"	6-3/4"	329	185	135
WBD33	1/2"	SLW-12	3-1/2"	2-1/2"	7-1/2"	329	185	135
WBD34	5/8"	SLW-58	3-1/4"	2-3/16"	6-3/4"	541	361	286
WBD35	5/8"	SLW-58	4-3/8"	3-1/8"	9-3/8"	519	332	257

DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH SCREW ANCHOR SIZE SEE PAGE 3.0.3.

ATTACHMENT WITH (2) SCREW ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
2WBD31	3/8"	2-1/8"	1-7/16"	6-3/4"	479	393	354
2WBD32	1/2"	2-1/2"	1-11/16"	6-3/4"	830	600	497
2WBD33	1/2"	3-1/2"	2-1/2"	7-1/2"	830	600	497
2WBD34	5/8"	3-1/4"	2-3/16"	6-3/4"	1269	1067	978
2WBD35	5/8"	4-3/8"	3-1/8"	9-3/8"	1238	1005	897



NOTES:
1. THE OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN THE DESIGN LOAD ON THE ANCHORS MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2526 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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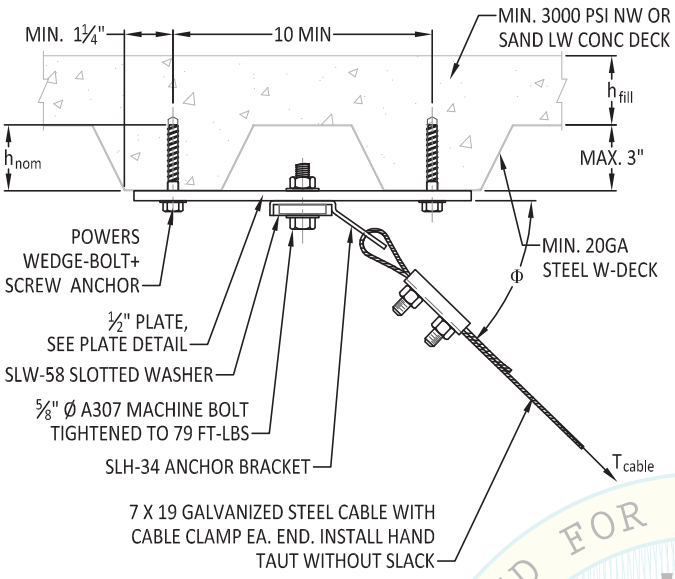
California PE No. C59644

POWERS WEDGE-BOLT+ SCREW ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK

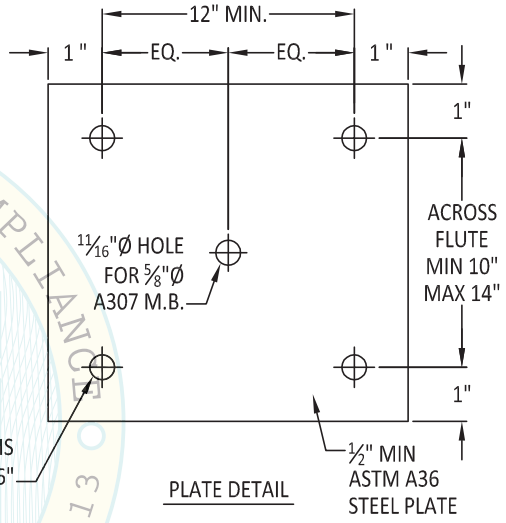


DECK NOTES:

- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH SCREW ANCHOR SIZE SEE PAGE 3.0.3.

ATTACHMENT WITH (4) SCREW ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
4WBD31	3/8"	2-1/8"	1-7/16"	6-3/4"	959	787	708
4WBD32	1/2"	2-1/2"	1-11/16"	6-3/4"	1660	1200	993
4WBD33	1/2"	3-1/2"	2-1/2"	7-1/2"	1660	1200	993
4WBD34	5/8"	3-1/4"	2-3/16"	6-3/4"	2539	2135	1957
4WBD35	5/8"	4-3/8"	3-1/8"	9-3/8"	2476	2010	1795



NOTES:

1. THE OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN THE DESIGN LOAD ON THE ANCHORS MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2526 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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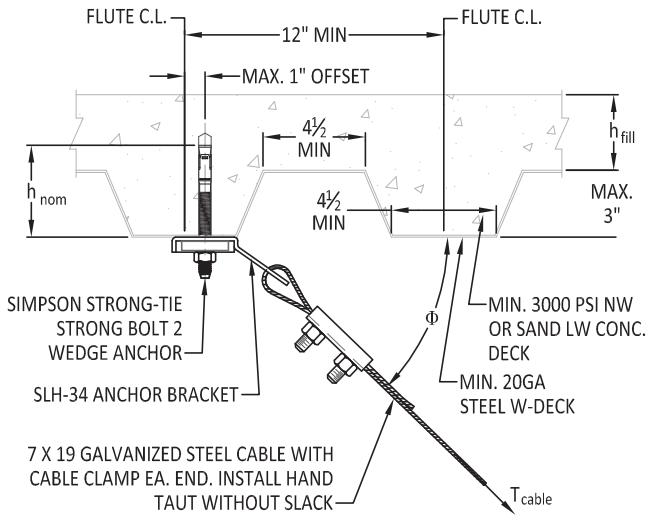
Page No.: 3.6.1

Date: May 9, 2016

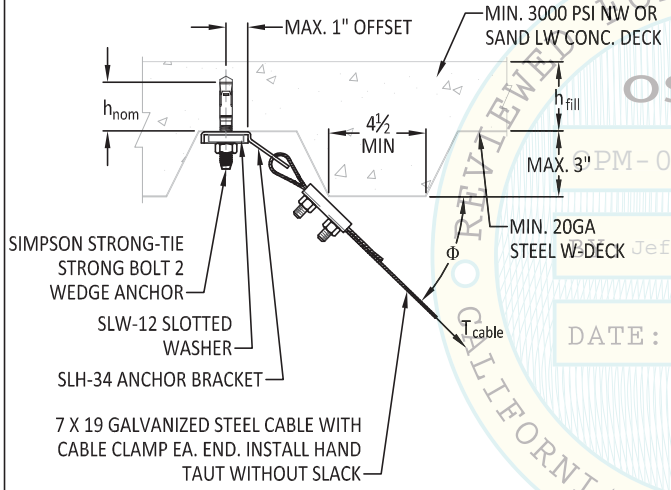
SIMPSON STRONG-TIE STRONG-BOLT 2 WEDGE ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK



ATTACHMENT WITH (1) ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" [8]		
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
SB2D31	3/8"	SLW-38	2"	1-5/8"	6-3/4"	230	138	104
SB2D32	3/8"	SLW-38	3-3/8"	3"	9"	546	338	257
SB2D33	1/2"	SLW-12	2-3/4"	2-1/4"	6-3/4"	361	241	191
SB2D34	1/2"	SLW-12	4-1/2"	4"	12"	600	362	272
SB2D35	5/8"	SLW-58	3-3/8"	2-3/4"	8-1/4"	454	306	244
SB2D36	5/8"	SLW-58	5-5/8"	5"	15"	1017	637	488
SB2D37	3/4"	SLW-34	4-1/8"	3-3/8"	10-1/8"	583	362	276

DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.2.



ATTACHMENT WITH (1) ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" [8]		
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
SB2D38	3/8"	SLW-38	2"	1⅝"	6-3/4"	357	194	140
SB2D39	1/2"	SLW-12	2-3/4"	2¼"	6-3/4"	809	495	375

NOTES:
1. THE OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN THE DESIGN LOAD ON THE ANCHORS MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-3037 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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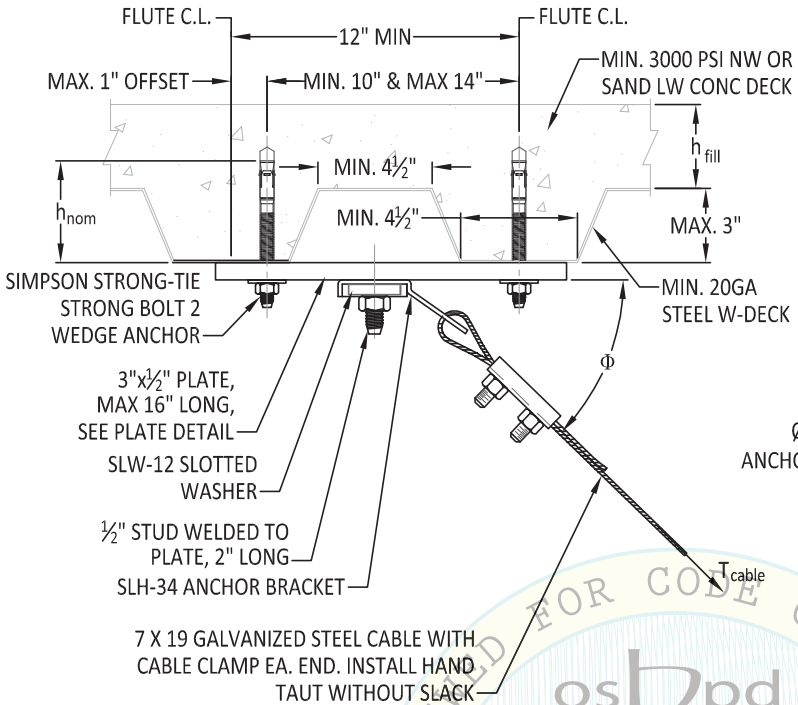
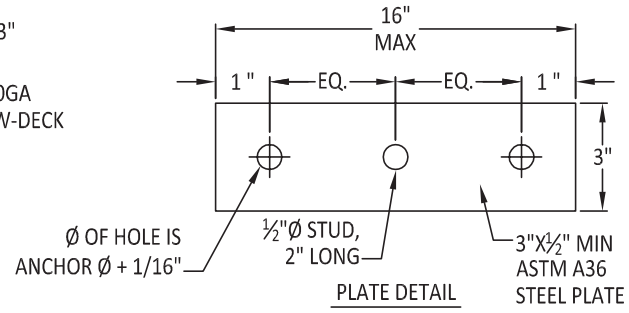
Civil Engineer: P.K. Sachdeva
California PE No. C59644

SIMPSON STRONG-TIE STRONG-BOLT 2 WEDGE ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK





ATTACHMENT WITH (2) ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
2SB2D31	3/8"	2"	1-5/8"	6-3/4"	469	385	346
2SB2D32	3/8"	3-3/8"	3"	9"	1112	930	848
2SB2D33	1/2"	2-3/4"	2-1/4"	6-3/4"	732	644	612
2SB2D34	1/2"	4-1/2"	4"	12"	1224	1006	906
2SB2D35	5/8"	3-3/8"	2-3/4"	8-1/4"	921	814	777
2SB2D36	5/8"	5-5/8"	5"	15"	2071	1744	1600
2SB2D37	3/4"	4-1/8"	3-3/8"	10-1/8"	1188	995	909

DECK NOTES:

- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.2.

NOTES:

1. THE OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN THE DESIGN LOAD ON THE ANCHORS MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-3037 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90° -$ ANGLE OF "x" CABLE FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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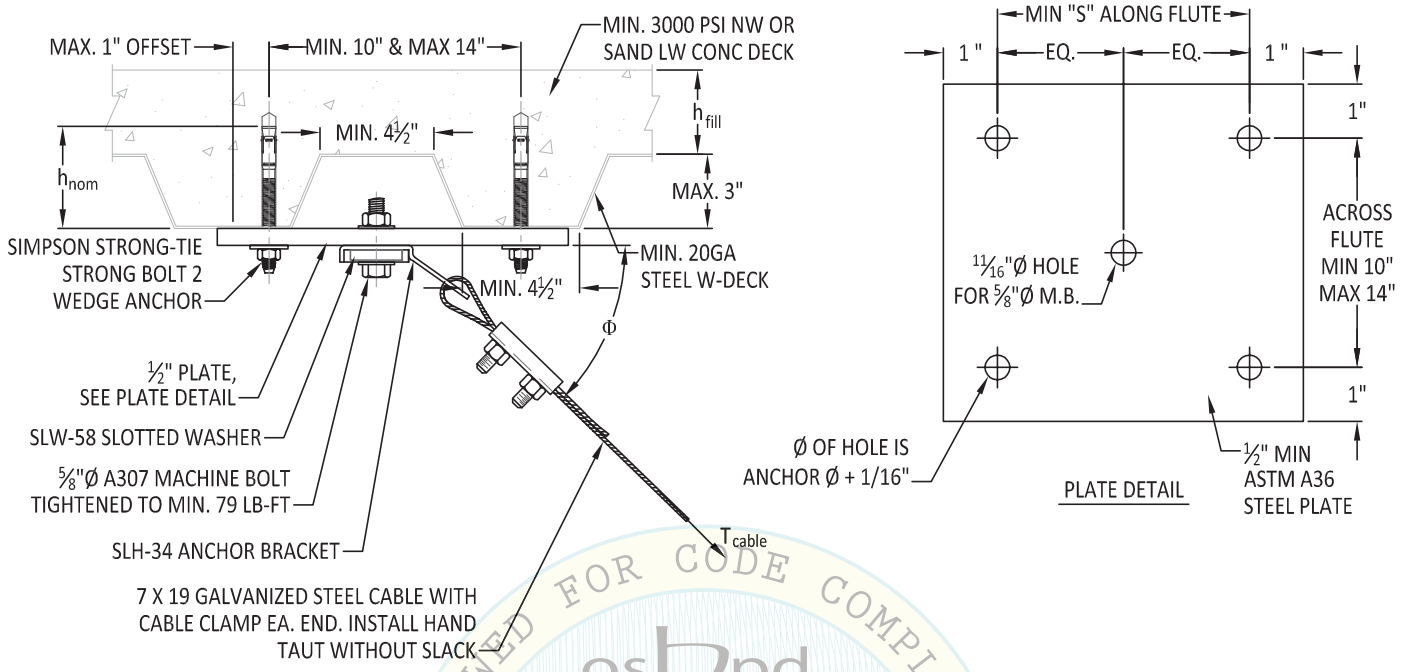
California PE No. C59644

Page No.: **3.8**

Date: May 9, 2016

SIMPSON STRONG-TIE STRONG-BOLT 2 WEDGE ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK



ATTACHMENT WITH (4) ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
4SB2D31	3/8"	2"	1-5/8"	6-3/4"	1127	866	745
4SB2D32	3/8"	3-3/8"	3"	9"	2641	2083	1822
4SB2D33	1/2"	2-3/4"	2-1/4"	6-3/4"	1689	1424	1307
4SB2D34	1/2"	4-1/2"	4"	12"	2935	2263	1949
4SB2D35	5/8"	3-3/8"	2-3/4"	8-1/4"	2119	1797	1659
4SB2D36	5/8"	5-5/8"	5"	15"	4893	3899	3436
4SB2D37	3/4"	4-1/8"	3-3/8"	10-1/8"	2816	2228	1954

DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.2.

NOTES:
1. THE OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN THE DESIGN LOAD ON THE ANCHORS MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-3037 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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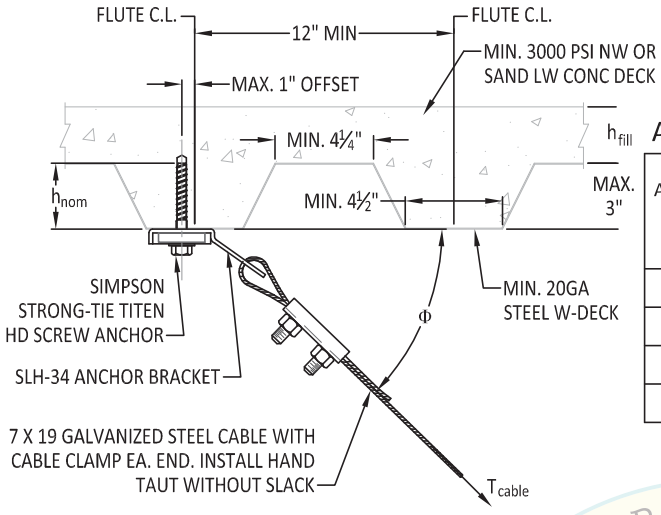
Page No.: **3.8.1**

Date: May 9, 2016

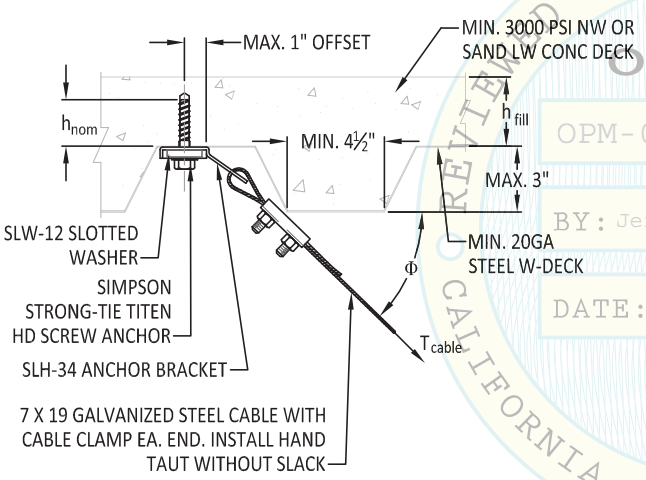
SIMPSON STRONG-TIE TITEN HD SCREW ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN. 20GA METAL DECK



ATTACHMENT WITH (1) SCREW ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE (lbs), "T_{cable}", @ ANGLE "Φ" [8]		
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
THD31	3/8"	SLW-38	1-7/8"	1-1/4"	6-3/4"	107	56	40
THD32	3/8"	SLW-12	2-1/2"	1-3/4"	6-3/4"	197	117	87
THD33	1/2"	SLW-12	2"	1-5/16"	6-3/4"	203	121	91
THD34	1/2"	SLW-58	3-1/2"	2-9/16"	7 11/16"	419	261	200

DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH SCREW ANCHOR SIZE SEE PAGE 3.0.3.



ATTACHMENT WITH (1) SCREW ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" [8]		
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
THD35	3/8"	SLW-38	1-7/8"	1-1/4"	6-3/4"	153	77	54
THD36	1/2"	SLW-12	2"	1-5/16"	6-3/4"	445	245	177

NOTES:
1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2713 (2014).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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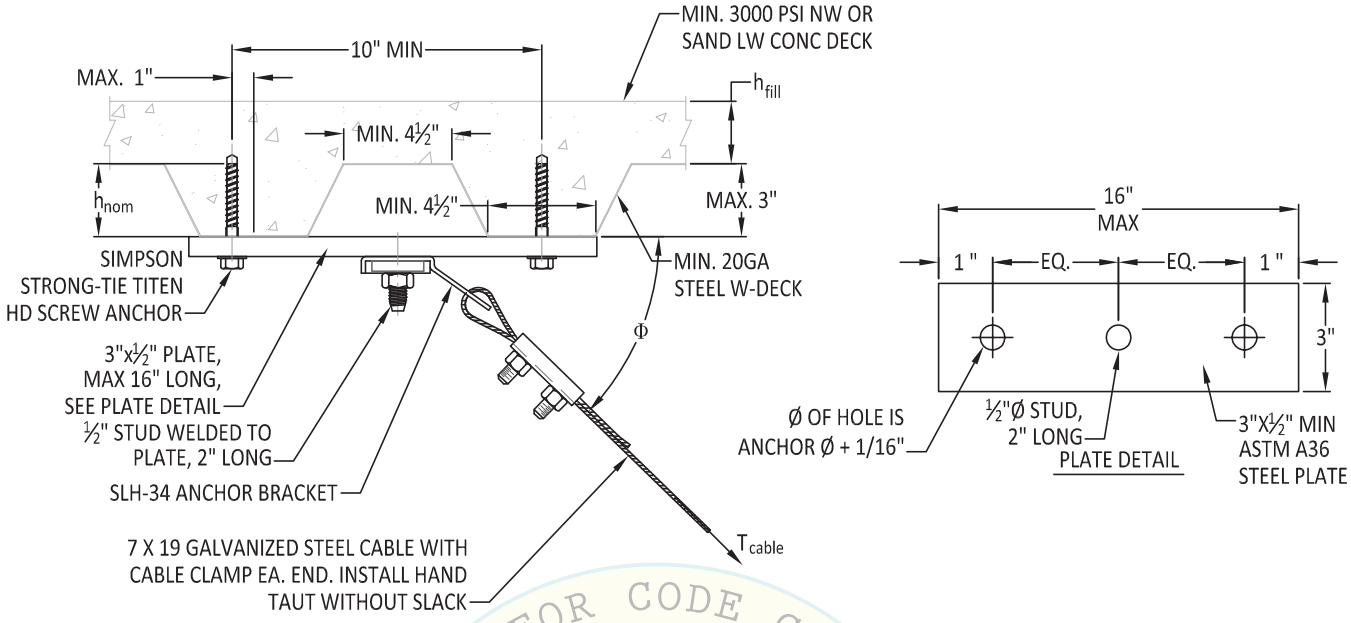
SIMPSON STRONG-TIE TITEN HD SCREW ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN 20GA METAL DECK



ATTACHMENT WITH (2) SCREW ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE (lbs), "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
2THD31	3/8"	1-7/8"	1-1/4"	6-3/4"	281	189	150
2THD32	3/8"	2-1/2"	1-3/4"	6-3/4"	485	369	315
2THD33	1/2"	2"	1-5/16"	6-3/4"	500	382	326
2THD34	1/2"	3-1/2"	2-9/16"	7-11/16"	1011	803	705

DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH SCREW ANCHOR SIZE SEE PAGE 3.0.3.

NOTES:
1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2713 (2014).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90°$ – ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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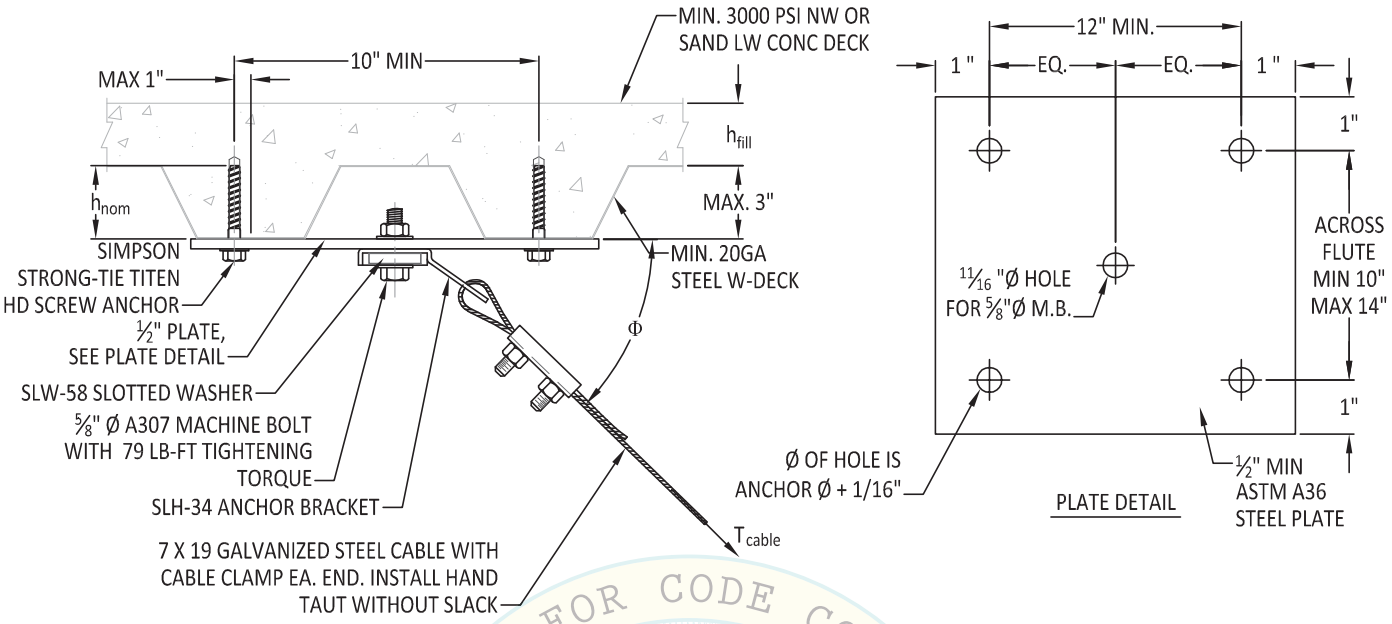
SIMPSON STRONG-TIE TITEN HD SCREW ANCHOR IN 3000 PSI NORMAL OR SAND LIGHT WEIGHT CONCRETE OVER MAX. 3" DEEP MIN 20GA METAL DECK



ATTACHMENT WITH (4) SCREW ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"S" MIN. SPACING BETWEEN ANCHORS[5]	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[8]		
					20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
4THD31	3/8"	1-7/8"	1-1/4"	6-3/4"	562	378	300
4THD32	3/8"	2-1/2"	1-3/4"	6-3/4"	970	738	630
4THD33	1/2"	2"	1-5/16"	6-3/4"	1000	763	653
4THD34	1/2"	3-1/2"	2-9/16"	7-11/16"	2022	1605	1411

DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH SCREW ANCHOR SIZE SEE PAGE 3.0.3.

NOTES:
1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2713 (2014).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS TABULATED ABOVE ARE ALONG THE FLUTE LENGTH.
6. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.4 FOR SLH-34 DETAILS.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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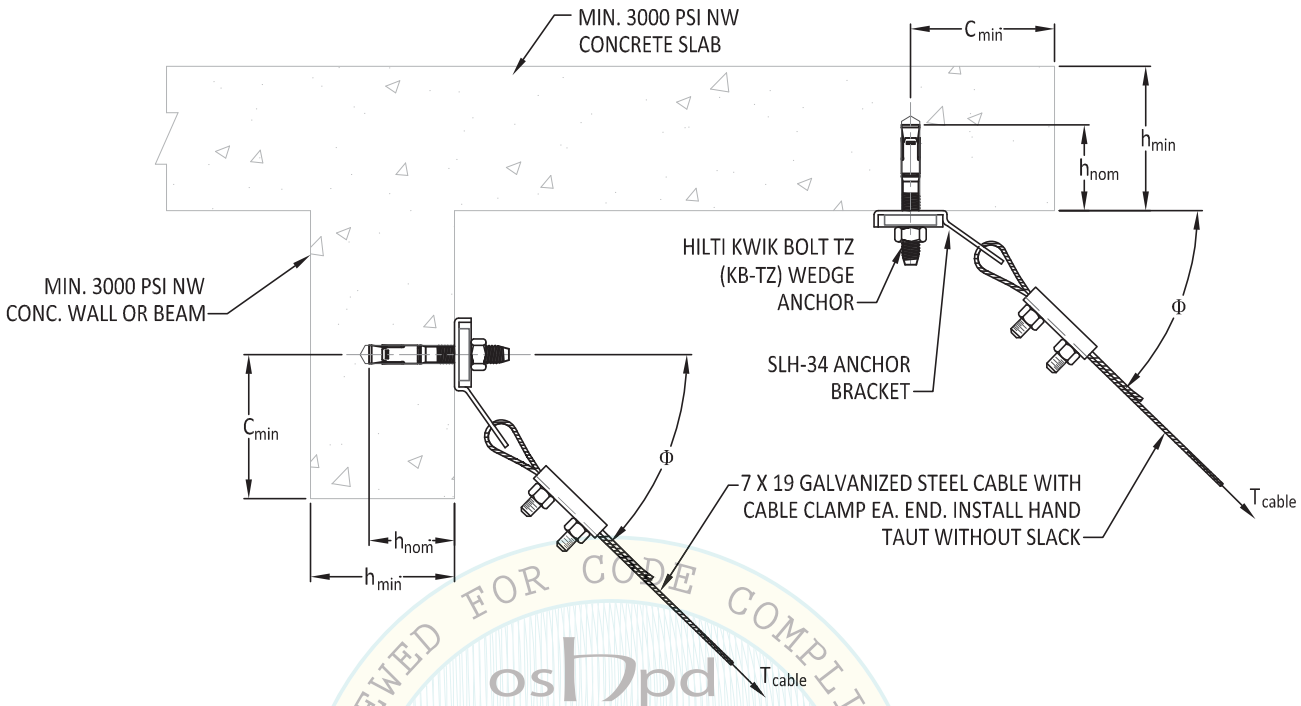
Page No.: 3.10.1
Date: May 9, 2016

HILTI KWIK BOLT TZ (KB-TZ) WEDGE ANCHOR IN 3000 PSI NORMAL WEIGHT CONCRETE SLAB/WALL/BEAM



ATTACHMENT WITH (1) ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	"h_{min}" MIN. CONC. THICKNESS	MAX TENSION IN CABLE(lbs), "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE(lbs), "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]		
							20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°
TZRC1	3/8"	SLW-38	2-5/16"	2"	4-3/8"	4"	431	291	232	232	291	431
TZRC2	1/2"	SLW-12	2-3/8"	2"	5-1/2"	4"	480	317	249	249	317	480
TZRC3	1/2"	SLW-12	3-5/8"	3-1/4"	7-1/2"	6"	992	652	511	511	652	992
TZRC4	5/8"	SLW-58	3-9/16"	3-1/8"	6-1/2"	5"	906	608	482	482	608	906
TZRC5	5/8"	SLW-58	4-7/16"	4"	8-3/4"	6"	1358	896	705	705	896	1358
TZRC6	3/4"	SLW-34	4-5/16"	3-3/4"	10"	6"	1402	870	664	664	870	1402
TZRC7	3/4"	SLW-34	5-9/16"	4-3/4"	9"	8"	1761	1161	913	913	1161	1761

NOTES:

1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-1917 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
6. SEE PAGE 4.4 FOR SLH-34 DETAILS.
7. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE GREATER THAN 70° FOR CAPACITIES TO BE VALID.

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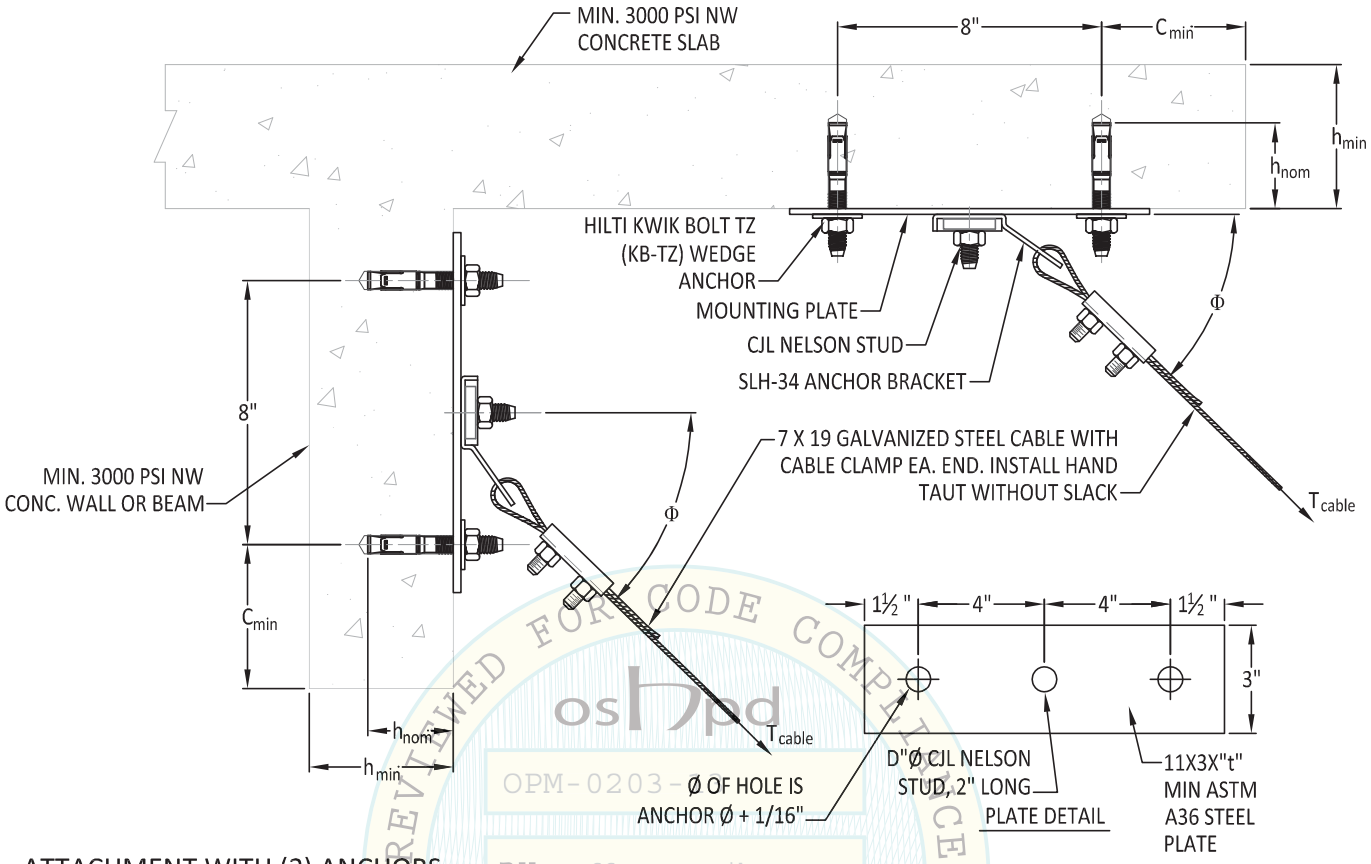
Page No.: 3.11

Date: May 9, 2016

HILTI KWIK BOLT TZ (KB-TZ) WEDGE ANCHOR IN 3000 PSI NORMAL WEIGHT CONCRETE SLAB/WALL/BEAM



ATTACHMENT WITH (2) ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	"h_{min}" MIN. CONC. THICKNESS	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]			MIN. PLATE THICK-NESS "t"	STUD DIA-METER "D"
							20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°		
2TZRC1	3/8"	SLW-38	2-5/16"	2"	4-3/8"	4"	1044	857	771	771	857	1044	3/8"	1/2"
2TZRC2	1/2"	SLW-12	2-3/8"	2"	5-1/2"	4"	1177	945	838	838	945	1177	3/8"	1/2"
2TZRC3	1/2"	SLW-12	3-5/8"	3-1/4"	7-1/2"	6"	2359	1855	1620	1620	1855	2359	1/2"	1/2"
2TZRC4	5/8"	SLW-58	3-9/16"	3-1/8"	6-1/2"	5"	2142	1718	1520	1520	1718	2142	1/2"	1/2"
2TZRC5	5/8"	SLW-58	4-7/16"	4"	8-3/4"	6"	3093	2391	2063	2063	2391	3093	1/2"	3/4"
2TZRC6	3/4"	SLW-34	4-5/16"	3-3/4"	10"	6"	3296	2420	2020	2020	2420	3296	5/8"	3/4"
2TZRC7	3/4"	SLW-34	5-9/16"	4-3/4"	9"	8"	3899	2970	2538	2538	2970	3899	5/8"	3/4"

NOTES:

1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-1917 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
6. SEE PAGE 4.4 FOR SLH-34 DETAILS.
7. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE GREATER THAN 70° FOR CAPACITIES TO BE VALID.

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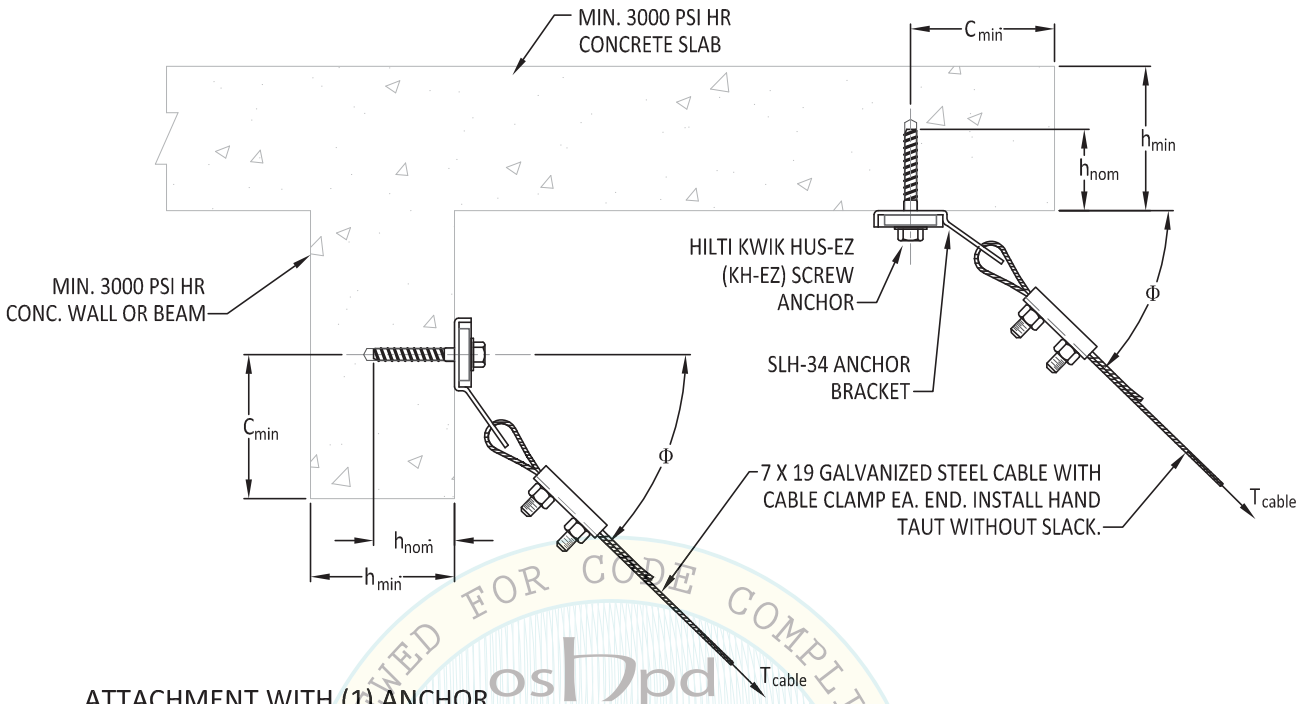
California PE No. C59644

Page No.: 3.12

Date: May 9, 2016

HILTI KWIK HUS-EZ (KH-EZ) SCREW ANCHOR IN 3000 PSI NORMAL WEIGHT CONCRETE SLAB/WALL/BEAM



ATTACHMENT WITH (1) ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	"h_{min}" MIN. CONC. THICKNESS	MAX TENSION IN CABLE(lbs), "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE(lbs), "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]		
							20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°
KHRC1	3/8"	SLW-38	1-5/8"	1-1/8"	2-1/8"	3-1/4"	152	98	76	76	98	152
KHRC2	3/8"	SLW-38	2-1/2"	1-7/8"	3"	4"	338	248	207	207	248	338
KHRC3	3/8"	SLW-38	3-1/4"	2-1/2"	3-3/4"	4-3/4"	503	375	317	317	375	503
KHRC4	1/2"	SLW-12	2-1/4"	1-1/2"	2-3/4"	4-1/2"	294	201	161	161	201	294
KHRC5	1/2"	SLW-12	3"	2-3/16"	3-11/16"	5-1/2"	496	340	273	273	340	496
KHRC6	1/2"	SLW-12	4-1/4"	3-1/4"	5-1/4"	6-3/4"	864	604	489	489	604	864
KHRC7	5/8"	SLW-58	3-1/4"	2-3/8"	3-5/8"	5"	532	377	309	309	377	532
KHRC8	5/8"	SLW-58	5"	3-7/8"	5-13/16"	7"	1107	783	640	640	783	1107
KHRC9	3/4"	SLW-34	4"	2-15/16"	4-7/16"	6"	755	525	424	424	525	755
KHRC10	3/4"	SLW-34	6-1/4"	4-7/8"	7-5/16"	8"	1607	1118	904	904	1118	1607

NOTES:

1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-3027 (2013).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
6. SEE PAGE 4.4 FOR SLH-34 DETAILS.
7. Φ = 90° – ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.
8. Φ = 90° – ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE GREATER THAN 70° FOR CAPACITIES TO BE VALID.

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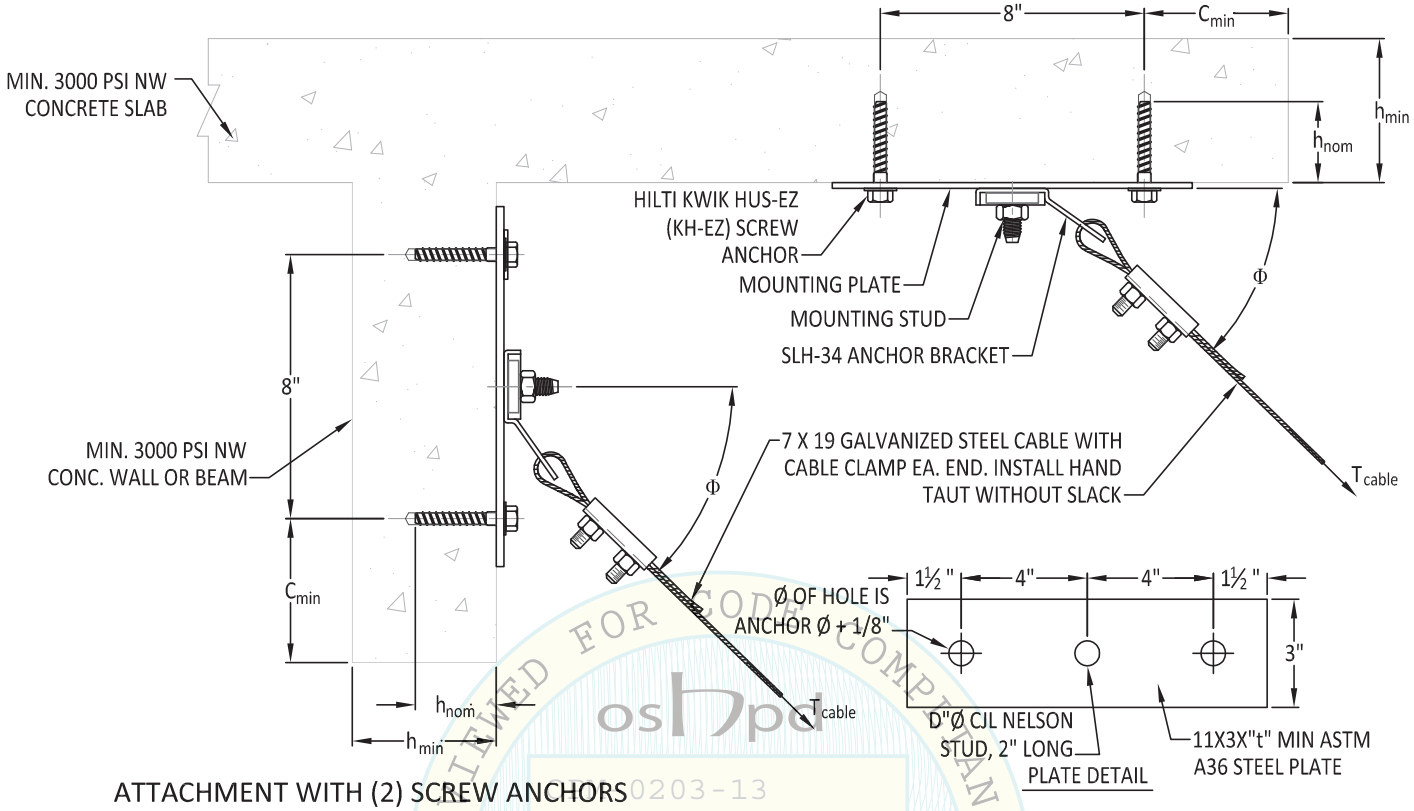

ATTACHMENT WITH (2) SCREW ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	"h_{min}" MIN. CONC. THICKNESS	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]			MIN. PLATE THICK-NESS "t"	STUD DIA-METER "D"
							20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°		
2KHRC1	3/8"	SLW-38	1-5/8"	1-1/8"	2-1/8"	3-1/4"	387	302	262	262	302	387	3/8"	1/2"
2KHRC2	3/8"	SLW-38	2-1/2"	1-7/8"	3"	4"	807	705	667	667	705	807	3/8"	1/2"
2KHRC3	3/8"	SLW-38	3-1/4"	2-1/2"	3-3/4"	4-3/4"	1190	1056	1012	1012	1056	1190	3/8"	1/2"
2KHRC4	1/2"	SLW-12	2-1/4"	1-1/2"	2-3/4"	4-1/2"	724	596	538	538	596	724	3/8"	1/2"
2KHRC5	1/2"	SLW-12	3"	2-3/16"	3-11/16"	5-1/2"	1223	1009	911	911	1009	1223	3/8"	1/2"
2KHRC6	1/2"	SLW-12	4-1/4"	3-1/4"	5-1/4"	6-3/4"	2049	1686	1520	1520	1686	2049	1/2"	1/2"
2KHRC7	5/8"	SLW-58	3-1/4"	2-3/8"	3-5/8"	5"	1288	1096	1013	1013	1096	1288	1/2"	1/2"
2KHRC8	5/8"	SLW-58	5"	3-7/8"	5-13/16"	7"	2542	2079	1867	1867	2079	2542	1/2"	1/2"
2KHRC9	3/4"	SLW-34	4"	2-15/16"	4-7/16"	6"	1507	1507	1364	1364	1507	1507	1/2"	1/2"
2KHRC10	3/4"	SLW-34	6-1/4"	4-7/8"	7-5/16"	8"	3601	2847	2494	2494	2847	3601	5/8"	3/4"

NOTES:

1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-3027 (2013).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
6. SEE PAGE 4.4 FOR SLH-34 DETAILS.
7. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.
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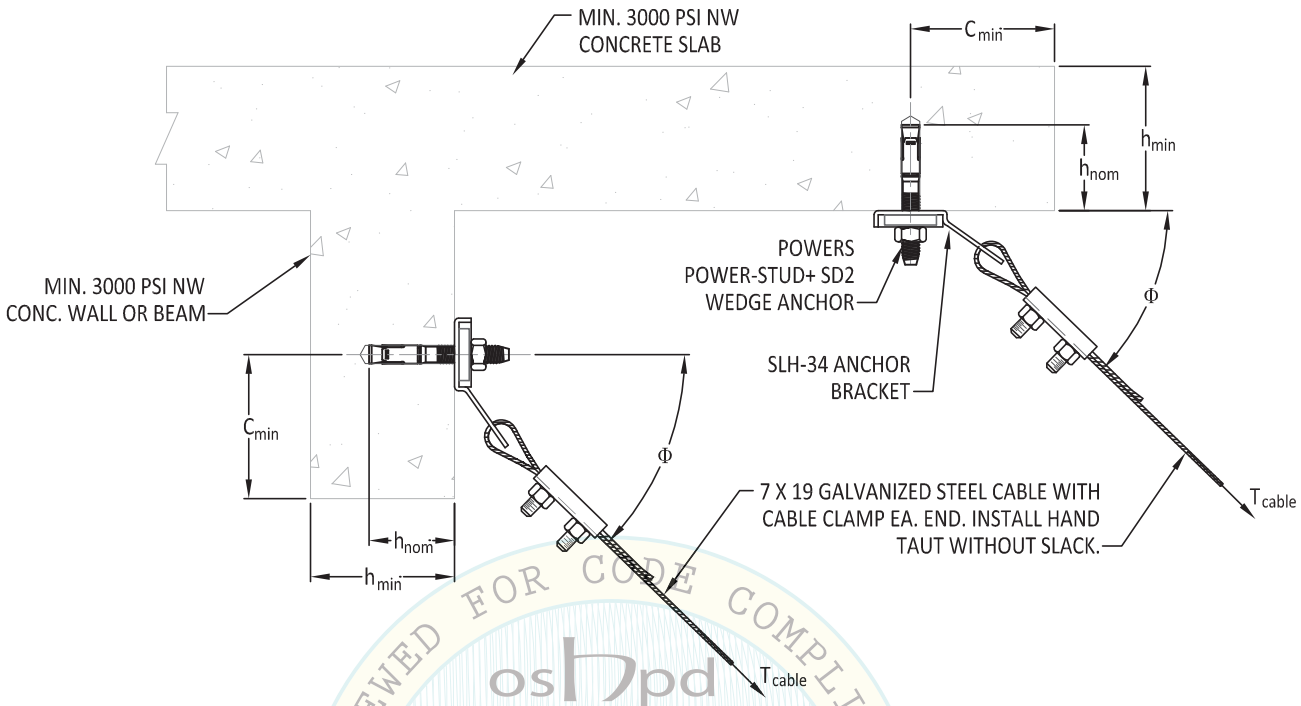
Civil Engineer: P.K. Sachdeva
California PE No. C59644

Page No.: **3.14**

Date: May 9, 2016

POWERS POWER-STUD+ SD2 WEDGE ANCHOR IN 3000 PSI NORMAL WEIGHT CONCRETE SLAB/WALL/BEAM



ATTACHMENT WITH (1) ANCHOR BOLT

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	"h_{min}" MIN. CONC. THICKNESS	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]		
							20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°
SD2RC1	3/8"	SLW-38	2-3/8"	2"	6-1/2"	4"	417	276	217	217	276	417
SD2RC2	1/2"	SLW-12	2-1/2"	2"	8"	4-1/2"	498	323	252	252	323	498
SD2RC3	1/2"	SLW-12	3-3/4"	3-1/4"	10"	5-3/4"	866	574	452	452	574	866
SD2RC4	5/8"	SLW-58	3-7/8	3-1/4"	8"	5-3/4"	1032	670	522	522	670	1032
SD2RC5	5/8"	SLW-58	4-7/8"	4-1/4"	15-3/4"	6-1/2"	1348	930	749	749	930	1348
SD2RC6	3/4"	SLW-34	4-1/2"	3-3/4"	12"	7"	1342	851	656	656	851	1342
SD2RC7	3/4"	SLW-34	5-3/4"	5"	12"	10"	1511	1011	801	801	1011	1511

NOTES:
1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2502 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
6. SEE PAGE 4.4 FOR SLH-34 DETAILS.
7. Φ = 90° – ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.
8. Φ = 90° – ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE GREATER THAN 70° FOR CAPACITIES TO BE VALID.

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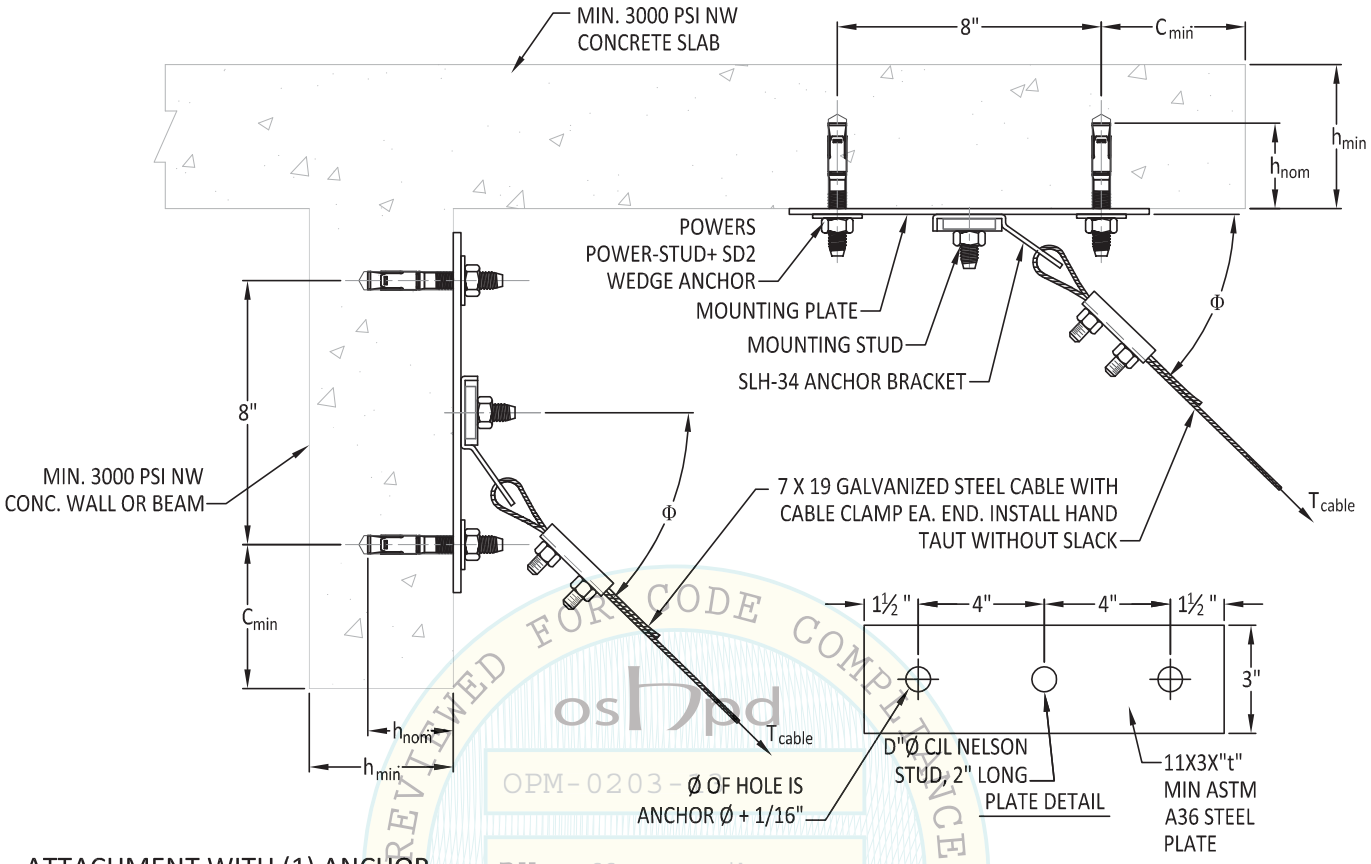
POWERS POWER-STUD+ SD2 WEDGE ANCHOR IN 3000 PSI NORMAL WEIGHT CONCRETE SLAB/WALL/BEAM



ATTACHMENT WITH (1) ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	"h_{min}" MIN. CONC. THICKNESS	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]			MIN. PLATE THICK-NESS "t"	STUD DIA-METER "D"
							20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°		
2SD2RC1	3/8"	SLW-38	2-3/8"	2"	6-1/2"	4"	1046	836	738	738	836	1046	3/8"	1/2"
2SD2RC2	1/2"	SLW-12	2-1/2"	2"	8"	4-1/2"	1265	991	863	863	991	1265	3/8"	1/2"
2SD2RC3	1/2"	SLW-12	3-3/4"	3-1/4"	10"	5-3/4"	2204	1753	1543	1543	1753	2204	1/2"	1/2"
2SD2RC4	5/8"	SLW-58	3-7/8	3-1/4"	8"	5-3/4"	2742	2038	1715	1715	2038	2742	1/2"	1/2"
2SD2RC5	5/8"	SLW-58	4-7/8"	4-1/4"	15-3/4"	6-1/2"	3082	2444	2146	2146	2444	3082	1/2"	1/2"
2SD2RC6	3/4"	SLW-34	3-7/8	3-1/4"	12"	7"	3233	2392	2006	2006	2392	3233	5/8"	3/4"
2SD2RC7	3/4"	SLW-34	4-7/8"	4-1/4"	15-3/4"	6-1/2"	3683	2926	2573	2573	2926	3683	5/8"	3/4"

NOTES:

1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2502 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
6. SEE PAGE 4.4 FOR SLH-34 DETAILS.
7. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.
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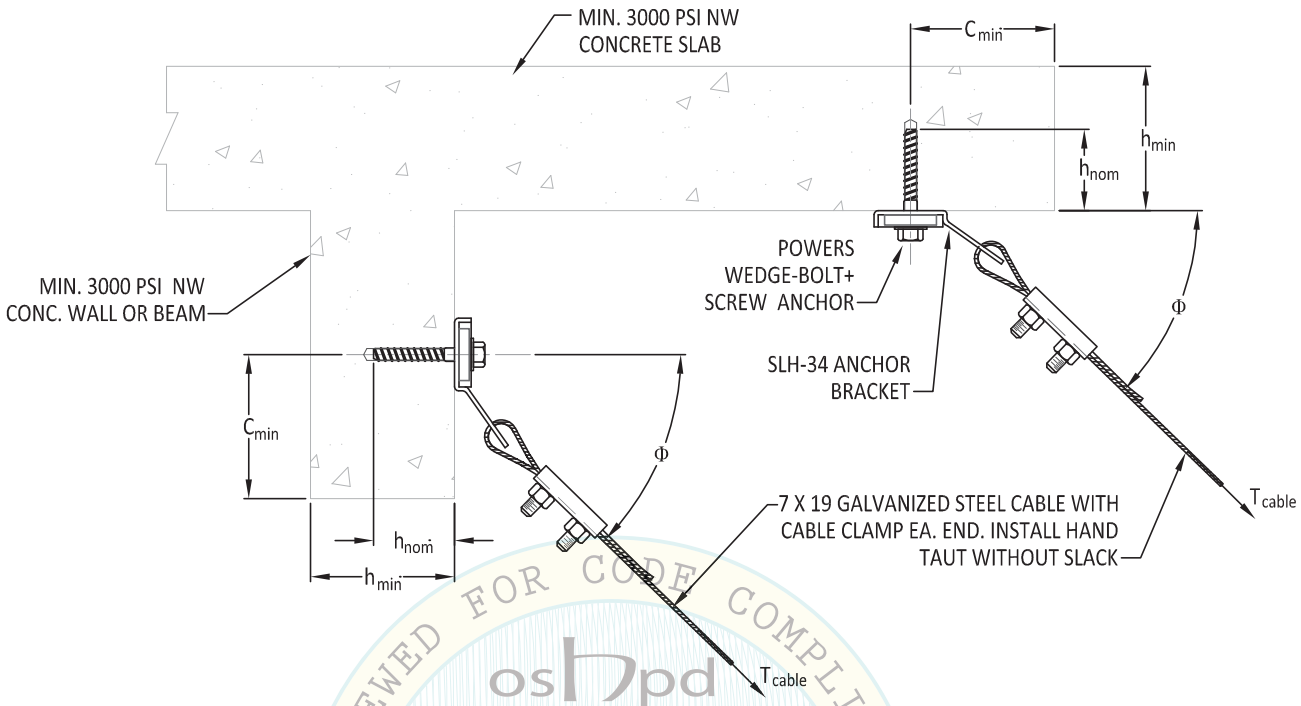
Page No.: 3.16

Date: May 9, 2016

POWERS WEDGE-BOLT+ SCREW ANCHOR IN 3000 PSI NORMAL WEIGHT CONCRETE SLAB/WALL/BEAM



ATTACHMENT WITH (1) ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	"h_{min}" MIN. CONC. THICKNESS	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]		
							20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°
WBRC1	3/8"	SLW-38	2-1/8"	1-7/16"	4"	3-1/2"	256	156	118	118	156	256
WBRC2	1/2"	SLW-12	2-1/2"	1-5/8"	4"	4"	319	194	147	147	194	319
WBRC3	1/2"	SLW-12	3-1/2"	2-1/2"	4-1/2"	6"	546	347	267	267	347	546
WBRC4	5/8"	SLW-58	3-1/4"	2-1/8"	5"	6"	554	359	280	280	359	554
WBRC5	5/8"	SLW-58	4-3/8"	3-1/8"	5"	7"	826	554	440	440	554	826
WBRC6	3/4"	SLW-34	4-1/4"	2-15/16"	6"	7"	914	581	448	448	581	914

NOTES:
1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2526 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
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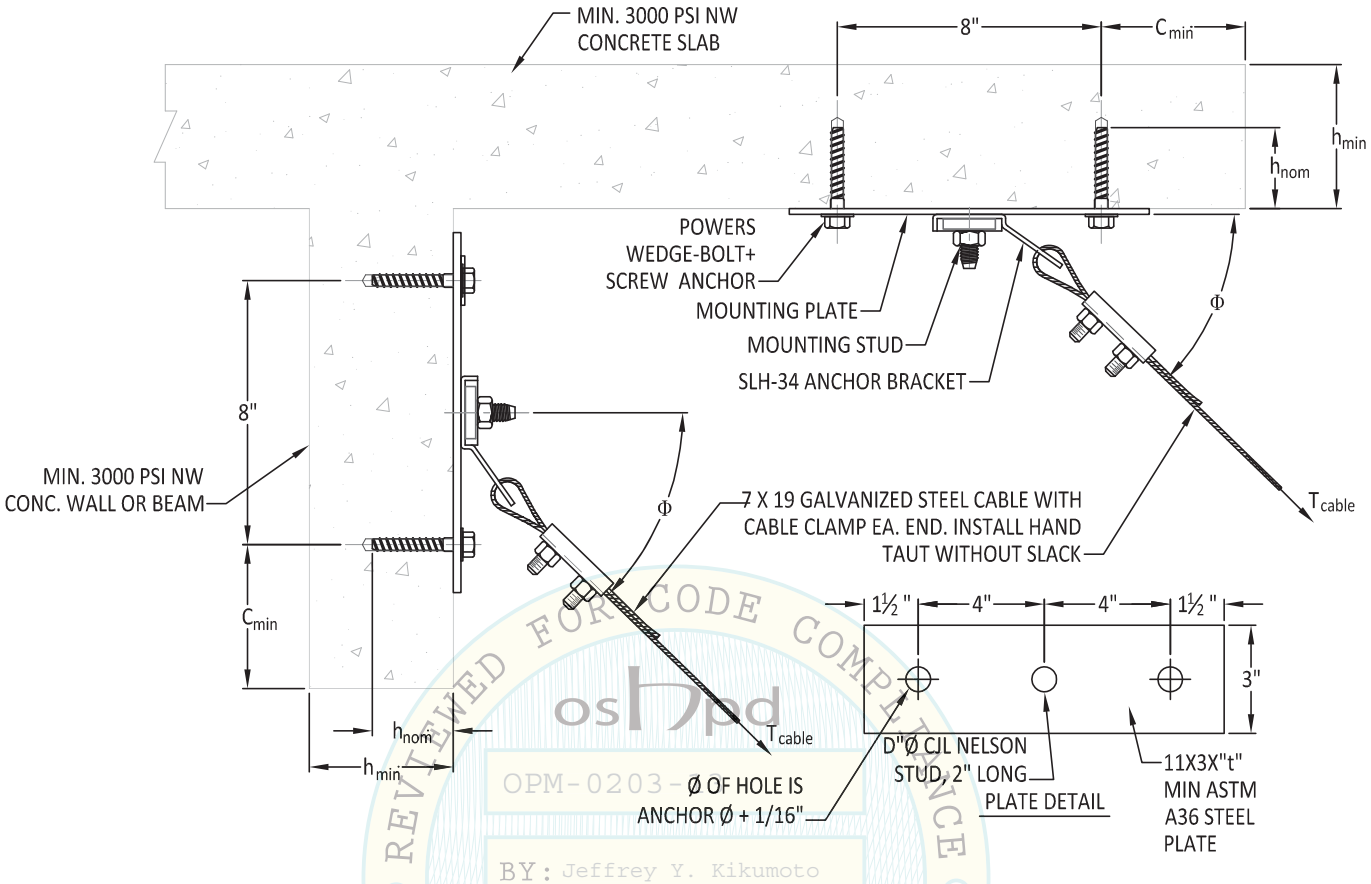
POWERS WEDGE-BOLT+ SCREW ANCHOR IN 3000 PSI NORMAL WEIGHT CONCRETE SLAB/WALL/BEAM



ATTACHMENT WITH (2) SCREW ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	"h_{min}" MIN. CONC. THICKNESS	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]			MIN. PLATE THICK-NESS "t"	STUD DIA-METER "D"
							20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°		
2WBRC1	3/8"	SLW-38	2-1/8"	1-7/16"	4"	3-1/2"	634	477	405	405	477	634	1/4"	1/2"
2WBRC2	1/2"	SLW-12	2-1/2"	1-5/8"	4"	4"	715	559	486	486	559	715	3/8"	1/2"
2WBRC3	1/2"	SLW-12	3-1/2"	2-1/2"	4-1/2"	6"	1326	1039	904	904	1039	1326	3/8"	1/2"
2WBRC4	5/8"	SLW-58	3-1/4"	2-1/8"	5"	6"	1332	1064	938	938	1064	1332	3/8"	1/2"
2WBRC5	5/8"	SLW-58	4-3/8"	3-1/8"	5"	7"	1958	1611	1452	1452	1611	1958	1/2"	1/2"
2WBRC6	3/4"	SLW-34	4-1/4"	2-15/16"	6"	7"	2179	1692	1464	1464	1692	2179	1/2"	1/2"

NOTES:

1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2526 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
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8. Φ = 90° – ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE GREATER THAN 70° FOR CAPACITIES TO BE VALID.

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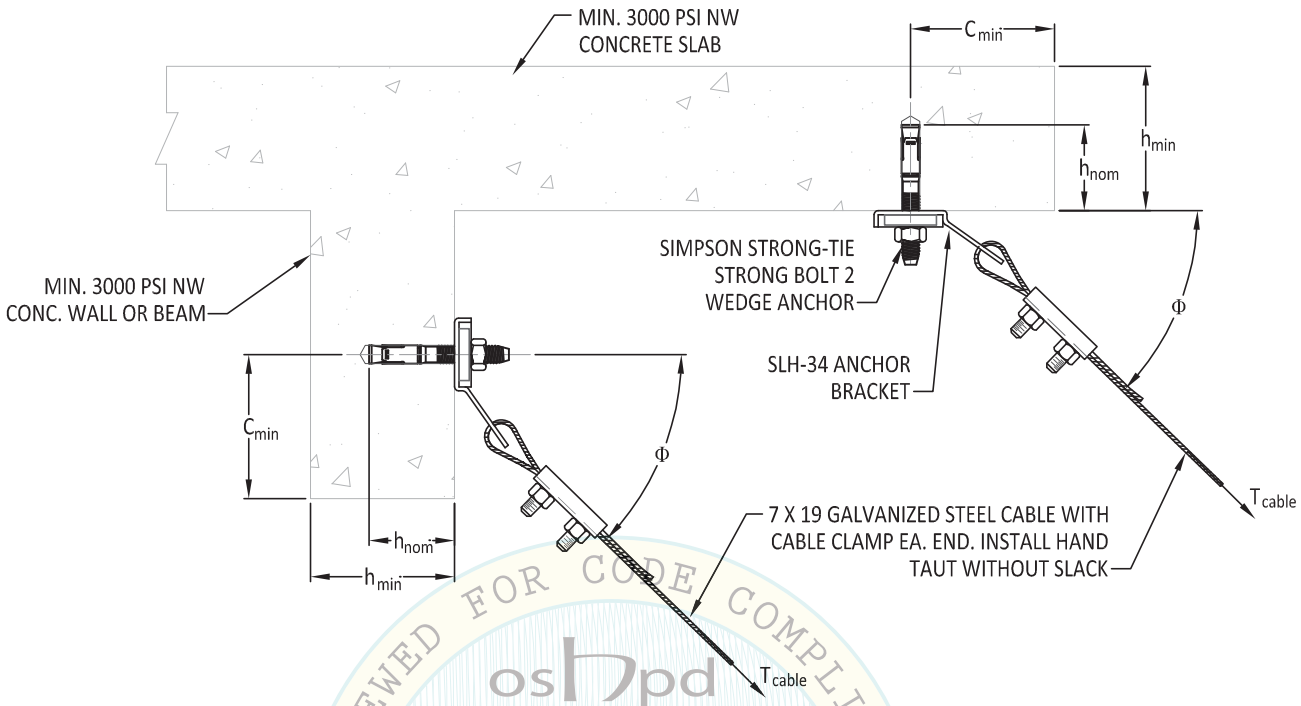
SIMPSON STRONG-TIE STRONG-BOLT 2 WEDGE ANCHOR IN 3000 PSI NORMAL WEIGHT CONCRETE SLAB/WALL/BEAM



ATTACHMENT WITH (1) ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]		
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°
SB2RC1	3/8"	SLW-38	1-7/8"	1-1/2"	6-1/2"	284	180	138	138	180	284
SB2RC2	3/8"	SLW-38	2-7/8"	2-1/2"	6"	411	308	260	260	308	411
SB2RC3	1/2"	SLW-12	2-3/4"	2-1/4"	7"	573	378	297	297	378	573
SB2RC4	1/2"	SLW-12	3-7/8"	3-3/8"	7-1/2"	875	535	405	405	535	875
SB2RC5	5/8"	SLW-58	3-3/8"	2-3/4"	7-1/2"	887	549	418	418	549	887
SB2RC6	5/8"	SLW-58	5-1/8"	4-1/2"	9"	1498	950	732	732	950	1498
SB2RC7	3/4"	SLW-34	4-1/8"	3-3/8"	9"	1284	769	577	577	769	1284
SB2RC8	3/4"	SLW-34	5-3/4"	5"	8"	1677	1113	878	878	1113	1677

NOTES:

1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-3037 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
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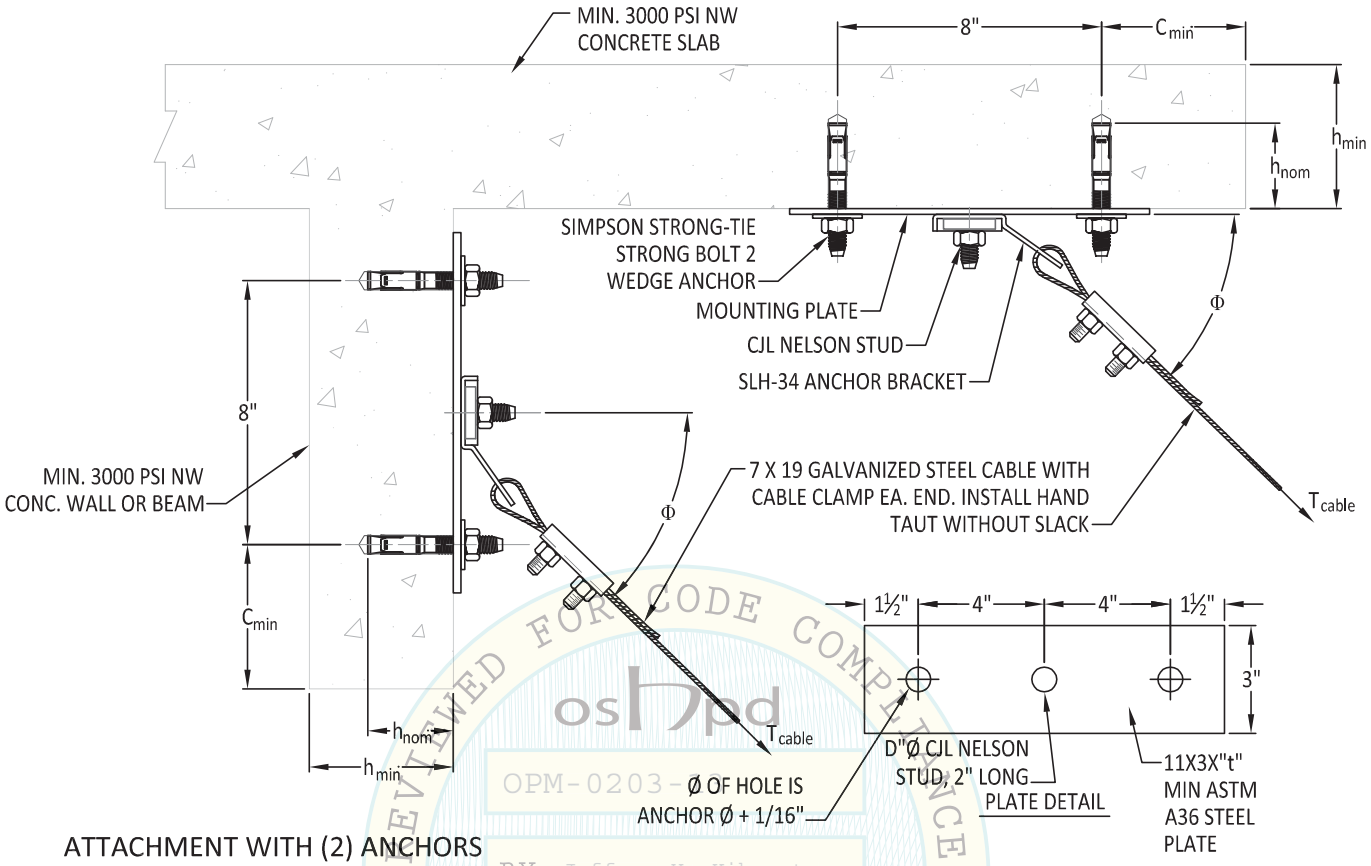
SIMPSON STRONG-TIE STRONG-BOLT 2 WEDGE ANCHOR IN 3000 PSI NORMAL WEIGHT CONCRETE SLAB/WALL/BEAM



ATTACHMENT WITH (2) ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]			MIN. PLATE THICK-NESS "t"	STUD DIA-METER "D"
						20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°		
2SB2RC1	3/8"	SLW-38	1-7/8"	1-1/2"	6-1/2"	731	559	479	479	559	731	3/8"	1/2"
2SB2RC2	3/8"	SLW-12	2-7/8"	2-1/2"	6"	969	864	830	830	864	969	3/8"	1/2"
2SB2RC3	1/2"	SLW-12	2-3/4"	2-1/4"	7"	1441	1148	1011	1011	1148	1441	3/8"	1/2"
2SB2RC4	1/2"	SLW-58	3-7/8"	3-3/8"	7-1/2"	2303	1699	1423	1423	1699	2303	1/2"	1/2"
2SB2RC5	5/8"	SLW-58	3-3/8"	2-3/4"	7-1/2"	2303	1714	1443	1443	1714	2303	1/2"	1/2"
2SB2RC6	5/8"	SLW-34	5-1/8"	4-1/2"	9"	3754	2834	2408	2408	2834	3754	5/8"	3/4"
2SB2RC7	3/4"	SLW-34	4-1/8"	3-3/8"	9"	3118	2236	1841	1841	2236	3118	5/8"	3/4"
2SB2RC8	3/4"	SLW-34	5-3/4"	5"	8"	3967	3069	2650	2650	3069	3967	5/8"	3/4"

NOTES:

1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-3037 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
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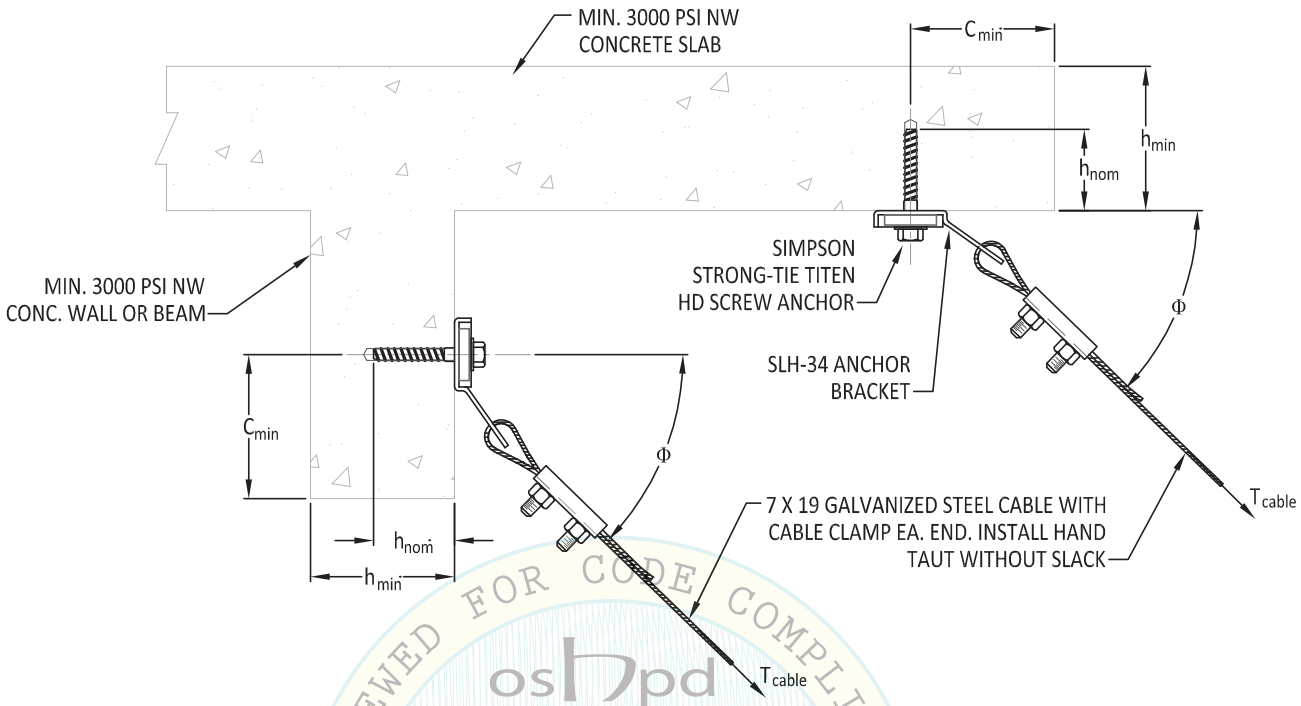
SIMPSON STRONG-TIE TITEN HD SCREW IN 3000 PSI NORMAL WEIGHT CONCRETE SLAB/WALL/BEAM



ATTACHMENT WITH (1) SCREW ANCHOR

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	"h_{min}" MIN. CONC. THICKNESS	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]		
							20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°
THRC1	3/8"	SLW-38	2-1/2"	1-3/4"	2-11/16"	4"	292	220	187	187	220	292
THRC2	3/8"	SLW-38	3-1/4"	2-3/8"	3-5/8"	5"	457	325	266	266	325	457
THRC3	1/2"	SLW-12	3-1/4"	2-3/8"	3-9/16"	5"	500	360	297	297	360	500
THRC4	1/2"	SLW-12	4"	3"	4-1/2"	6-1/4"	732	523	430	430	523	732
THRC5	5/8"	SLW-58	4"	2-15/16"	4-1/2"	6"	638	411	320	320	411	638
THRC6	5/8"	SLW-58	5-1/2"	4-1/4"	6-3/8"	8-1/2"	1151	748	583	583	748	1151
THRC7	3/4"	SLW-34	5-1/2"	4-1/4"	6-3/8"	8-3/4"	1244	811	634	634	811	1244
THRC8	3/4"	SLW-34	6-1/4"	4-7/8"	7-5/16"	10"	1503	971	756	756	971	1503

NOTES:
1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2713 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
6. SEE PAGE 4.4 FOR SLH-34 DETAILS.
7. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.
8. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE GREATER THAN 70° FOR CAPACITIES TO BE VALID.

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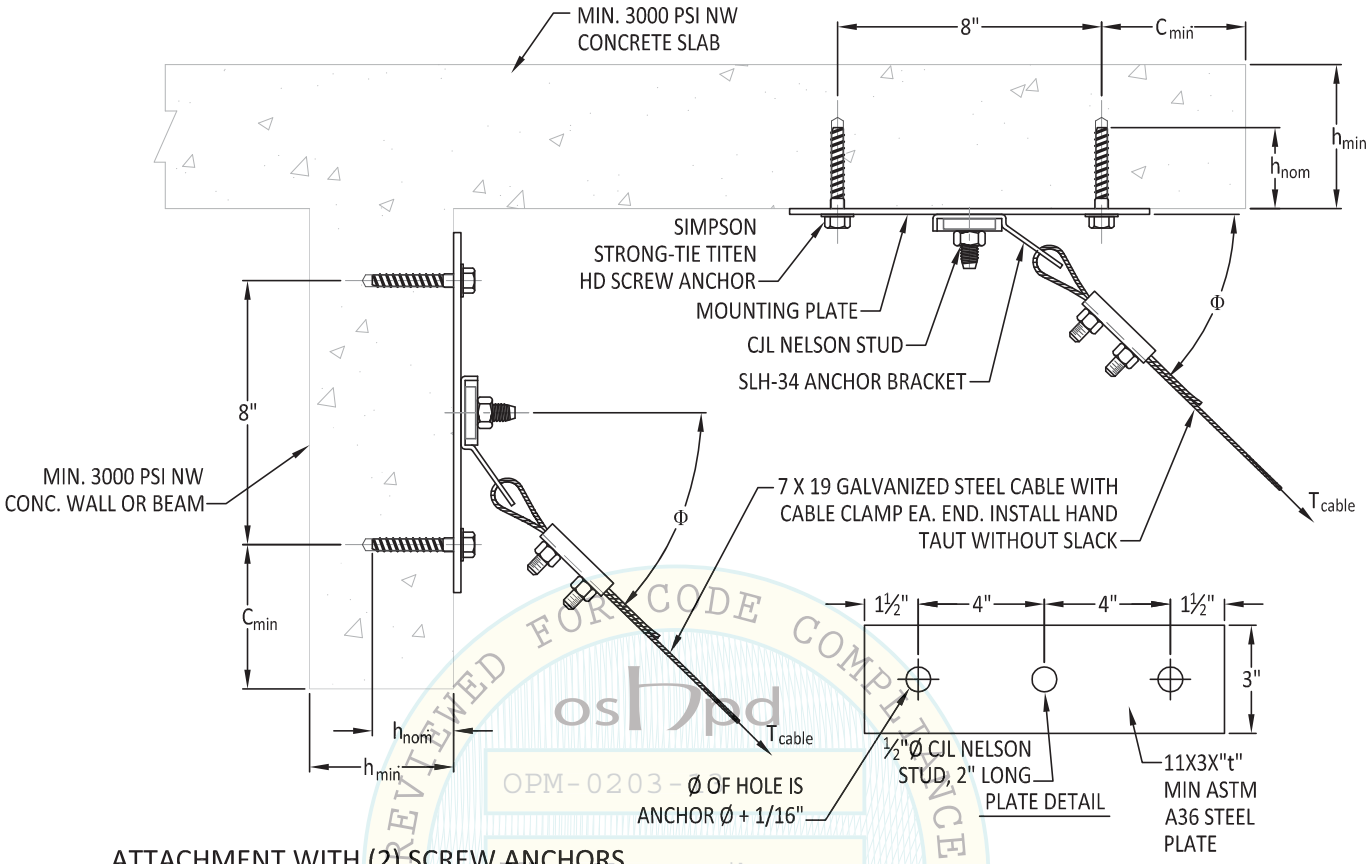
Page No.: **3.21**

Date: May 9, 2016

SIMPSON STRONG-TIE TITEN HD SCREW ANCHOR IN 3000 PSI NORMAL WEIGHT CONCRETE SLAB/WALL/BEAM



ATTACHMENT WITH (2) SCREW ANCHORS

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	"h_{min}" MIN. CONC. THICKNESS	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO SLAB[7]			MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ" ANCHORING TO WALL/BEAM[8]		
							20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°	30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°
2THRC1	3/8"	SLW-38	2-1/2"	1-3/4"	2-3/4"	4"	685	614	593	593	614	685
2THRC2	3/8"	SLW-38	3-1/4"	2-3/8"	2-3/4"	5"	1106	942	872	872	942	1106
2THRC3	1/2"	SLW-12	3-1/4"	2-3/8"	3-11/16"	4"	1202	1036	969	969	1036	1202
2THRC4	1/2"	SLW-12	4"	3"	5-1/4"	6-1/4"	1736	1469	1353	1353	1469	1736
2THRC5	5/8"	SLW-58	4"	2-15/16"	3-5/8"	6"	1627	1266	1098	1098	1266	1627
2THRC6	5/8"	SLW-58	5-1/2"	4-1/4"	5-13/16"	8-1/2"	2922	2292	1997	1997	2292	2922
2THRC7	3/4"	SLW-34	5-1/2"	4-1/4"	4-7/16"	8-3/4"	3138	2465	2151	2151	2465	3138
2THRC8	3/4"	SLW-34	6-1/4"	4-7/8"	7-5/16"	10"	3796	2949	2553	2553	2949	3796

NOTES:

1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-2713 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
6. SEE PAGE 4.4 FOR SLH-34 DETAILS.
7. Φ = 90° – ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.
8. Φ = 90° – ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE GREATER THAN 70° FOR CAPACITIES TO BE VALID.

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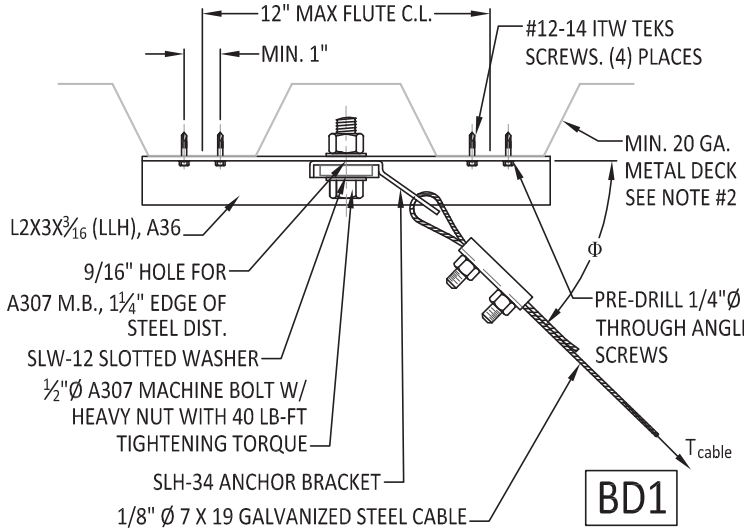
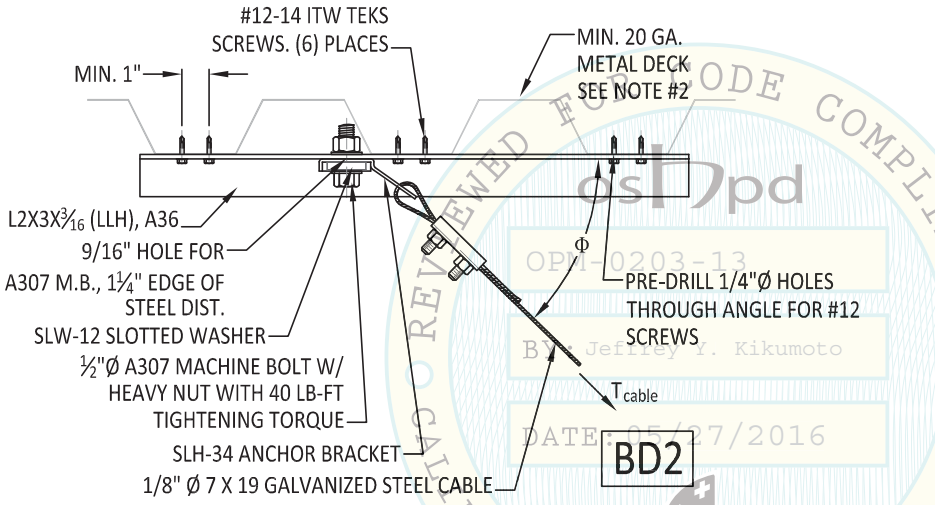
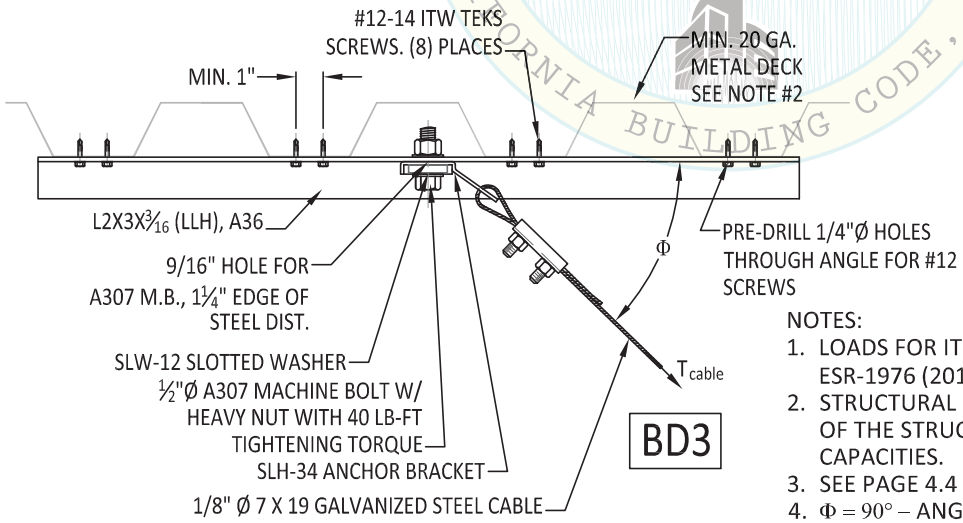
TEKS SCREWS TO METAL DECK



ATTACH-MENT TYPE	NUMBER OF SCREW (TOTAL)*	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[4]		
		20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
BD1	4	617	547	523
BD2	6	910	810	778
BD3	8	1193	1068	1029

*(2) SCREWS TYP. & EA. DECK CONTACT





NOTES:
1. LOADS FOR ITW TEKS SCREW ATTACHMENT BASED ON THE ICC ESR-1976 (2015).
2. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
3. SEE PAGE 4.4 FOR SLH-34 DETAILS.
4. Φ = 90° – ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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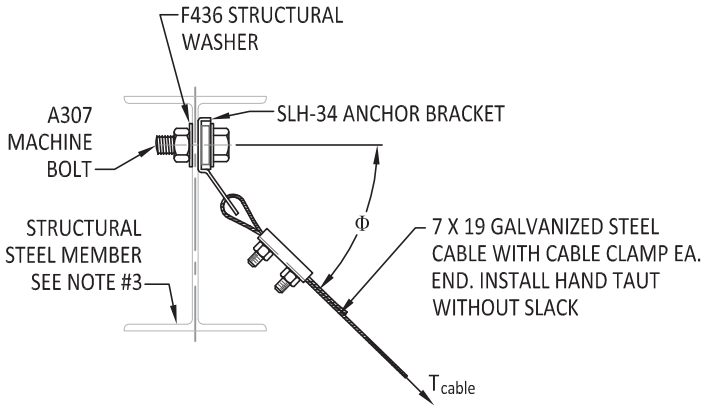
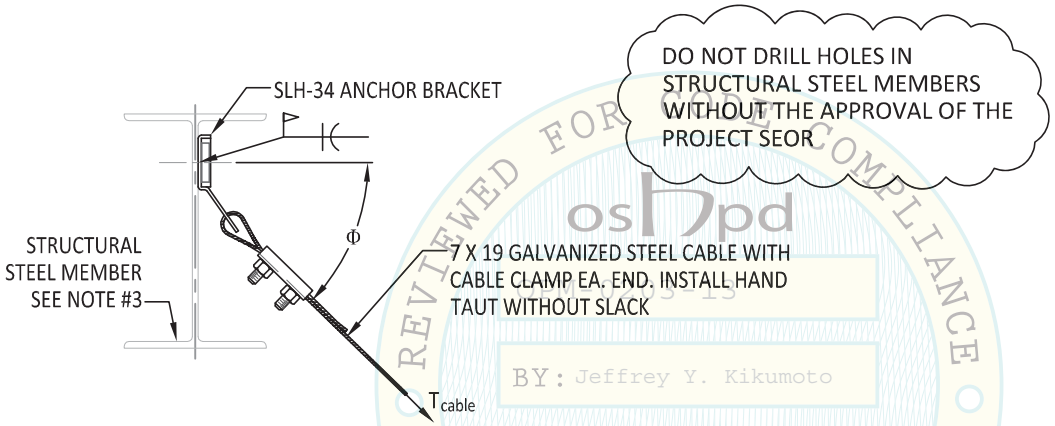
Date: May 9, 2016

BOLT OR WELD TO STEEL



ATTACH-MENT TYPE	A307 BOLT DIAMETER	MIN. INSTALL TORQUE	SLW SIZE	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[11]		
				30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°
SS1	3/8"	16	SLW-38	1644	1354	1222
SS2	1/2"	40	SLW-12	2926	2412	2179
SS3	5/8"	79	SLW-58	4590	3787	3421
SS4	3/4"	141	SLW-34	6601	5439	4909

NOTE: MAXIMUM LOADS SHOWN DEVELOPED USING A307 MATERIAL STRENGTHS PER THE AISC STEEL CONSTRUCTION MANUAL, 14th EDITION



NOTES:
1. ALL STRUCTURAL STEEL SHALL BE MINIMUM A36.
2. INSTALL SLH-34 BRACKET WITHIN TOP 1/3 OF BEAM HEIGHT
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. WELDING SHALL BE DONE BY ELECTRIC SHIELDED ARC PROCESS USING E-70XX ELECTRODES.
5. ALL WELDING SHALL BE PERFORMED BY A CERTIFIED WELDER.
6. ALL WELDING SHALL BE PERFORMED WITH SPECIAL INSPECTION.
7. ALL WELDING SHALL BE IN COMPLIANCE WITH 2013 CALIFORNIA BUILDING CODE.
8. WELDED ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN PROTECTED ZONE AS DEFINED IN AISC 341.
9. SEE PAGE 2.15 FOR STRUT DETAILS.
10. SEE PAGE 4.3 FOR SLH-34 DETAILS
11. $\Phi = 90° -$ ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE GREATER THAN 70° FOR CAPACITIES TO BE VALID.

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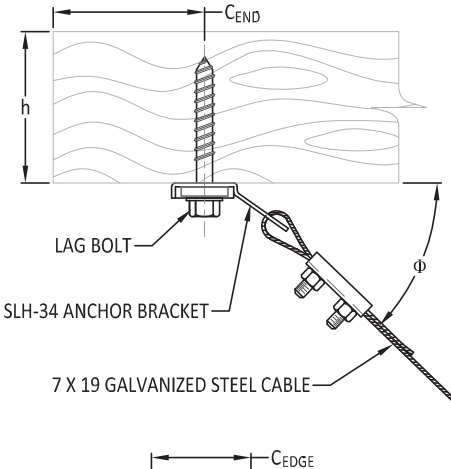
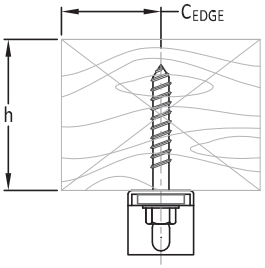
LAG BOLT TO WOOD MEMBER



ATTACHMENT WITH (1) LAG BOLT

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"C_{EDGE}" MIN EDGE. DISTANCE	"C_{END}" MIN. END DISTANCE	MIN. LAG BOLT LENGTH	"h" MIN. WOOD THREADS	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[6]		
							20°≤Φ<30°	30°≤Φ≤45°	45°<Φ≤60°
LBW1	3/8"	SLW-38	1-1/2"	2-5/8"	3"	3-1/2"	332	390	473
LBW2	1/2"	SLW-12	2"	3-1/2"	4"	4-1/2"	609	698	743
LBW3	5/8"	SLW-58	2-1/2"	4-3/8"	5"	5-1/2"	854	979	1041
LBW4	3/4"	SLW-34	3"	5-1/4"	6"	7-1/2"	1179	1343	1390

NOTE: LOADS ARE DETERMINED USING LRFD DESIGN METHOD AS PRESCRIBED PER THE 2012 NDS.

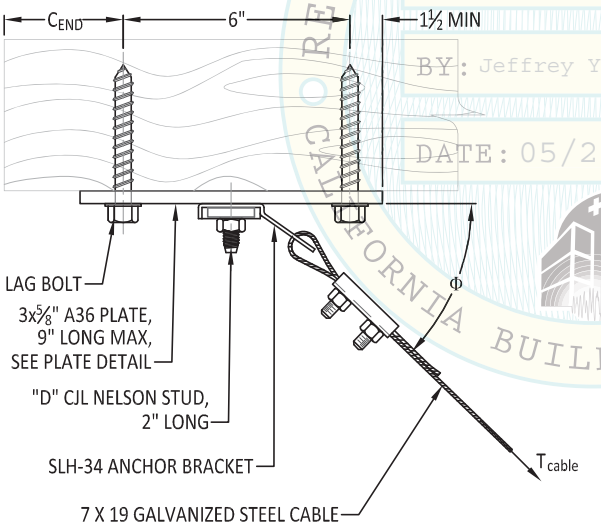


EDGE DISTANCE DETAIL

ATTACHMENT WITH (2) LAG BOLTS

ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"C_{MIN}" MIN EDGE. DISTANCE	"C_{END}" MIN. END DISTANCE	MIN. SPACING BETWEEN ANCHORS	MIN. LAG BOLT LENGTH	"h" MIN. WOOD THREADS	"D" SIZE STUD	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[6]		
									20°≤Φ<30°	30°≤Φ≤45°	45°<Φ≤60°
2LBW1	3/8"	SLW-12	1-1/2"	2-5/8"	1-1/2"	3"	3-1/2"	½"	593	655	1296
2LBW2	1/2"	SLW-12	2"	3-1/2"	2"	4"	4-1/2"	½"	1125	1237	2219
2LBW3	5/8"	SLW-12	2-1/2"	4-3/8"	2-1/2"	5"	5-1/2"	½"	1604	1763	3138
2LBW4	3/4"	SLW-58	3"	5-1/4"	3"	6"	7-1/2"	⅝"	2238	2459	4270

NOTE: LOADS ARE DETERMINED USING LRFD DESIGN METHOD AS PRESCRIBED PER THE 2012 NDS.



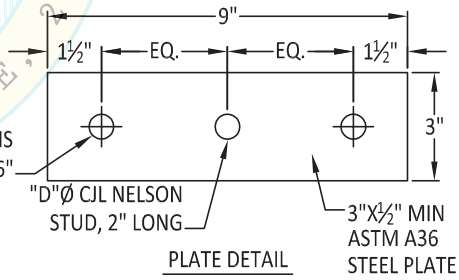


PLATE DETAIL

NOTES:
1. LOADS FOR LAG BOLT ATTACHMENTS ARE DERIVED FROM CBC 2013 AND NDS 2012 FOR WOOD WITH A MINIMUM SPECIFIC GRAVITY = 0.50 (I.E. DOUGLAS FIR-LARCH OR EQUAL), MIN. CONSTRUCTION GRADE.
2. MINIMUM WOOD MEMBER SIZE TO MEET THE EDGE, END, AND DEPTH REQUIREMENTS AS SPECIFIED IN THE TABLES ABOVE.
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. FASTENERS SHALL BE A307 BOLTS OR BETTER.
5. SEE PAGE 4.4 FOR SLH-34 DETAILS.
6. Φ = 90° – ANGLE "x" OF CABLE FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

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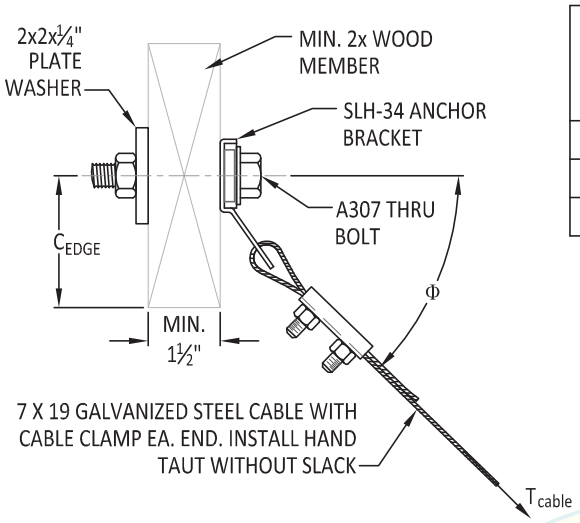
THRU-BOLT PERPENDICULAR TO WOOD MEMBER

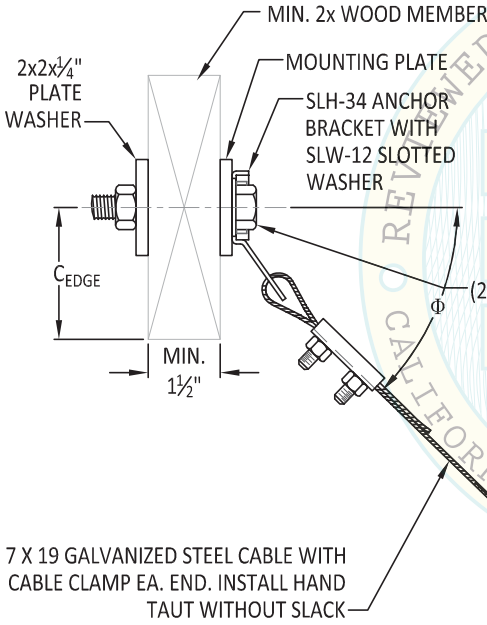
ATTACHMENT WITH (1) THRU BOLT



ATTACH-MENT TYPE	ANCHOR DIA.	"C_{EDGE}" MIN EDGE. DISTANCE	"C_{END}" MIN. END DISTANCE	TIGHTENING TORQUE	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[7]		
					20°≤Φ<30°	30°≤Φ≤45°	45°<Φ≤60°
TBW1	1/2"	2"	3-1/2"	40	756	618	569
TBW2	5/8"	2-1/2"	4-3/8"	79	879	717	661
TBW3	3/4"	3"	5-1/4"	141	1025	837	771

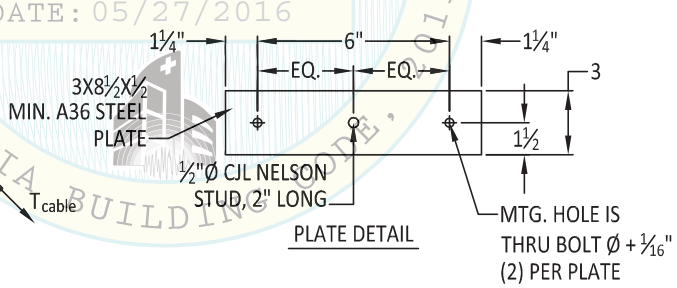
NOTE: LOADS ARE DETERMINED USING LRFD DESIGN METHOD AS PRESCRIBED PER THE 2012 NDS.

ATTACHMENT WITH (2) THRU BOLTS



ATTACH-MENT TYPE	ANCHOR DIA.	"C_{EDGE}" MIN EDGE. DISTANCE	"C_{END}" MIN. END DISTANCE	MIN. SPACING BETWEEN BOLTS	TIGHTENING TORQUE	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[7]		
						30°≤Φ<45°	45°≤Φ<60°	60°≤Φ≤70°
2TBW1	1/2"	2"	3-1/2"	2"	40	1513	1236	1139
2TBW2	5/8"	2-1/2"	4-3/8"	2-1/2"	79	1757	1435	1322
2TBW3	3/4"	3"	5-1/4"	3"	141	2050	1674	1543

NOTE: LOADS ARE DETERMINED USING LRFD DESIGN METHOD AS PRESCRIBED PER THE 2012 NDS.



NOTES:
1. BOLT HOLES SHALL BE BORED 1/16" LARGER THAN THE NOMINAL BOLT DIAMETER.
2. LOADS FOR THRU-BOLT ATTACHMENTS ARE DERIVED FROM CBC 2013 AND NDS 2012 FOR WOOD WITH A MINIMUM SPECIFIC GRAVITY = 0.50 (I.E. DOUGLAS FIR-LARCH) AND GRADE NO.2.
3. MINIMUM BEAM SIZE TO MEET THE DIMENSIONAL REQUIREMENTS SHOWN IN THE FIGURES AND TABLES ABOVE.
4. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
5. FASTENERS SHALL BE A307 BOLTS OR BETTER.
6. SEE PAGE 4.4 FOR SLH-34 DETAILS.
7. Φ = 90° – ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE EXCEED 70° FOR CAPACITIES TO BE VALID.

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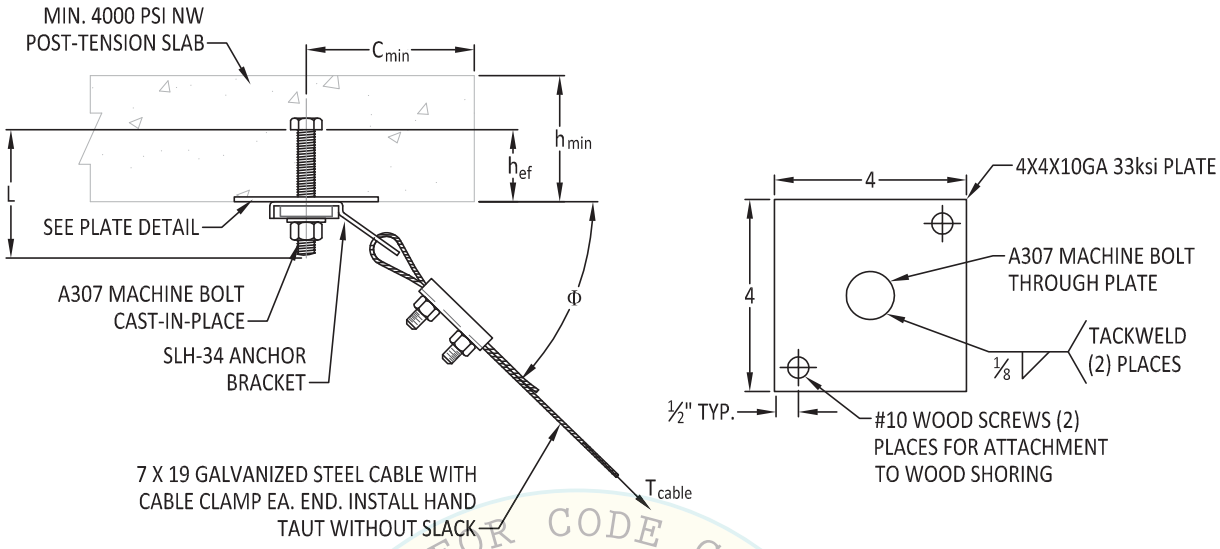
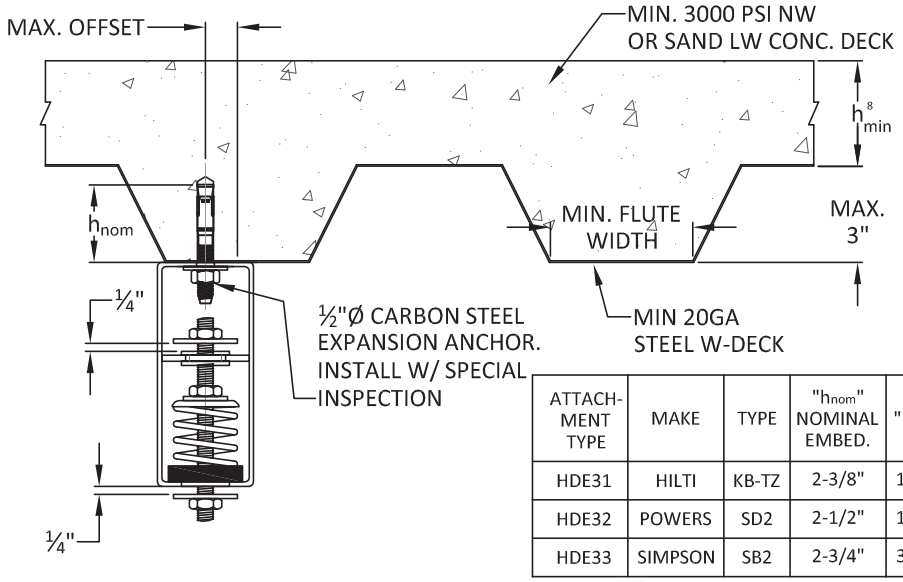
CAST-IN-PLACE BOLT IN MIN. 4000 PSI POST-TENSION CONCRETE SLAB



ATTACH-MENT TYPE	ANCHOR DIA.	SLW SIZE	"h_{ef}" EFFECTIVE EMBED.	"C_{min}" MIN. EDGE DISTANCE	"h_{min}" MIN. CONC. THICKNESS	"L" LENGTH OF BOLT FOR ASSEMBLY	MAX TENSION IN CABLE, "T_{cable}", @ ANGLE "Φ"[4]		
							20°≤Φ≤30°	30°<Φ≤45°	45°<Φ≤60°
CIP1	3/8"	SLW-38	2-1/2"	4"	4"	4"	645	499	430
CIP2	1/2"	SLW-12	3"	5"	5"	5"	1111	878	770
CIP3	5/8"	SLW-58	4"	7"	6"	6"	1785	1333	1124
CIP4	3/4"	SLW-34	5"	8"	7-1/2"	7"	2586	1903	1592
CIP5	3/4"	SLW-34	6-5/8"	10"	10"	10"	2782	2152	1858

NOTES:
1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS USED IN DETERMINING THE MAXIMUM DESIGN CABLE TENSION VALUES SHOWN. TO OBTAIN LOAD ON THE ANCHORAGE MULTIPLY THE TABULATED VALUES BY 2.5.
2. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
3. SEE PAGE 4.4 FOR SLH-34 DETAILS.
4. Φ = 90° – ANGLE OF CABLE "x" FROM SECTION 2 DETAILS. Φ MUST NOT BE LESS THAN 20° FOR CAPACITIES TO BE VALID.

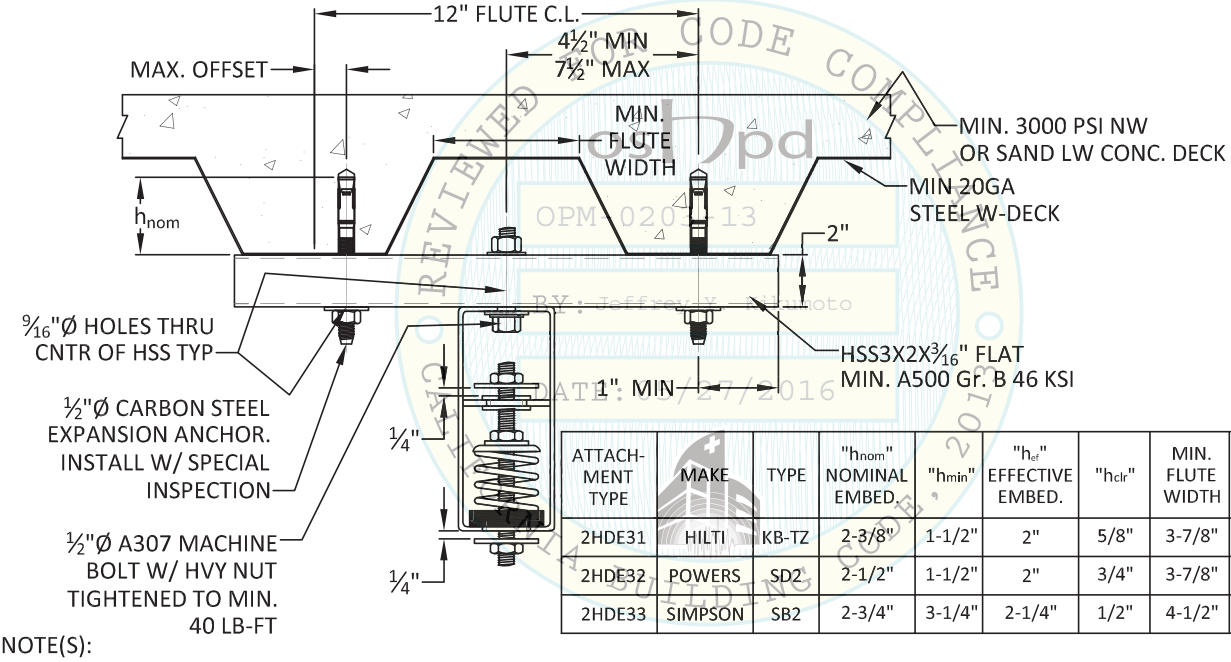
HANGER BOX ATTACHMENT OPTIONS



DECK NOTES:

- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.2.

ATTACH-MENT TYPE	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{min}"[8]	"h_{ef}" EFFECTIVE EMBED.	"h_{clr}"	MIN. FLUTE WIDTH	MAX OFFSET	MAX BOLT TENSION[3] 1 BOLT
HDE31	HILTI	KB-TZ	2-3/8"	1-1/2"	2"	5/8"	3-7/8"	15/16"	695 lbs
HDE32	POWERS	SD2	2-1/2"	1-1/2"	2"	3/4"	3-7/8"	15/16"	714 lbs
HDE33	SIMPSON	SB2	2-3/4"	3-1/4"	2-1/4"	1/2"	4-1/2"	1"	995 lbs



ATTACH-MENT TYPE	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{min}"	"h_{ef}" EFFECTIVE EMBED.	"h_{clr}"	MIN. FLUTE WIDTH	MAX OFFSET	MAX BOLT TENSION[3] 2 BOLT
2HDE31	HILTI	KB-TZ	2-3/8"	1-1/2"	2"	5/8"	3-7/8"	15/16"	1112 lbs
2HDE32	POWERS	SD2	2-1/2"	1-1/2"	2"	3/4"	3-7/8"	15/16"	1142 lbs
2HDE33	SIMPSON	SB2	2-3/4"	3-1/4"	2-1/4"	1/2"	4-1/2"	1"	1592 lbs

NOTE(S):

1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS INCLUDED FOR ANCHORAGE TO CONCRETE. WHEN DESIGNING ANCHORAGE AS SHOWN Ω_0 MUST BE TAKEN INTO ACCOUNT IN DETERMINING THE FINAL DESIGN SPRING HANGER AND/OR ROD TENSION (TYPICALLY FOR OVERTURNING ACTION OF SUSPENDED EQUIPMENT OR DUCT.)
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-1917 (2015), ESR-2502 (2016), OR ESR-3037 (2015).
3. MAX. DESIGN RATING IS THE LESSER OF THE LOAD CAPACITY SHOWN OR THE SEISMIC LOAD RATING OF HANGER BOX (1,200 LBS).
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. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.1 FOR HANGER BOX DETAILS.
8. FILL THICKNESS MUST NOT BE LESS THAN THE VALUE OF h_{min} LISTED AND MUST BE THICK ENOUGH TO ACCOMMODATE THE ANCHOR EMBEDMENT PLUS THE VALUE OF h_{clr}.
9. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE TEH SCOPE OF THIS OPM.

Vibrex® vibration & seismic control systems

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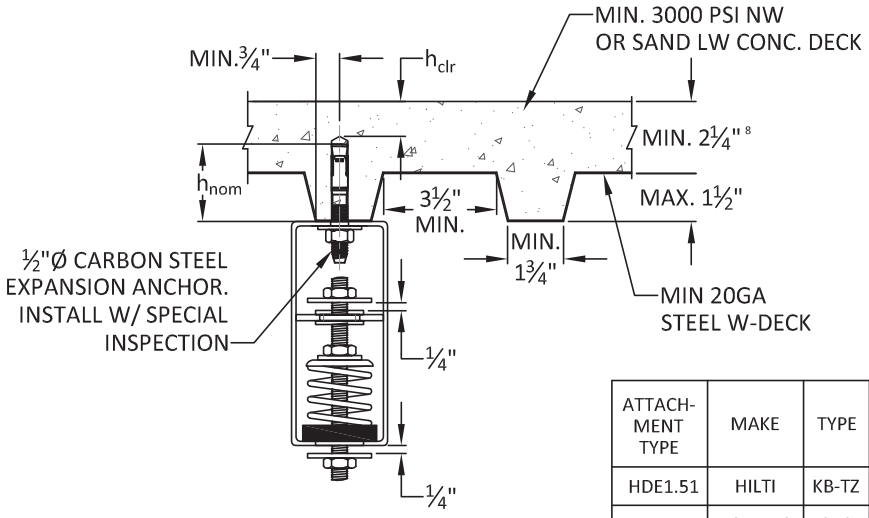
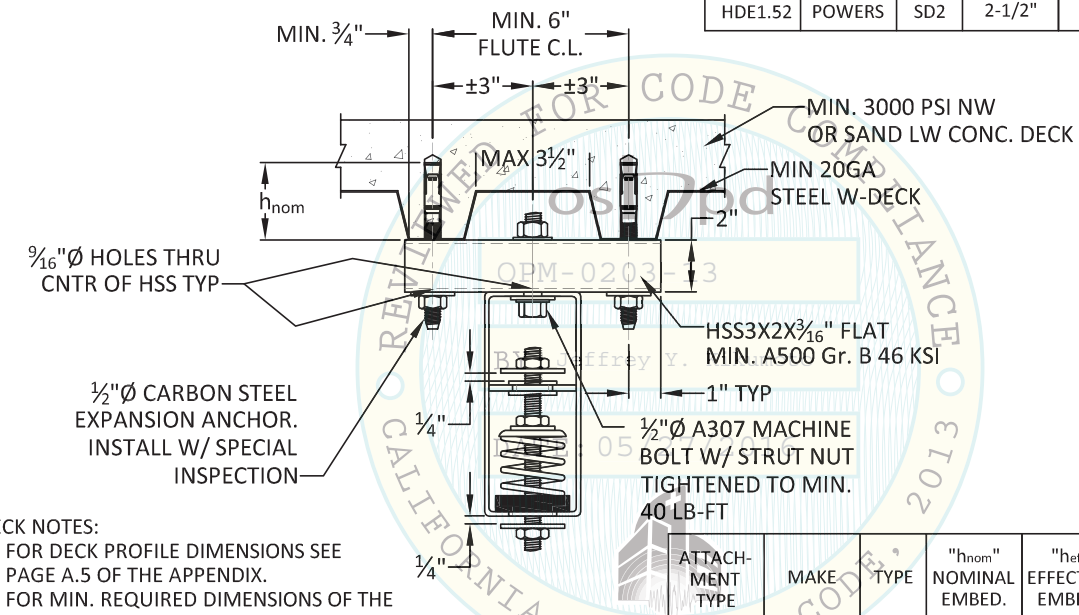
Civil Engineer: P.K. Sachdeva
California PE No. C59644

HANGER BOX ATTACHMENT OPTIONS



ATTACH-MENT TYPE	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"h_{clr}"	MAX BOLT TENSION [3]
						1 BOLT
HDE1.51	HILTI	KB-TZ	2-3/8"	2"	5/8"	646 lbs
HDE1.52	POWERS	SD2	2-1/2"	2"	1"	700 lbs



DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.2.

ATTACH-MENT TYPE	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"h_{clr}"	MAX BOLT TENSION [3]
						2 BOLT
2HDE1.51	HILTI	KB-TZ	2-3/8"	2"	5/8"	1292 lbs
2HDE1.52	POWERS	SD2	2-1/2"	2"	1"	1400 lbs

NOTE(S):
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2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-1917 (2015), ESR-2502 (2016), OR ESR-3037 (2015).
3. MAX. DESIGN RATING IS THE LESSER OF THE LOAD CAPACITY SHOWN OR THE SEISMIC LOAD RATING OF HANGER BOX (1,200 LBS).
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. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
7. SEE PAGE 4.1 FOR HANGER BOX DETAILS.
8. FILL THICKNESS MUST NOT BE LESS THAN THE VALUE LISTED AND MUST BE THICK ENOUGH TO ACCOMMODATE THE ANCHOR EMBEDMENT PLUS THE VALUE OF h_{clr}.
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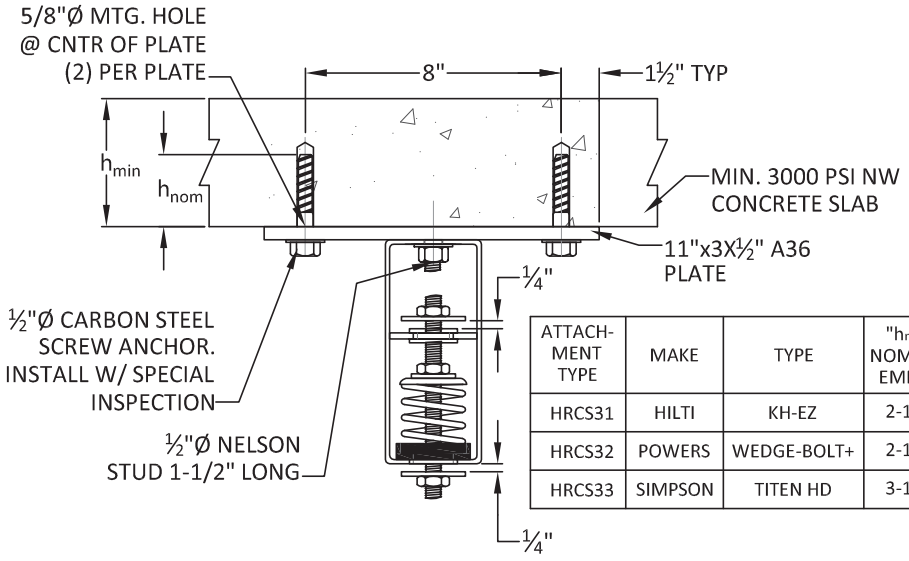
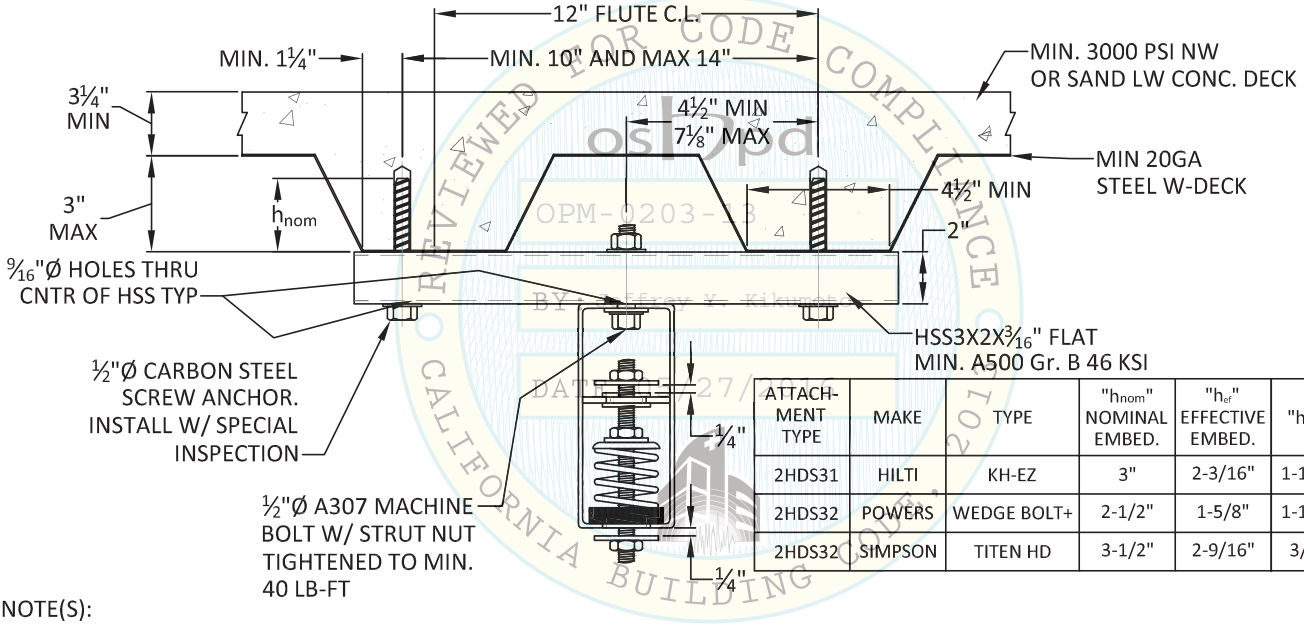
HANGER BOX ATTACHMENT OPTIONS



ATTACH-MENT TYPE	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"h_{min}" MIN. CONC. THICKNESS	MAX BOLT TENSION FOR 2 BOLTS[3]
HRCS31	HILTI	KH-EZ	2-1/4"	1-1/2"	4-1/2"	1702 lbs
HRCS32	POWERS	WEDGE-BOLT+	2-1/2"	1-5/8"	4"	1452 lbs
HRCS33	SIMPSON	TITEN HD	3-1/4"	2-3/8"	5"	3270 lbs



ATTACH-MENT TYPE	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"h_{clr}"	MAX BOLT[3] TENSION FOR 2 BOLTS
2HDS31	HILTI	KH-EZ	3"	2-3/16"	1-1/4"	1505 lbs
2HDS32	POWERS	WEDGE BOLT+	2-1/2"	1-5/8"	1-1/4"	1022 lbs
2HDS32	SIMPSON	TITEN HD	3-1/2"	2-9/16"	3/4"	1592 lbs

NOTE(S):

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2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-3027 (2015), ESR-2526 (2015), OR ESR-2713 (2015).
3. MAX. DESIGN RATING IS THE LESSER OF THE LOAD CAPACITY SHOWN OR THE SEISMIC LOAD RATING OF HANGER BOX (1,200 LBS.)
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. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
7. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS ARE ALONG THE FLUTE LENGTH.
8. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT 1/8" PER ICC-ESR.
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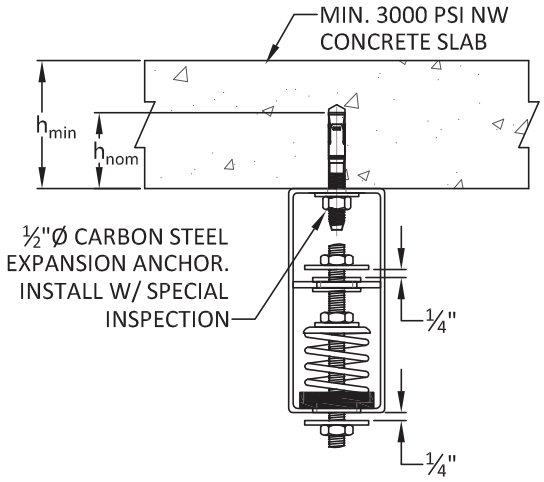
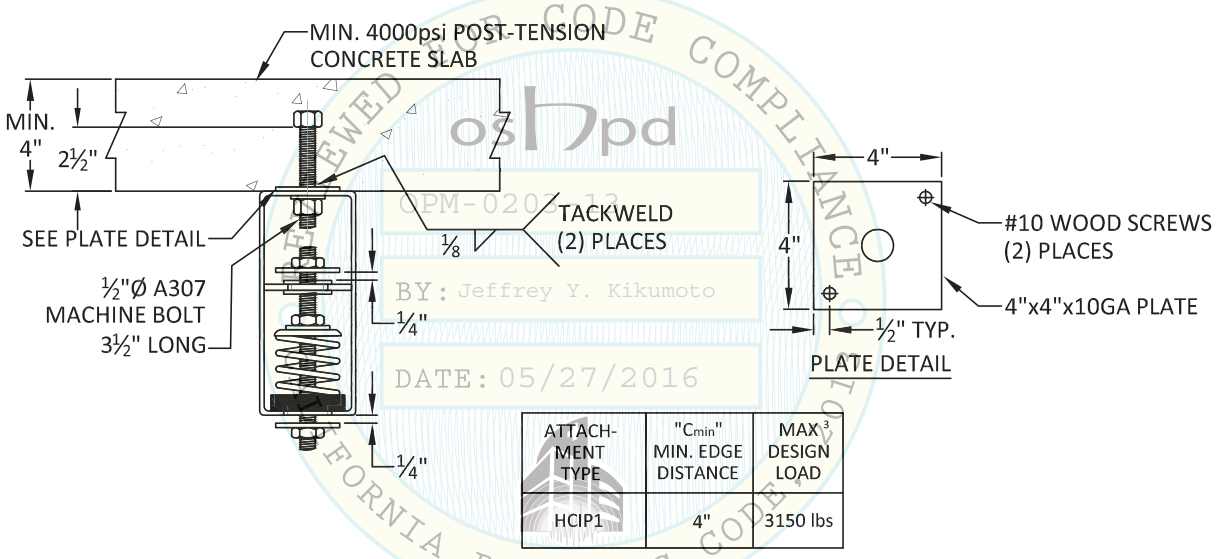
Page No.: 3.30

Date: May 9, 2016

HANGER BOX ATTACHMENT OPTIONS



ATTACH-MENT TYPE	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"h_{min}" MIN. CONC. THICKNESS	"C_{min}" MIN. EDGE DISTANCE	MAX [3] DESIGN LOAD
HRCE31	HILTI	KB-TZ	2-3/8"	2"	4"	5-1/2"	1284 lbs
HRCE32	POWERS	SD2	2-1/2"	2"	4-1/2"	8"	1284 lbs
HRCE32	SIMPSON	SB2	2-3/4"	2-1/4"	4-1/2"	7"	1532 lbs



ATTACH-MENT TYPE	"C_{min}" MIN. EDGE DISTANCE	MAX [3] DESIGN LOAD
HCIP1	4"	3150 lbs

NOTE(S):

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2. INSTALL ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-1917 (2015), ESR-2502 (2016), OR ESR-3037 (2015)
3. MAX. DESIGN RATING IS THE LESSER OF THE LOAD CAPACITY SHOWN OR THE SEISMIC LOAD RATING OF HANGER BOX (1,200 LBS).
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. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
7. SEE PAGE 4.1 FOR HANGER BOX DETAILS.
8. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.

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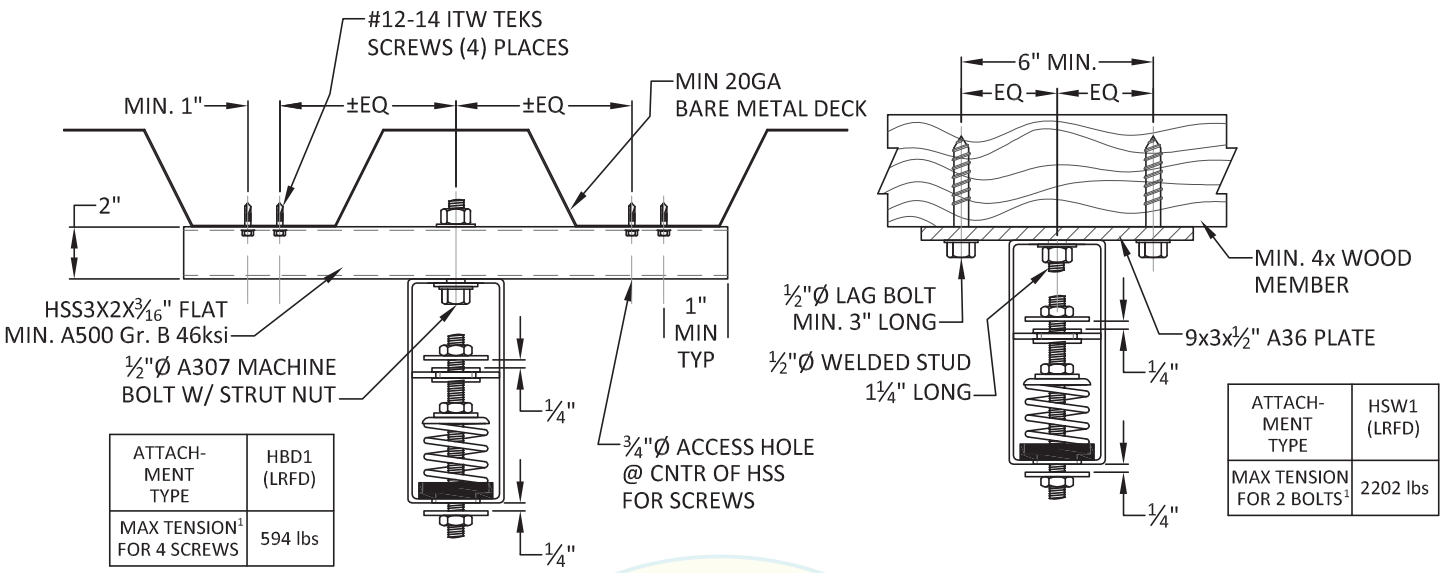
Page No.: 3.31

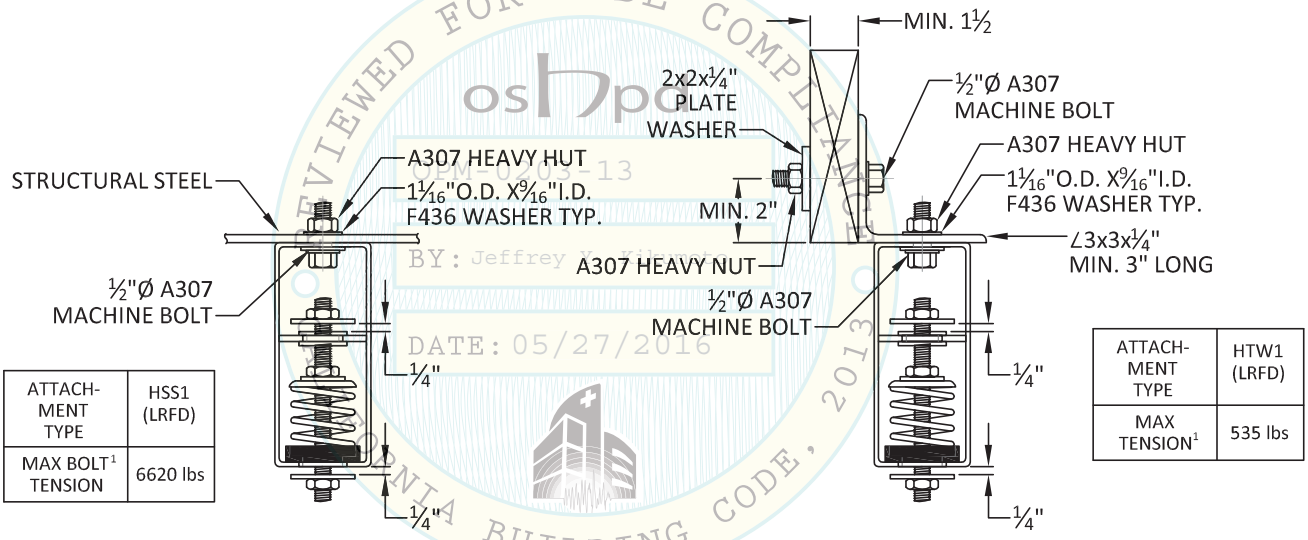
Date: May 9, 2016

HANGER BOX ATTACHMENT OPTIONS



ATTACH-MENT TYPE	HBD1 (LRFD)
MAX TENSION[1] FOR 4 SCREWS	594 lbs

ATTACH-MENT TYPE	HSW1 (LRFD)
MAX TENSION FOR 2 BOLTS[1]	2202 lbs



ATTACH-MENT TYPE	HSS1 (LRFD)
MAX BOLT[1] TENSION	6620 lbs

ATTACH-MENT TYPE	HTW1 (LRFD)
MAX TENSION[1]	535 lbs

NOTE(S):
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2. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
3. BOLT HOLES FOR THRU BOLT SHALL BE BORED 1/16" LARGER THAN THE NOMINAL BOLT DIAMETER.
4. LOADS FOR LAG BOLT ATTACHMENTS AND THRU-BOLT ATTACHMENTS ARE DERIVED FROM CBC 2013 AND NDS 2012 FOR WOOD WITH A MINIMUM SPECIFIC GRAVITY = 0.50 (I.E. DOUGLAS FIR-LARCH OR EQUAL), MIN. CONSTRUCTION GRADE.
5. SEE PAGE 4.1 FOR HANGER BOX DETAILS.
6. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.

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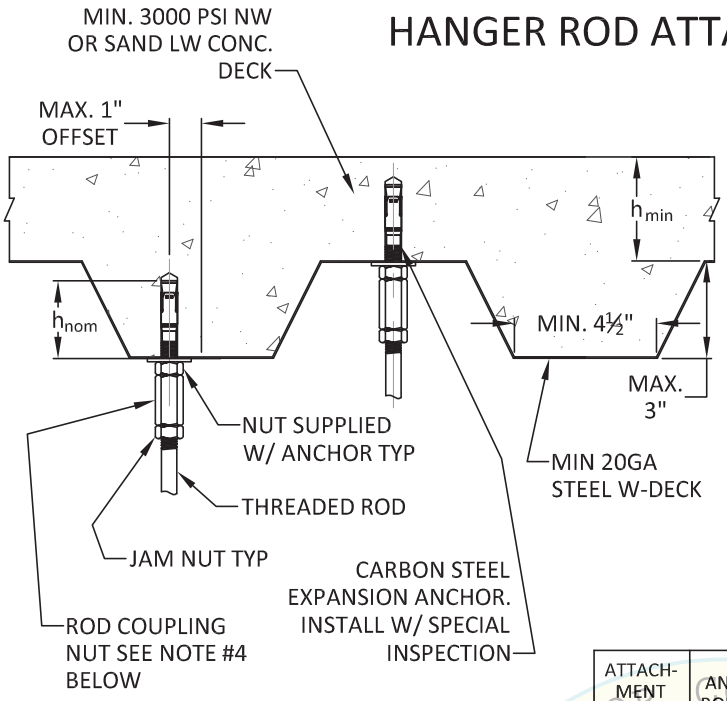
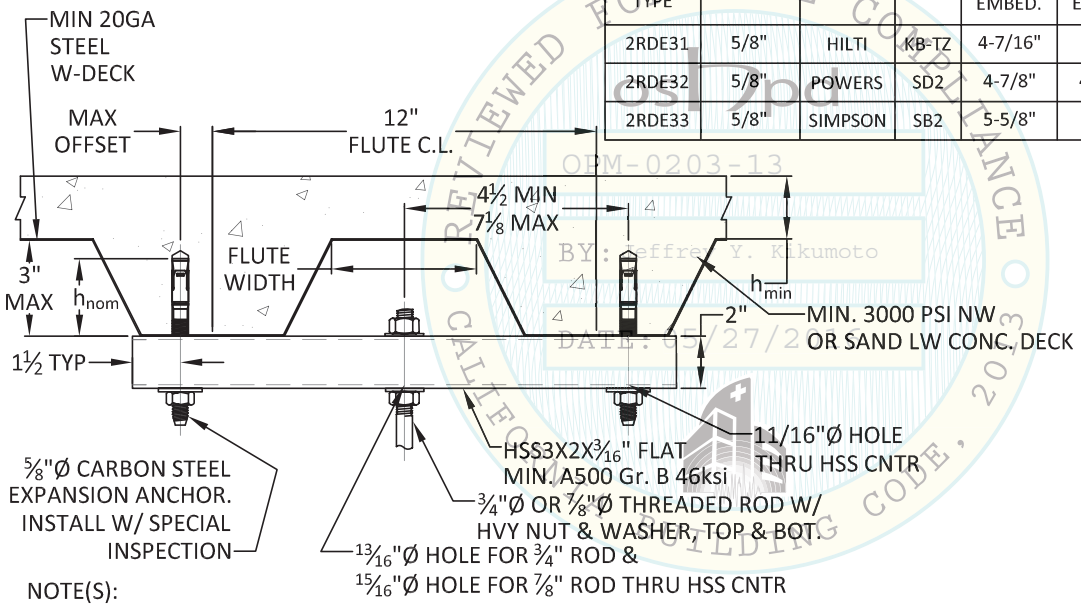
HANGER ROD ATTACHMENT OPTIONS



ATTACH-MENT TYPE	ROD & ANCHOR BOLT DIA.	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"h_{min}"	MAX BOLT TENSION
RDE31	3/8"	HILTI	KB-TZ	2-5/16"	2"	1-1/2"	695 lbs
RDE32	1/2"	HILTI	KB-TZ	2-3/8"	2"	1-1/2"	695 lbs
RDE33	5/8"	HILTI	KB-TZ	3-9/16"	3-1/8"	1-1/2"	975 lbs
RDE34	3/8"	POWERS	SD2	2-3/8"	2"	3-1/4"	704 lbs
RDE35	1/2"	POWERS	SD2	2-1/2"	2"	3-1/4"	714 lbs
RDE36	5/8"	POWERS	SD2	3-7/8"	3-1/4"	3-1/4"	1611 lbs
RDE37	3/8"	SIMPSON	SB2	2"	1-5/8"	3-1/4"	507 lbs
RDE38	1/2"	SIMPSON	SB2	2-3/4"	2-1/4"	3-1/4"	995 lbs
RDE39	5/8"	SIMPSON	SB2	3-3/8"	2-3/4"	3-1/4"	1275 lbs

DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.2.



ATTACH-MENT TYPE	ANCHOR BOLT DIA.	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"h_{min}"	MIN. FLUTE WIDTH	MAX OFFSET	MAX COMBINED BOLT TENSION
2RDE31	5/8"	HILTI	KB-TZ	4-7/16"	4"	1-1/2"	3-7/8"	15/16"	3022 lbs
2RDE32	5/8"	POWERS	SD2	4-7/8"	4-1/4"	1-1/2"	3-7/8"	15/16"	4067 lbs
2RDE33	5/8"	SIMPSON	SB2	5-5/8"	5"	3-1/4"	4-1/2"	1"	3892 lbs

NOTE(S):
1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS INCLUDED FOR ANCHORAGE TO CONCRETE. WHEN DESIGNING ANCHORAGE AS SHOWN Ω_0 MUST BE TAKEN INTO ACCOUNT IN DETERMINING THE FINAL DESIGN SPRING HANGER AND/OR ROD TENSION (TYPICALLY FOR OVERTURNING ACTION OF SUSPENDED EQUIPMENT OR DUCT.)
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3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACITIES.
4. ROD COUPLING NUT MUST BE MIN. ASTM A194-2H HEAVY HEX OR A563-DH HEAVY HEX NUTS. ROD AND ANCHOR MUST HAVE A MIN. THREAD ENGAGEMENT INTO THE COUPLING NUT EQUAL TO THE DIAMETER OF THE ROD/ANCHOR. ROD AND ANCHOR MUST BE IN CONTACT W/ EACH OTHER WITHIN THE COUPLING NUT AND TIGHTENED ACCORDINGLY.
5. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
6. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS ARE ALONG THE FLUTE LENGTH.
7. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT ⅛" PER ICC-ESR.
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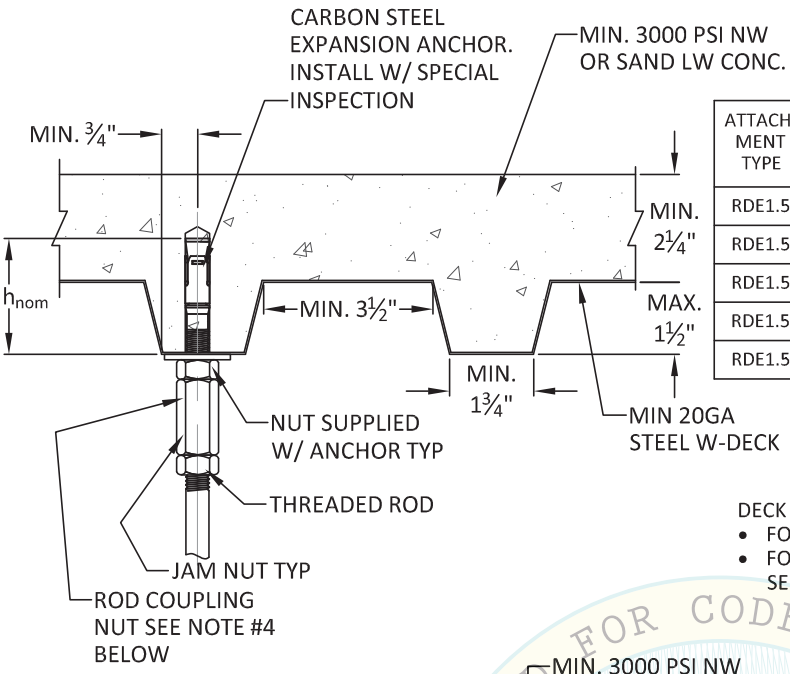
HANGER ROD ATTACHMENT OPTIONS



ATTACH-MENT TYPE	ROD & ANCHOR BOLT DIA.	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"h_{clr}"	MAX BOLT TENSION
RDE1.51	3/8"	HILTI	KB-TZ	2-5/16"	2"	5/8"	809 lbs
RDE1.52	1/2"	HILTI	KB-TZ	2-3/8"	2"	5/8"	646 lbs
RDE1.53	5/8"	HILTI	KB-TZ	3-9/16"	3-1/8"	5/8"	1923 lbs
RDE1.54	3/8"	POWERS	SD2	2-3/8"	2"	3/4"	609 lbs
RDE1.55	1/2"	POWERS	SD2	2-1/2"	2"	3/4"	700 lbs

DECK NOTES:
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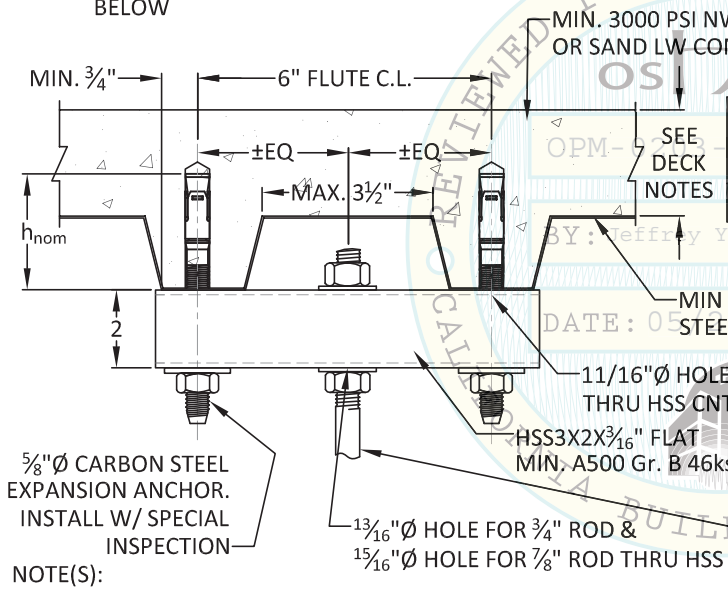

ATTACH-MENT TYPE	ROD & ANCHOR BOLT DIA.	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"h_{clr}"	MAX BOLT TENSION
2RDE1.51	5/8"	HILTI	KB-TZ	3-9/16"	3-1/8"	5/8"	3846 lbs

NOTE(S):
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4. ROD COUPLING NUT MUST BE MIN. ASTM A194-2H HEAVY HEX OR A563-DH HEAVY HEX NUTS. ROD AND ANCHOR MUST HAVE A MIN. THREAD ENGAGEMENT INTO THE COUPLING NUT EQUAL TO THE DIAMETER OF THE ROD/ANCHOR. ROD AND ANCHOR MUST BE IN CONTACT W/ EACH OTHER WITHIN THE COUPLING NUT AND TIGHTENED ACCORDINGLY.
5. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL..
6. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS ARE ALONG THE FLUTE LENGTH.
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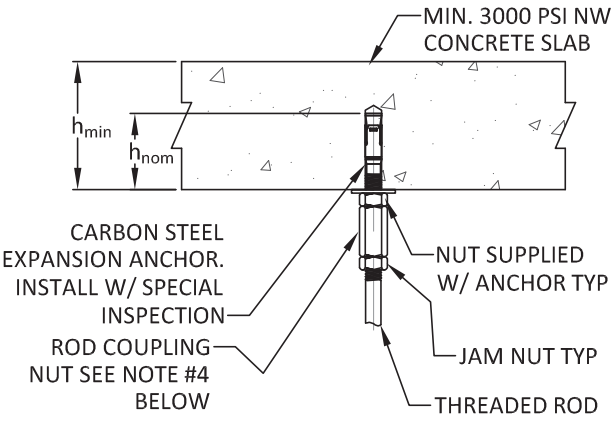
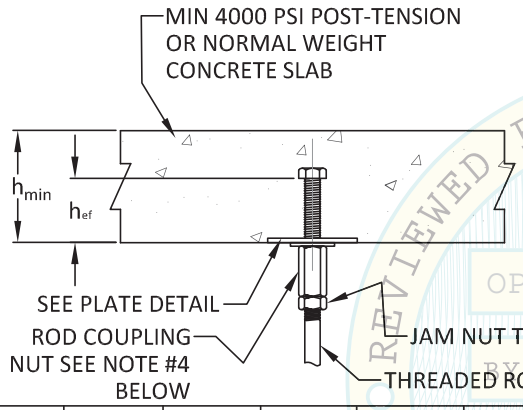
Page No.: **3.34**

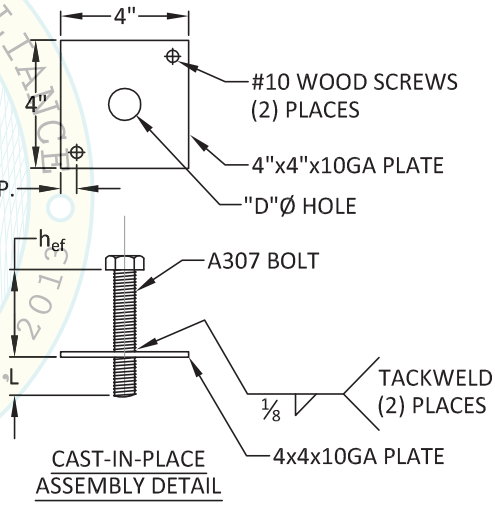
Date: May 9, 2016

HANGER ROD ATTACHMENT OPTIONS



ATTACH-MENT TYPE	ROD & ANCHOR BOLT DIA.	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"h_{min}" MIN. CONC. THICKNESS	"C_{min}" MIN. EDGE DISTANCE	MAX BOLT TENSION
RRCE1	3/8"	HILTI	KB-TZ	2-5/16"	2"	4"	4-3/8"	1212 lbs
RRCE2	1/2"	HILTI	KB-TZ	2-3/8"	2"	4"	5-1/2"	1284 lbs
RRCE3	5/8"	HILTI	KB-TZ	3-9/16"	3-1/8"	5"	6-1/2"	2508 lbs
RRCE4	3/4"	HILTI	KB-TZ	4-5/16	4"	6"	10"	3296 lbs
RRCE5	3/8"	POWERS	SD2	2-3/8"	2"	4"	6-1/2"	1122 lbs
RRCE6	1/2"	POWERS	SD2	2-1/2"	2"	4-1/2"	8"	1284 lbs
RRCE7	5/8"	POWERS	SD2	3-7/8"	3-1/4"	5-3/4"	8"	2660 lbs
RRCE8	3/4"	POWERS	SD2	4-1/2"	3-3/4"	7"	12"	3296 lbs
RRCE9	7/8"	POWERS	SD1	4-1/2"	3-1/2"	10"	11-1/2"	2972 lbs
RRCE10	3/8"	SIMPSON	SB2	1-7/8"	1-1/2"	3-1/4"	6-1/2"	694 lbs
RRCE11	1/2"	SIMPSON	SB2	2-3/4"	2-1/4"	4-1/2"	7"	1532 lbs
RRCE12	5/8"	SIMPSON	SB2	3-3/8"	2-3/4"	5-1/2"	7-1/2"	2070 lbs
RRCE13	3/4"	SIMPSON	SB2	4-1/8"	3-3/8"	7-7/8"	9"	2814 lbs





ATTACH-MENT TYPE	ROD & ANCHOR BOLT DIA.	GRADE	"h_{ef}" NOMINAL EMBED.	"h_{min}" MIN. CONC. THICKNESS	"L" LENGTH	"D" HOLE Ø	MAX BOLT TENSION	"C_{min}" MIN. EDGE DISTANCE
RCIP1	3/8"	A307	2-1/2"	4"	5/8"	7/16"	2528 lbs	4"
RCIP2	1/2"	A307	3"	5"	11/16"	9/16"	4629 lbs	5"
RCIP3	5/8"	A307	4"	6"	13/16"	11/16"	6375 lbs	7"
RCIP4	3/4"	A307	5"	7-1/2"	15/16"	13/16"	8910 lbs	8"
RCIP5	7/8"	A307	6"	9"	1-1/8"	15/16"	11712 lbs	9"

NOTE(S):

1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS INCLUDED FOR ANCHORAGE TO CONCRETE. WHEN DESIGNING ANCHORAGE AS SHOWN Ω_0 MUST BE TAKEN INTO ACCOUNT IN DETERMINING THE FINAL DESIGN SPRING HANGER AND/OR ROD TENSION (TYPICALLY FOR OVERTURNING ACTION OF SUSPENDED EQUIPMENT OR DUCT.)
2. INSTALL WEDGE ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-1917 (2015) , ESR-2502 (2016), ESR-2818 (2015), OR ESR-3037 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.
4. ROD COUPLING NUT MUST BE MIN. ASTM A194-2H HEAVY HEX OR A563-DH HEAVY HEX NUTS. ROD AND ANCHOR MUST HAVE A MIN. THREAD ENGAGEMENT INTO THE COUPLING NUT EQUAL TO THE DIAMETER OF THE ROD/ANCHOR. ROD AND ANCHOR MUST BE IN CONTACT W/ EACH OTHER WITHIN THE COUPLING NUT AND TIGHTENED ACCORDINGLY.
5. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
6. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
7. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE TEH SCOPE OF THIS OPM.

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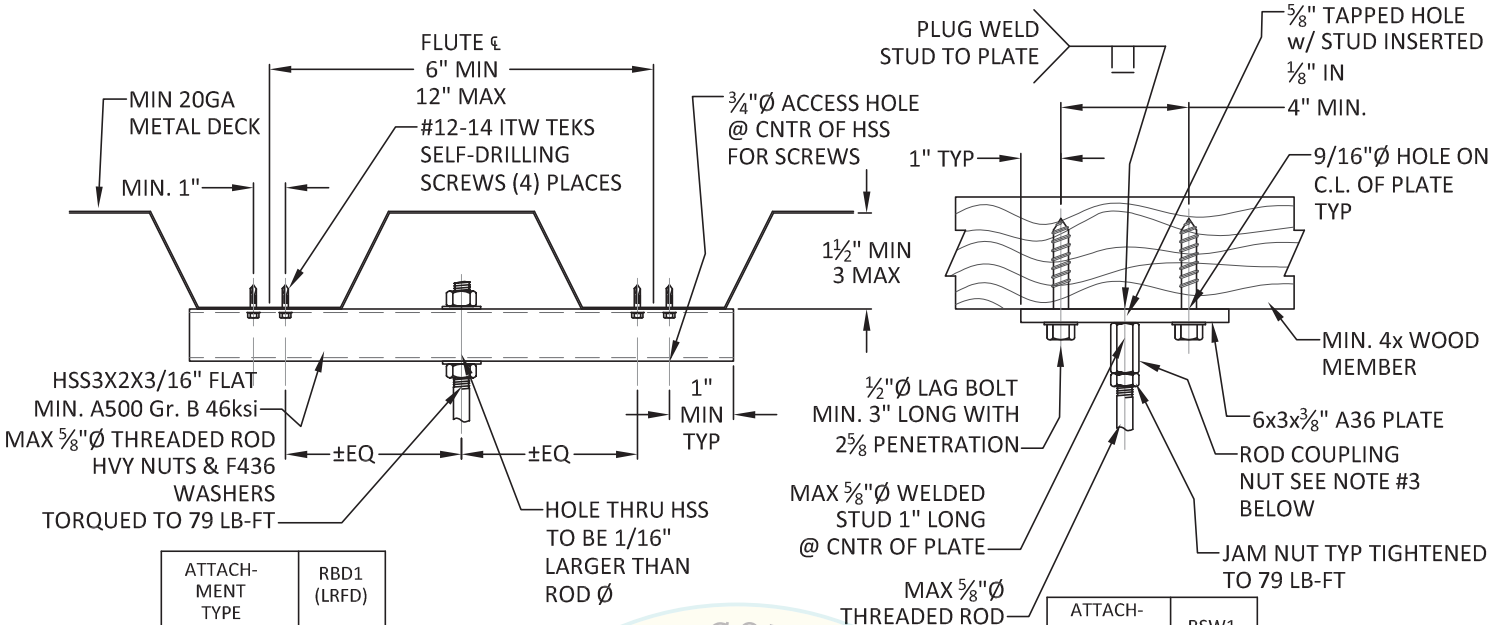
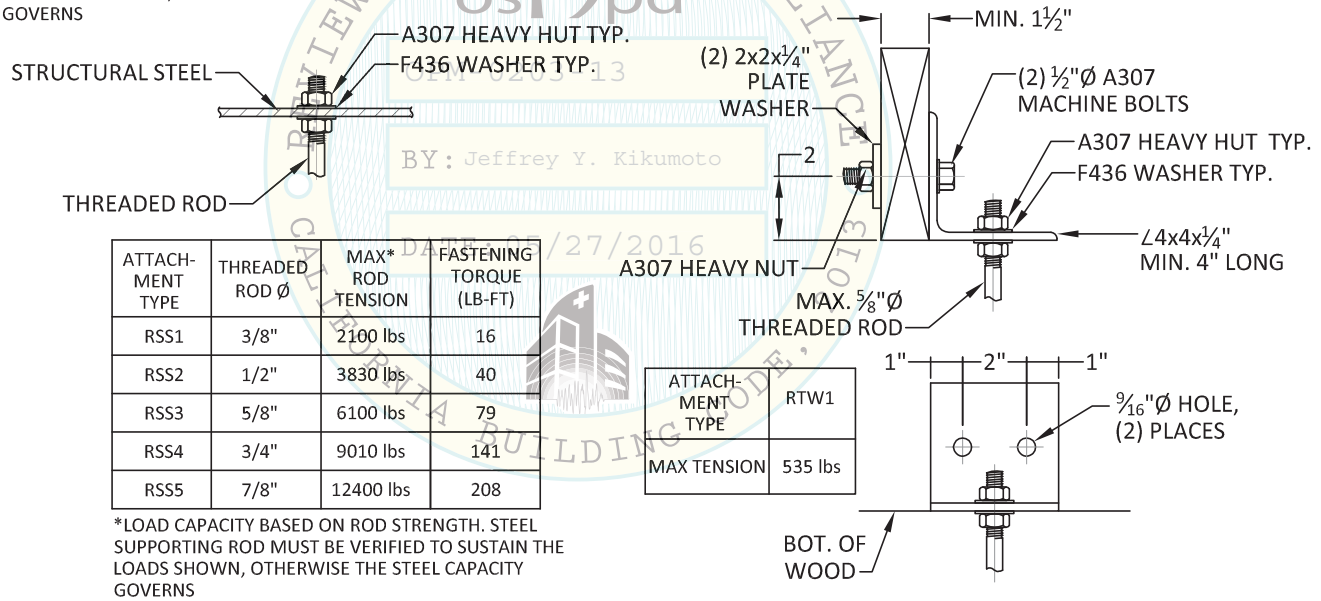
HANGER ROD ATTACHMENT OPTIONS



ATTACH-MENT TYPE	RBD1 (LRFD)
MAX TENSION* FOR 4 SCREWS	594 lbs

*LOAD CAPACITY BASED ON ATTACHMENT STRENGTH. DECK SUPPORTING ROD MUST BE VERIFIED TO SUSTAIN THE LOADS SHOWN, OTHERWISE THE DECK CAPACITY GOVERNS

ATTACH-MENT TYPE	RSW1
MAX TENSION FOR 2 BOLTS	653 lbs



ATTACH-MENT TYPE	THREADED ROD Ø	MAX* ROD TENSION	FASTENING TORQUE (LB-FT)
RSS1	3/8"	2100 lbs	16
RSS2	1/2"	3830 lbs	40
RSS3	5/8"	6100 lbs	79
RSS4	3/4"	9010 lbs	141
RSS5	7/8"	12400 lbs	208

*LOAD CAPACITY BASED ON ROD STRENGTH. STEEL SUPPORTING ROD MUST BE VERIFIED TO SUSTAIN THE LOADS SHOWN, OTHERWISE THE STEEL CAPACITY GOVERNS

ATTACH-MENT TYPE	RTW1
MAX TENSION	535 lbs

NOTE(S):

1. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOAD CAPACATIES.
2. BOLT HOLES FOR THRU BOLT SHALL BE BORED 1/16" LARGER THAN THE NOMINAL BOLT DIAMETER.
3. ROD COUPLING NUT MUST BE MIN. ASTM A194-2H HEAVY HEX OR A563-DH HEAVY HEX NUTS. ROD AND ANCHOR MUST HAVE A MIN. THREAD ENGAGEMENT INTO THE COUPLING NUT EQUAL TO THE DIAMETER OF THE ROD/ANCHOR. ROD AND ANCHOR MUST BE IN CONTACT W/ EACH OTHER WITHIN THE COUPLING NUT AND TIGHTENED ACCORDINGLY.
4. LOADS FOR LAG BOLT ATTACHMENTS AND THRU-BOLT ATTACHMENTS ARE DERIVED FROM CBC 2013 AND NDS 2012 FOR WOOD WITH A MINIMUM SPECIFIC GRAVITY = 0.50 (I.E. DOUGLAS FIR-LARCH OR EQUAL), ANY GRADE.
5. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.

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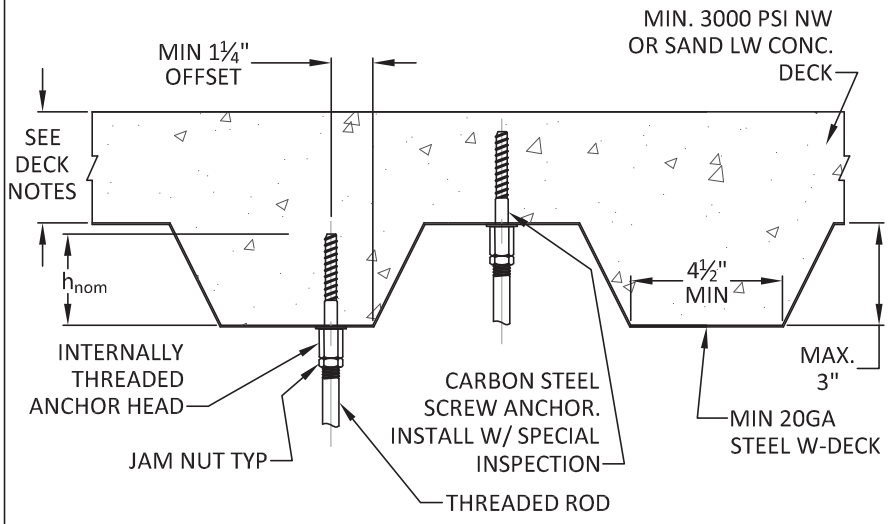
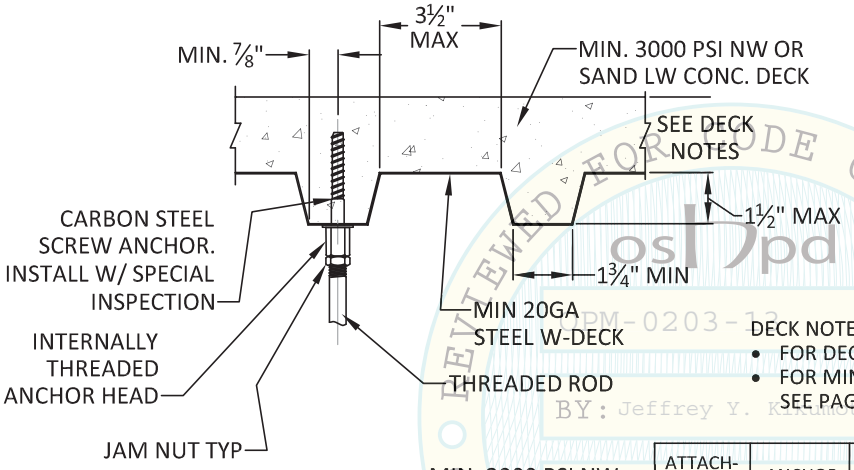
Date: May 9, 2016

HANGER ROD ATTACHMENT OPTIONS



ATTACH-MENT TYPE	ANCHOR BOLT DIA.	ROD DIA.	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.
RDS31	1/4"	3/8"	HILTI	KH-EZ I	2-1/2"
RDS32	3/8"	3/8" & 1/2"	POWERS	VERTIGO+	2-1/8"
RDS33	3/8"	3/8" & 1/2"	SIMPSON	TITEN HD HANGER	2-1/2"

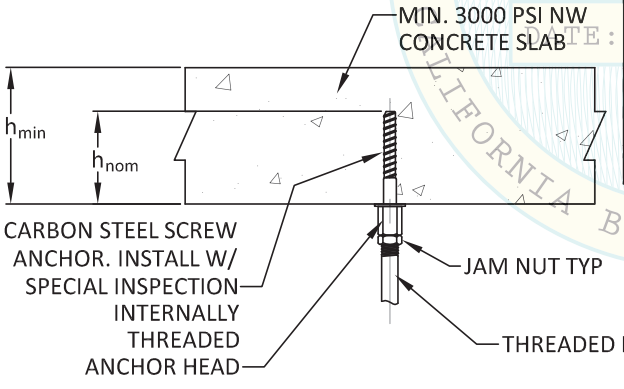
ATTACH-MENT TYPE	"h_{ef}"	MAX BOLT TENSION	
		UPPER FLUTE	LOWER FLUTE
RDS31	1-15/16"	453 lbs	475 lbs
RDS32	1-7/16"	517 lbs	517 lbs
RDS33	1-3/4"	-	424 lbs



ATTACH-MENT TYPE	ANCHOR BOLT DIA.	ROD DIA.	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.
RDS1.51	3/8"	3/8" & 1/2"	POWERS	VERTIGO+	2-1/8"

ATTACH-MENT TYPE	"h_{ef}"	"h_{min}"	"h_{clr}"	MAX BOLT TENSION	
				UPPER FLUTE	LOWER FLUTE
RDS1.51	1-7/16"	2-1/4"	3/4"	-	424 lbs

DECK NOTES:
- FOR DECK PROFILE DIMENSIONS SEE PAGE A.5 OF THE APPENDIX.
- FOR MIN. REQUIRED DIMENSIONS OF THE DECK FOR EACH ANCHOR SIZE SEE PAGE 3.0.3.



ATTACH-MENT TYPE	ANCHOR BOLT DIA.	ROD DIA.	MAKE	TYPE	"h_{nom}" NOMINAL EMBED.	"h_{ef}" EFFECTIVE EMBED.	"h_{min}"	MAX BOLT TENSION
RRCS1	1/4"	3/8"	HILTI	KH-EZ I	2-1/2"	1-15/16"	4-1/8"	600 lbs
RRCS2	3/8"	3/8" & 1/2"	POWERS	VERTIGO+	2-1/8"	1-7/16"	3-1/4"	579 lbs
RRCS3	3/8"	3/8" & 1/2"	SIMPSON	TITEN HD HANGER	2-1/2"	1-3/4"	4-1/4"	602 lbs

ATTACH-MENT TYPE	"C_{min}" MIN. EDGE DISTANCE
RRCS1	3"
RRCS2	3"
RRCS3	2-11/16"

NOTE(S):
1. OVER STRENGTH FACTOR Ω_0 =2.5 PER ASCE 7-10, TABLE 13.6-1 IS INCLUDED FOR ANCHORAGE TO CONCRETE. WHEN DESIGNING ANCHORAGE AS SHOWN Ω_0 MUST BE TAKEN INTO ACCOUNT IN DETERMINING THE FINAL DESIGN ROD TENSION (TYPICALLY FOR OVERTURNING ACTION OF SUSPENDED EQUIPMENT OR DUCT.)
2. INSTALL SCREW ANCHORS WITH SPECIAL INSPECTION PER THE ICC ESR-3027 (2013), ESR-2526 (2015), OR ESR-2713 (2015).
3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED DESIGN LOADS.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN CONCRETE ANCHORS ARE INSTALLED IN THE SOFFIT OF CONCRETE FILLED DECK, MINIMUM END DISTANCE AND SPACING REQUIREMENTS ARE ALONG THE FLUTE LENGTH.
6. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, COORDINATE ALL WORK WITH STRUCTURAL ENGINEER OF RECORD AND X-RAY SLAB PRIOR TO INSTALLATION TO AVOID DAMAGING POST TENSION CABLES AND REINFORCING STEEL.
7. HOLE DIAMETER THROUGH METAL DECK MAY NOT EXCEED ANCHOR HOLE DIMENSION BY MORE THAT ⅛" PER ICC-ESR.
8. DESIGN IS CONTROLLED BY SEISMIC FORCES. NON-SEISMIC FORCES SUCH AS GRAVITY ARE OUTSIDE THE SCOPE OF THIS OPM.

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California PE No. C59644

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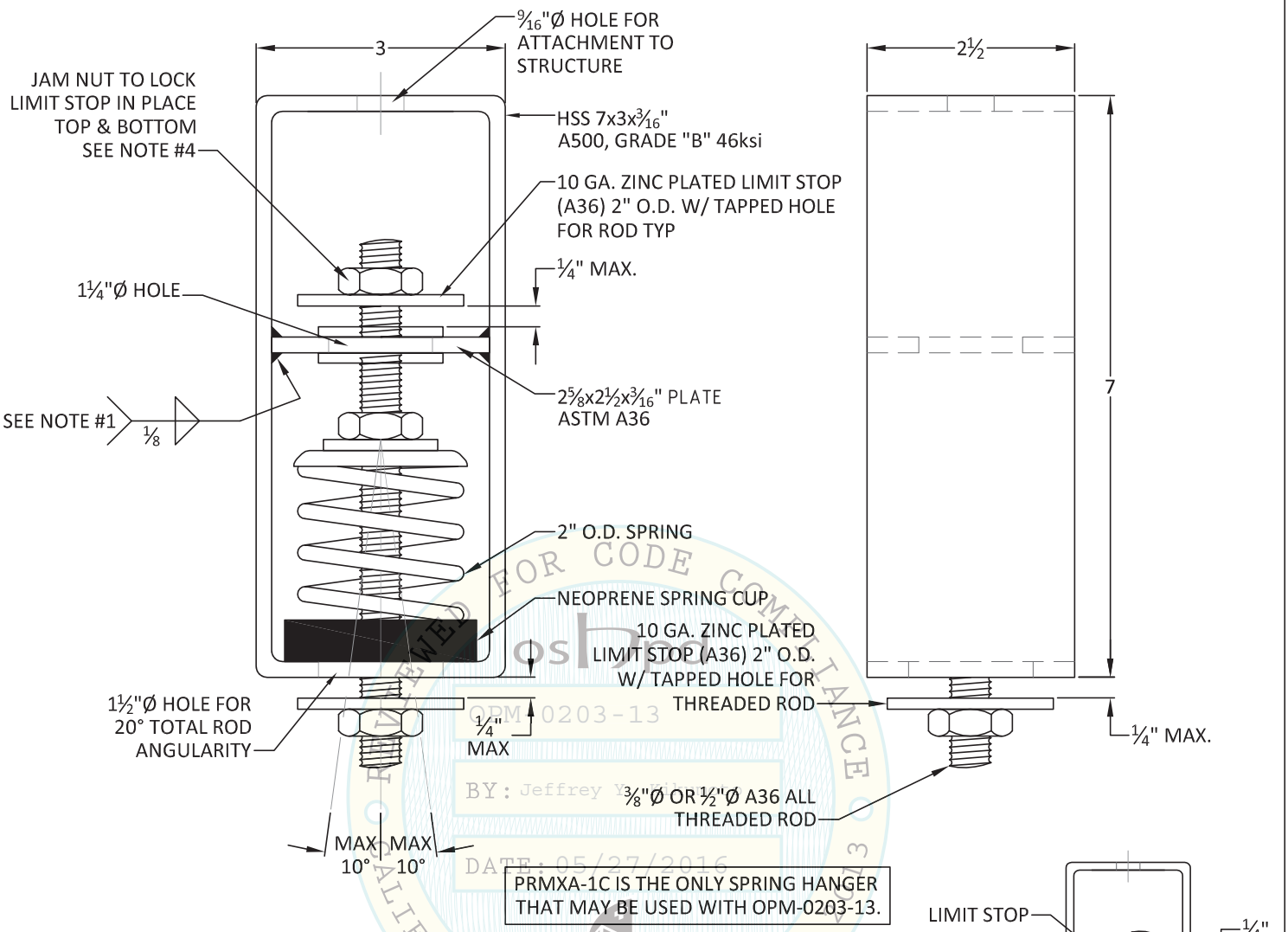
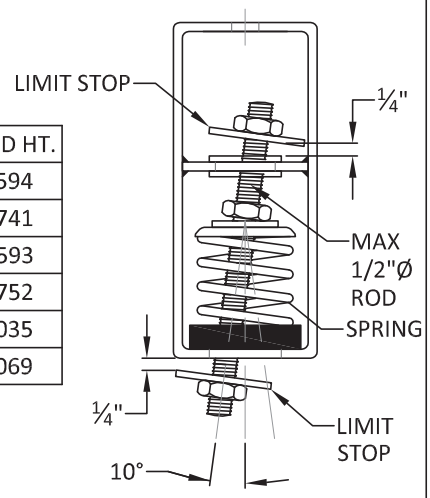
SECTION 4

SEISMIC BRACE & HANGER COMPONENTS

PRMXA-1C HANGER BOX DETAIL



SPRING	COLOR	OD	DEFL	LOAD @ DEFL[5]	ASTM DESIGN.[6]	WIRE Ø	TOTAL COILS	FREE HT.	SOLID HT.
2220	YELLOW	2"	1"	20 LBS	A229-12	0.125"	4.75	2.25	0.594
2250	RED	2"	1"	50 LBS	A229-12	0.156"	4.75	2.25	0.741
2275	GREEN	2"	1"	75 LBS	A229-12	0.156"	3.8	2.25	0.593
22100	PINK	2"	1"	100 LBS	A229-12	0.177"	4.25	2.25	0.752
22150	WHITE	2"	1"	150 LBS	A229-12	0.207"	5	2.5	1.035
22225	ORANGE	2"	1"	225 LBS	A229-12	0.225"	4.75	2.5	1.069



SPRING HANGER WITH MAX 10° ROD ANGULARITY

NOTE(S):
1. MAX. LOAD CAPACITY (DEAD): 225 LBS
2. MAX. SEISMIC LOAD RATING: 1,200 LBS
3. WELDING WILL BE DONE USING ER 70XX ELECTRODES.
4. THE LIMIT STOPS ARE TO BE ADJUSTED ONCE THE SPRING IS SET AT THE OPERATING DEFLECTION SO THE ¼" GAP IS ACHIEVED.
5. W/ DESIGN DEFL. @ 1", THE LOAD @ DEFL. IS ALSO THE SPRING RATE IN LBS/IN.
6. A229-12 WIRE USED IS MIN CLASS I (MIN. TENSILE STRENGTH IS 188ksi).

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RS-1 - ROD STIFFENER DETAILS & REQUIREMENTS

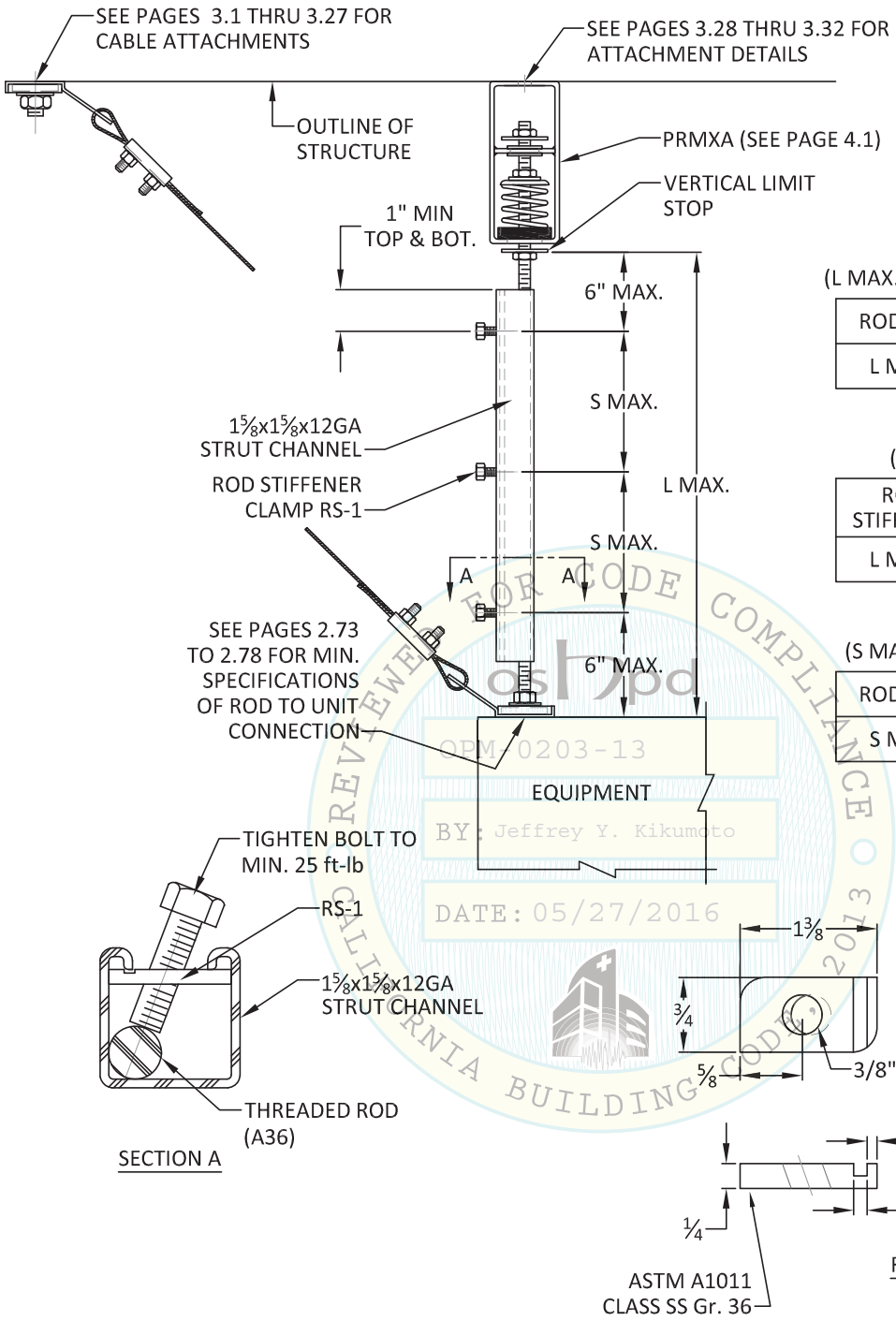

TABLE 1
(L MAX. WITHOUT ROD STIFFENER)

ROD DIA.	3/8"	1/2"
L MAX.	15"	21"

TABLE 2
(L MAX. WITH ROD STIFFENER)

ROD STIFFENER	1-5/8x1-5/8x12GA STRUT CHANNEL
L MAX.	116"

TABLE 3
(S MAX. WITH ROD STIFFENER)

ROD DIA.	3/8"	1/2"
S MAX.	15"	21"

NOTES:
1. SEE TABLE 1 FOR MAXIMUM LENGTH OF ⅜" THRU ⅝"Ø RODS WITHOUT ROD STIFFENER.
2. SEE TABLE 2 FOR MAXIMUM LENGTH OF ⅜" THRU ⅝"Ø RODS WITH ROD STIFFENER.
3. SEE TABLE 3 TO DETERMINE NUMBER OF ROD STIFFENER CLIPS REQUIRED.
4. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD.
5. SEE SECTION 3 FOR STRUCTURAL ATTACHMENTS FOR HANGER BOX AND CABLE BRACING

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RS-1 - ROD STIFFENER DETAILS & REQUIREMENTS

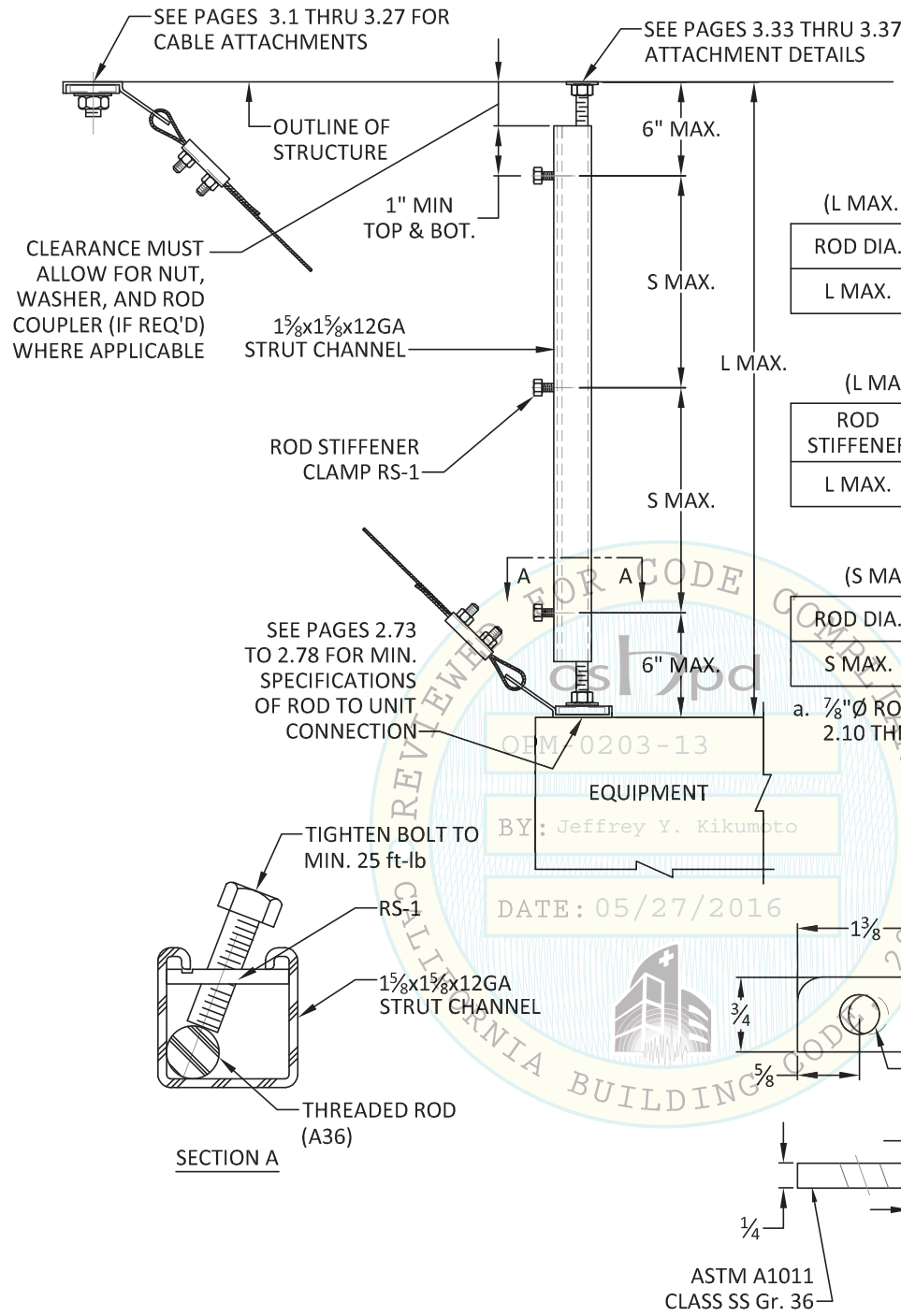

TABLE 1
(L MAX. WITHOUT ROD STIFFENER)

ROD DIA.	3/8"	1/2"	5/8"	3/4"	7/8"[a]
L MAX.	15"	21"	26"	32"	38"

TABLE 2
(L MAX. WITH ROD STIFFENER)

ROD STIFFENER	1-5/8x1-5/8x12GA STRUT CHANNEL
L MAX.	116"

TABLE 3
(S MAX. WITH ROD STIFFENER)

ROD DIA.	3/8"	1/2"	5/8"	3/4"	7/8"[a]
S MAX.	15"	21"	26"	32"	38"

a. ⅞"Ø ROD ONLY USED FOR HEAVY PIPE. SEE PAGES 2.10 THROUGH 2.15 FOR APPLICATIONS.

NOTES:
1. SEE TABLE 1 FOR MAXIMUM LENGTH OF ⅜" THRU ⅞"Ø RODS WITHOUT ROD STIFFENER.
2. SEE TABLE 2 FOR MAXIMUM LENGTH OF ⅜" THRU ⅞"Ø RODS WITH ROD STIFFENER.
3. SEE TABLE 3 TO DETERMINE NUMBER OF ROD STIFFENER CLIPS REQUIRED.
4. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD.
5. SEE SECTION 3 FOR STRUCTURAL ATTACHMENTS FOR HANGER BOX AND CABLE BRACING

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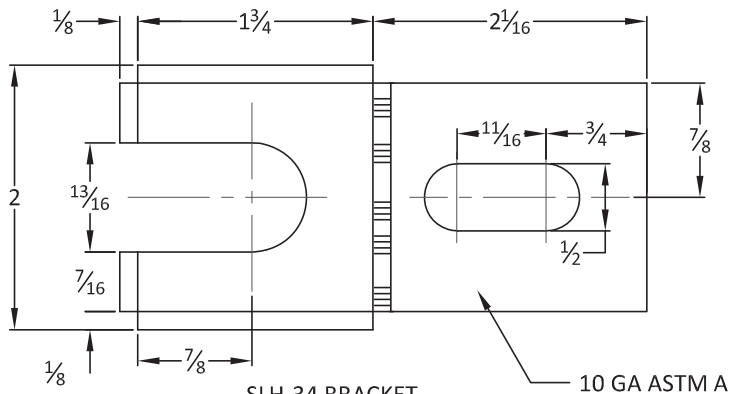
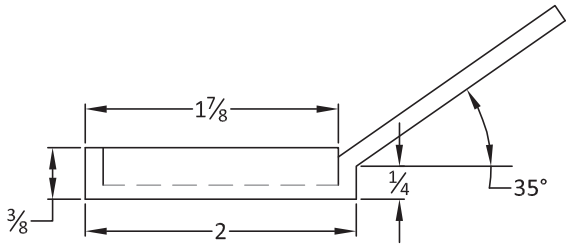
SLH-34 & SLW-38, 12, 58, & 34 DETAILS

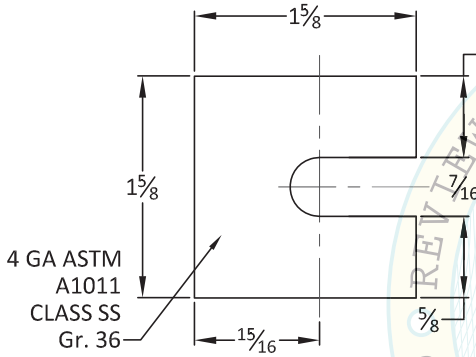


SLH-34 BRACKET
(FLAT)

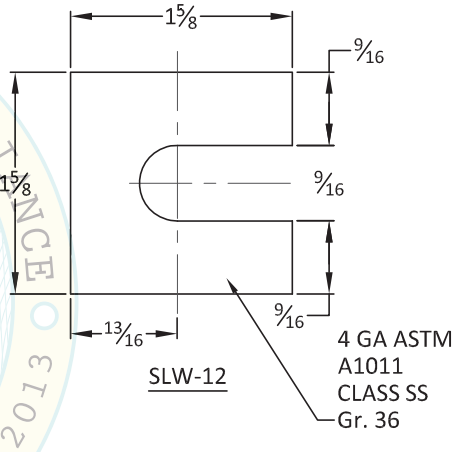
10 GA ASTM A1011
CLASS SS, Gr. 36
TOLERANCE : ±0.010



SLH-34 BRACKET
(ELEVATION)



SLW-38

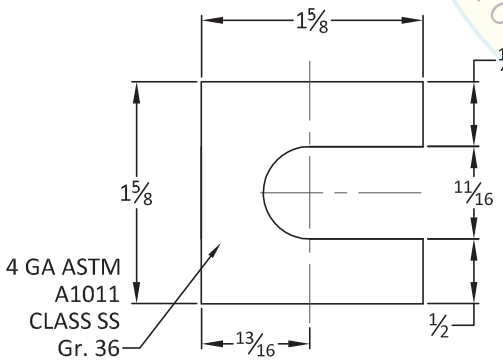


SLW-12

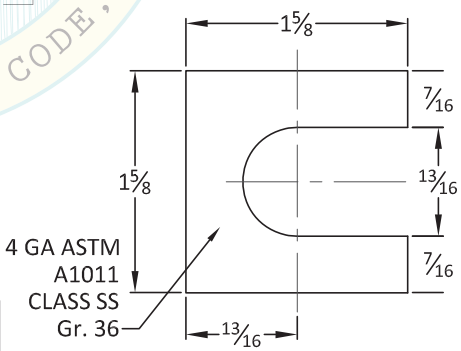
SLOT OF SLW
OPEN TOWARDS
CABLE ALWAYS

OUTLINE OF
SLH-34

USE OF SLW WITH
SLH-34



SLW-58



SLW-34

USE SLW-38 WITH 3/8"Ø ROD
USE SLW-12 WITH 1/2"Ø ROD
USE SLW-58 WITH 5/8"Ø ROD
USE SLW-34 WITH 3/4"Ø ROD

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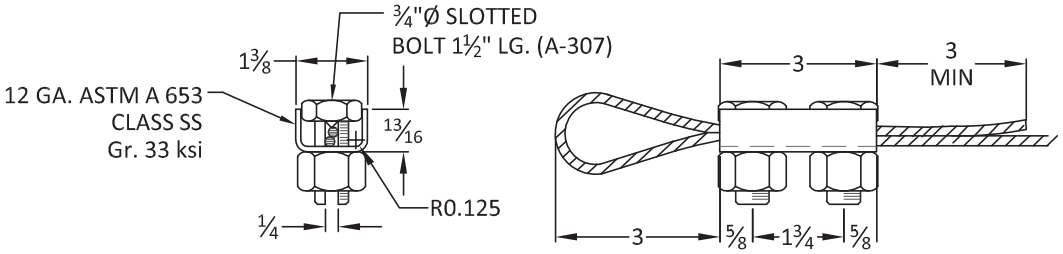
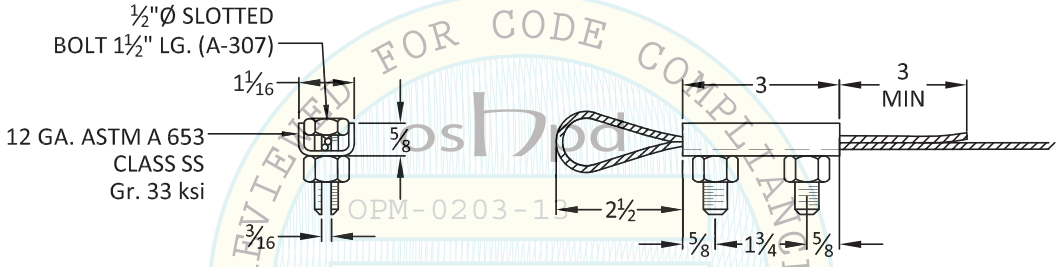
CABLE CLAMP DETAILS



3/16" CABLE CLAMP

REQUIRED FASTENING TORQUE: 15 ft-lbs



1/8" CABLE CLAMP

REQUIRED FASTENING TORQUE: 5 ft-lbs

CABLE INFORMATION

CABLE Ø	CLASSIFICATION/ CONSTRUCTION	BREAKING STRENGTH
⅛"	7X19	2,000 LBS
3/16"	7X19	4,200 LBS

CABLE IS SMALL DIA. (GALVANIZED) SPECIALTY CORD & MEETS ASTM A1023/A1023M STANDARDS & FEDERAL U.S. SPECIFICATION RR-W-410G, TYPE VI, CLASS 3.

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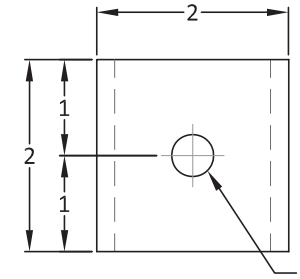
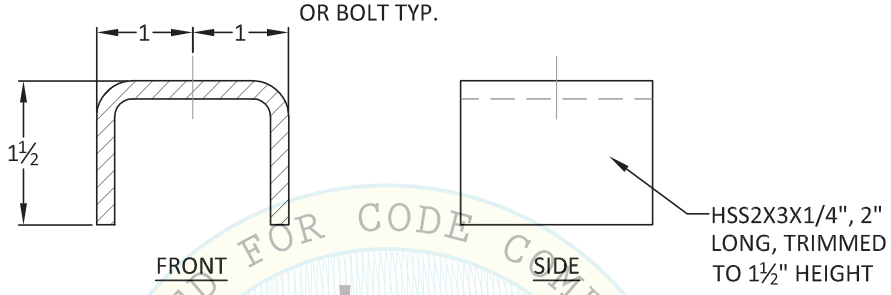
Page No.: 4.5

Date: May 9, 2016

PIPE LUG PL-38 DETAILS

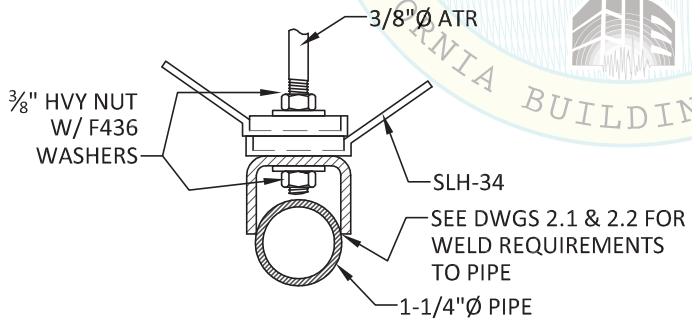


HSS USED FOR
PL-38 IS ASTM
A500 Gr. B 46ksi
CARBON STEEL

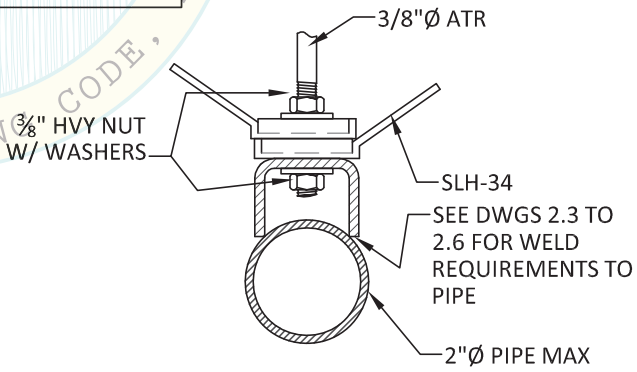


PL-38 FOR 1-1/4"Ø TO 2"Ø PIPE

REQUIRED FASTENING TORQUE
FOR ⅜"Ø ROD: 16 ft-lbs



1-1/4"Ø PIPE ASSEMBLY DETAIL



1-1/2"Ø & 2"Ø PIPE ASSEMBLY DETAIL

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California PE No. C59644

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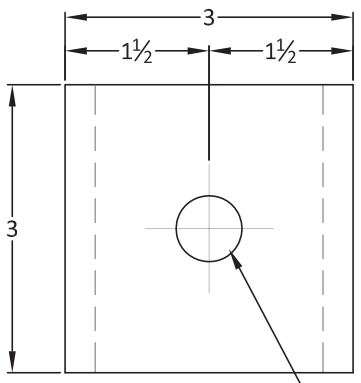
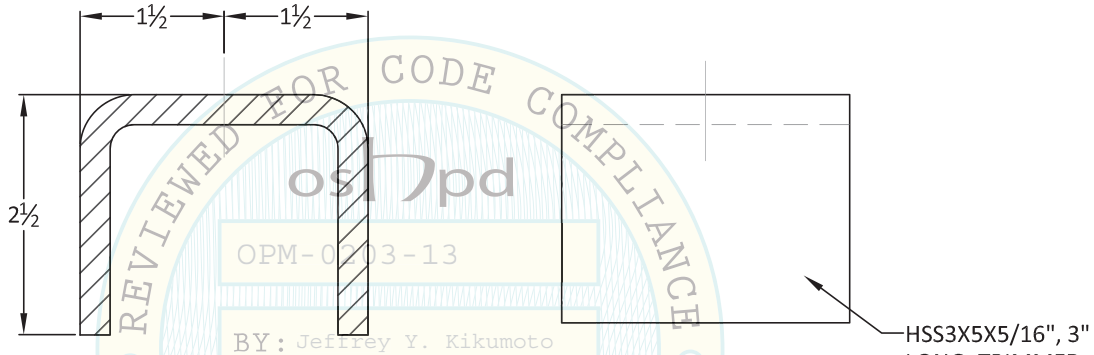
PIPE LUG PL-12 & 58 DETAILS



PLAN

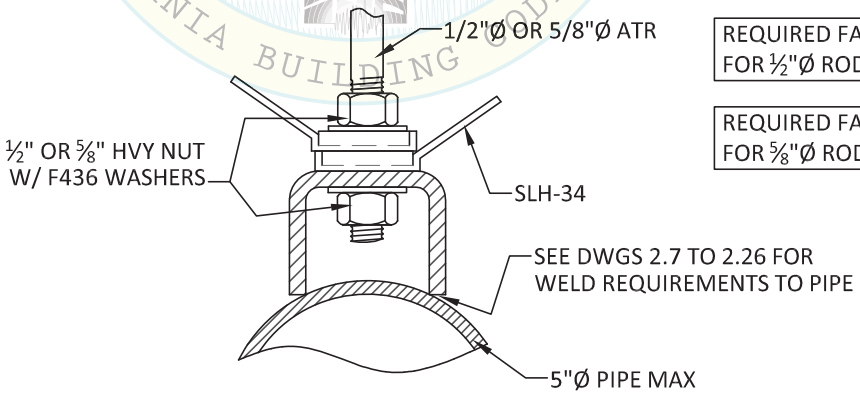
HSS USED FOR PL-12 & PL-58 ARE ASTM A500 Gr. B 46ksi CARBON STEEL

9/16"Ø HOLE FOR 1/2"Ø ROD OR BOLT (PL-12)
11/16"Ø HOLE FOR 5/8"Ø ROD OR BOLT (PL-58)



FRONT SIDE

PL-12 FOR 2-1/2"Ø TO 3-1/2"Ø PIPE
PL-58 FOR 4"Ø & 5"Ø PIPE



2-1/2"Ø TO 5"Ø PIPE ASSEMBLY DETAIL

REQUIRED FASTENING TORQUE FOR ½"Ø ROD: 40 ft-lbs

REQUIRED FASTENING TORQUE FOR ⅝"Ø ROD: 79 ft-lbs

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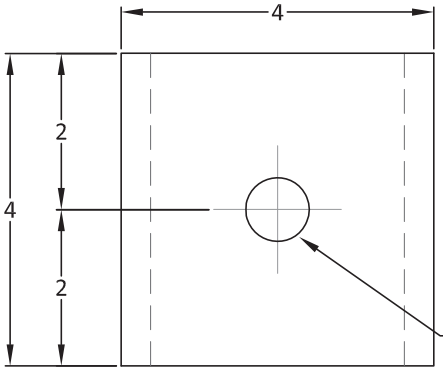
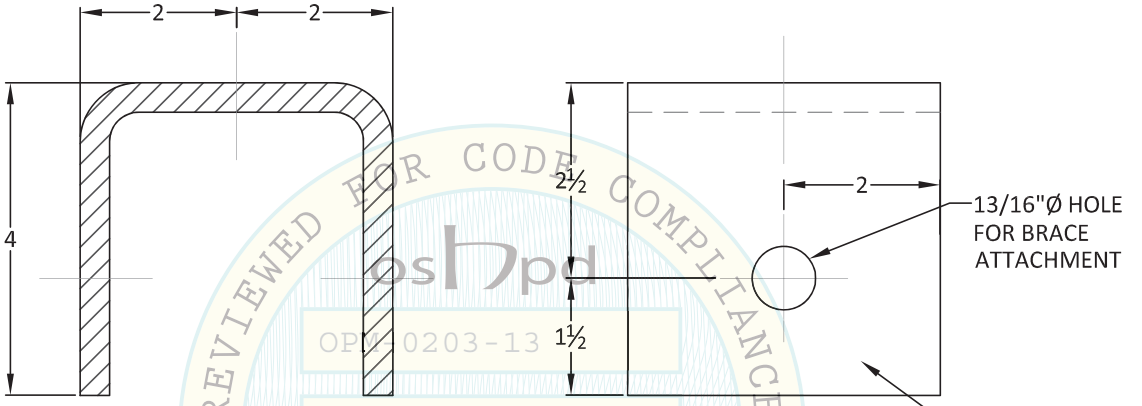
PIPE LUG PL-34 DETAILS



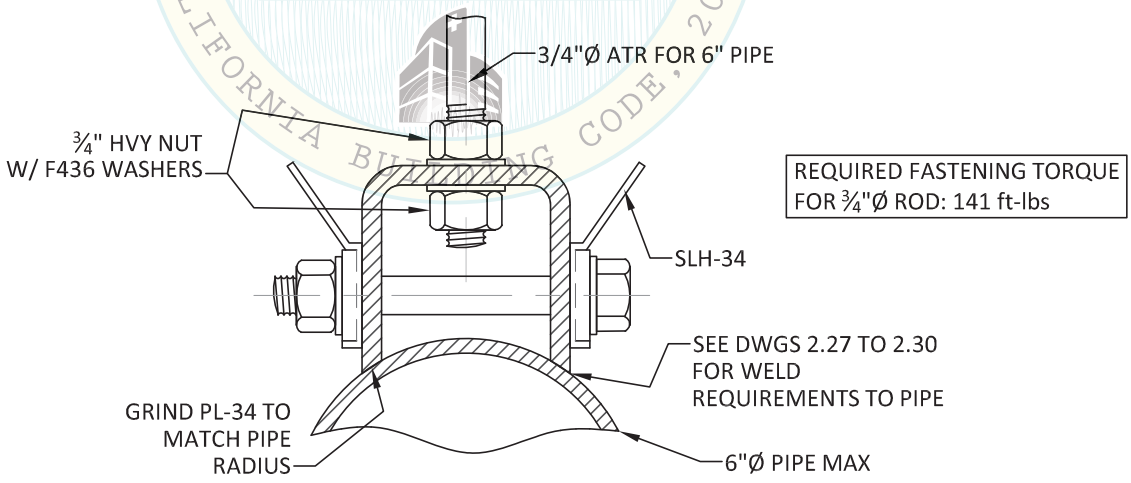
PLAN

HSS USED FOR PL-34
IS ASTM A500 Gr. B
46ksi CARBON
STEEL



FRONT SIDE

PL-34 FOR 6"Ø PIPE



REQUIRED FASTENING TORQUE
FOR ¾"Ø ROD: 141 ft-lbs

6"Ø PIPE ASSEMBLY DETAIL

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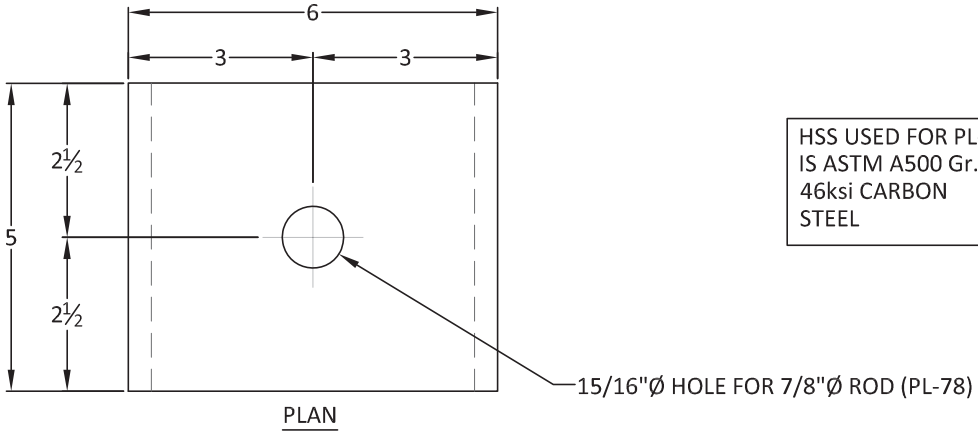
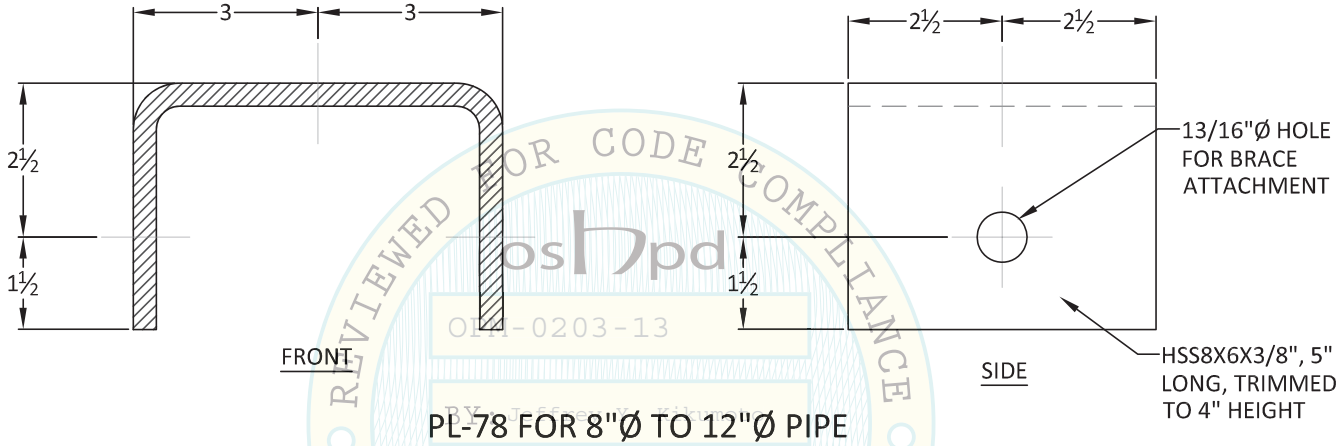
PIPE LUG PL-78 DETAILS



PLAN

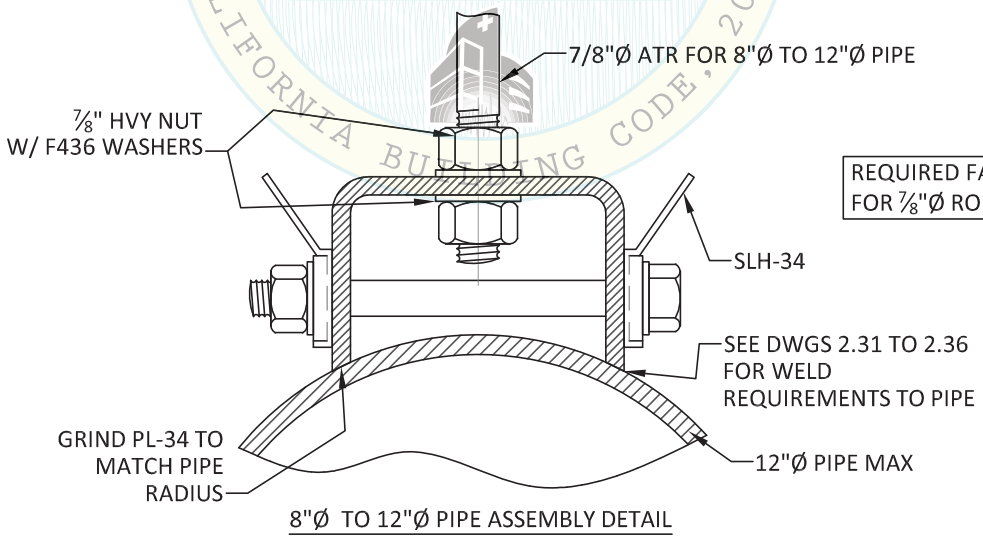
HSS USED FOR PL-78
IS ASTM A500 Gr. B
46ksi CARBON
STEEL



FRONT

SIDE

PL-78 FOR 8"Ø TO 12"Ø PIPE



8"Ø TO 12"Ø PIPE ASSEMBLY DETAIL

REQUIRED FASTENING TORQUE
FOR ⅞"Ø ROD: 208 ft-lbs

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SECTION D

DESIGN TABLES FOR SUSPENDED PIPE, DUCT, & CABLE TRAY

BRACING KIT DETAIL SELECTION
SCH. 40 STEEL PIPE W/ INSULATION & WATER

CABLE BRACING ANGLE "x" AT 45° to 60° (1:1 to 1.7:1) SLOPE

PIPE DIAMETER (in)	LINEAR WT. (PLF)	STD.[1] SUPPORT SPACING (FT)	TRANSVERSE BRACING KIT DETAIL PAGE No. BASED ON "g" VALUE OF Fp										
			0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
1.25	3.6	7	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
1.50	4.3	9	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
2.0	6.0	10	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
2.5	8.8	11	2.7	2.7	2.7	2.7	2.7	2.9	2.9	2.9	2.9	2.9	2.9
3.0	11.9	12	2.11	2.11	2.11	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13
3.5	14.6	13	2.15	2.15	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17
4.0	17.6	14	2.19	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21
5.0	24.8	16	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	n/a	n/a
6.0	33.3	17	2.27	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	n/a	n/a
8.0	52.5	19	2.31	2.31	2.31	2.31	2.31	2.31	2.31	n/a	n/a	n/a	n/a
10.0	77.4	22	2.33	2.33	2.33	2.33	2.33	n/a	n/a	n/a	n/a	n/a	n/a
12.0	101.7	23	2.35	2.35	2.35	2.35	n/a	n/a	n/a	n/a	n/a	n/a	n/a

PIPE DIAMETER (in)	LINEAR WT. (PLF)	STD.[1] SUPPORT SPACING (FT)	TRANSVERSE & LONGITUDINAL BRACING KIT DETAIL PAGE No. BASED ON "g" VALUE OF Fp										
			0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
1.25	3.6	7	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
1.50	4.3	9	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
2.0	6.0	10	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
2.5	8.8	11	2.8	2.8	2.8	2.8	2.10	2.10	2.10	2.10	2.10	2.10	2.10
3.0	11.9	12	2.12	2.12	2.12	2.14	2.14	2.14	2.14	2.14	2.14	2.14	2.14
3.5	14.6	13	2.16	2.16	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18
4.0	17.6	14	2.20	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22
5.0	24.8	16	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	n/a	n/a
6.0	33.3	17	2.28	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	n/a	n/a
8.0	52.5	19	2.32	2.32	2.32	2.32	2.32	2.32	2.32	n/a	n/a	n/a	n/a
10.0	77.4	22	2.34	2.34	2.34	2.34	2.34	n/a	n/a	n/a	n/a	n/a	n/a
12.0	101.7	23	2.36	2.36	2.36	2.36	n/a	n/a	n/a	n/a	n/a	n/a	n/a

NOTES:
1. SUPPORT SPACING MUST NOT EXCEED THE MAXIMUM BRACE SPACING SPECIFIED ON PAGES D.2 & D.3.
2. SEE PAGES D.2 & D.3 FOR BRACE AND HANGER/ROD ATTACHMENT DETAIL TABLES.
3. DETAILS LISTED ABOVE APPLY FOR PIPES WITH WELDED, BOLTED, COUPLED, OR THREADED CONNECTIONS.
4. ▭ DENOTES CABLE KITS WITH $\frac{3}{16}$"Ø CABLE.

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Page No.: **D.1**

Date: May 9, 2016

TRANSVERSE BRACING & HANGER/ROD ATTACHMENT DESIGNATION SELECTION FOR SCH. 40 STEEL PIPE W/ INSULATION & WATER

CABLE BRACING ANGLE "x" AT 45° to 60° (1:1 to 1.7:1) SLOPE

PIPE DIAMETER (in)	BRACING ATTACHMENT DESIGNATION BASED ON "g" VALUE OF Fp[1]											HANGER/ROD DESIGNATION ALL "g" VALUES[2]
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	
1.25	B1	B1	B2	B2	B2	B3	B3	B3	B3	B3	B3	H1/R1
1.50	B1	B2	B2	B2	B3	B3	B3	B4	B4	B4	B4	H1/R1
2.0	B2	B2	B3	B3	B4	B4	B5	B5	B6	B6	B6	H1/R1
2.5	B2	B3	B4	B5	B6	B7	B7	B7	B7	B7	B7	H1/R1
3.0	B3	B5	B6	B7	B7	B7	B7	B7	B7	B7	B7	H1/R1
3.5	B4	B6	B7	B7	B7	B7	B7	B7	B7	B7	B7	H1/R1
4.0	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R2
5.0	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R2
6.0	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R3
8.0	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R4
10.0	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R6
12.0	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R7

PIPE DIAMETER (in)	MAXIMUM TRANSVERSE BRACE SPACING IN FEET BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
1.25	19.6	19.0	18.4	17.7	16.4	15.3	14.3	13.5	12.7	12.1	11.5
1.50	21.6	21.0	20.4	19.7	18.3	17.1	16.0	15.1	14.3	13.6	13.1
2.0	25.2	24.7	23.9	23.2	21.3	19.8	18.6	17.6	16.7	15.9	15.0
2.5	29.5	28.8	27.6	26.3	24.2	22.5	20.8	17.3	14.8	13.0	11.5
3.0	32.5	31.9	30.3	28.8	23.2	17.4	13.9	11.6	9.9	8.7	7.7
3.5	34.7	33.9	32.1	26.5	17.7	13.3	10.6	8.8	7.6	6.6	5.9
4.0	36.7	35.7	27.6	20.7	13.8	10.4	8.3	8.5	7.1	8.5	7.1
5.0	40	33.0	22.0	16.5	11.0	8.2	5.3	4.4	3.8	n/a	n/a
6.0	40	30.3	20.2	15.1	10.1	7.6	6.1	5.0	4.3	n/a	n/a
8.0	40	21.0	14.0	10.5	7.0	5.2	4.2	n/a	n/a	n/a	n/a
10.0	24.9	12.4	8.3	6.2	4.1	n/a	n/a	n/a	n/a	n/a	n/a
12.0	16.6	8.3	5.5	4.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a

NOTES:
1. SEE PAGES D.9 THRU D.12 FOR SELECTION OF SPECIFIC BRACING ATTACHMENT DETAILS BASED ON THE SPECIFIED BRACING ATTACHMENT DESIGNATION ABOVE.
2. SEE PAGES D.13 THRU D.16 FOR SELECTION OF SPECIFIC HANGER/ROD ATTACHMENT DETAILS BASED ON THE SPECIFIED HANGER/ROD ATTACHMENT DESIGNATION ABOVE.
3. DETAILS AND SPACING VALUES LISTED ABOVE APPLY FOR WELDED, BOLTED, COUPLED OR THREADED CONNECTIONS.

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Page No.: D.2

Date: May 9, 2016

TRANSVERSE & LONGITUDINAL BRACING & HANGER/ROD ATTACHMENT DESIGNATION SELECTION
FOR SCH. 40 STEEL PIPE W/ INSULATION & WATER

CABLE BRACING ANGLE "x" AT 45° to 60° (1:1 to 1.7:1) SLOPE

PIPE DIAMETER (in)	BRACING ATTACHMENT DESIGNATION BASED ON "g" VALUE OF Fp[1]											HANGER/ROD DESIGNATION ALL "g" VALUES[2]
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	
1.25	B2	B2	B3	B3	B4	B5	B6	B6	B6	B6	B6	H1/R1
1.50	B2	B3	B3	B4	B5	B6	B6	B6	B6	B6	B6	H1/R1
2.0	B2	B3	B4	B5	B6	B6	B6	B6	B6	B6	B6	H1/R1
2.5	B3	B4	B5	B5	B6	B7	B7	B7	B7	B7	B7	H1/R1
3.0	B3	B5	B6	B7	B7	B7	B7	B7	B7	B7	B7	H1/R1
3.5	B3	B6	B7	B7	B7	B7	B7	B7	B7	B7	B7	H1/R1
4.0	B4	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R2
5.0	B7	B7	B7	B7	B7	B7	B7	B7	B7	n/a	n/a	R2
6.0	B6	B7	B7	B7	B7	B7	B7	B7	B7	n/a	n/a	R3
8.0	B7	B7	B7	B7	B7	B7	B7	n/a	n/a	n/a	n/a	R4
10.0	B7	B7	B7	B7	B7	n/a	n/a	n/a	n/a	n/a	n/a	R6
12.0	B7	B7	B7	B7	n/a	n/a	n/a	n/a	n/a	n/a	n/a	R7

PIPE DIAMETER (in)	MAXIMUM TRANSVERSE & LONGITUDINAL BRACE SPACING IN FEET BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
1.25	80	80	80	80	80	80	78.2	65.1	55.8	48.9	43.4
1.50	80	80	80	80	80	80	65	54.2	46.4	40.6	36.1
2.0	80	80	80	80	79	59.3	47.4	39.5	33.9	29.6	26.3
2.5	80	80	80	80	75.1	56.3	45.1	37.6	32.2	28.2	25
3.0	80	80	80	80	55.8	41.9	33.5	27.9	23.9	20.9	18.6
3.5	80	80	80	68.1	45.4	34.1	27.3	22.7	19.5	17.0	15.1
4.0	80	80	75.2	56.4	37.6	28.2	22.6	18.8	16.1	14.1	12.5
5.0	80	80	53.4	40	26.7	20	16	13.3	11.4	n/a	n/a
6.0	80	59.8	39.8	29.9	19.9	14.9	12	10	4.3	n/a	n/a
8.0	75.8	37.9	25.3	19	12.6	9.5	4.2	n/a	n/a	n/a	n/a
10.0	51.4	25.7	17.1	12.9	8.6	n/a	n/a	n/a	n/a	n/a	n/a
12.0	39.1	19.5	13	9.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a

NOTES:
1. SEE PAGES D.9 THRU D.12 FOR SELECTION OF SPECIFIC BRACING ATTACHMENT DETAILS BASED ON THE SPECIFIED BRACING ATTACHMENT DESIGNATION ABOVE.
2. SEE PAGES D.13 THRU D.16 FOR SELECTION OF SPECIFIC HANGER/ROD ATTACHMENT DETAILS BASED ON THE SPECIFIED HANGER/ROD ATTACHMENT DESIGNATION ABOVE.
3. DETAILS AND SPACING VALUES LISTED ABOVE APPLY FOR WELDED, BOLTED, COUPLED OR THREADED CONNECTIONS.

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Page No.: D.3

Date: May 9, 2016

TRANSVERSE BRACE SPACING LIMITS FOR SCH. 40 STEEL PIPE[1] BASED ON DEFLECTION AND PIPE STRESSES & η VALUES FOR MANUAL DESIGN APPROACH

PIPE DIAMETER (in)	MAXIMUM TRANSVERSE BRACE SPACING IN FEET BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
1.25	19.6	19.0	18.4	17.7	16.4	15.3	14.3	13.5	12.7	12.1	11.5
1.50	21.6	21.0	20.4	19.7	18.3	17.1	16.0	15.1	14.3	13.6	13.1
2.0	25.2	24.7	23.9	23.2	21.3	19.8	18.6	17.6	16.7	15.9	15.3
2.5	29.5	28.8	27.6	26.3	24.2	22.5	21.1	19.9	19.0	18.1	17.4
3.0	32.5	31.9	30.3	28.8	26.5	24.6	23.1	21.8	20.8	19.8	19.0
3.5	34.7	33.9	32.1	30.6	28.1	26.1	24.5	23.2	22.1	21.1	20.2
4.0	36.7	35.7	33.9	32.3	29.6	27.6	25.9	24.4	23.2	22.2	21.3
5.0	40	39.2	37.1	35.4	32.5	30.2	28.4	26.8	25.5	24.4	23.4
6.0	40	40	40	38.1	35.0	32.6	30.6	28.9	27.5	26.2	26.2
8.0	40	40	40	40	39.2	36.5	34.2	32.4	30.8	29.4	28.2
10.0	40	40	40	40	40	40	37.6	35.5	33.8	32.3	30.9
12.0	40	40	40	40	40	40	39.6	37.4	35.6	34.0	32.6

η VALUE FOR MANUAL CABLE TENSION CALCULATIONS - TRANSVERSE KITS ONLY [2,3]			
PIPE DIAMETER (in)	η		
	30°≤ x <45°	45°≤ x ≤60°	60°< x ≤70°
1.25	2.60	2.82	3.51
1.50	2.91	3.27	4.16
2.0	3.09	3.52	4.53
2.5	3.67	4.34	5.73
3.0	4.00	4.81	6.41
3.5	4.23	5.13	6.88
4.0	4.45	5.44	7.34
5.0	4.87	6.04	8.21
6.0	3.39	3.95	5.15
8.0	3.15	3.61	4.66
10.0	3.60	4.25	5.59
12.0	4.00	4.81	6.41

NOTES:
1. SPACING LIMITS ARE BASED 70% OF THE YIELD STRESS CAPACITY OF THE PIPE (INCLUDES THREADED, BONDED, WELDED, AND BOLTED PIPING), A MAXIMUM DEFLECTION OF L/60, AND 6", WHICHEVER YIELDS THE LEAST DISTANCE.
2. THE CABLE DEMAND TENSION IS CALCULATED AS $T_{cable} = F_p \eta$.
3. THE VALUE OF η ACCOUNTS FOR THE LOAD ECCENTRICITIES OF THE BRACE POINT ABOVE THE PIPE CENTER OF GRAVITY.

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Page No.: D.3.1
Date: May 9, 2016

BRACING KIT DETAIL SELECTION
RECTANGULAR SHEET METAL DUCTWORK W/ INSULATION

CABLE BRACING ANGLE "x" AT 45° to 60° (1:1 to 1.7:1) SLOPE

LINEAR DUCT WT. (PLF), SUPPORT SPACING 10'-0" O.C.[1]	TRANSVERSE BRACING KIT DETAIL PAGE No. BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
10	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.39	2.39	2.39
20	2.37	2.37	2.37	2.37	2.37	2.39	2.39	2.39	2.39	2.39	2.39
30	2.37	2.37	2.37	2.37	2.39	2.39	2.39	2.39	2.39	2.39	2.39
40	2.41	2.41	2.41	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43
50	2.41	2.41	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43
60	2.41	2.41	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43
70	2.45	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47
80	2.45	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47
90	2.45	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	n/a
100	2.45	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	n/a	n/a

LINEAR DUCT WT. (PLF), STD. SUPPORT SPACING 10'-0" O.C.[1]	TRANSVERSE & LONGITUDINAL BRACING KIT DETAIL PAGE No. BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
10	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.40	2.40	2.40
20	2.38	2.38	2.38	2.38	2.38	2.40	2.40	2.40	2.40	2.40	2.40
30	2.38	2.38	2.38	2.38	2.40	2.40	2.40	2.40	2.40	2.40	2.40
40	2.42	2.42	2.42	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44
50	2.42	2.42	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44
60	2.42	2.42	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44
70	2.46	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48
80	2.46	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48
90	2.46	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	n/a
100	2.46	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	n/a	n/a

NOTES:
1. SUPPORT SPACING MUST NOT EXCEED THE MAXIMUM BRACE SPACING SPECIFIED ON PAGE D.6.
2. SEE PAGE D.6 FOR BRACE AND HANGER/ROD ATTACHMENT DETAIL TABLES.
3. ▭ DENOTES CABLE KITS WITH $\frac{3}{16}$"Ø CABLE.

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Page No.: D.4

Date: May 9, 2016

BRACING KIT DETAIL SELECTION
ROUND SHEET METAL DUCTWORK W/ INSULATION

CABLE BRACING ANGLE "x" AT 45° to 60° (1:1 to 1.7:1) SLOPE

LINEAR DUCT WT. (PLF) STD. SUPPORT SPACING 10'-0" O.C.[1]	TRANSVERSE BRACING KIT DETAIL PAGE No. BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
10	2.49	2.49	2.49	2.49	2.49	2.49	2.49	2.49	2.51	2.51	2.51
20	2.49	2.49	2.49	2.49	2.49	2.51	2.51	2.51	2.51	2.51	2.51
30	2.49	2.49	2.49	2.49	2.51	2.51	2.51	2.51	2.51	2.51	2.51
40	2.53	2.53	2.53	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
50	2.53	2.53	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
60	2.53	2.53	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
70	2.57	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59
80	2.57	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59
90	2.57	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	n/a
100	2.57	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	n/a	n/a

LINEAR DUCT WT. (PLF) STD. SUPPORT SPACING 10'-0" O.C.[1]	TRANSVERSE & LONGITUDINAL BRACING KIT DETAIL PAGE No. BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
10	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.52	2.52	2.52
20	2.50	2.50	2.50	2.50	2.50	2.52	2.52	2.52	2.52	2.52	2.52
30	2.50	2.50	2.50	2.50	2.52	2.52	2.52	2.52	2.52	2.52	2.52
40	2.54	2.54	2.54	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
50	2.54	2.54	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
60	2.54	2.54	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
70	2.58	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
80	2.58	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
90	2.58	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	n/a
100	2.58	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	n/a	n/a

NOTES:
1. BRACE SPACING MUST NOT EXCEED THE MAXIMUM BRACE SPACING SPECIFIED ON PAGE D.6.
2. SEE PAGE D.5 FOR BRACE AND HANGER/ROD ATTACHMENT DETAIL TABLES.
3. ☐ DENOTES CABLE KITS WITH $\frac{3}{16}$"Ø CABLE.

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Page No.: D.5

Date: May 9, 2016

BRACING & HANGER/ROD ATTACHMENT DESIGNATION SELECTION FOR SHEET METAL DUCTWORK W/ INSULATION

CABLE BRACING ANGLE "x" AT 45° to 60° (1:1 to 1.7:1) SLOPE

LINEAR DUCT WT. (PLF)	BRACING ATTACHMENT DESIGNATION BASED ON "g" VALUE OF Fp											HANGER DESIGNATION ALL "g" VALUES
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	
10	B2	B2	B3	B3	B4	B4	B5	B6	B6	B7	B7	H1/R1
20	B2	B3	B4	B4	B6	B7	B7	B7	B7	B7	B7	H1/R1
30	B3	B4	B5	B6	B7	B7	B7	B7	B7	B7	B7	H1/R1
40	B3	B4	B6	B7	B7	B7	B7	B7	B7	B7	B7	H1/R1
50	B3	B5	B7	B7	B7	B7	B7	B7	B7	B7	B7	R1
60	B4	B6	B7	B7	B7	B7	B7	B7	B7	B7	B7	R2
70	B4	B6	B7	B7	B7	B7	B7	B7	B7	B7	B7	R2
80	B4	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R3
90	B5	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R3
100	B5	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R4

LINEAR DUCT WT. (PLF)	MAXIMUM TRANSVERSE BRACING SPACING IN FEET BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
10	30	30	30	30	30	30	30	30	30	30	30
20	30	30	30	30	30	30	28.2	23.5	20.2	17.6	15.7
30	30	30	30	30	30	23.5	18.8	15.7	13.4	11.8	10.5
40	30	30	30	30	23.5	17.6	14.1	11.8	10.1	8.8	7.8
50	30	30	30	28.2	18.8	14.1	11.3	9.4	8.1	7.1	6.3
60	30	30	30	23.5	15.7	11.8	9.4	7.8	6.7	5.9	5.2
70	30	30	26.9	20.2	13.4	10.1	8.1	6.7	5.8	5.0	4.5
80	30	30	23.5	17.6	11.8	8.8	7.1	5.9	5.0	4.4	3.9
90	30	30	20.9	15.7	10.5	7.8	6.3	5.2	4.5	3.9	n/a
100	30	28.2	18.8	14.1	9.4	7.1	5.6	4.7	4.0	n/a	n/a

LINEAR DUCT WT. (PLF)	MAXIMUM TRANSVERSE & LONGITUDINAL BRACING SPACING IN FEET BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
10	60	60	60	60	60	60	60	60	60	60	60
20	60	60	60	60	60	60	56.4	47	40.3	35.3	31.4
30	60	60	60	60	60	47	37.6	31.4	26.9	23.5	20.9
40	60	60	60	60	47	35.3	28.2	23.5	20.2	17.6	15.7
50	60	60	60	56.4	37.6	28.2	22.6	18.8	16.1	14.1	12.5
60	60	60	60	47	31.4	23.5	18.8	15.7	13.4	11.8	10.5
70	60	60	53.8	40.3	26.9	20.2	16.1	13.4	11.5	10.1	9.0
80	60	60	47	35.3	23.5	17.6	14.1	11.8	10.1	8.8	7.8
90	60	60	41.8	31.4	20.9	15.7	12.5	10.5	9.0	7.8	n/a
100	60	56.4	37.6	28.2	18.8	14.1	11.3	9.4	8.1	n/a	n/a

NOTES:
1. SEE PAGES D.9 THRU D.12 FOR SELECTION OF SPECIFIC BRACING ATTACHMENT DETAILS BASED ON THE SPECIFIED BRACING ATTACHMENT DESIGNATION ABOVE.
2. SEE PAGES D.13 THRU D.16 FOR SELECTION OF SPECIFIC HANGER/ROD ATTACHMENT DETAILS BASED ON THE SPECIFIED HANGER/ROD ATTACHMENT DESIGNATION ABOVE.

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BRACING KIT DETAIL SELECTION FOR CABLE TRAY/RACEWAY

CABLE BRACING ANGLE "x" AT 45° to 60° (1:1 to 1.7:1) SLOPE

ELECTRICAL TRAY LINEAR WEIGHT (PLF), STD. SUPPORT SPACING 10'-0" O.C.[1]	TRANSVERSE BRACING KIT DETAIL PAGE No. BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
10	2.61	2.61	2.61	2.61	2.61	2.61	2.61	2.61	2.63	2.63	2.63
20	2.61	2.61	2.61	2.61	2.61	2.63	2.63	2.63	2.63	2.63	2.63
30	2.65	2.65	2.65	2.65	2.67	2.67	2.67	2.67	2.67	2.67	2.67
40	2.65	2.65	2.65	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67
45	2.65	2.65	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67
50	2.69	2.69	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71
60	2.69	2.69	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71
70	2.69	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71
80	2.69	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71
85	2.69	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71

ELECTRICAL TRAY LINEAR WEIGHT (PLF), STD. SUPPORT SPACING 10'-0" O.C.[1]	TRANSVERSE & LONGITUDINAL BRACING KIT DETAIL PAGE No. BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
10	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.64	2.64	2.64
20	2.62	2.62	2.62	2.62	2.62	2.64	2.64	2.64	2.64	2.64	2.64
30	2.66	2.66	2.66	2.66	2.68	2.68	2.68	2.68	2.68	2.68	2.68
40	2.66	2.66	2.66	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68
45	2.66	2.66	2.48	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68
50	2.70	2.70	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72
60	2.70	2.70	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72
70	2.70	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72
80	2.70	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72
85	2.70	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72

NOTES:
1. SUPPORT SPACING MUST NOT EXCEED THE MAXIMUM BRACE SPACING SPECIFIED ON PAGE D.8.
2. SEE PAGE D.7 FOR BRACE AND HANGER/ROD ATTACHMENT DETAIL TABLES.
3. ▭ DENOTES CABLE KITS WITH $\frac{3}{16}$"Ø CABLE.

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Page No.: D.7

Date: May 9, 2016

BRACING & HANGER/ROD ATTACHMENT DESIGNATION SELECTION
CABLE TRAY/RACEWAY

CABLE BRACING ANGLE "x" AT 45° to 60° (1:1 to 1.7:1) SLOPE

ELECTRICAL TRAY LINEAR WEIGHT[3] (PLF)	BRACING ATTACHMENT DESIGNATION BASED ON "g" VALUE OF Fp											HANGER DESIGNATION ALL "g" VALUES
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	
10	B2	B2	B3	B3	B4	B4	B5	B6	B7	B7	B7	R1
20	B2	B3	B4	B4	B6	B7	B7	B7	B7	B7	B7	R1
30	B3	B4	B5	B6	B7	B7	B7	B7	B7	B7	B7	R1
40	B3	B4	B6	B7	B7	B7	B7	B7	B7	B7	B7	R1
45	B3	B5	B6	B7	B7	B7	B7	B7	B7	B7	B7	R1
50	B3	B5	B7	B7	B7	B7	B7	B7	B7	B7	B7	R2
60	B4	B6	B7	B7	B7	B7	B7	B7	B7	B7	B7	R2
70	B4	B6	B7	B7	B7	B7	B7	B7	B7	B7	B7	R3
80	B4	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R3
85	B5	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	R4

LINEAR TRAY WT. (PLF)	MAXIMUM TRANSVERSE BRACING SPACING IN FEET BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
10	30	30	30	30	30	30	30	30	30	30	30
20	30	30	30	30	30	30	28.2	23.5	20.2	17.6	15.7
30	30	30	30	30	30	23.5	18.8	15.7	13.4	11.8	10.5
40	30	30	30	30	23.5	17.6	14.1	11.8	10.1	8.8	7.8
45	30	30	30	30	20.9	15.7	12.5	10.5	9.0	7.8	7.0
50	30	30	30	28.2	18.8	14.1	11.3	9.4	8.1	7.1	6.3
60	30	30	30	23.5	15.7	11.8	9.4	7.8	6.7	5.9	5.2
70	30	30	26.9	20.2	13.4	10.1	8.1	6.7	5.8	5.0	4.5
80	30	30	23.5	17.6	11.8	8.8	7.1	5.9	5.0	4.4	3.9
85	30	30	22.1	16.6	11.1	8.3	6.6	5.5	4.7	4.2	3.7

LINEAR TRAY WT. (PLF)	MAXIMUM TRANSVERSE & LONGITUDINAL BRACING SPACING IN FEET BASED ON "g" VALUE OF Fp										
	0.25	0.50	0.75	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
10	60	60	60	60	60	60	60	60	60	60	60
20	60	60	60	60	60	60	56.4	47	40.3	35.3	31.4
30	60	60	60	60	60	47	37.6	31.4	26.9	23.5	20.9
40	60	60	60	60	47	35.3	28.2	23.5	20.2	17.6	15.7
45	60	60	60	60	41.8	31.4	25.1	20.9	17.9	15.7	13.9
50	60	60	60	56.4	37.6	28.2	22.6	18.8	16.1	14.1	12.5
60	60	60	60	47	31.4	23.5	18.8	15.7	13.4	11.8	10.5
70	60	60	53.8	40.3	26.9	20.2	16.1	13.4	11.5	10.1	9.0
80	60	60	47	35.3	23.5	17.6	14.1	11.8	10.1	8.8	7.8
85	60	60	44.3	33.2	22.1	16.6	13.3	11.1	9.5	8.3	7.4

CRITICAL SPACING NOTE

CABLE TRAY MUST BE APPROVED ON A PROJECT SPECIFIC BASIS OR PREAPPROVED BY OSHPD. DO NOT EXCEED MAXIMUM SPACING LIMITS OF THE CABLE TRAY SPECIFIED BY ITS MANUFACTURER. THE SPACING LIMITS SHOWN ARE BASED SOLELY ON THE STRENGTH OF THE CABLE KITS AS SHOWN IN SECTION 2.

NOTES:

1. SEE PAGES D.9 THRU D.12 FOR SELECTION OF SPECIFIC BRACING ATTACHMENT DETAILS BASED ON THE SPECIFIED BRACING ATTACHMENT DESIGNATION ABOVE.
2. SEE PAGES D.13 THRU D.16 FOR SELECTION OF SPECIFIC HANGER/ROD ATTACHMENT DETAILS BASED ON THE SPECIFIED HANGER/ROD ATTACHMENT DESIGNATION ABOVE.
3. LINEAR WEIGHT SHOWN INCLUDES CONTENT WEIGHT (WIRE, CABLE, ETC.).

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BRACE ATTACHMENT INDEX FOR 3" STEEL DECK WITH 3000psi SAND LW CONCRETE FILL

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B1 MAX CABLE TENSION: 100 LBS 30°<Φ ≤ 45°	TZD31	3.1
	TZD32	3.1
	TZD34	3.1
	KHD32	3.3
	KHD34	3.3
	KHD35	3.3
	KHD37	3.3
	2KHD31	3.3
	SD2D31	3.4
	SD2D32	3.4
	WBD31	3.6
	WBD32	3.6
	WBD33	3.6
	SB2D31	3.7
	SB2D33	3.7
	SB2D38	3.7
	THD32	3.9
	THD33	3.9
	THD34	3.9
	THD36	3.10
	4THD31	3.10
B2 MAX CABLE TENSION: 300 LBS 30°<Φ ≤ 45°	TZD33	3.1
	TZD35	3.1
	TZD36	3.1
	TZD36	3.1
	2TZD31	3.1
	2TZD32	3.1
	KHD33	3.3
	KHD36	3.3
	KHD38	3.3
	KHD39	3.3
	2KHD32	3.3
	2KHD34	3.3
	4KHD31	3.3.1
	SD2D33	3.4
	SD2D34	3.4
	SD2D35	3.4
	SD2D36	3.4
	2SD2D31	3.4

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B2 MAX CABLE TENSION: 300 LBS 30°<Φ ≤ 45°	WBD34	3.6
	WBD35	3.6
	2WBD31	3.6
	SB2D32	3.7
	SB2D34	3.7
	SB2D35	3.7
	SB2D37	3.7
	SB2D39	3.7
	2SB2D31	3.8
	2THD32	3.10
	2THD33	3.10
	4THD31	3.10.1
B3 MAX CABLE TENSION: 600 LBS 30°<Φ ≤ 45°	2KHD33	3.3
	2KHD35	3.3
	2KHD36	3.3
	2KHD37	3.3
	4KHD32	3.3.1
	4KHD34	3.3.1
	2SD2D32	3.4
	2WBD32	3.6
	2WBD33	3.6
	4WBD31	3.6.1
	SB2D36	3.7
	2SB2D33	3.8
	2SB2D35	3.8
	4SB2D31	3.8.1
	2THD34	3.10
	4THD32	3.10.1
	4THD33	3.10.1
B4 MAX CABLE TENSION: 900 LBS 30°<Φ ≤ 45°	2TZD33	3.1
	2TZD34	3.1
	4TZD31	3.1.1
	4TZD32	3.1.1
	2SD2D33	3.4
	2SD2D34	3.4
	2SD2D36	3.4
	4SD2D31	3.4.1

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B4 MAX CABLE TENSION: 900 LBS 30°<Φ ≤ 45°	2WBD34	3.6
	2WBD35	3.6
	2SB2D32	3.8
	2SB2D34	3.8
	2SB2D37	3.8
B5 MAX CABLE TENSION: 1200 LBS 30°<Φ ≤ 45°	2TZD36	3.1
	2KHD38	3.3
	4KHD35	3.3.1
	4SD2D32	3.4.1
	4WBD32	3.6.1
	4WBD33	3.6.1
	4SD2D33	3.8.1
B6 MAX CABLE TENSION: 1500 LBS 30°<Φ ≤ 45°	2TZD35	3.1
	4TZD34	3.1.1
	4KHD36	3.3.1
	4KHD37	3.4
	2SD2D36	3.8
	4SB2D35	3.8.1
	4THD34	3.10.1
B7 MAX CABLE TENSION: 2000 LBS 30°<Φ ≤ 45°	4TZD33	3.1.1
	4TZD35	3.1.1
	4TZD36	3.1.1
	4KHD38	3.3.1
	4SD2D33	3.4.1
	4SD2D34	3.4.1
	4SD2D35	3.4.1
	4SD2D36	3.4.1
	4WBD34	3.6.1
	4WBD35	3.6.1
	4SB2D32	3.8.1
	4SB2D34	3.8.1
	4SB2D36	3.8.1
	4SB2D37	3.8.1

NOTES:
1. THE VALUE OF Φ IS THE ANGLE OF THE CABLE MEASURED FROM The HORIZONTAL PLANE FOR THE ATTACHMENTS.
2. TO FIND Φ : Φ = 90° - x, WHERE x IS THE CABLE ANGLE FROM THE VERTICAL USED FOR THE BRACING DETAILS.
3. MAX LOAD DOES NOT INCLUDE Ω_0.

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Page No.: D.9

Date: May 9, 2016

BRACE ATTACHMENT INDEX FOR 1-1/2" STEEL DECK WITH 3000psi SAND LW CONCRETE FILL

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B1 MAX CABLE TENSION: 100 LBS 30°<Φ ≤ 45°	TZD1.51	3.2
	TZD1.52	3.2
	SD2D1.51	3.5
	SD2D1.52	3.5
	--	--
B2 MAX CABLE TENSION: 300 LBS 30°<Φ ≤ 45°	TZD1.53	3.2
	TZD1.54	3.2
	2TZD1.52	3.2
	--	--
	--	--
	--	--
B3 MAX CABLE TENSION: 600 LBS 30°<Φ ≤ 45°	2TZD1.51	3.2
	2SD2D1.51	3.5
	--	--
	--	--
	--	--
B4 MAX CABLE TENSION: 900 LBS 30°<Φ ≤ 45°	2SD2D1.52	3.5
	--	--
	--	--
	--	--
	--	--
B5 MAX CABLE TENSION: 1200 LBS 30°<Φ ≤ 45°	2TZD1.53	3.2
	4TZD1.52	3.2.1
	4SD2D1.52	3.5.1
	--	--
	--	--
B6 MAX CABLE TENSION: 1500 LBS 30°<Φ ≤ 45°	2TZD1.54	3.2
	4TZD1.51	3.2.1
	4SD2D1.52	3.5.1
	--	--
	--	--
B7 MAX CABLE TENSION: 2000 LBS 30°<Φ ≤ 45°	4TZD1.53	3.2.1
	4TZD1.54	3.2.1
	--	--
	--	--
	--	--

NOTES:
1. THE VALUE OF Φ IS THE ANGLE OF THE CABLE MEASURED FROM The HORIZONTAL PLANE FOR THE ATTACHMENTS.
2. TO FIND Φ : Φ = 90° - x, WHERE x IS THE CABLE ANGLE FROM THE VERTICAL USED FOR THE BRACING DETAILS.
3. MAX LOAD DOES NOT INCLUDE Ω_0.

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Page No.: **D.10**

Date: May 9, 2016

BRACE ATTACHMENT INDEX FOR MIN. 3000psi NW REINFORCED CONCRETE

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B1 MAX CABLE TENSION: 100 LBS 30°<Φ ≤ 45°	TZRC1	3.11
	TZRC2	3.11
	KHRC2	3.13
	KHRC3	3.13
	KHRC4	3.13
	KHRC5	3.13
	2KHRC1	3.14
	SD2RC1	3.15
	SD2RC2	3.15
	WBRC1	3.17
	WBRC2	3.17
	WBRC3	3.17
	WBRC4	3.17
	SB2RC1	3.19
	SB2RC2	3.19
	SB2RC3	3.19
	THRC1	3.21
	THRC2	3.21
	THRC3	3.21
B2 MAX CABLE TENSION: 300 LBS 30°<Φ ≤ 45°	TZRC3	3.11
	TZRC4	3.11
	KHRC6	3.13
	KHRC7	3.13
	2KHRC4	3.14
	SD2RC3	3.15
	SD2RC4	3.15
	WBRC5	3.17
	WBRC6	3.17
	2WBRC1	3.18
	2WBRC2	3.18
	SB2RC4	3.19
	SB2RC5	3.19
	SB2RC7	3.19
	2SB2RC1	3.20
	THRC4	3.21
	THRC5	3.21
	THRC6	3.21
	2THRC1	3.22

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B3 MAX CABLE TENSION: 600 LBS 30°<Φ ≤ 45°	TZRC5	3.11
	TZRC6	3.11
	2TZRC1	3.12
	2TZRC2	3.12
	KHRC8	3.13
	2KHRC2	3.14
	SD2RC5	3.15
	SD2RC6	3.15
	SD2RC7	3.15
	2SD2RC1	3.16
	2SD2RC2	3.16
	SB2RC6	3.19
	SB2RC8	3.19
	2SB2RC2	3.20
	THRC7	3.21
	THRC8	3.21
	2THRC2	3.22
B4 MAX CABLE TENSION: 900 LBS 30°<Φ ≤ 45°	TZRC7	3.11
	KHRC10	3.13
	2KHRC3	3.14
	2KHRC5	3.14
	2KHRC7	3.14
	2WBRC3	3.18
	2WBRC4	3.18
	2SB2RC3	3.20
	2THRC3	3.22
	2THRC5	3.22

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B5 MAX CABLE TENSION: 1200 LBS 30°<Φ ≤ 45°	2KHRC9	3.14
	2WBRC5	3.18
	2WBRC6	3.18
	2SB2RC4	3.20
	2SB2RC5	3.20
	2THRC4	3.22
	2KHRC1	3.14
B6 MAX CABLE TENSION: 1500 LBS 30°<Φ ≤ 45°	2TZRC3	3.12
	2TZRC4	3.12
	2KHRC6	3.14
	2KHRC8	3.14
	2SD2RC3	3.16
	2SD2RC4	3.16
	2SB2RC7	3.20
B6 MAX CABLE TENSION: 1500 LBS 30°<Φ ≤ 45°	2TZRC5	3.12
	2TZRC6	3.12
	2TZRC7	3.12
	2KHRC10	3.14
	2SD2RC5	3.16
	2SD2RC6	3.16
	2SD2RC7	3.16
	2SB2RC6	3.20
	2SB2RC8	3.20
	2THRC6	3.22
	2THRC7	3.22
	2THRC8	3.22

NOTES:
1. THE VALUE OF Φ IS THE ANGLE OF THE CABLE MEASURED FROM The HORIZONTAL PLANE FOR THE ATTACHMENTS.
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3. MAX LOAD DOES NOT INCLUDE Ω_0.

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Page No.: D.11

Date: May 9, 2016

BRACE ATTACHMENT INDEX FOR WOOD, STEEL, & CAST-IN-PLACE

TO MIN. 20GA BARE STEEL DECKING

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B2 MAX CABLE TENSION: 300 LBS 30°<Φ ≤ 45°	BD1	3.23
	--	--
	--	--
	--	--
B3 MAX CABLE TENSION: 600 LBS 30°<Φ ≤ 45°	BD2	3.23
	--	--
	--	--
	--	--
B4 MAX CABLE TENSION: 900 LBS 30°<Φ ≤ 45°	BD3	3.23
	--	--
	--	--
	--	--

TO STRUCTURAL STEEL FRAMING

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B5 MAX CABLE TENSION: 1200 LBS 30°<Φ ≤ 45°	SS1	3.24
	--	--
	--	--
	--	--
B7 MAX CABLE TENSION: 2000 LBS 30°<Φ ≤ 45°	SS2	3.24
	--	--
	--	--
	--	--

NOTES:
1. THE VALUE OF Φ IS THE ANGLE OF THE CABLE MEASURED FROM The HORIZONTAL PLANE FOR THE ATTACHMENTS.
2. TO FIND Φ : Φ = 90° - x, WHERE x IS THE CABLE ANGLE FROM THE VERTICAL USED FOR THE BRACING DETAILS.
3. MAX LOAD DOES NOT INCLUDE Ω_0 FOR CONCRETE ATTACHMENTS.

TO WOOD MEMBERS/BLOCKING WITH LAG BOLTS

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B2 MAX CABLE TENSION: 300 LBS 30°<Φ ≤ 45°	LBW1	3.25
	--	--
	--	--
	--	--
B3 MAX CABLE TENSION: 600 LBS 30°<Φ ≤ 45°	LBW2	3.25
	2LBW1	3.25
	--	--
	--	--
B4 MAX CABLE TENSION: 900 LBS 30°<Φ ≤ 45°	LBW3	3.25
	2LBW1	3.25
	--	--
	--	--
B5 MAX CABLE TENSION: 1200 LBS 30°<Φ ≤ 45°	LBW4	3.25
	2LBW2	3.25
	--	--
	--	--
B6 MAX CABLE TENSION: 1500 LBS 30°<Φ ≤ 45°	2LBW3	3.25
	--	--
	--	--
	--	--
B7 MAX CABLE TENSION: 2000 LBS 30°<Φ ≤ 45°	2LBW4	3.25
	--	--
	--	--
	--	--

TO WOOD MEMBERS/BLOCKING WITH THRU BOLTS

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B3 MAX CABLE TENSION: 600 LBS 30°<Φ ≤ 45°	TBW1	3.26
	TBW2	3.26
	TBW3	3.26
	--	--
B5 MAX CABLE TENSION: 1200 LBS 30°<Φ ≤ 45°	2TBW1	3.26
	2TBW2	3.26
	--	--
	--	--
B6 MAX CABLE TENSION: 1500 LBS 30°<Φ ≤ 45°	2TBW3	3.26
	--	--
	--	--
	--	--

CAST-IN-PLACE FOR NORMAL REINFORCED & PT CONCRETE SLAB & MEMBERS

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
B2 MAX CABLE TENSION: 300 LBS 30°<Φ ≤ 45°	CIP1	3.27
	--	--
	--	--
B3 MAX CABLE TENSION: 600 LBS 30°<Φ ≤ 45°	CIP2	3.27
	--	--
	--	--
	--	--
B5 MAX CABLE TENSION: 1200 LBS 30°<Φ ≤ 45°	CIP3	3.27
	--	--
	--	--
	--	--
B6 MAX CABLE TENSION: 1500 LBS 30°<Φ ≤ 45°	CIP4	3.27
	--	--
	--	--
	--	--
B7 MAX CABLE TENSION: 2000 LBS 30°<Φ ≤ 45°	CIP5	3.27
	--	--
	--	--
	--	--

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Page No.: D.12

Date: May 9, 2016

PRMXA-1C HANGER ATTACHMENT INDEX FOR ALL CONDITIONS

TO 3" STEEL DECK WITH MIN. 3000psi SAND LW CONCRETE FILL

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
H2 MAX LOAD: 700 LBS	HDE31	3.28
	HDE32	3.28
	HDE33	3.28
H3 MAX LOAD: 1000 LBS	2HDE31	3.28
	2HDE32	3.28
	2HDE33	3.28
	2HDS31	3.30
	2HDS32	3.30
	2HDS33	3.30

*MAX LOAD DOES NOT INCLUDE Ω_0.

TO 1.5" STEEL DECK WITH MIN. 3000psi SAND LW CONCRETE FILL

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
H1 MAX LOAD: 350 LBS	HDE1.51	3.29
	--	--
	--	--
H2 MAX LOAD: 700 LBS	HDE1.52	3.29
	--	--
	--	--
H3 MAX LOAD: 1000 LBS	2HDE1.51	3.29
	2HDE1.52	3.29
	--	--

*MAX LOAD DOES NOT INCLUDE Ω_0.

TO NORMAL REINFORCED CONC. SLAB OR MEMBER

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
H2 MAX LOAD: 700 LBS	HRCS31	3.30
	HRCS32	3.30
	HRCS33	3.30
H3 MAX LOAD: 1000 LBS	HRCE31	3.31
	HRCE32	3.31
	HRCE33	3.31

*MAX LOAD DOES NOT INCLUDE Ω_0.

TO PT CONCRETE SLAB OR MEMBER

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
H3 MAX LOAD: 1000 LBS	HCIP1	3.31
	--	--
	--	--

*MAX LOAD DOES NOT INCLUDE Ω_0.

TO MIN. 20GA BARE STEEL DECKING

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
H1 MAX LOAD: 350 LBS	HBD1	3.32
	--	--
	--	--

TO STRUCTURAL STEEL FRAMING

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
H3 MAX LOAD: 1000 LBS	HSS1	3.32
	--	--
	--	--

TO WOOD MEMBERS/BLOCKING WITH LAG BOLTS

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
H3 MAX LOAD: 1000 LBS	HSW1	3.32
	--	--
	--	--

TO WOOD MEMBERS/BLOCKING WITH THRU-BOLTS

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
H1 MAX LOAD: 350 LBS	HTW1	3.32
	--	--
	--	--

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Page No.: **D.13**

Date: May 9, 2016

ROD ATTACHMENT INDEX FOR 3" & 1-1/2" STEEL DECK WITH 3000psi SAND LW CONCRETE FILL

TO 3" STEEL DECK WITH MIN. 3000psi SAND LW CONCRETE FILL

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
R1 MAX LOAD: 300 LBS	RDE37	3.33
	RDS31	3.37
	RDS32	3.37
	RDS33	3.37
R2 MAX LOAD: 600 LBS	RDE31	3.33
	RDE32	3.33
	RDE33	3.33
	RDE34	3.33
	RDE35	3.33
	RDE38	3.33
R3 MAX LOAD: 1000 LBS	RDE39	3.33
	--	--
	--	--
R4 MAX LOAD: 1500 LBS	RDE36	3.33
	--	--
	--	--
R7 MAX LOAD: 3000 LBS	2RDE31	3.33
	2RDE32	3.33
	2RDE33	3.33

*MAX LOAD DOES NOT INCLUDE Ω_0.

TO 1.5" STEEL DECK WITH MIN. 3000psi SAND LW CONCRETE FILL

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
R1 MAX LOAD: 300 LBS	RDS1.51	3.37
	--	--
	--	--
R2 MAX LOAD: 600 LBS	RDE1.51	3.34
	RDE1.52	3.34
	RDE1.54	3.34
	RDE1.55	3.34
R4 MAX LOAD: 1500 LBS	RDE1.53	3.34
	--	--
	--	--
R7 MAX LOAD: 3000 LBS	2RDE1.51	3.34
	--	--
	--	--

*MAX LOAD DOES NOT INCLUDE Ω_0.

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Page No.: D.14

Date: May 9, 2016

ROD ATTACHMENT INDEX FOR NORMAL REINFORCED AND POST-TENSIONED CONCRETE SLAB & MEMBERS

TO NORMAL REINFORCED CONCRETE SLAB/MEMBER

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
R1 MAX LOAD: 300 LBS	RRCS2	3.37
	--	--
	--	--
R2 MAX LOAD: 600 LBS	RRCE10	3.35
	RRCS1	3.37
	RRCS3	3.37
	--	--
R3 MAX LOAD: 1000 LBS	RRCE1	3.35
	RRCE2	3.35
	RRCE5	3.35
	RRCE6	3.35
R4 MAX LOAD: 1500 LBS	RRCE11	3.35
	--	--
	--	--
R5 MAX LOAD: 2000 LBS	RRCE3	3.35
	RRCE12	3.35
	--	--
R6 MAX LOAD: 2500 LBS	RRCE4	3.35
	RRCE7	3.35
	RRCE9	3.35
	RRCE13	3.35
R7 MAX LOAD: 3000 LBS	RRCE8	3.35
	--	--
	--	--

*MAX LOAD DOES NOT INCLUDE Ω_0.

TO POST-TENSIONED CONCRETE SLAB/MEMBER

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
R5 MAX LOAD: 2000 LBS	RCIP1	3.35
	--	--
	--	--
R7 MAX LOAD: 3000 LBS	RCIP2	3.34
	RCIP3	3.34
	RCIP4	3.34
	RCIP5	3.34

*MAX LOAD DOES NOT INCLUDE Ω_0.

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ROD ATTACHMENT INDEX FOR WOOD, STEEL, & CAST-IN-PLACE

TO MIN. 20GA BARE STEEL DECKING

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
R2 MAX LOAD: 600 LBS	RBD1	3.36
	--	--
	--	--

TO STRUCTURAL STEEL FRAMING

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
R5 MAX LOAD: 2000 LBS	RSS1	3.36
	--	--
	--	--
R7 MAX LOAD: 3000 LBS	RSS2	3.36
	RSS3	3.36
	RSS4	3.36
	RSS5	3.36

TO WOOD MEMBERS/BLOCKING WITH LAG BOLTS

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
R2 MAX LOAD: 600 LBS	RSW1	3.36
	--	--
	--	--

TO WOOD MEMBERS/BLOCKING WITH THRU-BOLTS

DESIGNATION	ATTACHMENT TYPE	DETAIL PAGE #
R1 MAX LOAD: 300 LBS	RTW1	3.36
	--	--
	--	--

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Page No.: D.16

Date: May 9, 2016

APPENDIX A

FOR REFERENCE ONLY

Unit Conversion Chart

Convert From	To	Multiply By
Angle		
degree	radian (rad)	0.17453
radian	degree (°)	57.29578
Area		
sq. feet (ft^2)	sq. meter (m^2)	0.092903
sq. inch (in^2)	sq. meter (m^2)	0.000645
sq. centimeter (cm^2)	sq. inch (in^2)	0.001077
sq. meter (m^2)	sq. feet (ft^2)	10.7639
sq. meter (m^2)	sq. inch (in^2)	1550
Temperature		
degree Fahrenheit (°F)	degree Celsius (°C)	t°C = (t°F-32)/1.8
degree Celsius (°C)	degree Fahrenheit (°F)	t°F = 1.8t°C+32
Kelvin (K)	degree Celsius (°C)	t°C = t°K+273.15
Force		
Pound-force	Newton (N)	4.4482
Kip (1000 lbs)	kilo Newton (kN)	4.4482
pound-foot (lb-ft)	Newton-meter (N-m)	1.355818
Length		
foot (ft)	meter (m)	0.3048
inch (in)	centimeter (cm)	2.54
mil	inch (in)	0.001
meter (m)	foot (ft)	3.28084
centimeter (cm)	inch (in)	0.393701
micrometer (µm)	inch (in)	3.93701e-5
Volume		
cubic foot (ft^3)	cubic meter (m^3)	0.02832
cubic inch (in^3)	cubic centimeter (cm^3)	16.3871
cubic centimeter (cm^3)	cubic inch (in^3)	0.061024
cubic meter (m^3)	cubic foot (m^3)	35.3147
gallon (US Liquid)	cubic foot (ft^3)	0.13368
Liter (L)	gallon (US Liquid)	0.26417
Liter (L)	cubic foot (ft^3)	0.35315

Unit Conversion Chart (continued)

Convert From	To	Multiply By
<u>Mass</u>		
pound (lb)	Kilogram (kg)	0.45359
Kilogram (kg)	pound (lb)	2.20462
<u>Mass/Length</u>		
lb/ft	kg/m	1.48816
lb/in	kg/m	17.85797
kg/m	lb/ft	0.671969
kg/m	lb/in	0.055997
<u>Mass/Volume</u>		
lb/ft^3	kg/m^3	16.0185
lb/in^3	kg/m^3	2767.99
kg/m^3	lb/ft^3	0.062478
kg/m^3	lb/in^3	0.000036127
lb/ft^3	lb/in^3	1728.0
<u>Mass/Area or Pressure</u>		
pascal (Pa)	lbs/sq. inch (psi)	0.000145
kilopascal (kPa)	lbs/sq. inch (psi)	0.145038
megapascal (MPa)	kips/sq. inch (ksi)	0.145038
lb/ft^2	kg/m^2	0.204816
kg/m^2	lb/ft^2	4.882427
lb/in (psi)	lb/ft^2	144
kip/in (ksi)	MPa	6.894759

Pipe, Duct, & Cable Tray Weights

STEEL PIPE					
PIPE DIA.	PIPE SCH.	Weight per Foot (lbs)			
		Steel	Water	1½" Insul.[2]	Total
1"	40	1.68	0.375	0.61	2.67
1¼"	40	2.27	0.648	0.68	3.61
1½"	40	2.72	0.882	0.74	4.34
2"	40	3.65	1.454	0.84	5.95
2½"	40	5.80	2.075	0.95	8.82
3"	40	7.58	3.203	1.08	11.87
3½"	40	9.12	4.284	1.19	14.59
4"	40	10.80	5.516	1.30	17.62
5"	40	14.63	8.669	1.53	24.83
6"	40	18.99	12.52	1.76	33.27
8"	40	28.58	21.68	2.19	52.45
10"	40	40.52	34.17	2.65	77.35
12"	[1]STD	49.61	49.01	3.09	101.7
14"	[1]STD	54.62	59.75	3.36	117.7
16"	[1]STD	62.64	79.15	3.79	145.6
18"	[1]STD	70.66	101.3	4.23	176.2
20"	[1]STD	78.67	126.1	4.66	209.4
22"	[1]STD	86.69	153.7	5.09	245.5
24"	[1]STD	94.71	184.0	5.53	284.2

PIPE NOTES:

1. STD. designation means the wall thickness for 12" pipe and larger is 0.375".
2. Insulation weight per foot varies greatly depending on the type used. Insulation density used for the above table is 6.622 lb/ft^3.

ROUND DUCT WEIGHT						
DUCT DIA.	1 ½" INSUL[1]	Weight in lb/ft per Gage				Cross Section Area, ft^2
		26	24	22	20	
24"	0.63	2.3	3.1	3.8	4.6	3.1
26"	0.67	2.5	3.3	4.2	5.0	3.7
28"	0.72	2.7	3.6	4.5	5.4	4.3
30"	0.77	2.9	3.8	4.8	5.8	4.9
32"	0.82	3.1	4.1	5.1	6.1	5.6
34"	0.87	3.3	4.3	5.4	6.5	6.3
36"	0.92	3.4	4.6	5.8	6.9	7.1
38"	0.97	3.6	4.9	6.1	7.3	7.9
40"	1.02	3.8	5.1	6.4	7.7	8.7
42"	1.07	4.0	5.4	6.7	8.1	9.6
44"	1.12	4.2	5.6	7.0	8.4	10.6
46"	1.17	4.4	5.9	7.4	8.8	11.5
48"	1.21	4.6	6.1	7.7	9.2	12.6
50"	1.26	4.8	6.4	8.0	9.6	13.6
52"	1.31	5.0	6.6	8.3	10.0	14.7
54"	1.36	5.2	6.9	8.6	10.4	15.9
56"	1.41	5.4	7.2	9.0	10.7	17.1
58"	1.46	5.6	7.4	9.3	11.1	18.3
60"	1.51	5.7	7.7	9.6	11.5	19.6
62"	1.56	5.9	7.9	9.9	11.9	21.0
64"	1.61	6.1	8.2	10.2	12.3	22.3
66"	1.66	6.3	8.4	10.6	12.7	23.8
68"	1.71	6.5	8.7	10.9	13.1	25.2
70"	1.75	6.7	8.9	11.2	13.4	26.7
72"	1.80	6.9	9.2	11.5	13.8	28.3

DUCT NOTE

1. Insulation type used for this weight table is Type 75 ASTM C518-15.

RECTANGULAR DUCT WEIGHT						
DUCT PERI-METER	1 ½" INS[1]	Weight in lb/ft per Gage				Max Section Area, ft^2
		26	24	22	20	
48"	0.38	2.9	3.9	4.9	5.9	1.0
56"	0.44	3.4	4.6	5.7	6.8	1.4
64"	0.50	3.9	5.2	6.5	7.8	1.8
72"	0.56	4.4	5.9	7.3	8.8	2.3
80"	0.63	4.9	6.5	7.1	9.8	2.8
88"	0.69	5.4	7.2	9.0	10.8	3.4
96"	0.75	5.8	7.8	9.8	11.7	4.0
104"	0.81	6.3	8.5	10.6	12.7	4.7
112"	0.88	6.8	9.1	11.4	13.7	5.4
120"	0.94	7.3	9.8	12.2	14.7	6.3
128"	1.00	7.8	10.4	13.0	15.6	7.1
136"	1.06	8.3	11.1	13.8	16.6	8.0
144"	1.13	8.8	11.7	14.7	17.6	9.0
152"	1.19	9.3	12.4	15.5	18.6	10.0
160"	1.25	9.7	13.0	16.3	19.5	11.1
168"	1.31	10.2	13.7	17.1	20.5	12.3
176"	1.38	10.7	14.3	17.9	21.5	13.4
184"	1.44	11.2	15.0	18.7	22.5	14.7

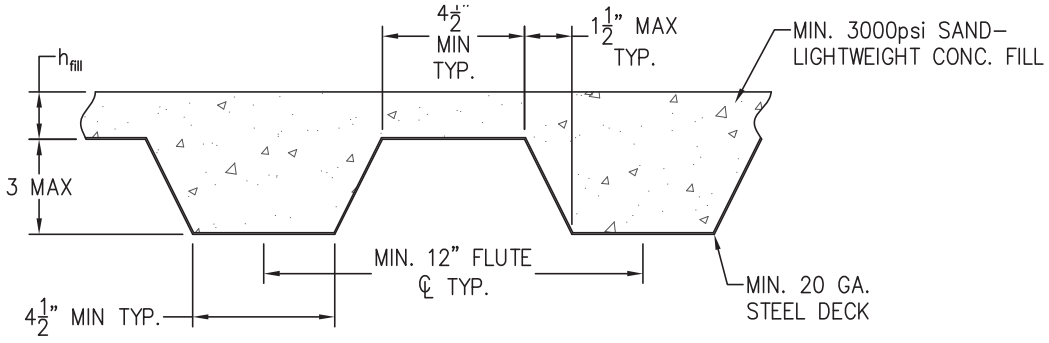
DUCT NOTE

1. Insulation type used for this weight table is Type 75 ASTM C518-15.

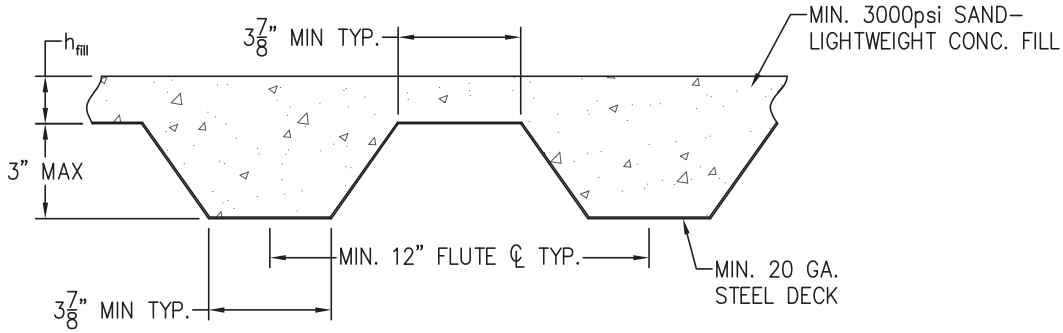
CABLE TRAY WEIGHTS W/ DATA CABLE							
TRAY DEPTH (in)	TRAY WIDTH						
	6" (lb/ft)	9" (lb/ft)	12" (lb/ft)	18" (lb/ft)	24" (lb/ft)	30" (lb/ft)	36" (lb/ft)
2	5	7	9	14	17	21	27
3	7	10	14	21	26	32	41
4	9	13	18	27	35	43	54
5	12	17	23	34	43	53	68
6	14	20	27	41	52	64	81

CABLE TRAY WEIGHTS W/ POWER CABLE			
TRAY WIDTH			
6" (lb/ft)	9" (lb/ft)	12" (lb/ft)	18" (lb/ft)
23	35	45	70

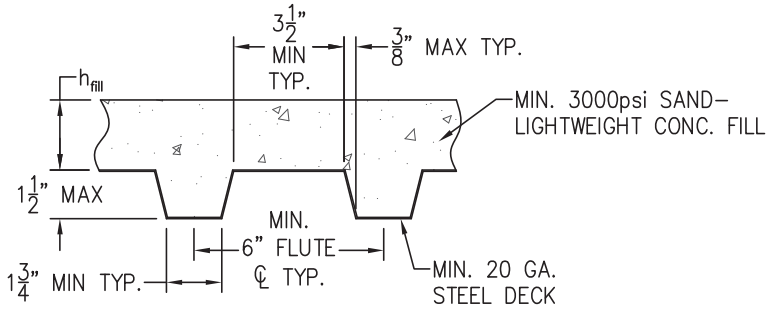
Steel Deck with Concrete Fill



STANDARD 3" STEEL DECK WITH CONCRETE FILL



3" STEEL DECK WITH CONCRETE FILL (3–7/8" FLUTES)



TYPE "B" 1–1/2" STEEL DECK WITH CONCRETE FILL

Notes:

- The details above are typical for all concrete anchor bolts with ICC Evaluation Service Reports (ESR's) where applicable. See section 3 for deck profiles specific to each anchor (not all anchors are approved for TYPE "B" decking). Units are in inches.
- See pages 3.0.2 & 3.0.3 for minimum concrete fill thickness (h_{fill}) required for all applicable concrete anchors.

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