

UNISTRUT®

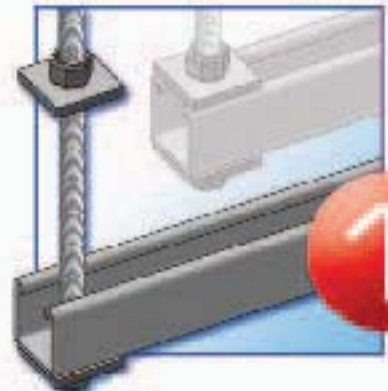


**Seismic
Bracing &
Retro-Fitting**

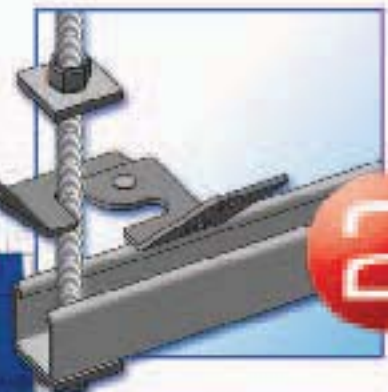
Introducing...

Retrofit seismic fasteners

A family of channel fittings that make retrofitting seismic bracing as easy as...



1



2



3

1. Move nut & washer up.
2. Slide fitting around rod.
3. Close fitting & bolt down.

UNISTRUT®

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Seismic Systems Design Overview

These guidelines were developed using sound engineering principles and judgment. They represent realistic and safe details compatible with the general guidelines and force factors in the State of California Code of Regulations, Title 24, also referred to as the California Building Standards Code. Material contained in this publication is for general information only and can be referenced in the 2001 California Building Code (CBC) based on the 1997 Uniform Building Code. Anyone making use of the data does so at his own risk and assumes any and all liability resulting from such use. Unistrut and Lord & Sons disclaims any and all express or implied warranties of fitness for any general or particular application.

A copy of this Seismic Application Manual showing the proper Seismic Brace tables and Brace Location Requirements along with the OPA and Unistrut General Engineering catalog shall be on the jobsite prior to starting the installation of the seismic bracing system.

Unistrut Seismic Bracing Systems are designed and constructed to resist virtually all code specified seismic forces in the event of an earthquake; therefore, keeping non-building structural components operational and intact.

Actual applications may vary and are not limited to support methods shown. However, any changes to the support methods, hardware and designs depicted in these guidelines should only be made in accordance with standard engineering practices by a qualified registered engineer and shall be approved by California Office of Statewide Health Planning and Development (OSHPD) or governing agency.

Unistrut bracing systems designed per the catalog requirements do not guarantee adequacy of existing structures to withstand the loads induced by the seismic attachments. It is the responsibility of the project engineer to verify that the structure is capable of supporting any and all items constructed using these guidelines. It is the responsibility of the project engineer and the installer to determine the adequacy of placement and installation in regards to these guidelines including compliance with all applicable codes.

Seismic bracing shall not limit the expansion and contraction of systems; the engineer of record shall ascertain that consideration is given to the individual dynamic and thermal properties of these systems and the building structure. Proper seismic & thermal joints should be provided as directed by the project engineer. The details and schedules presented do not include the weights from branch lines. All fire sprinkler branch line bracing shall comply with the requirements of the current edition of the NFPA-13. The project engineer must verify the additional load from branch lines are within the allowable capacity of the bracing details.

Where possible, pipes and conduit and their connections shall be constructed of ductile materials [copper, ductile iron, steel or aluminum and brazed, or welded connection]. Pipes and their connections, constructed of other material, e.g. cast iron, no-hub pipe and threaded connections, shall have the brace spacing reduced to one-half of the spacing for ductile pipe.

Pipes, ducts and conduit supported by a trapeze where none of those elements would individually be braced need not be braced if connections to the pipe/conduit/ductwork and directional changes do not restrict the movement of the trapeze. If this flexibility is not provided, bracing will be required when the aggregate weight of the pipes and conduits exceed 10 lb/ft.



Specification Sample – Seismic Bracing for Mechanical & Electrical Supports

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. Provide design engineering for strut type seismic bracing for all trapeze supports and single rod hangers for all pipe, conduit, cable and similar systems designed in accordance with local and/or national building codes.
- B. Provide drawings showing locations and details of all seismic bracing
- C. Provide all labor, material, equipment, tools, fabrication and supervision to install seismic bracing in accordance with the manufacturer's instructions and engineering documents.

1.02 REFERENCES (Latest Editions)

- A. UNISTRUT Seismic Bracing System (SBS)
- B. Uniform Building Code (UBC)
- C. California Building Code (CBC)
- D. International Building Code (IBC)
- E. Building Officials and Code Administrators Building Code (BOCA)
- F. Standard Building Code (SBC)
- G. Local Building Codes
- H. American Society of Civil Engineers Minimum Design Loads for Buildings & Other Structures (ASCE-7)
- I. American Iron and Steel Institute (AISI) Specification for the Design of Cold Formed Steel Structural Members
- J. American Society for Testing And Materials (ASTM)
- K. Metal Framing Manufacturer's Association (MFMA)

1.03 QUALITY ASSURANCE

- A. Engineering Qualifications
 - 1. Engineer shall be registered as a Professional Engineer (PE) or Structural Engineer (SE) in state of the project's location.
 - 2. Engineer shall have a minimum of five (5) years experience designing seismic bracing systems for mechanical and electrical supports.
- B. Manufacturer's Qualifications:
 - 1. The manufacturer shall not have had less than 10 year's experience in manufacturing strut type systems.
 - 2. The manufacturer must certify in writing all components supplied have been produced in accordance with an established quality assurance program.
 - 3. Strut type channels shall be stamped with a unique identifying number that allows traceability to the origin of the steel. Traceability shall include steel chemistry and mechanical performance (tensile and yield strengths)
 - 4. Manufacturer's part number shall be imprinted on all major components (e.g. channel, fittings, clamps, straps, etc.)
 - 5. Manufacturers shall provide material certification sheets and test reports upon request.
- C. Installer's Qualifications:
 - 1. Installer must be manufacturer approved and trained.
 - 2. Installer must have at least five (5) years experience installing strut type systems.

Specification Sample – Seismic Bracing for Mechanical & Electrical Supports

1.04 SUBMITTALS

- A. Submit structural engineering calculations, braces location drawings, and brace details to the Engineer of Record for review and approval.
- B. Submit all pertinent manufacturer's published data.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all material to the work site in original factory packaging to avoid damage to the products and/or finish.
- B. Protect all delivered components from the elements by a shelter or other covering.
- C. Protect all delivered components from construction activities and traffic.

1.06 GUARANTEES

- A. Manufacturer shall guarantee, for a period of 1 year, against any defects that may arise from the manufacture of the material supplied.
- B. Installer shall guarantee, for a period of 1 year, against any defects that may arise from their installation.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. All seismic bracing systems, fittings and components shall be manufactured by UNISTRUT CORPORATION, or approved equal as determined by the Architect or Engineer of record in writing ten (10) days prior to bid date.
- B. All parts and components must be supplied by a single manufacturer.

2.02 MATERIALS

- A. All channel members shall be fabricated from structural grade steel conforming to one of the following ASTM specifications:
 - A 1011 SS GR 33
 - A 653 GR 33
- B. All fittings shall be fabricated from steel conforming to one of the following ASTM Specifications:
 - A 575
 - A 576
 - A 36
 - A 635
- C. Any substitutions of product or manufacturer must be approved in writing ten days prior to bid date, by Architect or Engineer of Record.

Specification Sample – Seismic Bracing for Mechanical & Electrical Supports

2.03 FINISHES (One of the Following)

- A. PERMA-GREEN® II (GR)
Rust inhibiting thermoset acrylic paint applied by electro-deposition, after cleaning and phosphating, and thoroughly baked.
Color is per Federal Standard 595a color number 14109 (dark limit V-), or FHWA Highway Greed, Color Tolerance Chart, PR Color No. 4
Hardness=2H
Salt Spray performance per ASTM B 117 – Scribed: exceeds 400 hours; Unscribed: exceeds 600 hours.
- B. ELECTRO-GALVANIZED (EG)
Electroplated zinc conforming to ASTM B 633 Type III SC 1.
- C. PRE-GALVANIZED (PG)
Zinc coated by hot-dipped process prior to roll forming. The zinc weight shall be G90 conforming to ASTM A 653.
- D. HOT-DIPPED GALVANIZED (HG)
Zinc coated after all manufacturing operations are complete. Coating shall conform to ASTM A 123 or A 153.
- E. SPECIAL COATING / MATERIAL
(Describe as applicable)

PART 3 – EXECUTION

3.01 Professional Engineering

- A. Design analysis shall be in accordance with the applicable building code in the State or locale of the project unless otherwise required by the project documents.
- B. Analysis shall include, but is not limited to:
 - 1. Dead Loads
 - 2. Seismic Loads
 - 3. Other Live Loads (as required)
 - 4. Capacities of Seismic Bracing Members and Connectors
 - 5. Anchoring Methods & Attachments including bolt types, diameters and embedment depths
- C. Drawings shall show:
 - 1. Locations of all seismic bracing locations
 - 2. Details of seismic bracing connections to trapezes and/or pipe hangers
 - 3. Details of seismic bracing connections to building structures (e.g. roof/floor beams, trusses, joists, concrete floors, etc.)
- D. Coordinate all attachments with the Engineer of Record. Attachments loads and locations must be approved by the Engineer of Record.

Specification Sample – Seismic Bracing for Mechanical & Electrical Supports

3.02 INSTALLATION

- A. Engineer of Record must approve all seismic bracing attachment loads and locations prior to installation of any seismic brace.
- B. The installer shall inspect the work area prior to installation. If work area conditions are unsatisfactory, installation shall not proceed until satisfactory corrections are completed.
- C. Installation shall be accomplished by a fully trained manufacturer authorized installer.
- D. All Seismic Bracing System components shall be set into final position true to line, level and plumb, in accordance with approved shop drawings.
- E. Seismic Bracing must be installed at the locations shown on the drawings. No deviation in seismic brace location shall be permitted without the written approval and authorization of the Engineer of Record.
- F. Anchor metal firmly in place. Tighten all connections to their recommended torques.
- G. Brace angle shall not exceed 45 degrees unless specifically approved.
- H. All anchors into the structure shall be installed in strict conformance to the manufacturers' instructions. Where anchor inspections are required installer shall follow these procedures in addition to the above noted requirements.

3.03 CLEAN-UP & REPAIR

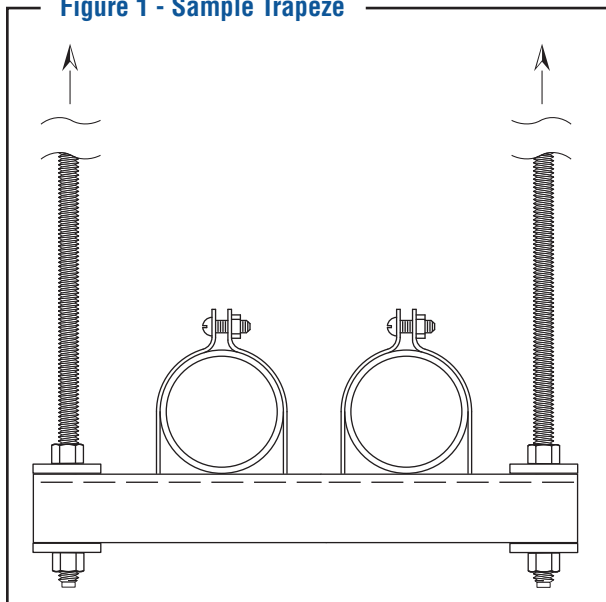
- A. Upon completion of all work, remove all protective wraps and debris.
- B. Repair any damage due to installation of this section of work.

3.04 PROTECTION

- A. During installation, it shall be the responsibility of the installer to protect this work from damage.
- B. Upon completion of this scope of work, it shall become the responsibility of the general contractor to protect this work from damage during the remainder of construction on the project and until substantial completion

Channel Bracing - Overview

Figure 1 - Sample Trapeze



A trapeze pipe hanger, like the one shown in Figure (1), can be braced in two different ways using metal framing channel.

Figure (2) illustrates simple transverse bracing. The hanger is attached via strut to structural supports. Since the channel is rigid, the transverse brace is only required on one side of the trapeze.

Figure 2 - Transverse Brace

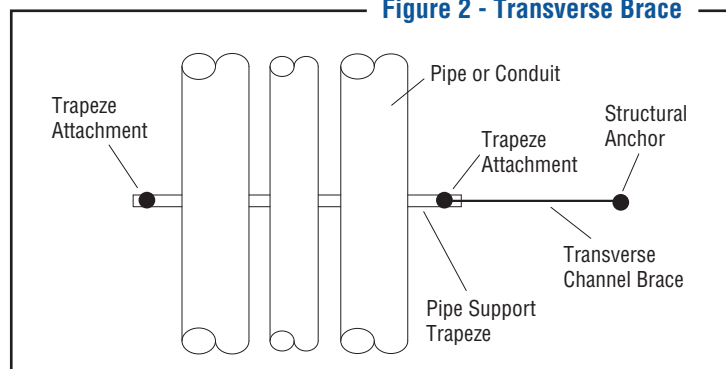


Figure (3) illustrates both transverse and longitudinal bracing. In this case, the hanger is attached via strut to three structural supports.

There are different methods for attaching the bracing strut to the hanger depending upon the hanger style. There are also different methods for attaching the bracing strut to structural supports depending upon the type of structure involved. Thus, a complete solution is obtained by selecting a hanger attachment and a corresponding structural attachment.

Figure 3 - Transverse & Longitudinal Brace

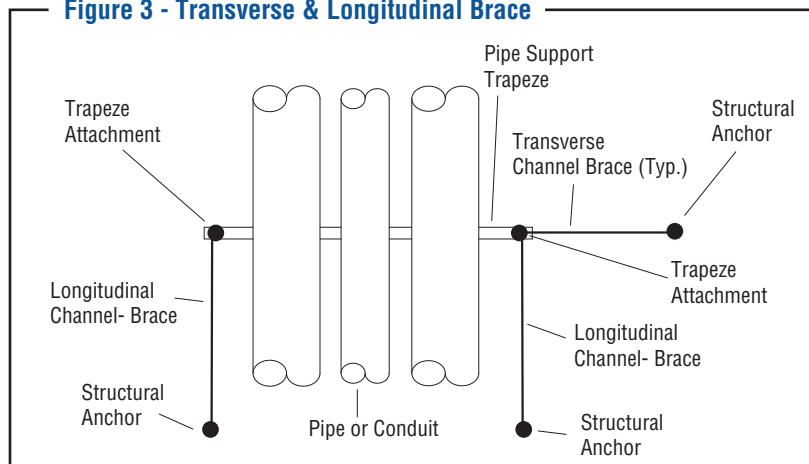


Figure 4 - Braced Trapeze

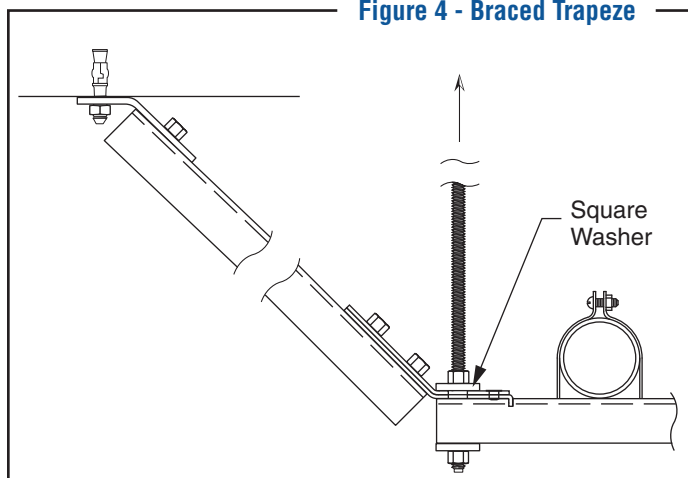


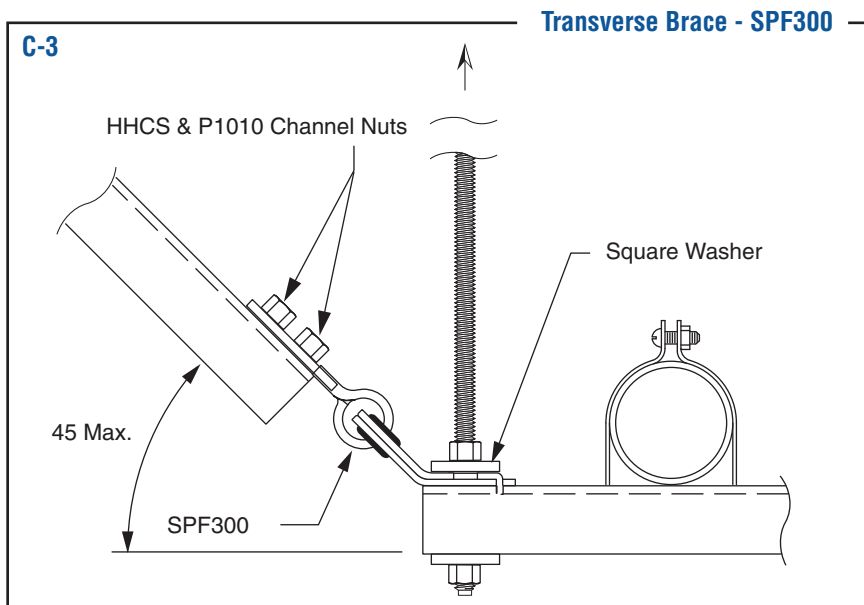
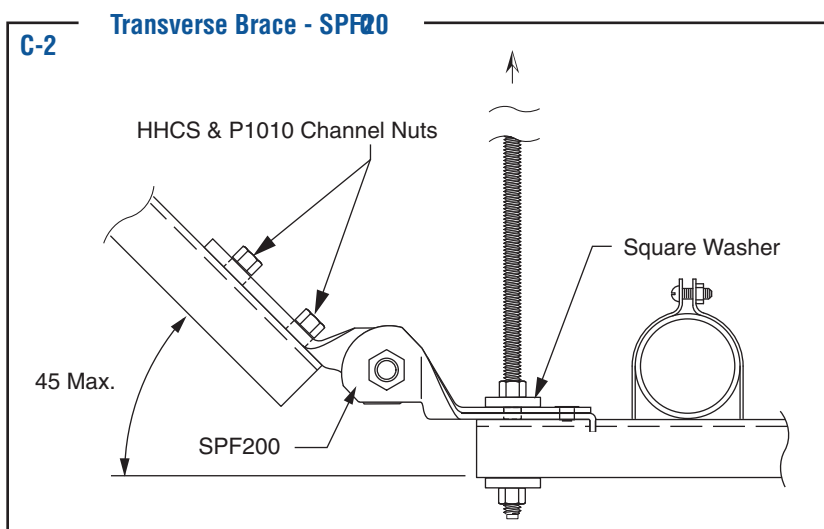
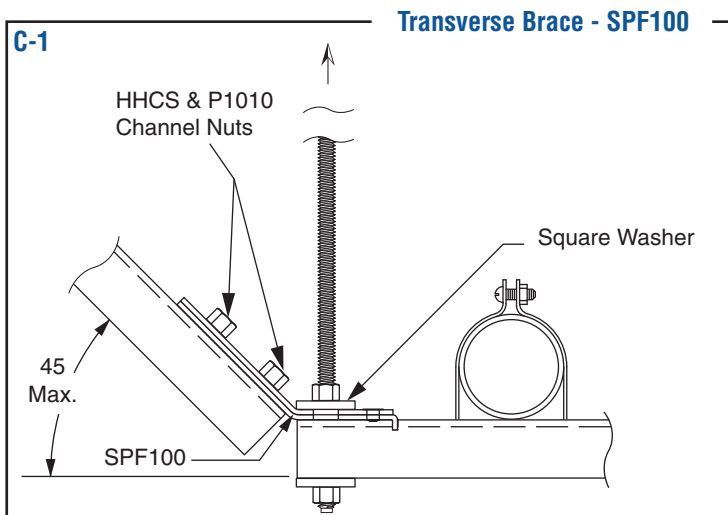
Figure (4) illustrates one example of combining the hanger attachment and the structural attachment.

The following pages illustrate various methods of attaching the bracing strut to the trapeze or other fixture.



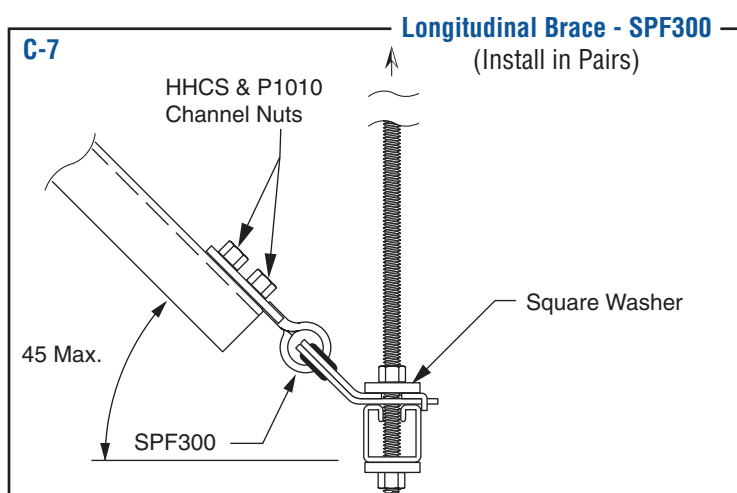
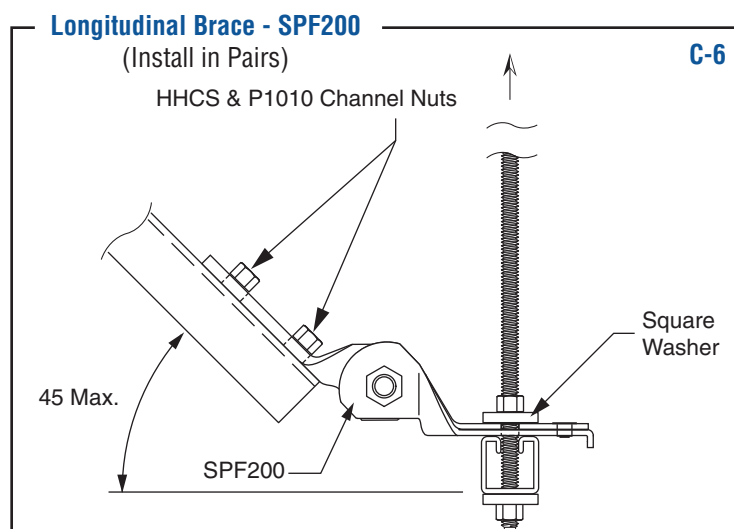
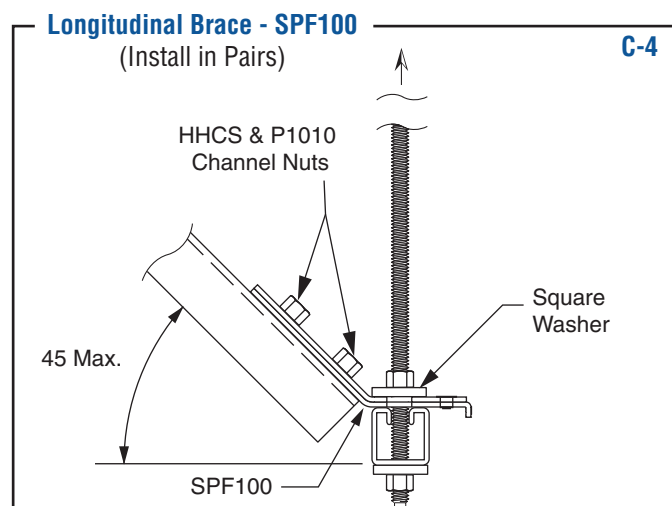
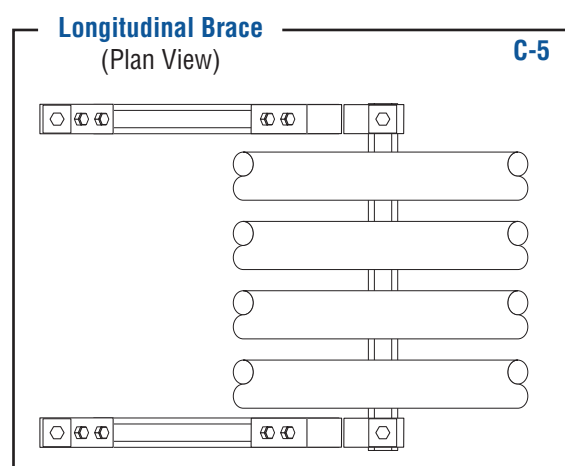
Channel Bracing - Single Channel, Transverse Brace

Note: The transverse channel brace is typically attached to just one side of the trapeze.



Channel Bracing - Single Channel, Longitudinal Brace

Note: The longitudinal channel brace is must be attached to both side of the trapeze.



Channel Bracing - Double Channel, Transverse Brace

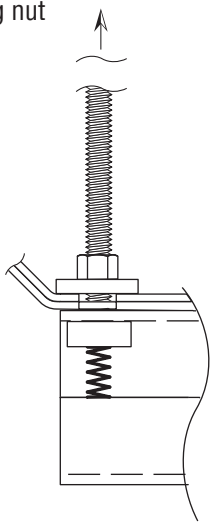
Note: The transverse channel brace is typically attached to just one side of the trapeze.

There are two different methods of attaching the hanger rod to the trapeze. One is to allow the rod to go through the channel and add a square washer on the bottom side as shown in the examples.

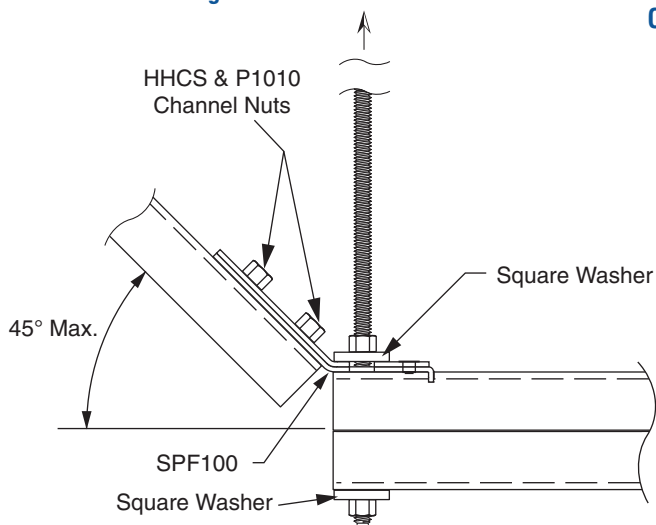
Another method, shown below, is to use a channel nut in the top half of the back-to-back channel.

Optional Attachment

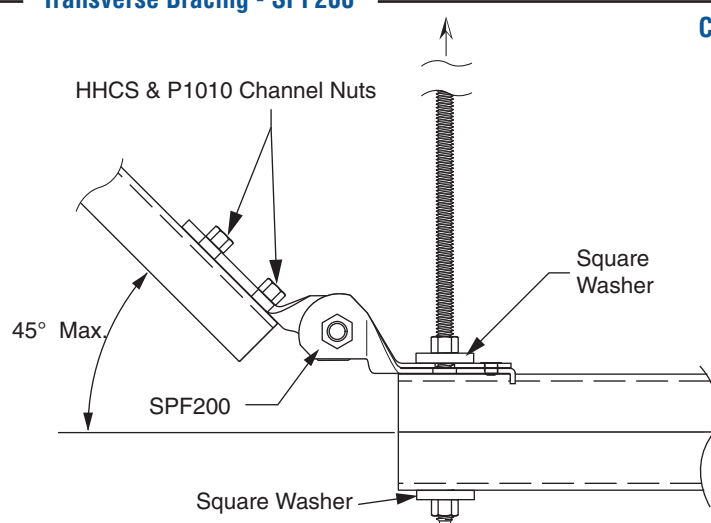
Rod through top channel with spring nut

C-9


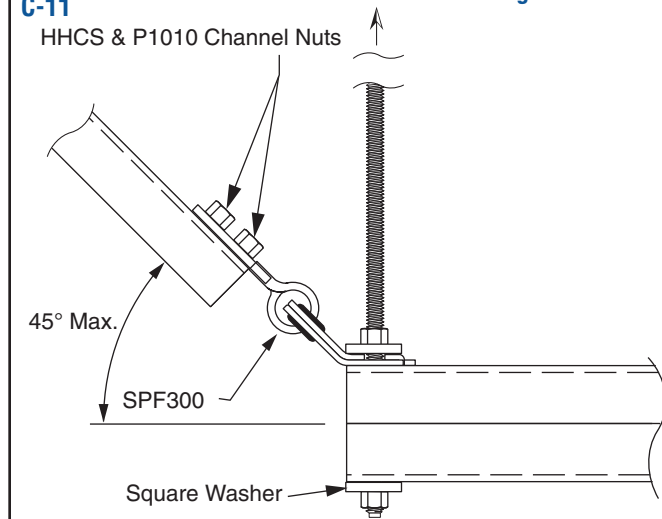
Transverse Bracing - SPF100

C-8


Transverse Bracing - SPF200

C-10

C-11

Transverse Bracing - SPF300

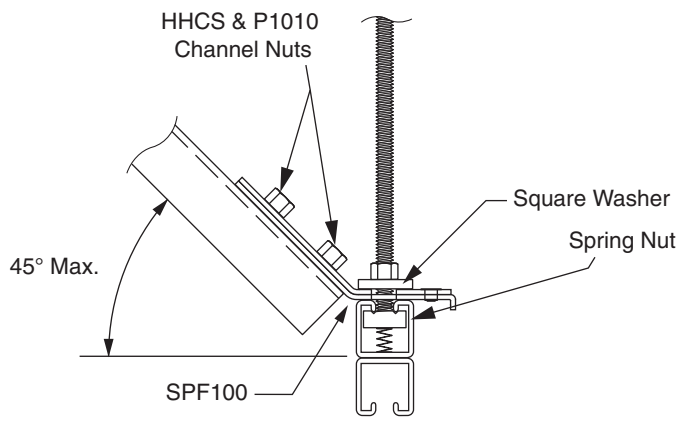


Channel Bracing - Double Channel, Longitudinal Brace

Longitudinal Brace - SPF100

(Install in Pairs)

C-12

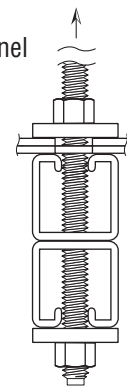


Note: The longitudinal channel brace is must be attached to both side of the trapeze.

There method of attaching the hanging rod to the trapeze. One is using the channel nut as shown in the examples. The other is to extend the rod through the channel and use a square washer and nut to hold it as shown below.

Optional Attachment

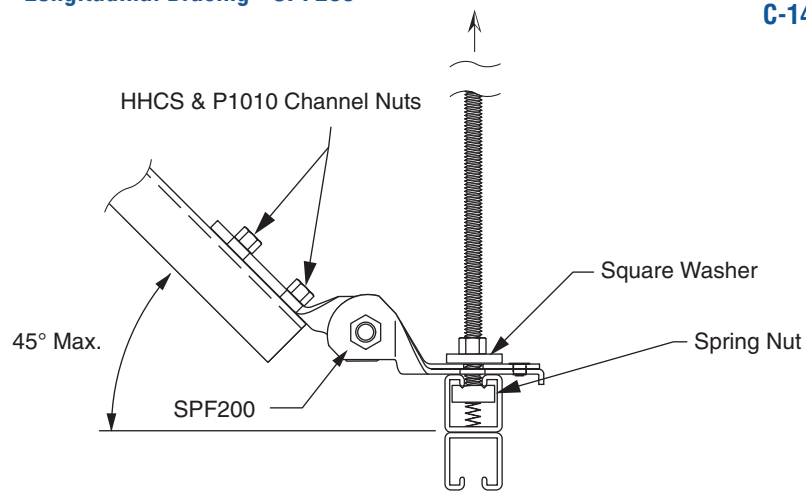
Rod through
double channel
trapeze



C-13

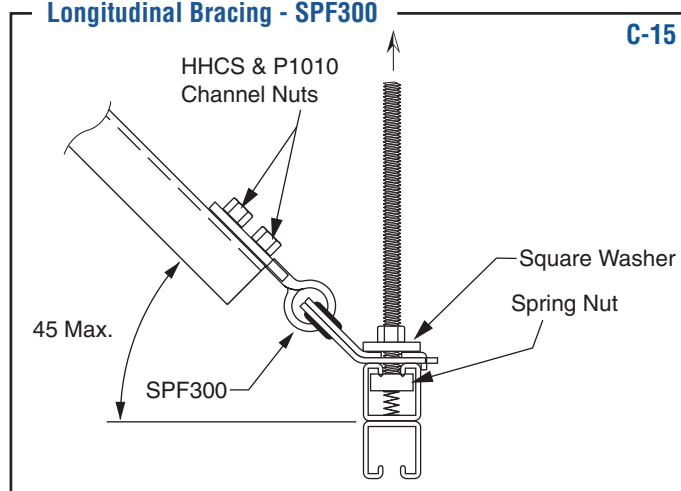
Longitudinal Bracing - SPF200

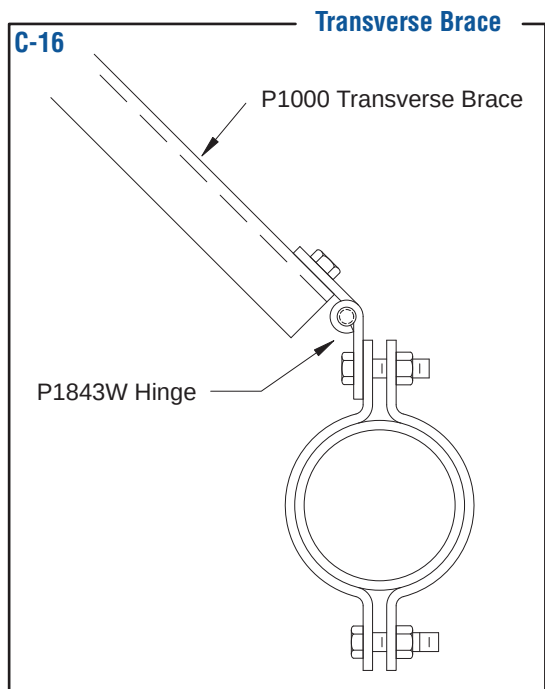
C-14



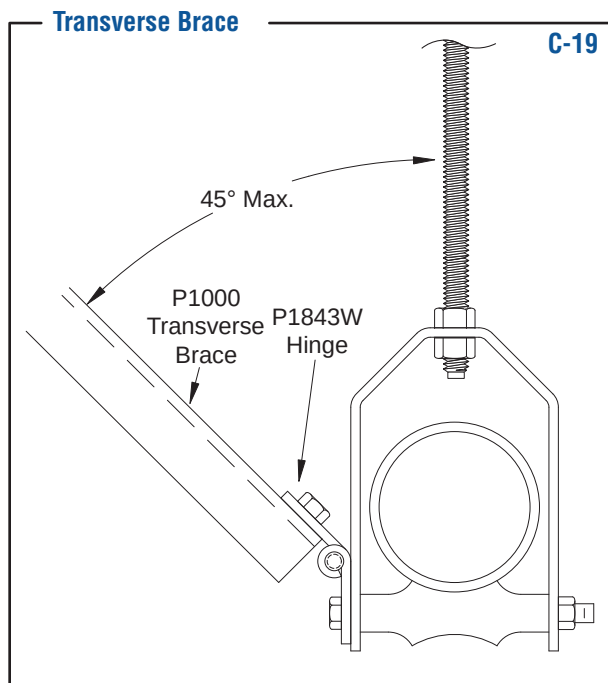
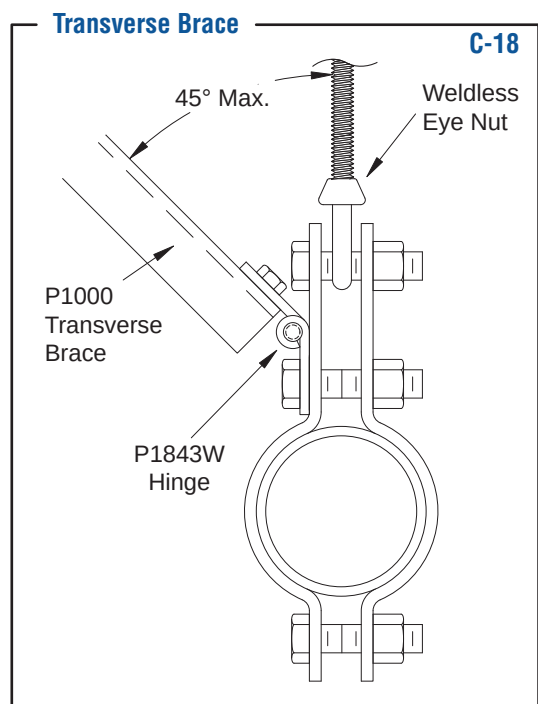
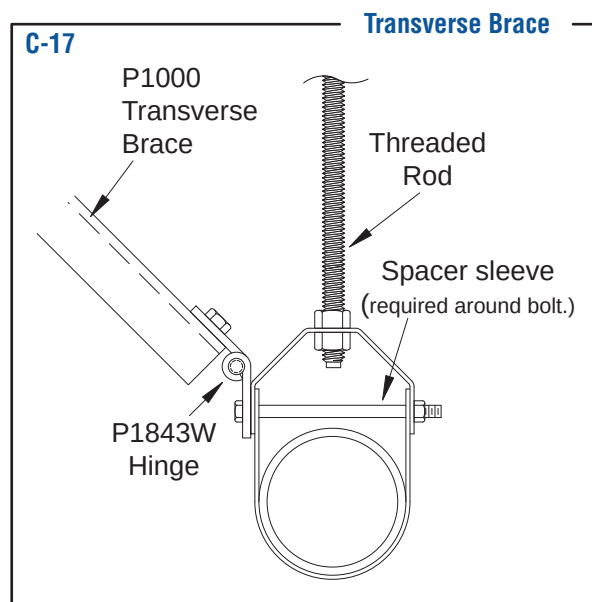
Longitudinal Bracing - SPF300

C-15



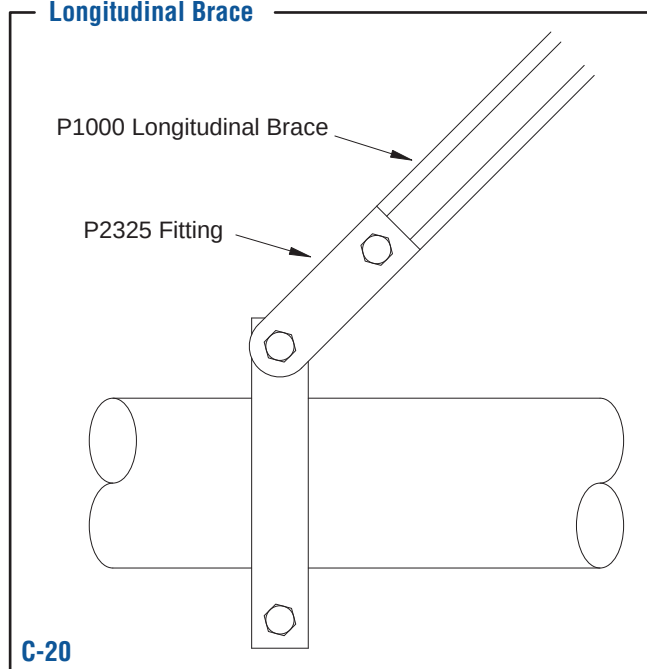
**Channel Bracing - Single Pipe, Transverse Brace**

Note: The Transverse brace is attached to one side of the hanger. The specific connection depends upon the type of pipe hanger used.



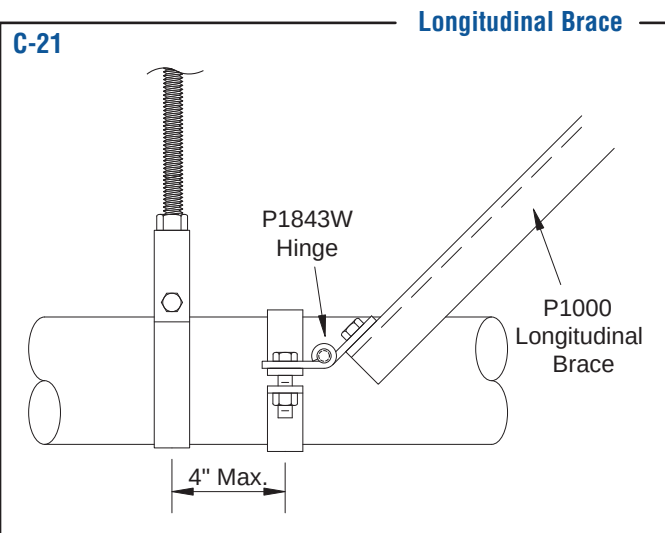
Channel Bracing - Single Pipe, Longitudinal Brace

Longitudinal Brace



Note: Unlike the trapeze, only one longitudinal brace is attached to the pipe hanger. The simplest method is using a flat fitting and a pipe clamp as shown on the left.

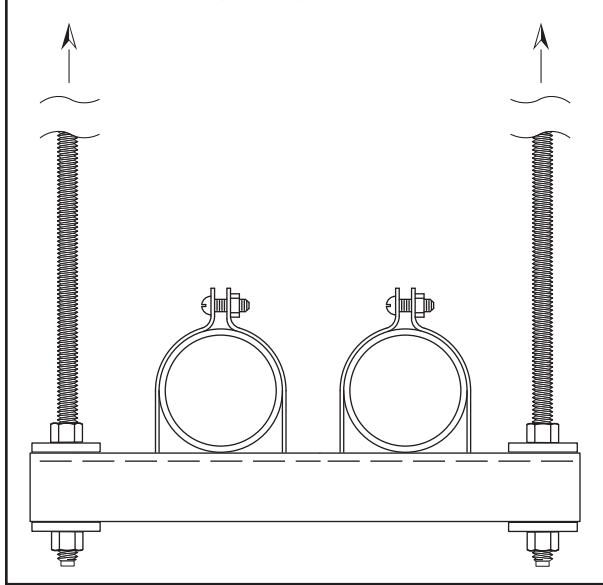
An alternative is to connect a hinge to the pipe clamp as shown below. This method allows some adjustment in the connection of the longitudinal brace to the anchor above.





Cable Bracing - Design Overview

Figure 5 - Sample Trapeze



An single trapeze, like the one shown in Figure (5), can be braced in two different ways using wire cable.

Figure (6) illustrates simple transverse bracing. The trapeze is attached via cable to two structural supports. Unlike channel bracing, a transverse cable brace must be installed in pairs since the cable is not a rigid brace.

Figure 6 - Transverse Brace

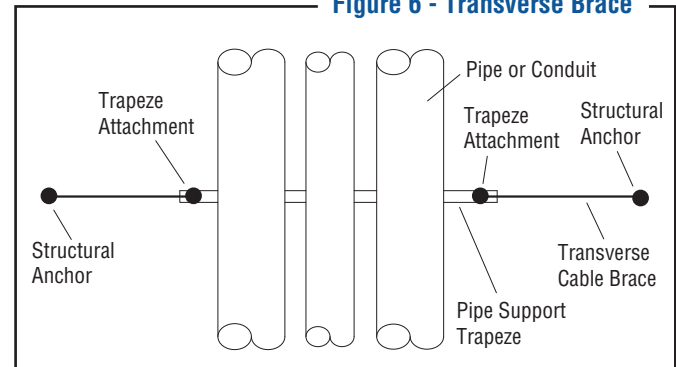


Figure (7) illustrates both transverse and longitudinal bracing. In this case, the trapeze is attached via cable to four structural supports.

There are different methods for attaching the bracing cable to the trapeze depending upon the trapeze style. There are also different methods for attaching the bracing cable to structural supports depending upon the type of structure involved. Thus, a complete solution is obtained by selecting a trapeze attachment and a corresponding structural attachment.

Figure 7 - Transverse & Longitudinal Brace

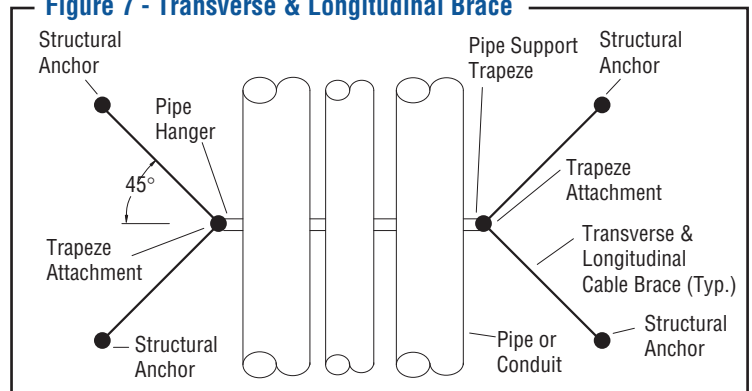


Figure 8 - Transverse Brace

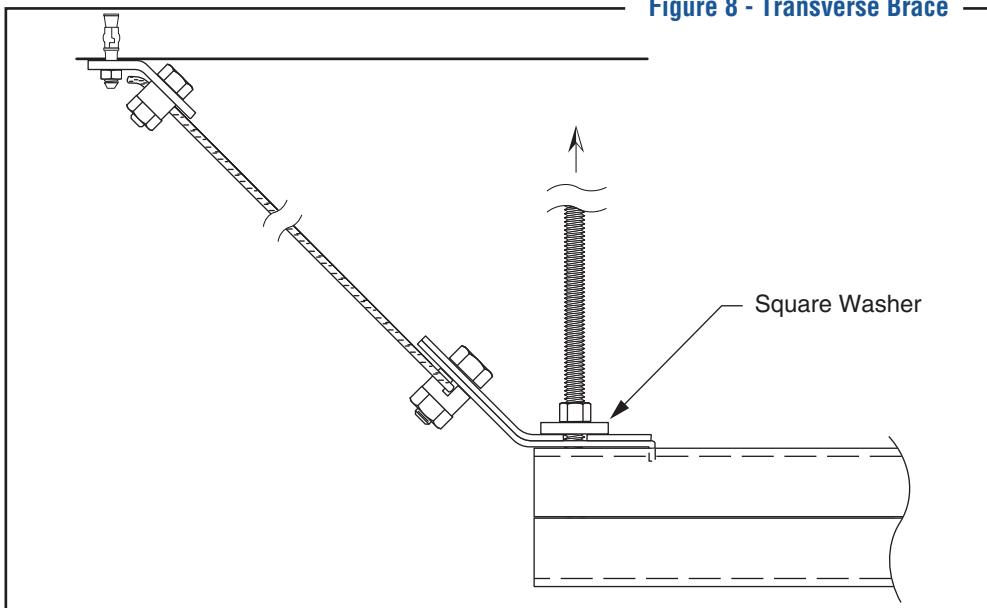
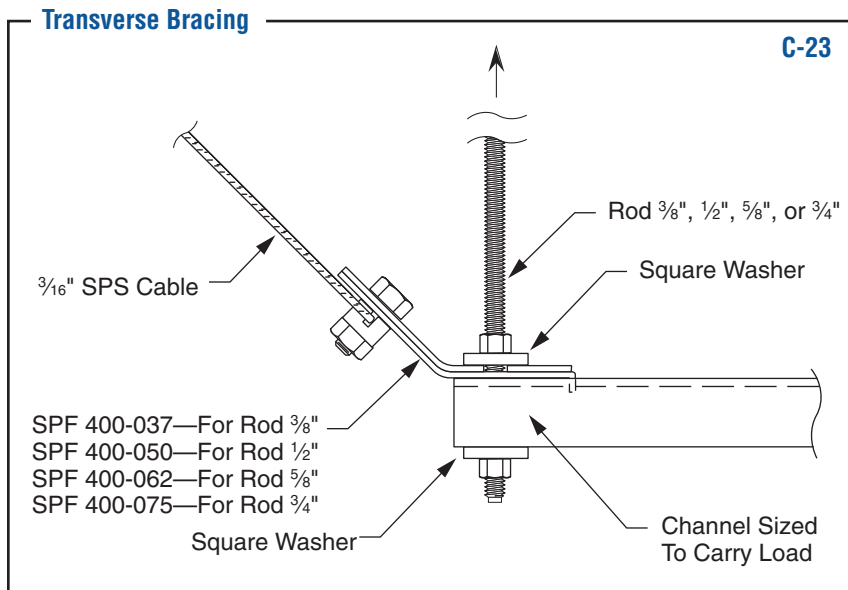


Figure (8) illustrates one example of combining the trapeze attachment and the structural attachment.

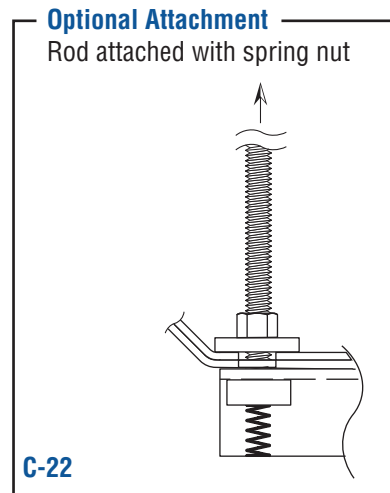
Cable Bracing - Single Channel, Transverse Brace



Note: The transverse cable brace is attached to both sides of the trapeze.

There are two different methods of attaching the hanger rod to the trapeze. One is to allow the rod to go through the channel and add a square washer on the bottom side as shown in the example.

Another method, shown below, is to use a channel nut to attach the rod as shown below

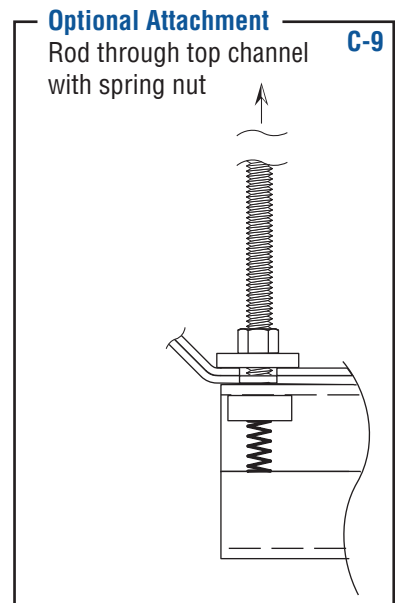
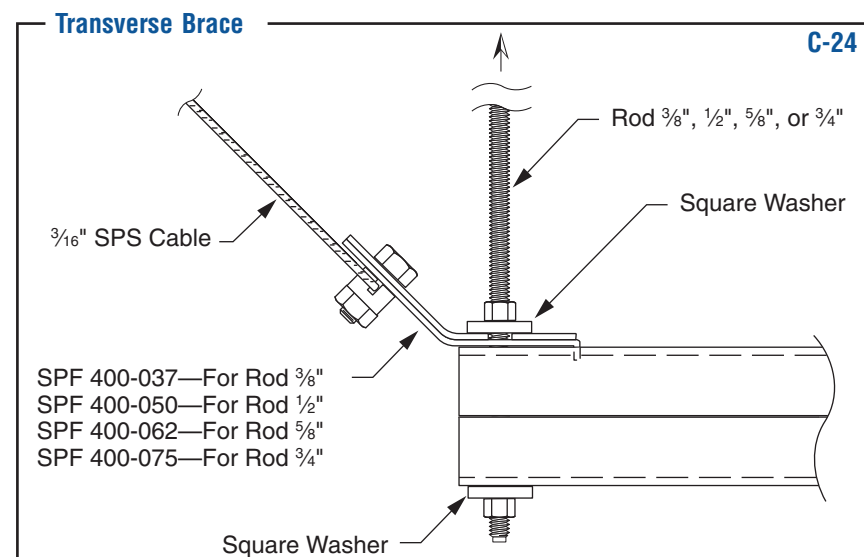


Cable Bracing - Double Channel, Transverse Brace

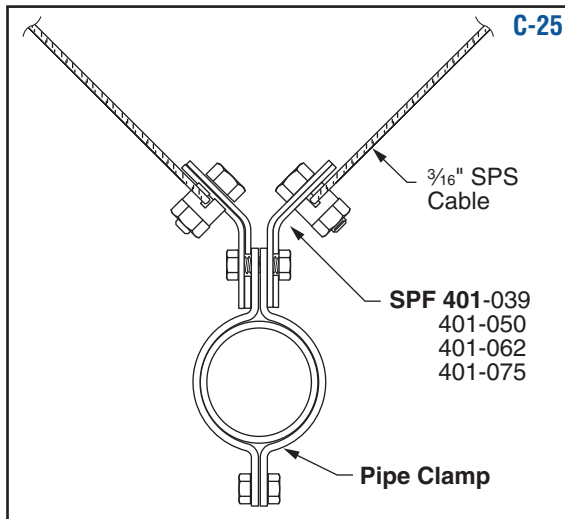
Note: The transverse cable brace is attached to just both side of the trapeze.

There are two different methods of attaching the hanger rod to the trapeze. One is to allow the rod to go through the channel and add a square washer on the bottom side as shown in the example.

Another method, shown below, is to use a channel nut in the top half of the back-to-back channel as shown on the right.

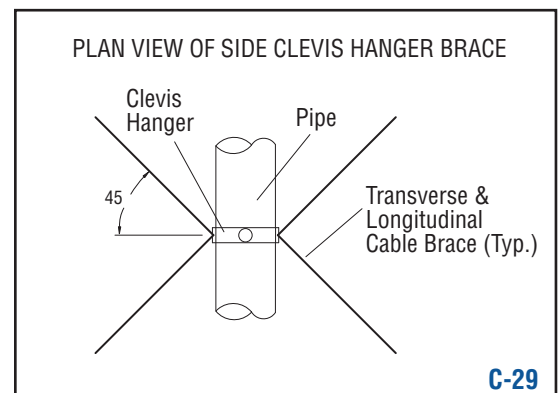
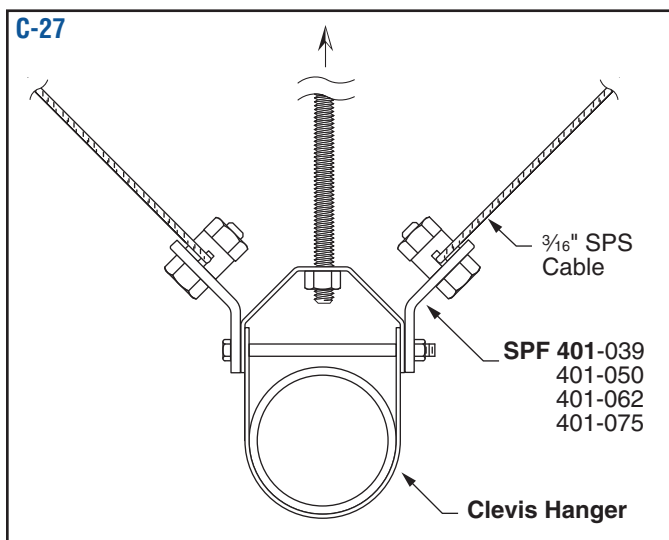
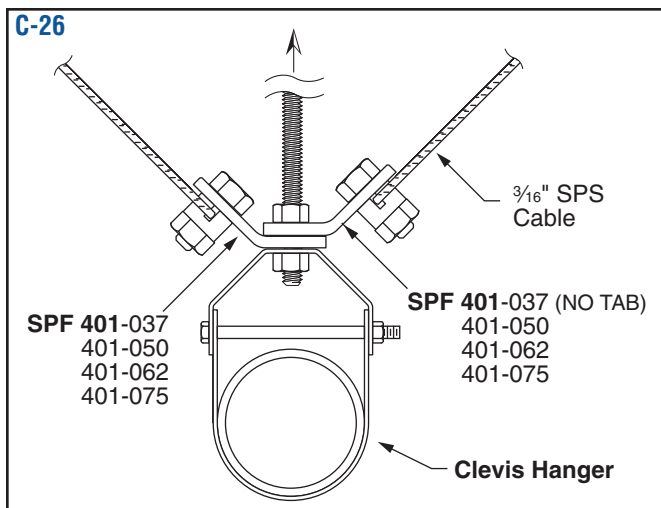
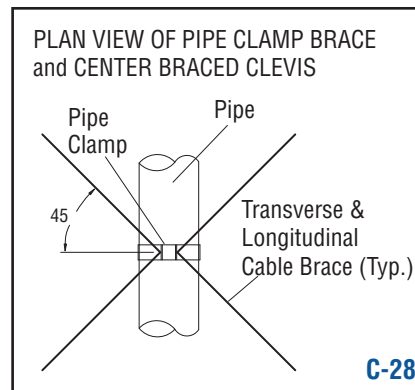


Cable Bracing - Single Hanger Support



Note: For a single pipe hanger, the longitudinal and transverse cable brace is attached to both sides of the pipe.

There are two different methods of attaching the cable brace to a clevis hanger. One is to attach the braces to the drop rod. The other alternative shown at the bottom of the page is to attach a cable brace to both sides of the clevis hanger.





Bracing Stiffener - Primary Trapeze Support

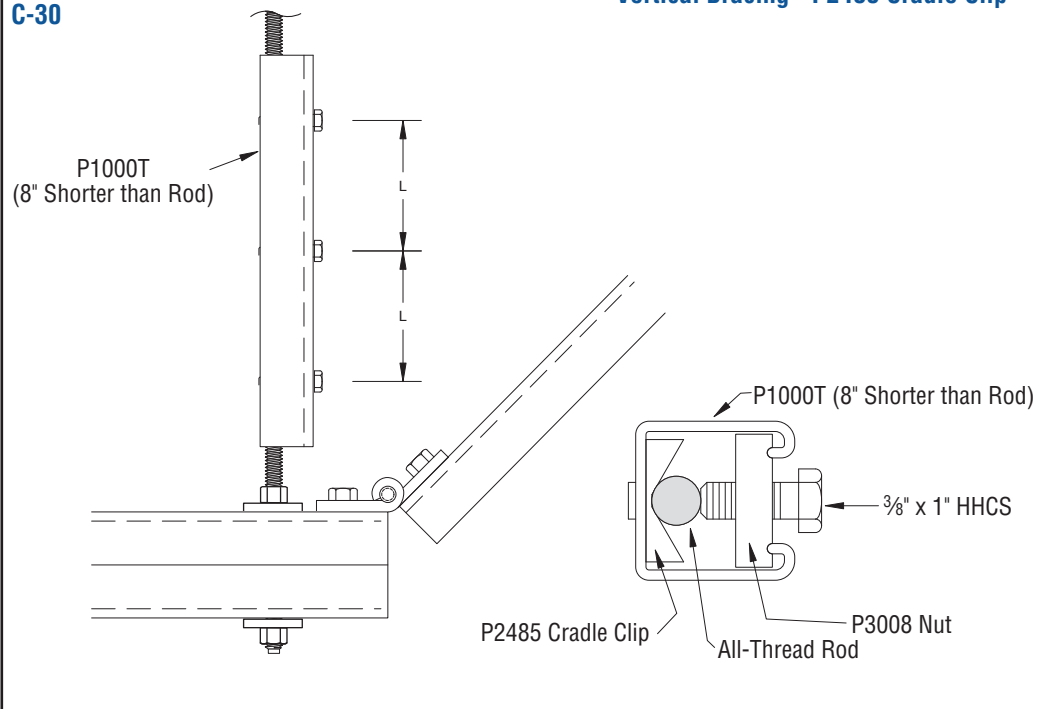
In many cases, the drop rod supporting the trapeze or pipe clamp must be stiffened for adequate seismic bracing. The table of the following page can be used to determine the required stiffener. This is accomplished by adding a piece of channel surrounding the threaded rod.

In the first case, P1000T channel is used and the cradle clips are at-

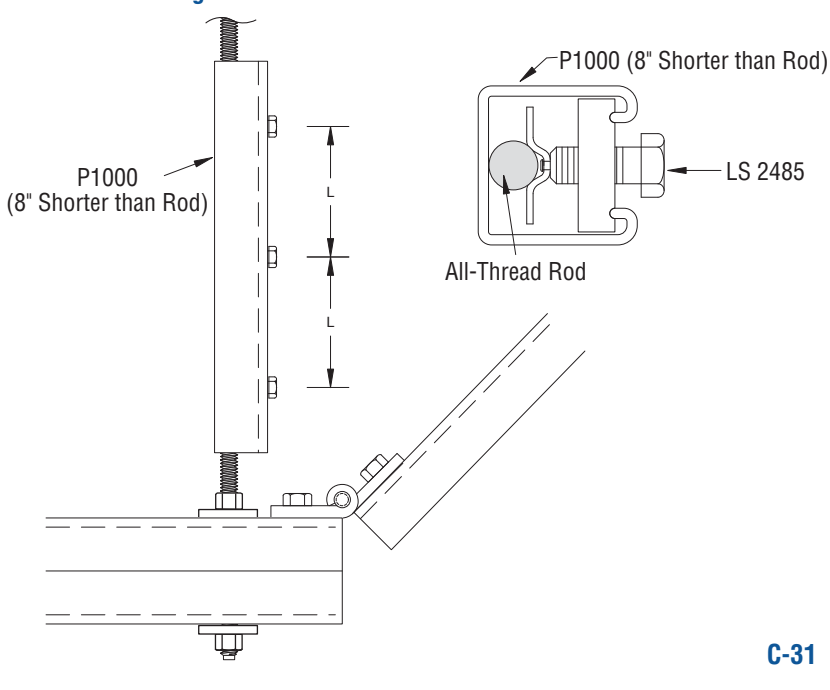
tached to the slots in the back of the channel. Then, a standard channel nut and bolt are used to clamp the rod to the retaining clip.

In the second case, standard P1000 channel is used. The special LS2486 channel nut and bolt have an attachment on the end of the bolt to clamp the threaded rod against the back of the channel.

Vertical Bracing - P2485 Cradle Clip

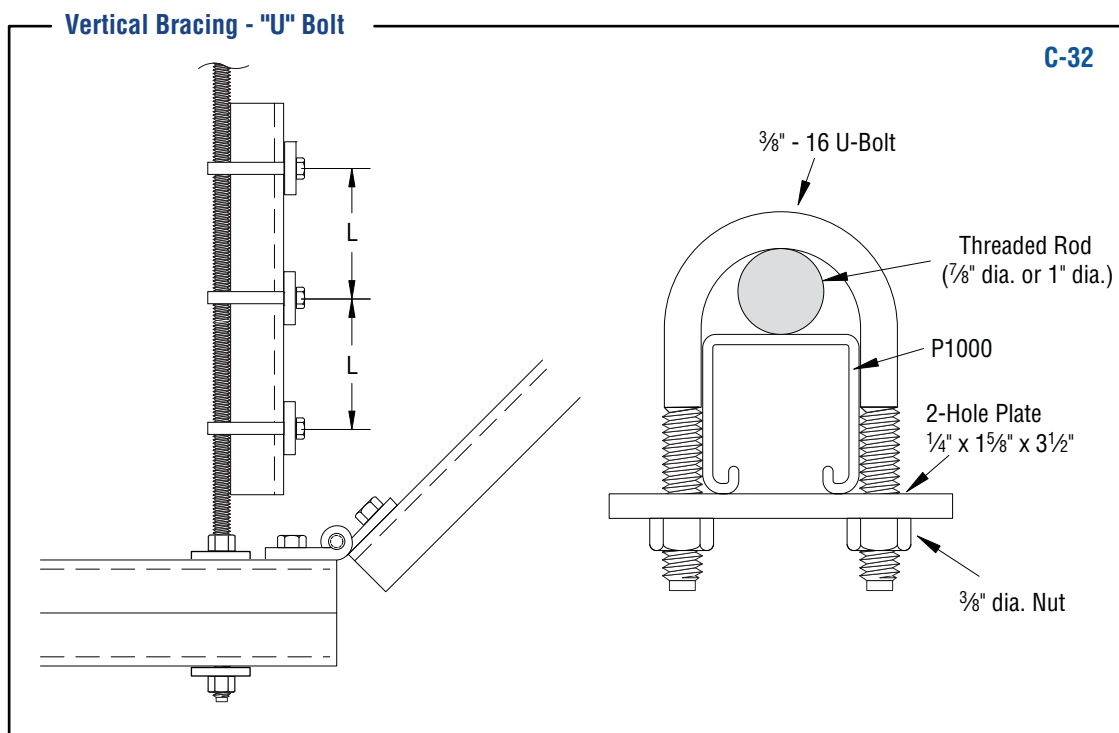
C-30

Vertical Bracing - LS 2485

**C-31**

Bracing Stiffener - Primary Trapeze Support

Another technique to secure the channel to the drop rod and provide vertical stiffening is to utilize standard Ubolts and a 2-hole plate as shown below..



VERTICAL BRACING OR STIFFENER LOAD TABLE

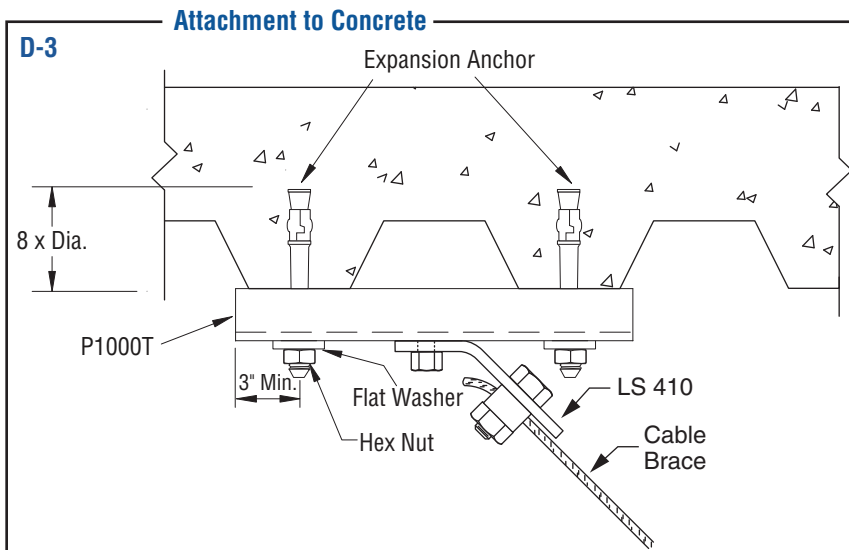
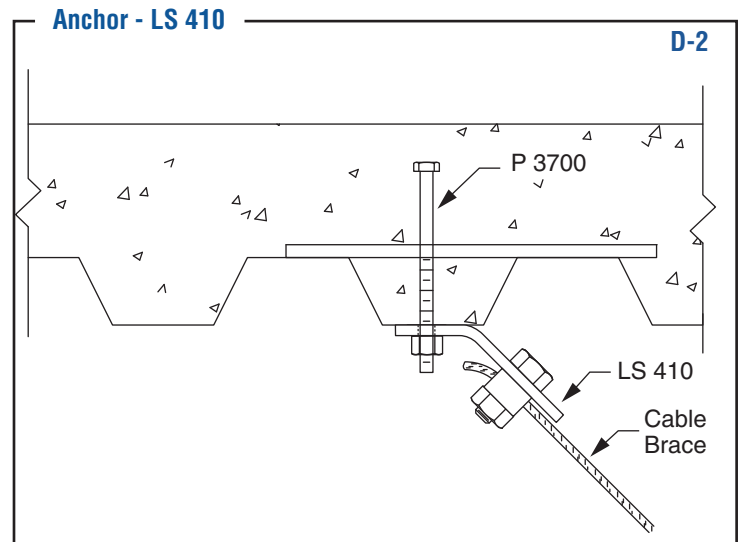
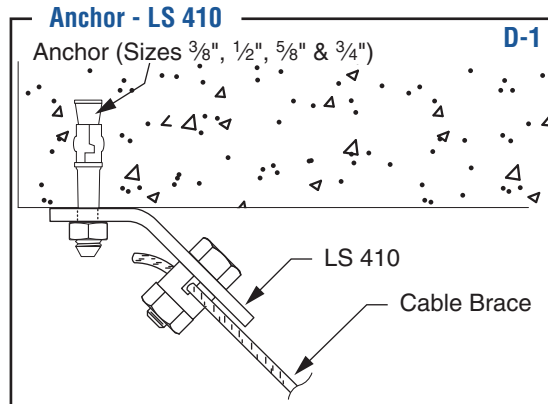
Rod Size In.	Root Area In. ²	Root Diameter In.	Radius of Gyration In.	Max. Allowable Rod Compression Lbs. @ 100%	Clip Spacing L (In.)			Max. Seismic Safe Load* Lbs.
					Rod Stress at 50% 4,500 PSI	Rod Stress at 75% 6,750 PSI	Rod Stress at 100% 9,000 PSI	
3/8	0.068	0.314	0.0785	610	14	12	10	810
1/2	0.126	0.425	0.1063	1,130	20	16	14	1,500
5/8	0.202	0.536	0.1341	1,810	24	20	16	2,410
3/4	0.302	0.652	0.1630	2,710	30	24	20	3,610
7/8 ⁴	0.419	0.730	0.1920	3,770	35	28	25	5,030
1 ⁴	0.552	0.838	0.2200	4,960	40	33	28	6,610

- Assumptions:
1. Rod held against translation at location of cradle clips K equals 1.0.
 2. L = Distance between connection points.
 3. Trapeze with braces on alternate members.
 4. Must use U-Bolt detail, shown above.
- *5. Loads are based on the root area of the thread and at a stress of 9,000 psi.
- *6. Safe seismic forces are determined by increasing allowable safe loads by 33%



Bracing - Structural Anchor [Concrete]

This section of the document describes how to attach a brace to an overhead anchor. The main criteria for selecting the top anchor scheme is the type of construction for the building..

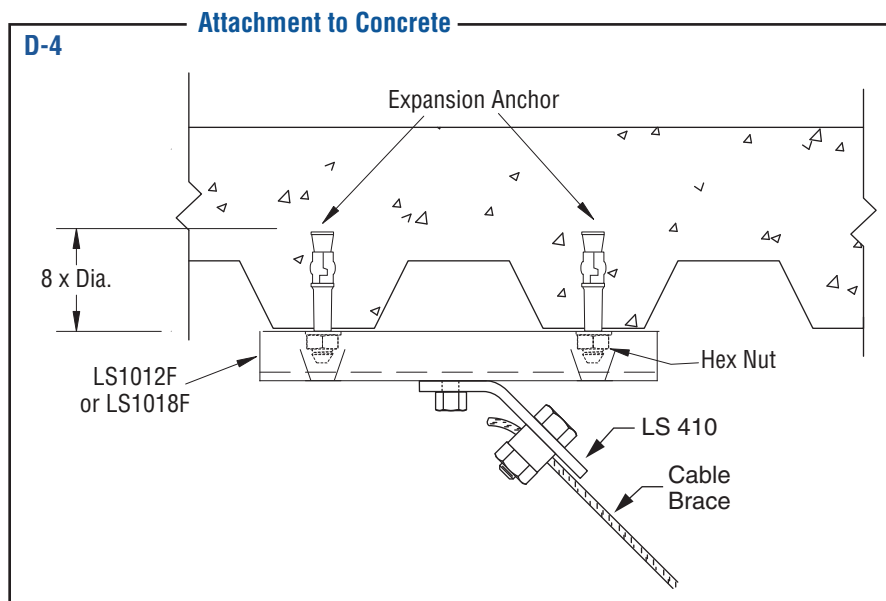


In both of the cases shown on the left, metal framing channel is anchored to the concrete structure and then the cable brace is anchored to the channel.

This technique provides for greater load capacity and some adjustment in the connection.

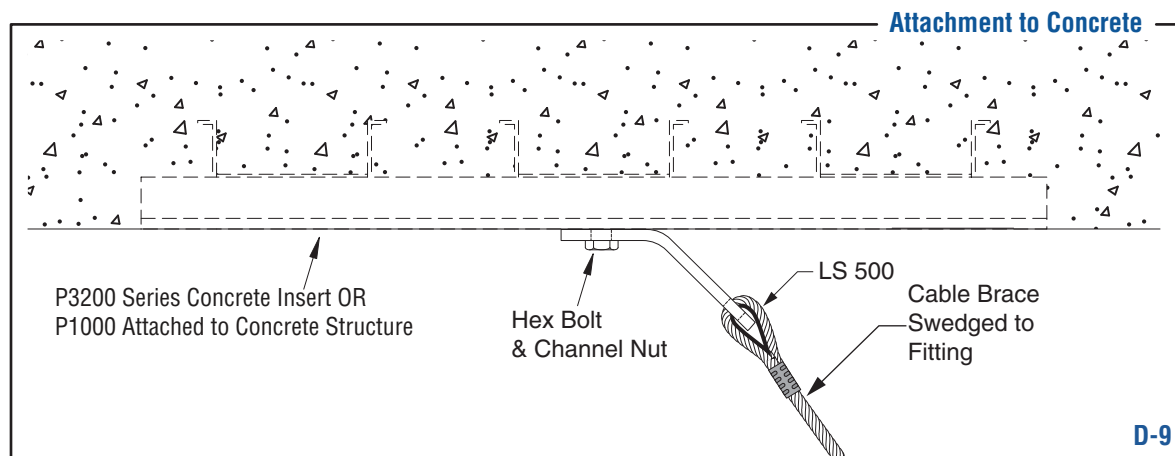
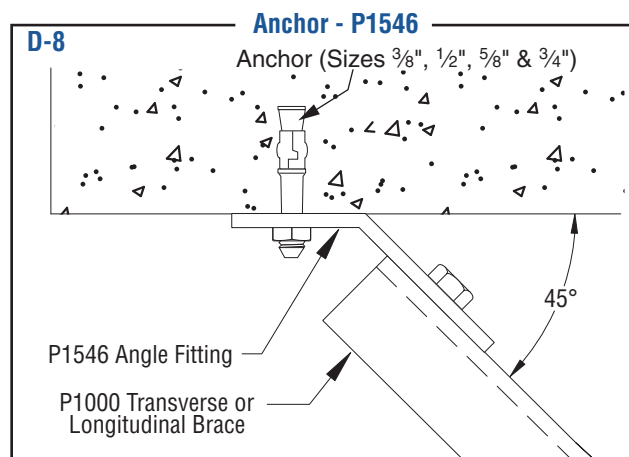
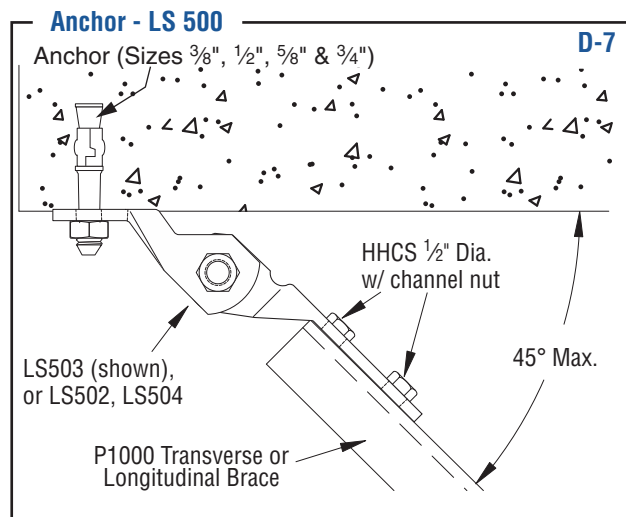
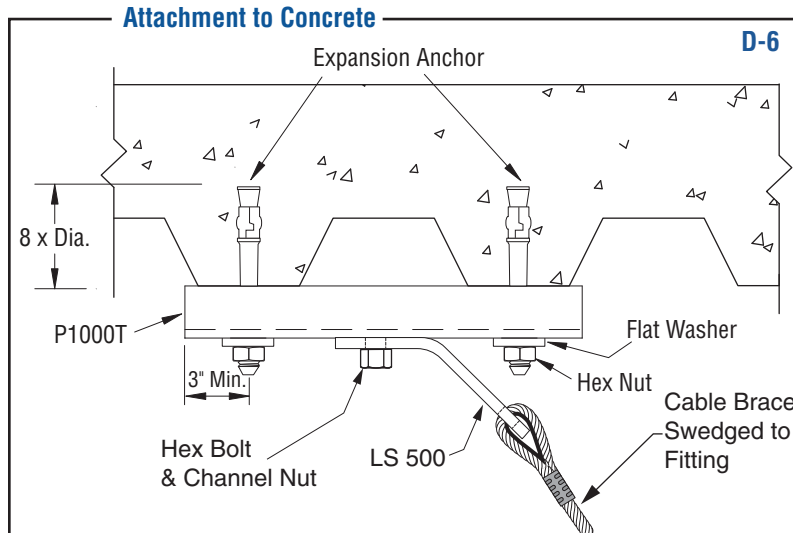
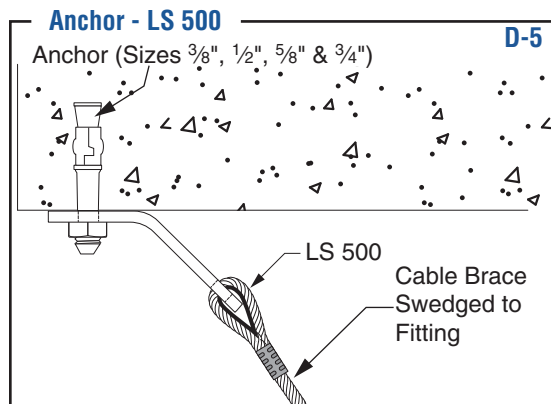
In the first example, standard P1000T channel is used and a square washer and bolt anchor the channel to the structure.

In the bottom example, the LS1012F (or LS1018F) channel is used. This eliminates the need for the bolt to go all the way through the channel since the channel is enlarged at the point of anchor so that a socket will fit on the bolt head.



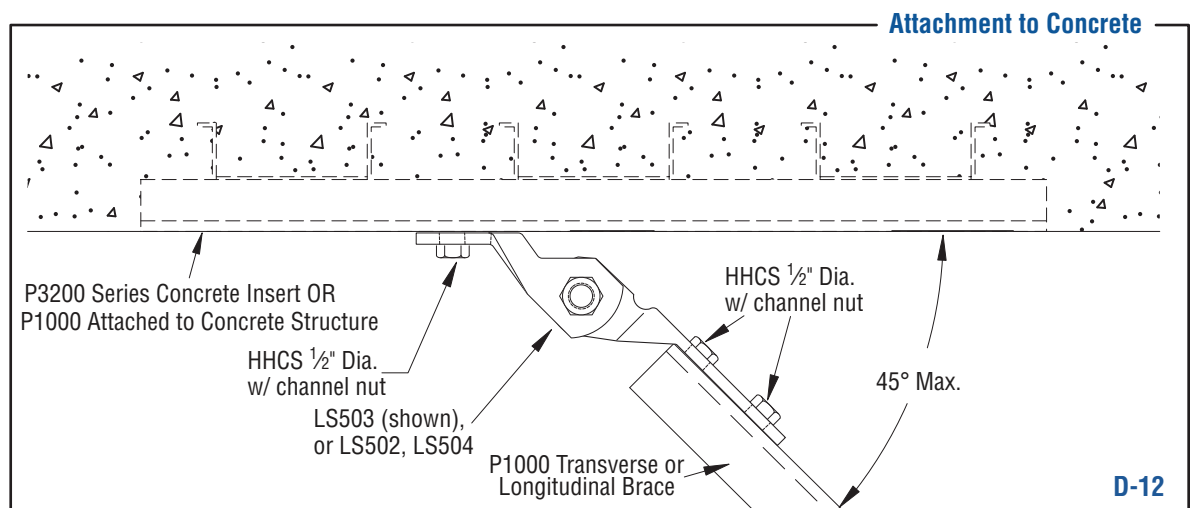
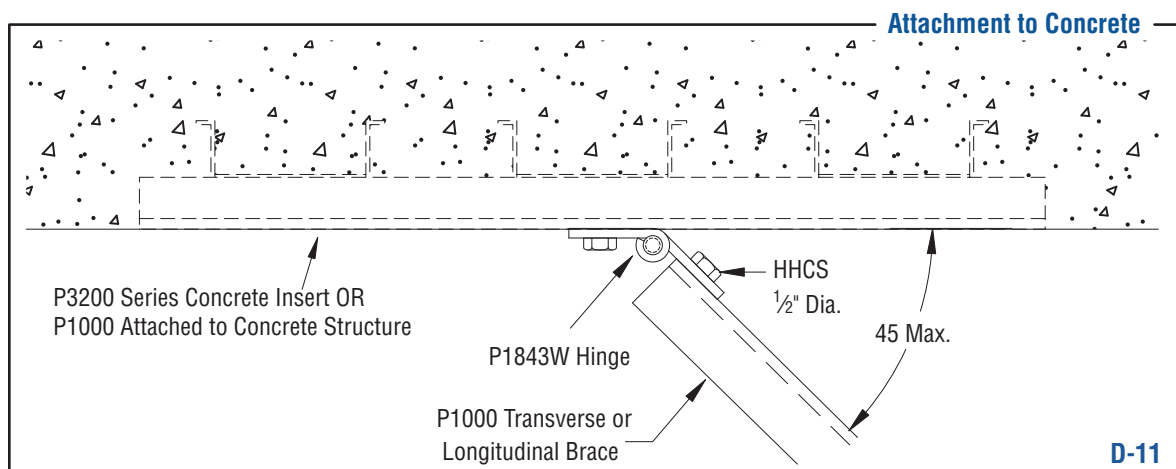
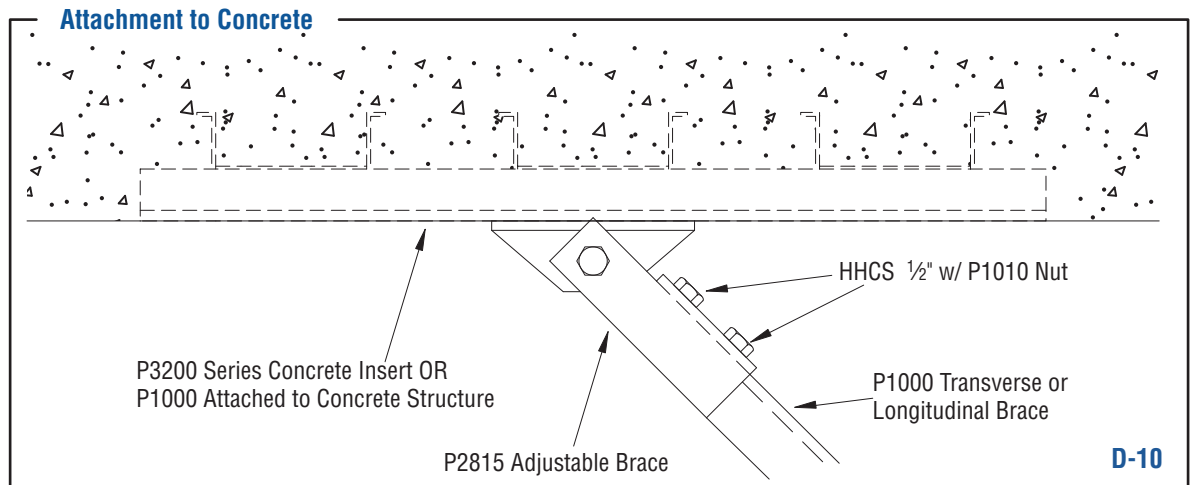


Bracing - Structural Anchor [Concrete]



Bracing - Structural Anchor [Concrete]

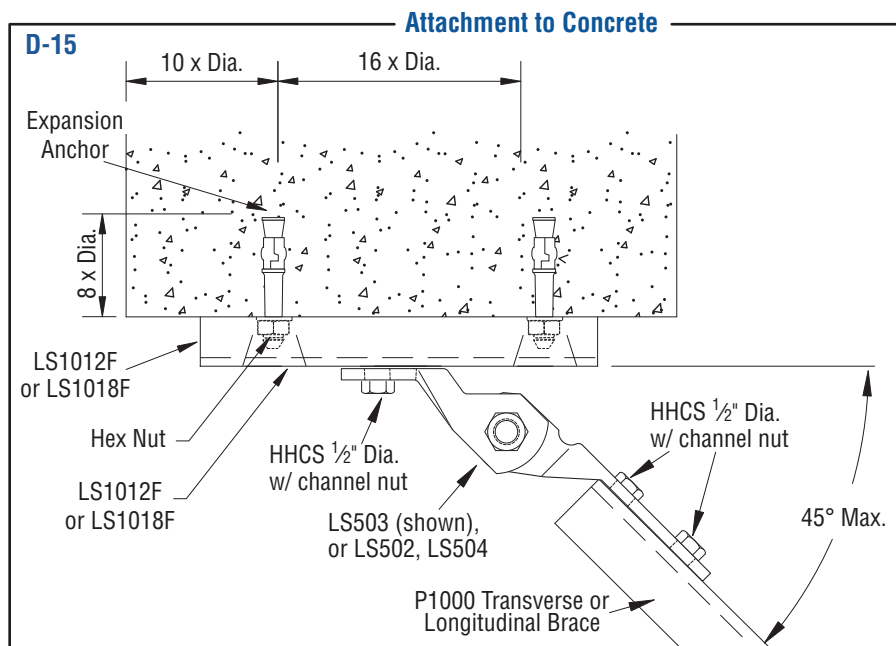
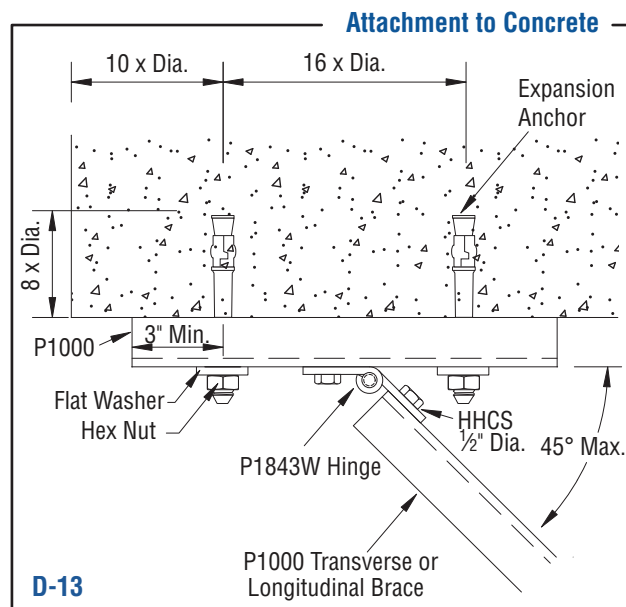
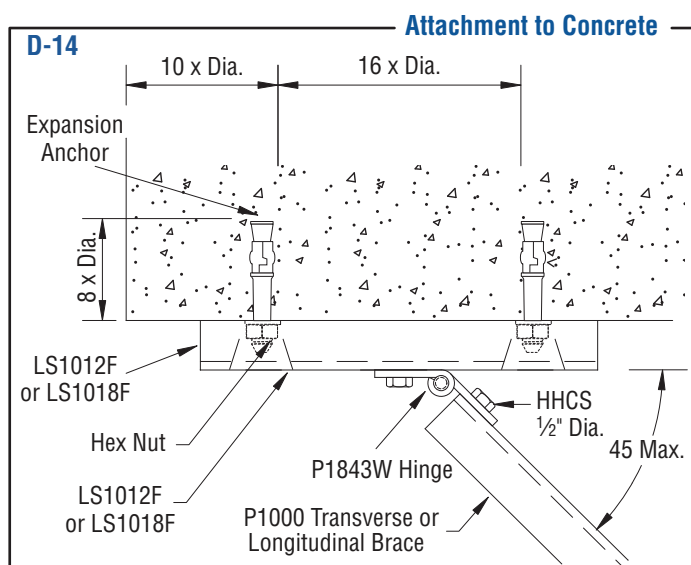
A number of different fittings can be used to connect the brace to an embedded concrete insert. The final choice depends on the load capacity required and the flexibility offered by each fitting.



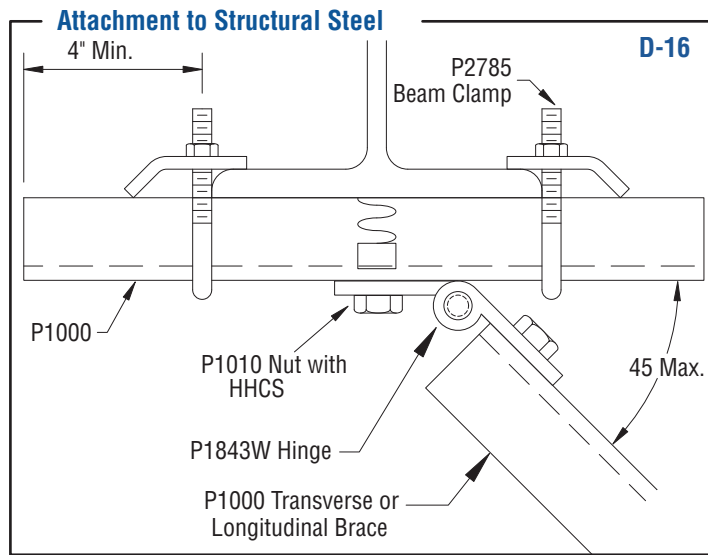


Attachment to - Concrete Structures

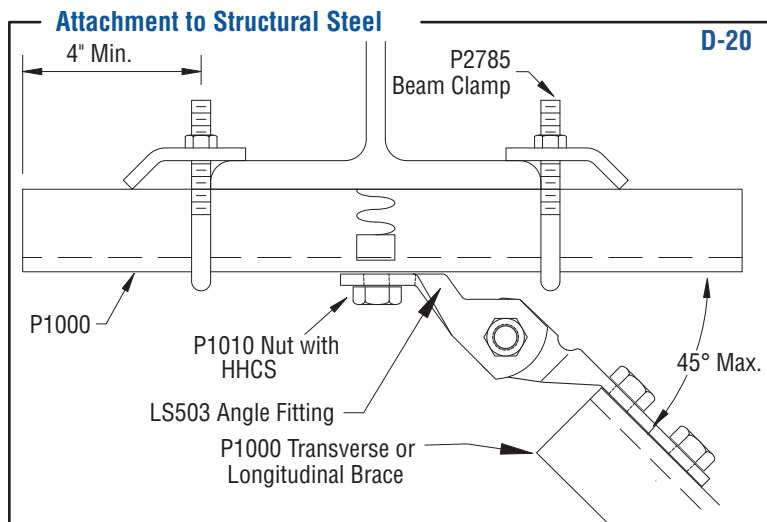
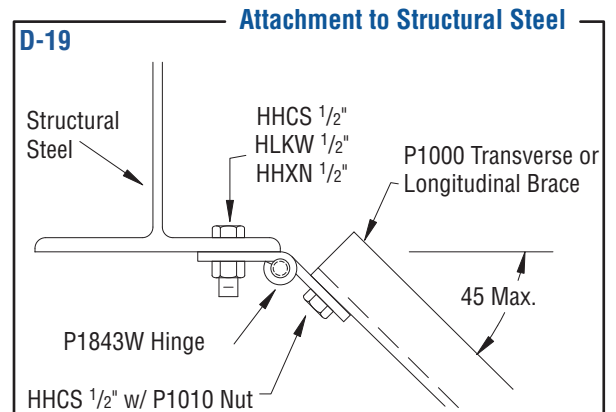
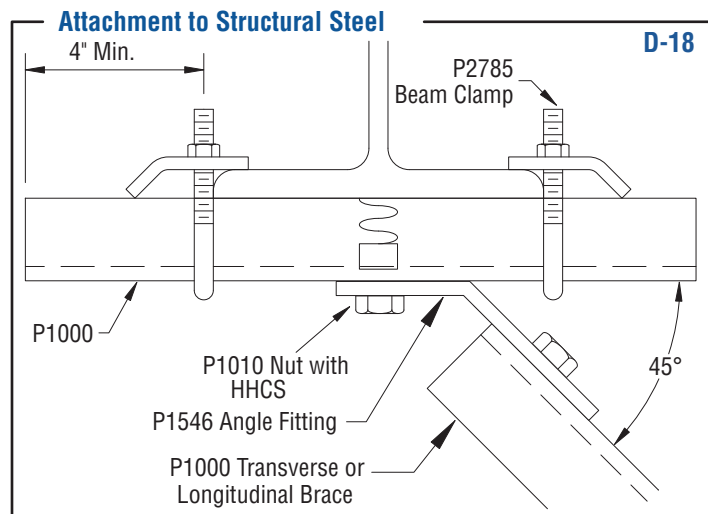
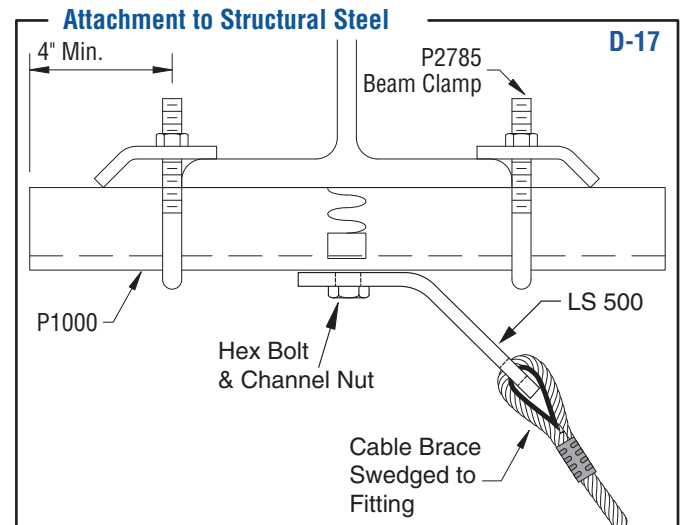
A connection similar to the ones using an embedded concrete insert can be created by attaching a piece of channel to the concrete using anchors. Then, appropriate fittings can be used to anchor the brace.

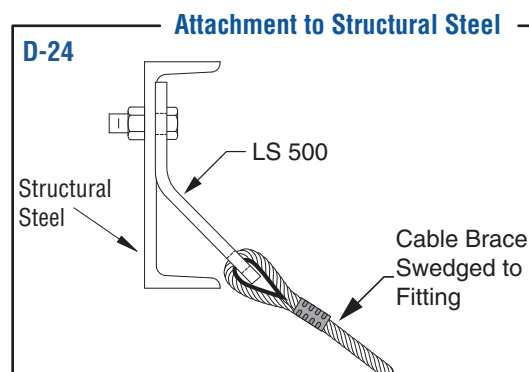
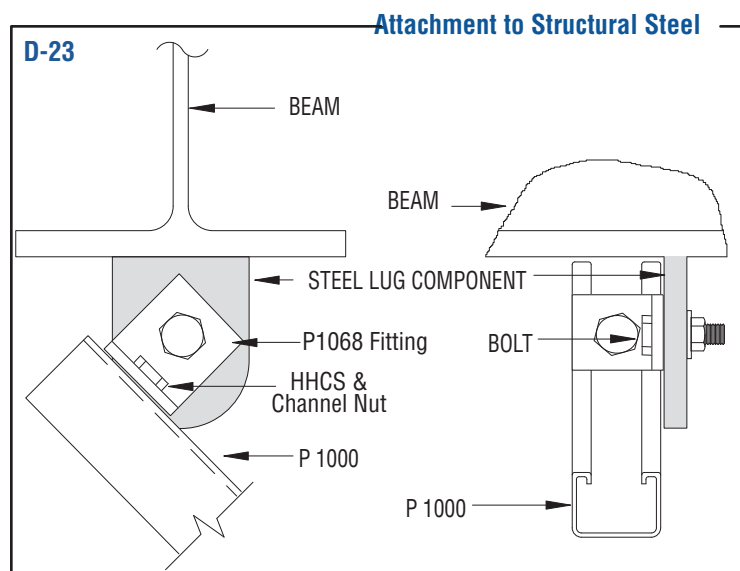
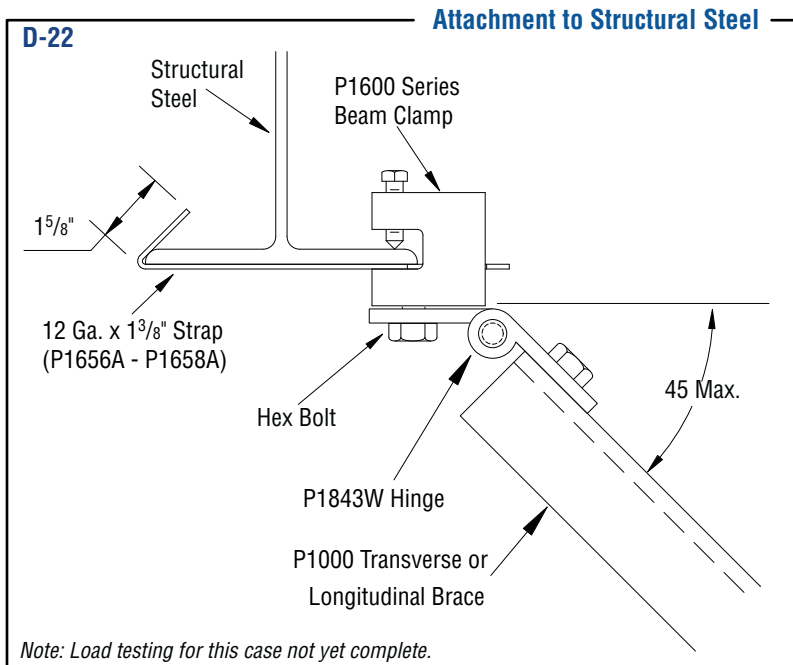
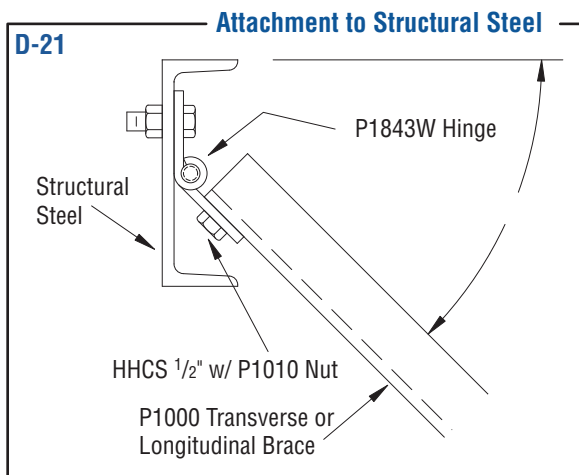


Bracing - Structural Anchor [Structural Steel]



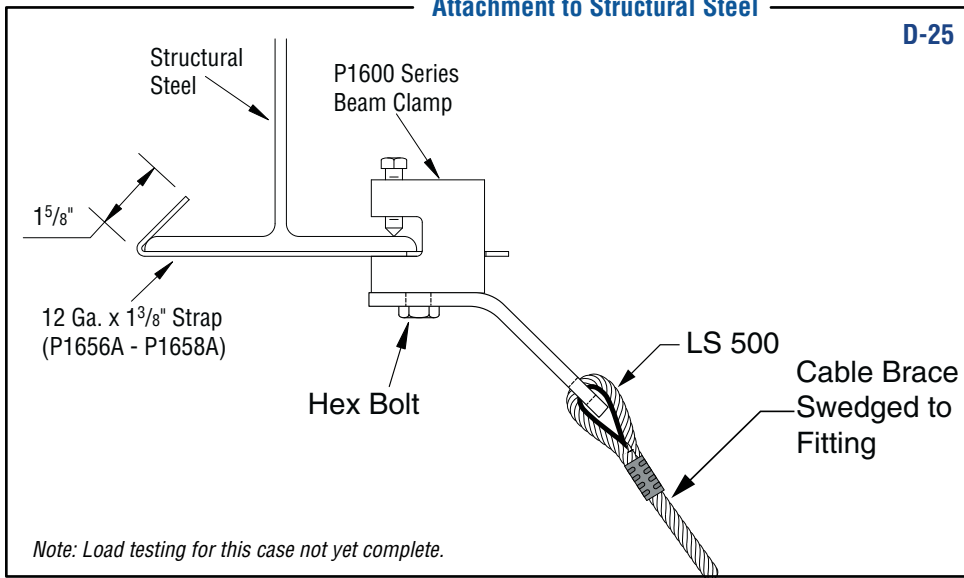
The options for attaching the brace to a structural steel anchor are nearly limitless. One concept is to attach a piece of channel to the beam using appropriate beam clamps. Refer to the Unistrut General Engineering Catalog for other beam clamping options.



**Bracing - Structural Anchor [Structural Steel]**

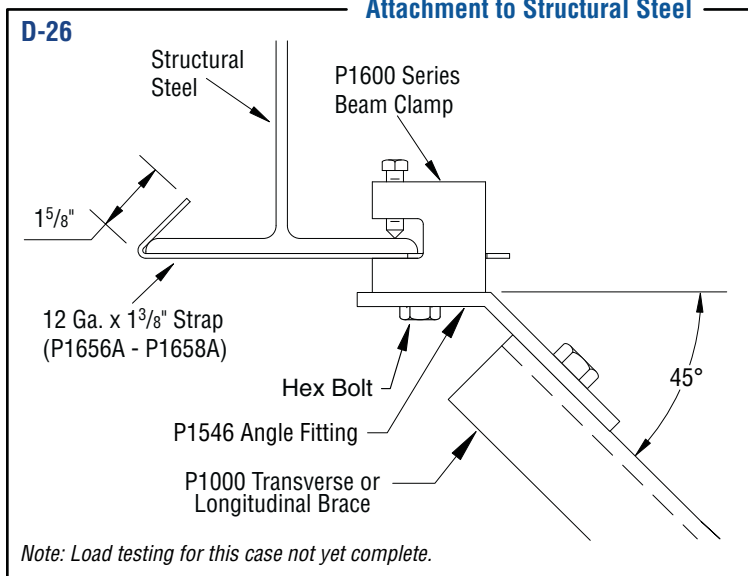
Attachment to Structural Steel

D-25



Attachment to Structural Steel

D-26

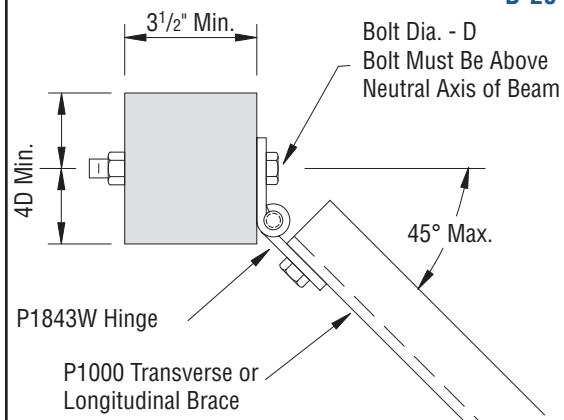




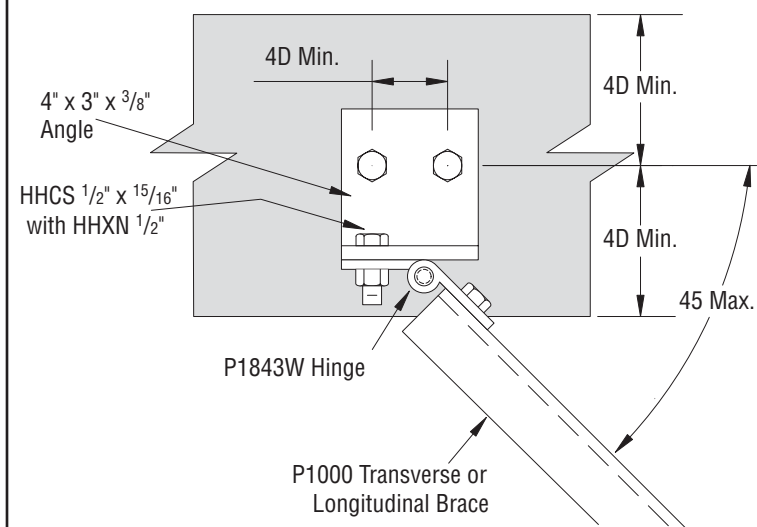
Bracing - Structural Anchor [Wood]

Attaching the seismic brace to wood anchors is usually accomplished by attaching a metal framing fitting to the wood anchor and then attaching the brace to that.

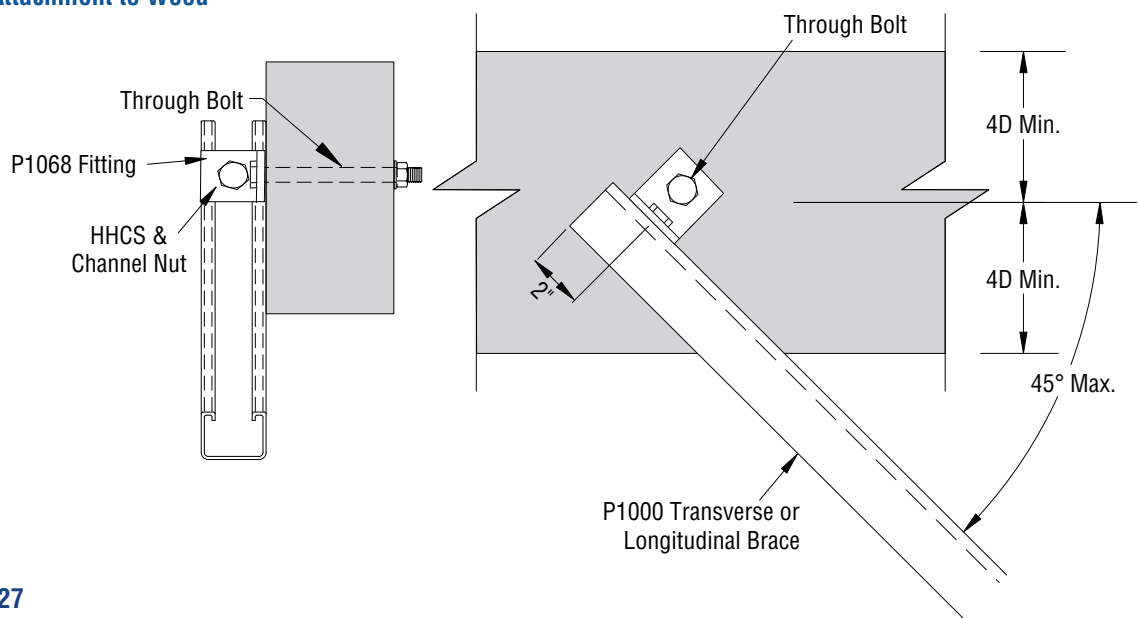
Attachment to Wood

D-29

Attachment to Wood

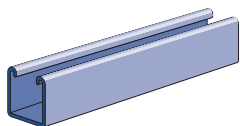
D-28

Attachment to Wood

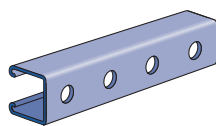
D-27

Channel

P1000
Page E-5

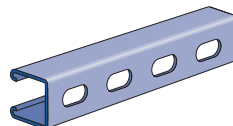


P1000 HS
Page E-6



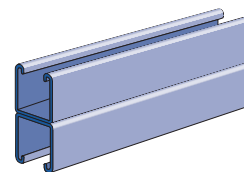
9/16" Dia. Holes on
1 7/8" Center

P1000 T
Page E-7

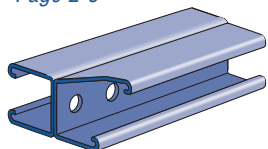


1 1/8" x 9/16" Slots

P1001/P1001 AW
Page E-8

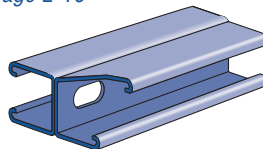


**P1001 HS/
P1001 HSAW**
Page E-9



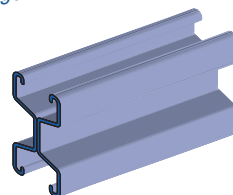
9/16" Dia. Holes on
1 7/8" Center

**P1001 T/
P1001 TAW**
Page E-10

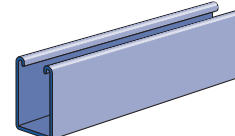


2 3/4" x 7/8" Slots

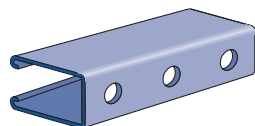
P1001 K
Page E-11



P5500
Page E-12

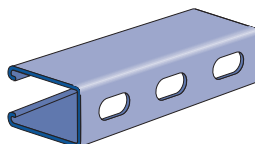


P5500 HS
Page E-13



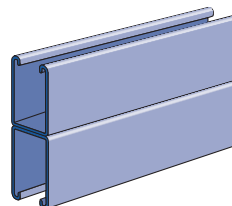
1 1/8" x 9/16" Slots

P5500 T
Page E-14

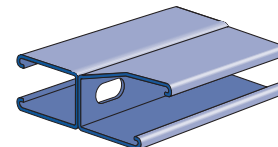


9/16" Dia. Holes on
1 7/8" Center

P5501/P5501 AW
Page E-15



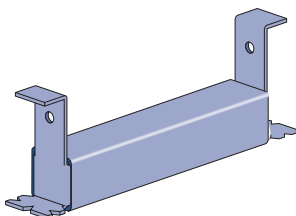
P5501 T/P5501 TAW
Page E-16



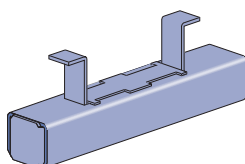
2 3/4" x 7/8" Slots

Concrete Inserts

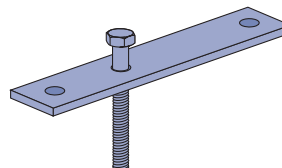
P3249 thru P3252
Page E-17



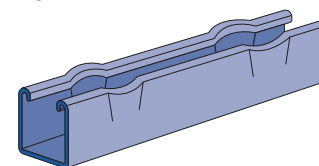
P3253 thru P3270
Page E-18



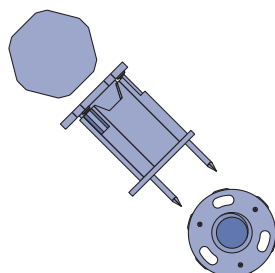
P3700 Series
Page E-19



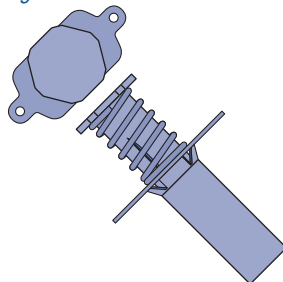
**LS 1012F - 12"
LS 1018F - 18"**
Page E-19



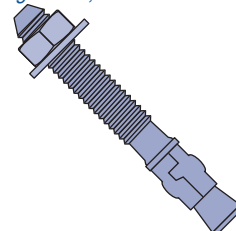
Wood-Knocker™
Page E-20



Bang-It™
Page E-21



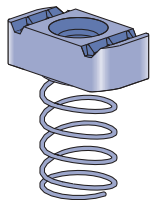
**Power-Stud™ Wedge Type
Expansion Anchor**
Page E-22, E-23



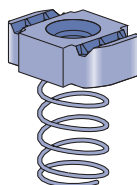


Channel Nuts and Hardware

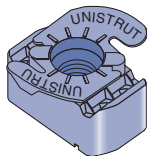
P1006-1420
P1008
P1010
Page E-24



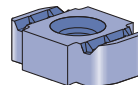
P1012S
P1023S
Page E-24



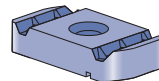
P1006T-1420
P1008T
P1010T
Page E-24



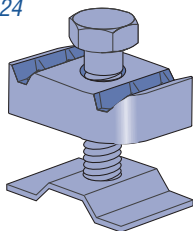
P1012
P1023
Page E-24



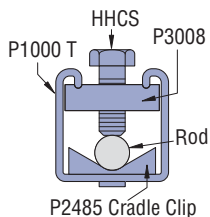
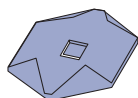
P3006-1420
P3008
P3010
Page E-24



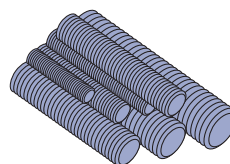
LS 2485
Page E-24



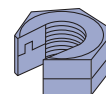
P2485 Cradle Clip Assembly
Page E-25



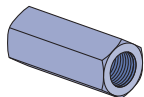
Threaded Rod "HTHR"
Page E-26



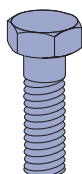
Slip-On® Lock Nut
Page E-26



Coupler Nut "HRCN", IFI128
Page E-26



Hex Head Cap Screw "HHCS"
Page E-27



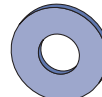
Hex Nut "HHXN"
Page E-27



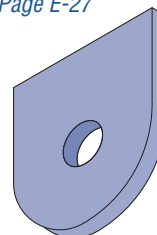
Lock Washer "HLKW"
Page E-27



Flat Washer "HFLW"
Page E-27

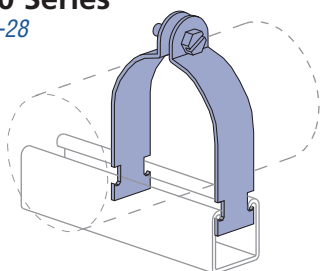


Structural Welding Lug
Page E-27

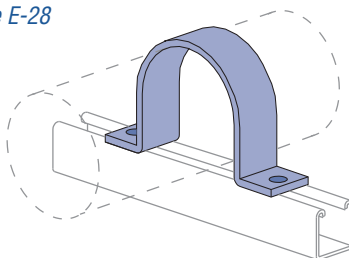


Misc. Fittings

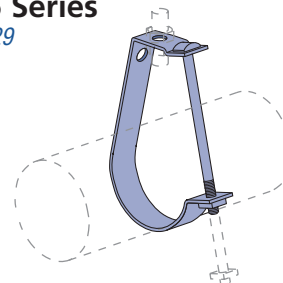
P1100 Series
Page E-28



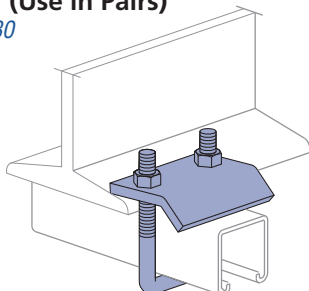
P2558 Series
Page E-28



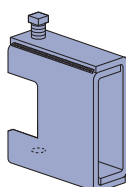
J1205 Series
Page E-29



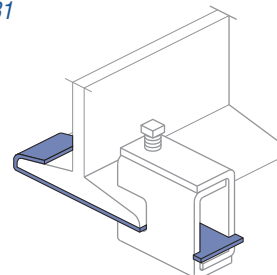
P2785 (Use in Pairs)
Page E-30



P2401S, P2403S
Page E-30



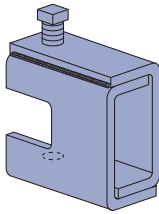
P1656A Thru P1658A
Page E-31



Misc. Fittings (cont.)

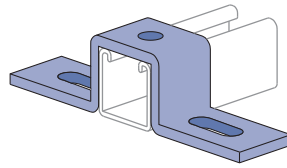
P1649AS thru P1651AS

Page E-31



P1050

Page E-30



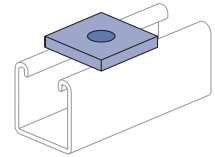
P1063 3/8"

P1064 1/2"

P1964 5/8"

P2471 3/4"

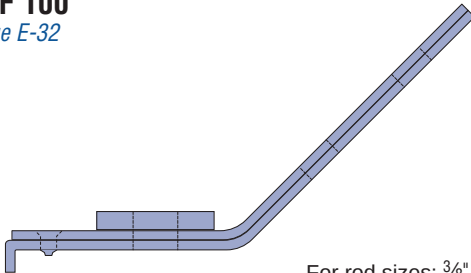
Page E-30



Seismic Pivot Fittings

SPF 100

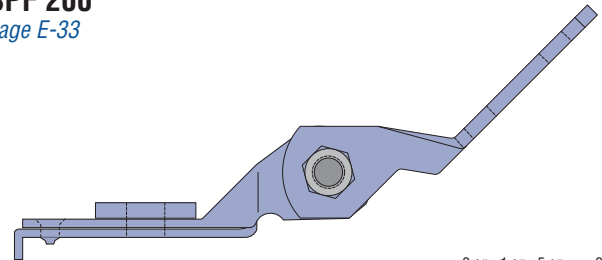
Page E-32



For rod sizes: 3/8", 1/2", 5/8", & 3/4"

SPF 200

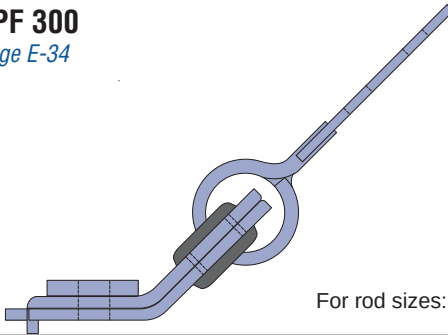
Page E-33



For rod sizes: 3/8", 1/2", 5/8", & 3/4"

SPF 300

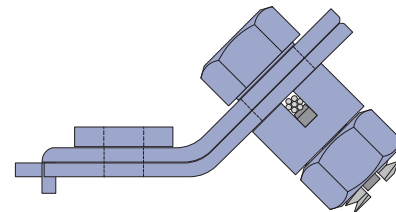
Page E-34



For rod sizes: 3/8", 1/2", 5/8", & 3/4"

SPF 400

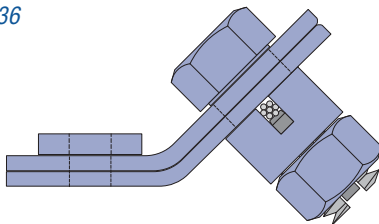
Page E-35



For rod sizes: 3/8", 1/2", 5/8", & 3/4"

SPF 401

Page E-36



For rod sizes: 3/8", 1/2", 5/8", & 3/4"

Note:

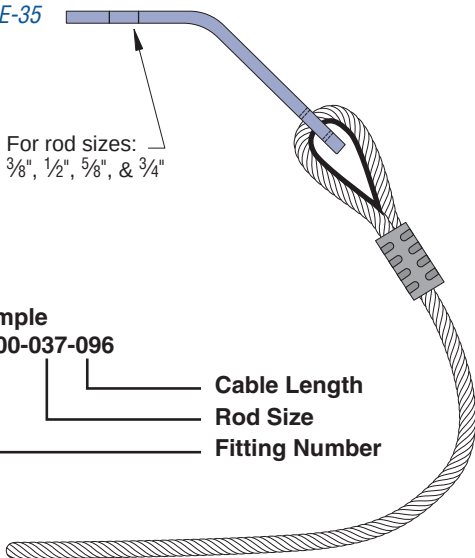
All SPF Fittings come with the proper rod size square washer.



Seismic Brace/Anchor Fittings

LS 500

Page E-35



For rod sizes:
3/8", 1/2", 5/8", & 3/4"

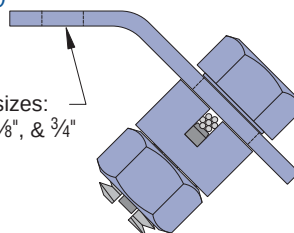
Example LS500-037-096

Cable Length
Rod Size
Fitting Number

Cable	Length
096	8'
120	10'
144	12'
180	15'
240	20'
300	25'
360	30'
480	40'

LS 410-037

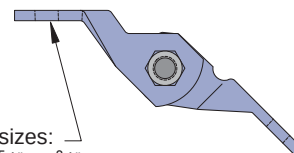
Page E-35



For rod sizes:
3/8", 1/2", 5/8", & 3/4"

LS 502

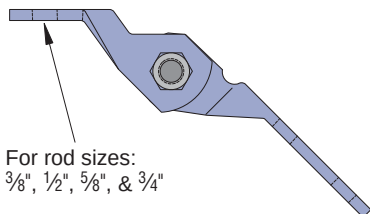
Page E-36



For rod sizes:
3/8", 1/2", 5/8", & 3/4"

LS 503

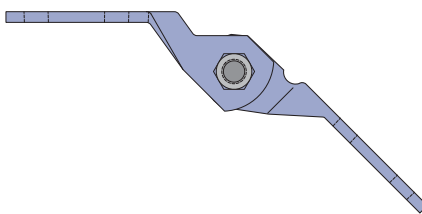
Page E-36



For rod sizes:
3/8", 1/2", 5/8", & 3/4"

LS 504

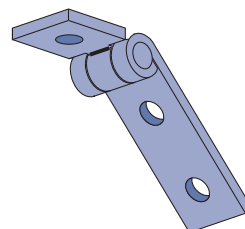
Page E-36



All hole sizes: 9/16"

P1843AW

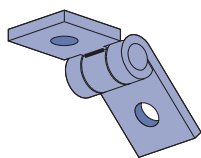
Page E-36



All hole sizes: 9/16"

P1843W

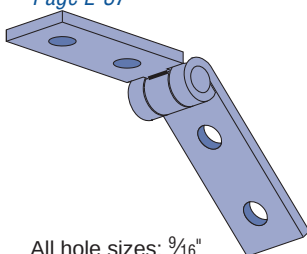
Page E-37



All hole sizes: 9/16"

P1354W

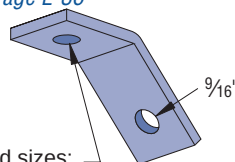
Page E-37



All hole sizes: 9/16"

LS 103

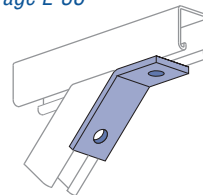
Page E-36



For rod sizes:
3/8", 1/2", 5/8", & 3/4"

P1546 series

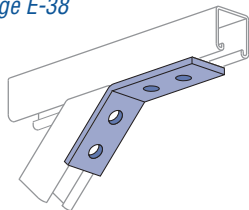
Page E-38



All hole sizes: 9/16"

P2265 series

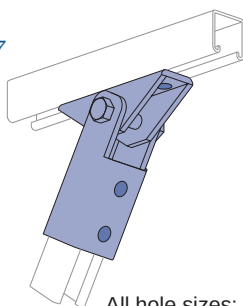
Page E-38



All hole sizes: 9/16"

P2815

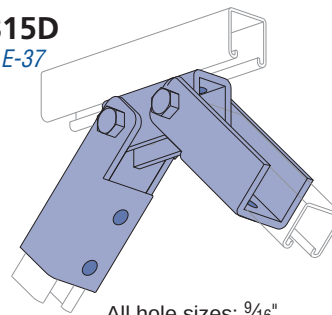
Page E-37



All hole sizes: 9/16"

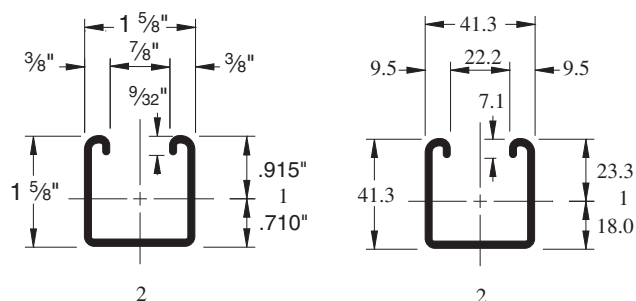
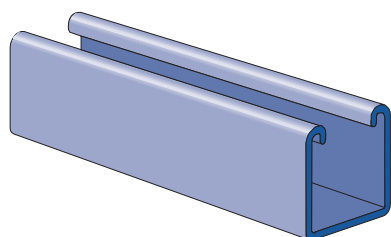
P2815D

Page E-37



All hole sizes: 9/16"

Channel - P1000



BEAM LOADING – P1000

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	1,690	0.06	1,690	1,690	1,690
36	1,130	0.13	1,130	1,130	900
48	850	0.22	850	760	510
60	680	0.35	650	490	320
72	560	0.50	450	340	220
84	480	0.68	330	250	170
96	420	0.89	250	190	130
108	380	1.13	200	150	100
120	340	1.40	160	120	80
144	280	2.01	110	80	60
168	240	2.74	80	60	40
192	210	3.57	60	50	NR
216	190	4.52	50	40	NR
240	170	5.58	40	NR	NR

COLUMN LOADING – P1000

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	3,450	10,750	9,900	8,770	7,730
36	3,050	8,910	7,730	6,370	5,280
48	2,660	7,250	5,980	4,660	3,770
60	2,290	5,890	4,660	3,600	2,940
72	2,000	4,800	3,770	2,940	2,380
84	1,760	4,010	3,170	2,460	1,970
96	1,570	3,450	2,730	2,090	1,650
108	1,410	3,020	2,380	1,800	**
120	1,270	2,680	2,090	**	**

P1000 BRACE DESIGN LOAD

Unsupported Length	Compression Load*	
in (mm)	lbs	(KN)
24 (610)	4,200	18.50
36 (914)	3,650	16.00
48 (1219)	3,130	13.50
60 (1524)	2,650	11.50
72 (1829)	2,230	9.50
84 (2134)	1,850	8.00
96 (2438)	1,570	6.50
108 (2743)	1,360	6.00
120 (3048)	1,200	5.00

*Note: 1. Maximum axial load under seismic loading conditions.
2. The design load shall not exceed the allowable loads for connection detail.

Wt/100 Ft: 190 Lbs (283 kg/100 m)
Allowable Moment 5,080 In-Lbs (570 N•m)
Standard Lengths: 10' & 20'

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

For other materials, see Unistrut General Engineering Catalog

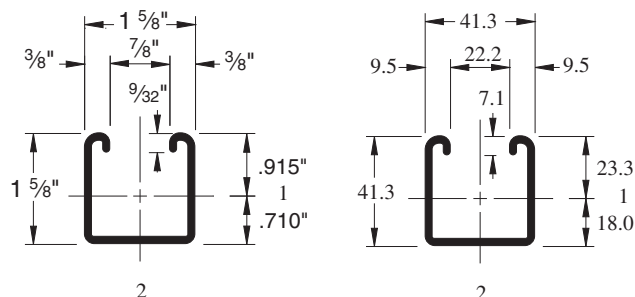
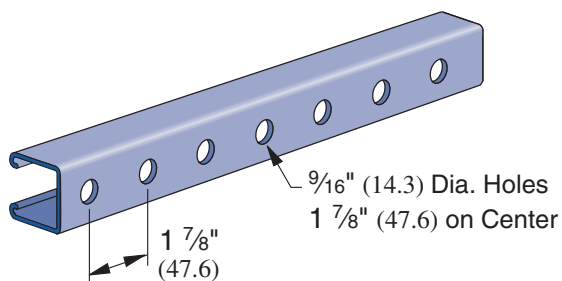
FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)



Channel - P1000 HS



BEAM LOADING – P1000 HS

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	1520	0.06	1520	1520	1520
36	1020	0.13	1020	1020	810
48	770	0.22	770	680	460
60	610	0.35	590	440	290
72	500	0.5	410	310	200
84	430	0.68	300	230	150
96	380	0.89	230	170	120
108	340	1.13	180	140	90
120	310	1.4	140	110	70
144	250	2.01	100	70	50
168	220	2.74	70	50	40
192	190	3.57	50	50	NR
216	170	4.52	50	40	NR
240	150	5.58	40	NR	NR

Note: Beam load shown above is 90% of the P1000 beam load.

COLUMN LOADING – P1000 HS

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	3,450	10,750	9,900	8,770	7,730
36	3,050	8,910	7,730	6,370	5,280
48	2,660	7,250	5,980	4,660	3,770
60	2,290	5,890	4,660	3,600	2,940
72	2,000	4,800	3,770	2,940	2,380
84	1,760	4,010	3,170	2,460	1,970
96	1,570	3,450	2,730	2,090	1,650
108	1,410	3,020	2,380	1,800	**
120	1,270	2,680	2,090	**	**

P1000 HS BRACE DESIGN LOAD

Unsupported Length	Compression Load*	
in (mm)	lbs	(KN)
24 (610)	4,200	18.50
36 (914)	3,650	16.00
48 (1219)	3,130	13.50
60 (1524)	2,650	11.50
72 (1829)	2,230	9.50
84 (2134)	1,850	8.00
96 (2438)	1,570	6.50
108 (2743)	1,360	6.00
120 (3048)	1,200	5.00

*Note: 1. Maximum axial load under seismic loading conditions.
2. The design load shall not exceed the allowable loads for connection detail.

Wt/100 Ft: 190 Lbs (283 kg/100 m)
Allowable Moment 5,080 In-Lbs (570 N•m)
Standard Lengths: 10' & 20'

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

For other materials, see Unistrut General Engineering Catalog

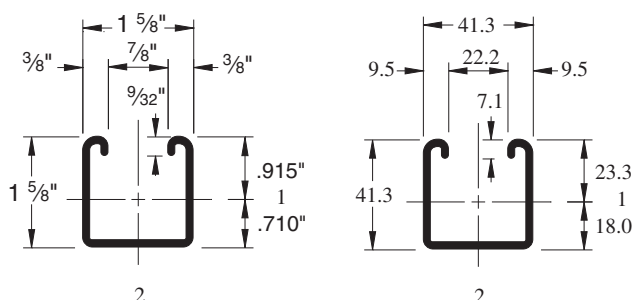
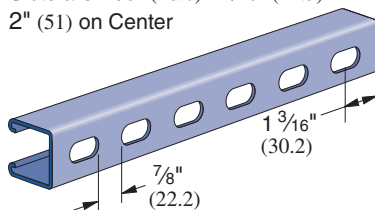
FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)

Channel - P1000 T

Slots are 1 1/8" (28.6) x 9/16" (14.3)
2" (51) on Center



BEAM LOADING – P1000 T

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	1440	0.06	1440	1440	1440
36	960	0.13	960	960	770
48	720	0.22	720	650	430
60	580	0.35	550	420	270
72	480	0.5	380	290	190
84	410	0.68	280	210	140
96	360	0.89	210	160	110
108	320	1.13	170	130	90
120	290	1.4	140	100	70
144	240	2.01	90	70	50
168	200	2.74	70	50	30
192	180	3.57	50	40	NR
216	160	4.52	40	30	NR
240	140	5.58	30	NR	NR

Note: Beam load shown above is 85% of the P1000 beam load.

COLUMN LOADING – P1000 T

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	3,450	10,750	9,900	8,770	7,730
36	3,050	8,910	7,730	6,370	5,280
48	2,660	7,250	5,980	4,660	3,770
60	2,290	5,890	4,660	3,600	2,940
72	2,000	4,800	3,770	2,940	2,380
84	1,760	4,010	3,170	2,460	1,970
96	1,570	3,450	2,730	2,090	1,650
108	1,410	3,020	2,380	1,800	**
120	1,270	2,680	2,090	**	**

P1000 T BRACE DESIGN LOAD

Unsupported Length in (mm)	Compression Load*	
	lbs	(KN)
24 (610)	4,200	18.50
36 (914)	3,650	16.00
48 (1219)	3,130	13.50
60 (1524)	2,650	11.50
72 (1829)	2,230	9.50
84 (2134)	1,850	8.00
96 (2438)	1,570	6.50
108 (2743)	1,360	6.00
120 (3048)	1,200	5.00

*Note: 1. Maximum axial load under seismic loading conditions.
2. The design load shall not exceed the allowable loads for connection detail.

Wt/100 Ft: 185 Lbs (275 kg/100 m)
Standard Lengths: 10' & 20'

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

For other materials, see Unistrut General Engineering Catalog

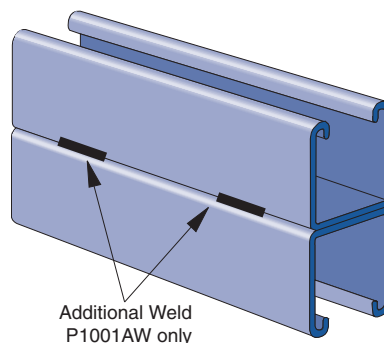
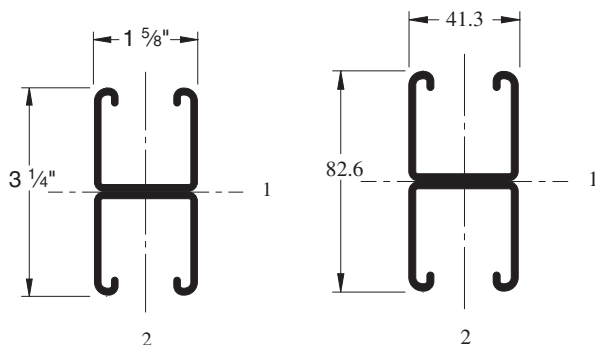
FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)



Channel - P1001/P1001AW



Channel Finishes:
PL, GR, HG, PG;
Standard Lengths:
10' & 20'

COLUMN LOADING – P1001/P1001AW

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	6,430	25,060	24,620	23,900	23,050
36	6,230	24,000	23,050	21,570	19,890
48	5,950	22,590	21,030	18,690	16,170
60	5,620	20,890	18,690	15,540	12,400
72	5,240	18,990	16,170	12,400	8,960
84	4,830	16,970	13,640	9,470	6,580
96	4,390	14,900	11,200	7,250	5,040
108	3,930	12,860	8,960	5,730	3,980
120	3,510	10,910	7,250	4,640	**

BEAM LOADING – P1001/P1001AW

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	3,130 *	0.03	3,130 *	3,130 *	3,130 *
36	3,130 *	0.07	3,130 *	3,130 *	3,130 *
48	2,400	0.13	2,400	2,400	2,400
60	1,920	0.20	1,920	1,920	1,630
72	1,600	0.28	1,600	1,600	1,130
84	1,370	0.39	1,370	1,240	830
96	1,200	0.50	1,200	950	640
108	1,070	0.64	1,000	750	500
120	960	0.79	810	610	410
144	800	1.13	560	420	280
168	690	1.54	410	310	210
192	600	2.01	320	240	160
216	530	2.55	250	190	130
240	480	3.15	200	150	100

*Load limited by weld shear.

Wt/100 Ft: 380 Lbs (566 kg/100 m)
Allowable Moment 14,390 In-Lbs (1,630 N•m)

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

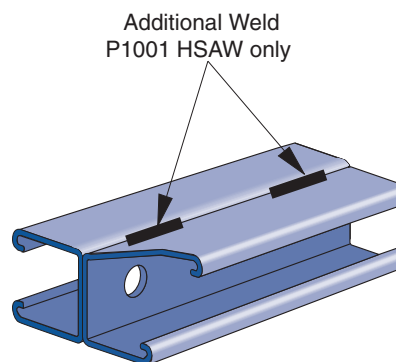
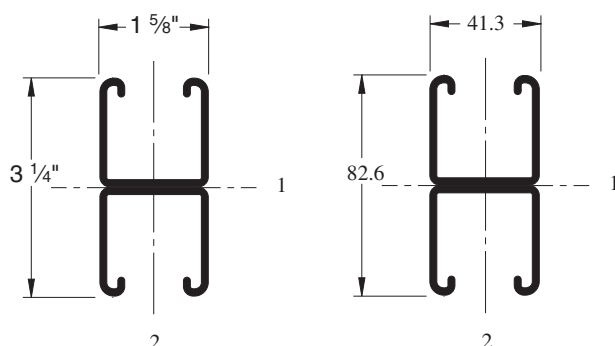
For other materials, see Unistrut General Engineering Catalog

FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)

Channel - P1001 HS/P1001 HSAW



Channel Finishes:
PL, GR, HG, PG;
Standard Lengths:
10' & 20'

COLUMN LOADING – P1001 HS/P1001 HSAW

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	6,430	25,060	24,620	23,900	23,050
36	6,230	24,000	23,050	21,570	19,890
48	5,950	22,590	21,030	18,690	16,170
60	5,620	20,890	18,690	15,540	12,400
72	5,240	18,990	16,170	12,400	8,960
84	4,830	16,970	13,640	9,470	6,580
96	4,390	14,900	11,200	7,250	5,040
108	3,930	12,860	8,960	5,730	3,980
120	3,510	10,910	7,250	4,640	**

BEAM LOADING – P1001 HS/P1001 HSAW

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	2820 *	0.03	2820	2820 *	2820
36	2820 *	0.07	2820	2820 *	2820
48	2160	0.13	2160	2160	2160
60	1730	0.2	1730	1730	1470
72	1440	0.28	1440	1440	1020
84	1230	0.39	1230	1120	750
96	1080	0.5	1080	860	580
108	960	0.64	900	680	450
120	860	0.79	730	550	370
144	720	1.13	500	380	250
168	620	1.54	370	280	190
192	540	2.01	290	220	140
216	480	2.55	230	170	120
240	430	3.15	180	140	90

*Load limited by weld shear.

Note: Beam load shown above is 90% of the P1001 beam load.

Wt/100 Ft: 380 Lbs (566 kg/100 m)
Allowable Moment 14,390 In-Lbs (1,630 N•m)

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

For other materials, see Unistrut General Engineering Catalog

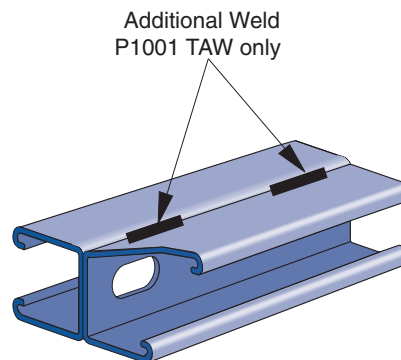
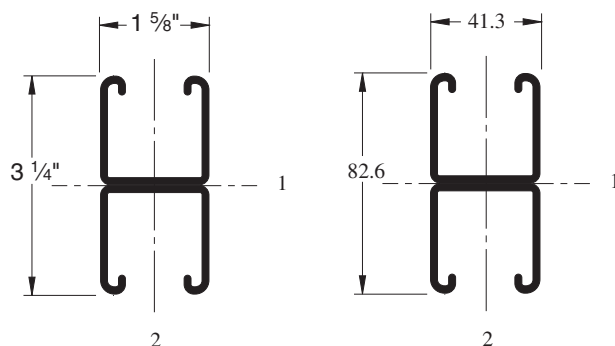
FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)



Channel - P1001 T/P1001 TAW



Channel Finishes:
PL, GR, HG, PG;
Standard Lengths:
10' & 20'

COLUMN LOADING – P1001 T/P1001 TAW

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	6,430	25,060	24,620	23,900	23,050
36	6,230	24,000	23,050	21,570	19,890
48	5,950	22,590	21,030	18,690	16,170
60	5,620	20,890	18,690	15,540	12,400
72	5,240	18,990	16,170	12,400	8,960
84	4,830	16,970	13,640	9,470	6,580
96	4,390	14,900	11,200	7,250	5,040
108	3,930	12,860	8,960	5,730	3,980
120	3,510	10,910	7,250	4,640	**

BEAM LOADING – P1001 T/P1001 TAW

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	2660 *	0.03	2660	2660 *	2660
36	2660 *	0.07	2660	2660 *	2660
48	2040	0.13	2040	2040	2040
60	1630	0.2	1630	1630	1390
72	1360	0.28	1360	1360	960
84	1160	0.39	1160	1050	710
96	1020	0.5	1020	810	540
108	910	0.64	850	640	430
120	820	0.79	690	520	350
144	680	1.13	480	360	240
168	590	1.54	350	260	180
192	510	2.01	270	200	140
216	450	2.55	210	160	110
240	410	3.15	170	130	90

*Load limited by weld shear.

Note: Beam load shown above is 85% of the P1001 beam load.

Wt/100 Ft: 380 Lbs (566 kg/100 m)
Allowable Moment 14,390 In-Lbs (1,630 N•m)

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

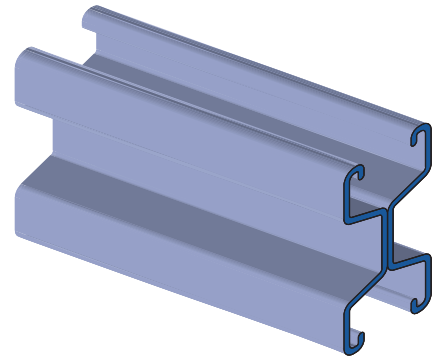
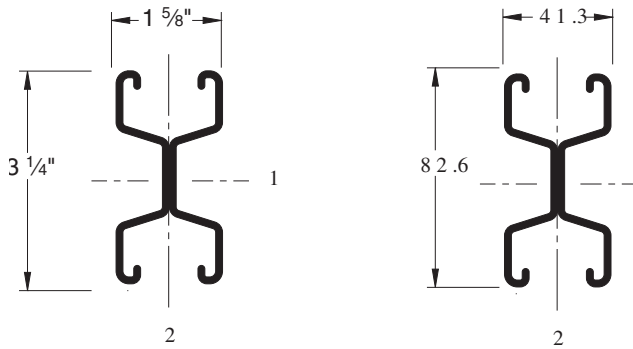
For other materials, see Unistrut General Engineering Catalog

FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)

Channel - P1001 K



For loading information,
please contact Unistrut.

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

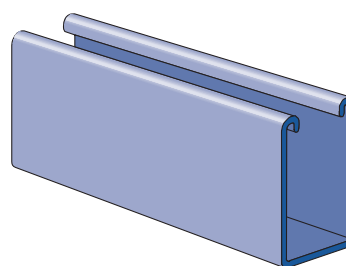
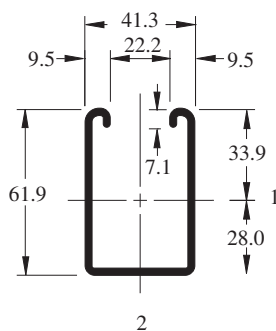
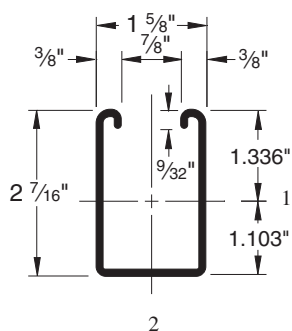
For other materials, see Unistrut General Engineering Catalog

FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)

Channel - P5500



Channel Finishes:
PL, GR, HG, PG;
Standard Lengths:
10' & 20'

COLUMN LOADING – P5500

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	4,580	13,860	12,610	10,910	9,300
36	4,010	11,120	9,300	7,190	5,550
48	3,370	8,550	6,580	4,800	3,800
60	2,810	6,430	4,800	3,610	2,920
72	2,410	4,970	3,800	2,920	2,390
84	2,120	4,060	3,160	2,460	2,020
96	1,900	3,450	2,720	2,130	1,740
108	1,720	3,000	2,390	1,870	1,520
120	1,570	2,670	2,130	1,660	**

BEAM LOADING – P5500

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	3,280	0.04	3,280	3,280	3,280
36	2,190	0.09	2,190	2,190	2,190
48	1,640	0.15	1,640	1,640	1,430
60	1,310	0.24	1,310	1,310	910
72	1,090	0.34	1,090	950	630
84	940	0.47	930	700	470
96	820	0.61	710	540	360
108	730	0.77	560	420	280
120	660	0.96	460	340	230
144	550	1.38	320	240	160
168	470	1.87	230	170	120
192	410	2.45	180	130	90
216	360	3.10	140	110	70
240	330	3.82	110	90	60

Wt/100 Ft: 247 Lbs (368 kg/100 m)
Allowable Moment 9,830 In-Lbs (1,110 N•m)
12 Gauge Nominal Thickness .105" (2.7mm)

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

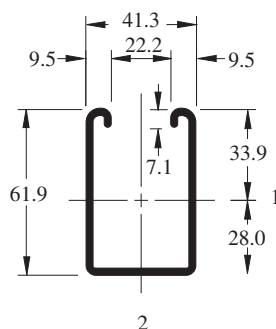
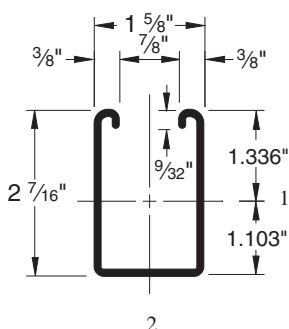
For other materials, see Unistrut General Engineering Catalog

FINISHES

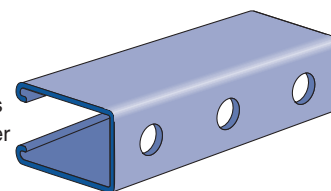
All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)

Channel - P5500 HS



9/16" (14.3) Dia. Holes
1 7/8" (47.6) on Center



COLUMN LOADING – P5500 HS

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	4,580	13,860	12,610	10,910	9,300
36	4,010	11,120	9,300	7,190	5,550
48	3,370	8,550	6,580	4,800	3,800
60	2,810	6,430	4,800	3,610	2,920
72	2,410	4,970	3,800	2,920	2,390
84	2,120	4,060	3,160	2,460	2,020
96	1,900	3,450	2,720	2,130	1,740
108	1,720	3,000	2,390	1,870	1,520
120	1,570	2,670	2,130	1,660	**

BEAM LOADING – P5500 HS

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	2950	0.03	2950	2950	2950
36	1970	0.07	1970	1970	1970
48	1480	0.13	1480	1480	1290
60	1180	0.2	1180	1180	820
72	980	0.28	980	860	570
84	850	0.39	840	630	420
96	740	0.5	640	490	320
108	660	0.64	500	380	250
120	590	0.79	410	310	210
144	500	1.13	290	220	140
168	420	1.54	210	150	110
192	370	2.01	160	120	80
216	320	2.55	130	100	60
240	300	3.15	100	80	50

Note: Beam load shown above is 90% of the P5500 beam load.

Wt/100 Ft: 242 Lbs (360 kg/100 m)
Allowable Moment 9,830 In-Lbs (1,110 N•m)
12 Gauge Nominal Thickness .105" (2.7mm)

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

For other materials, see Unistrut General Engineering Catalog

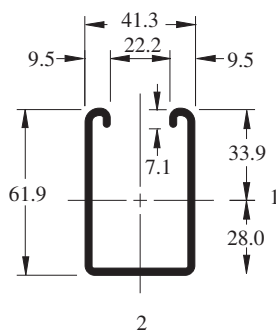
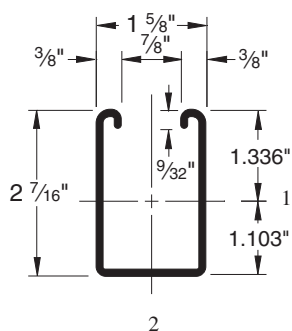
FINISHES

All channels are available in:

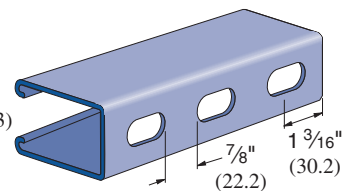
- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)



Channel - P5500 T



Slots are
 $1\frac{1}{8}$ " (28.6) x $\frac{9}{16}$ " (14.3)
 2" (51) on Center



COLUMN LOADING – P5500 T

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	4,580	13,860	12,610	10,910	9,300
36	4,010	11,120	9,300	7,190	5,550
48	3,370	8,550	6,580	4,800	3,800
60	2,810	6,430	4,800	3,610	2,920
72	2,410	4,970	3,800	2,920	2,390
84	2,120	4,060	3,160	2,460	2,020
96	1,900	3,450	2,720	2,130	1,740
108	1,720	3,000	2,390	1,870	1,520
120	1,570	2,670	2,130	1,660	**

BEAM LOADING – P5500 T

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	2790	0.03	2790	2790	2790
36	1860	0.07	1860	1860	1860
48	1390	0.13	1390	1390	1220
60	1110	0.2	1110	1110	770
72	930	0.28	930	810	540
84	800	0.39	790	600	400
96	700	0.5	600	460	310
108	620	0.64	480	360	240
120	560	0.79	390	290	200
144	470	1.13	270	200	140
168	400	1.54	200	140	100
192	350	2.01	150	110	80
216	310	2.55	120	90	60
240	280	3.15	90	80	50

Note: Beam load shown above is 85% of the P5500 beam load.

Wt/100 Ft: 242 Lbs (360 kg/100 m)
 Allowable Moment 9,830 In-Lbs (1,110 N•m)
 12 Gauge Nominal Thickness .105" (2.7mm)

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

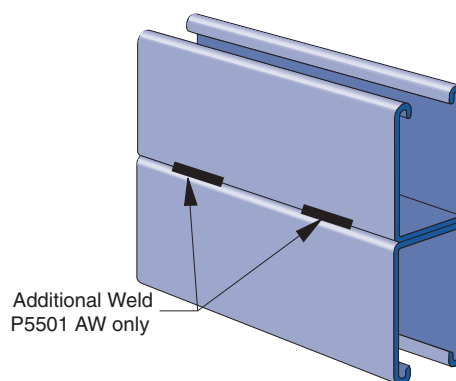
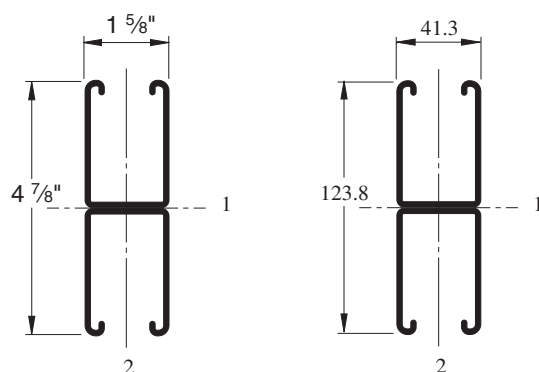
For other materials, see Unistrut General Engineering Catalog

FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)

Channel - P5501/P5501AW



Channel Finishes:
PL, GR, HG, PG;
Standard Lengths:
10' & 20'

COLUMN LOADING – P5501/P5501AW

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	8,650	32,840	32,310	31,440	30,410
36	8,450	31,560	30,410	28,610	26,550
48	8,180	29,850	27,950	25,070	21,960
60	7,830	27,780	25,070	21,160	17,200
72	7,420	25,450	21,960	17,200	12,730
84	6,940	22,950	18,770	13,460	9,350
96	6,410	20,360	15,660	10,310	7,160
108	5,810	17,780	12,730	8,150	5,660
120	5,220	15,280	10,310	6,600	**

BEAM LOADING – P5501/P5501AW

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	4,680 *	0.02	4,680 *	4,680 *	4,680 *
36	4,680 *	0.05	4,680 *	4,680 *	4,680 *
48	4,680 *	0.08	4,680 *	4,680 *	4,680 *
60	3,870	0.13	3,870	3,870	3,870
72	3,220	0.19	3,220	3,220	3,220
84	2,760	0.26	2,760	2,760	2,510
96	2,420	0.34	2,420	2,420	1,920
108	2,150	0.42	2,150	2,150	1,520
120	1,930	0.52	1,930	1,840	1,230
144	1,610	0.76	1,610	1,280	850
168	1,380	1.03	1,250	940	630
192	1,210	1.34	960	720	480
216	1,070	1.70	760	570	380
240	970	2.10	610	460	310

*Load limited by weld shear.

Wt/100 Ft: 494 Lbs (735 kg/100 m)
Allowable Moment 29,000 In-Lbs (3,280 N•m)
12 Gauge Nominal Thickness .105" (2.7mm)

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

For other materials, see Unistrut General Engineering Catalog

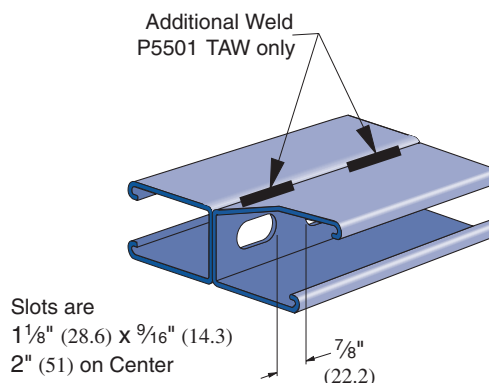
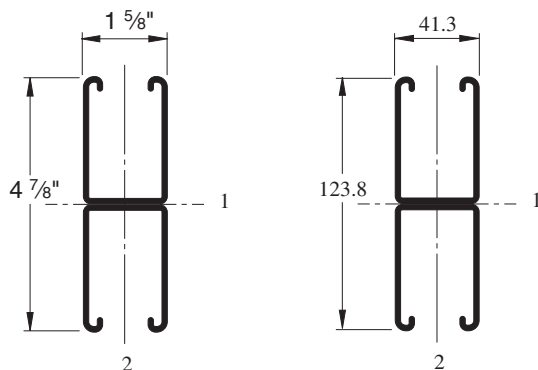
FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)



Channel - P5501 T/ P5501 TAW



Channel Finishes:
PL, GR, HG, PG;
Standard Lengths:
10' & 20'

COLUMN LOADING – P5501 T

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	8,650	32,840	32,310	31,440	30,410
36	8,450	31,560	30,410	28,610	26,550
48	8,180	29,850	27,950	25,070	21,960
60	7,830	27,780	25,070	21,160	17,200
72	7,420	25,450	21,960	17,200	12,730
84	6,940	22,950	18,770	13,460	9,350
96	6,410	20,360	15,660	10,310	7,160
108	5,810	17,780	12,730	8,150	5,660
120	5,220	15,280	10,310	6,600	**

BEAM LOADING – P5501 T

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	3980 *	0.03	3980	3980 *	3980
36	3980 *	0.07	3980	3980 *	3980
48	3980	0.13	3980	3980	3980
60	3290	0.2	3290	3290	3290
72	2740	0.28	2740	2740	2740
84	2350	0.39	2350	2350	2130
96	2060	0.5	2060	2060	1630
108	1830	0.64	1830	1830	1290
120	1640	0.79	1640	1560	1050
144	1370	1.13	1370	1090	720
168	1170	1.54	1060	800	540
192	1030	2.01	820	610	410
216	910	2.55	650	480	320
240	820	3.15	520	390	260

*Load limited by weld shear.

Note: Beam load shown above is 85% of the P5501 beam load.

Wt/100 Ft: 494 Lbs (735 kg/100 m)
Allowable Moment 29,000 In-Lbs (3,280 N•m)
12 Gauge Nominal Thickness .105" (2.7mm)

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

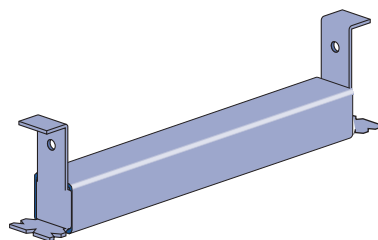
For other materials, see Unistrut General Engineering Catalog

FINISHES

All channels are available in:

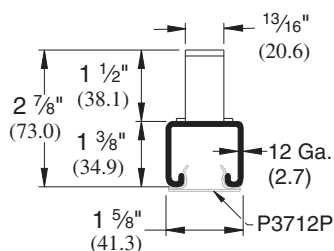
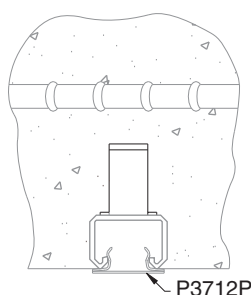
- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)

Concrete Inserts - P3249 thru P3252

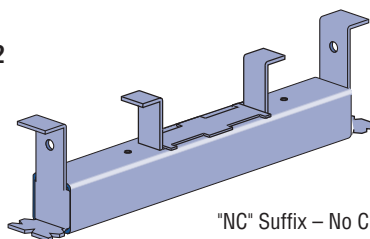


"NC" Suffix – No Closure Strip, With End Caps

"WC" Suffix – With Closure Strip & End Caps

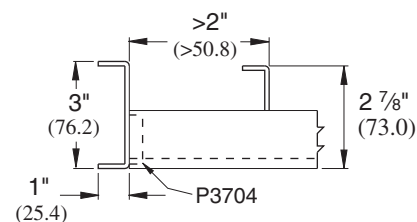


P3252



"NC" Suffix – No Closure Strip, With End Caps

"WC" Suffix – With Closure Strip & End Caps



Part Number	Insert Length In/Ft (mm)	Wt/100 pcs Lbs (kg)	Max. Allowable Point Load Lbs (kg)	Min. Spacing of Pt. Loads In (mm)	Max. Allowable Uniform Load Lbs (kg)
P3249	3" 76.2	85 38.6	500 226.8	—	500 226.8
P3250	4" 101.6	100 45.4	800 362.9	—	800 362.9
P3251	6" 152.4	130 59.0	1,000 453.6	—	1,000 453.6
P3252	8" 203.2	159 72.1	1,200 544.3	—	1,200 544.3

-  when used for sprinkler systems.
- Includes closure and end caps unless otherwise requested.
- P3280 end cap used when distance to first anchor is up to 2" (50.8 mm).
- P3704 end cap is used when end distance to first anchor is over 2" (50.8 mm).
- Nail or anchor inserts to forms every 16" (406 mm) to 24" (610 mm).
- Anchors are 8" (203.2 mm) on center.

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

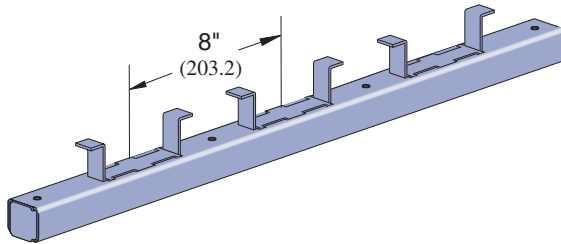
For other materials, see Unistrut General Engineering Catalog

FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)

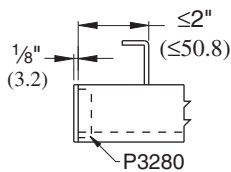
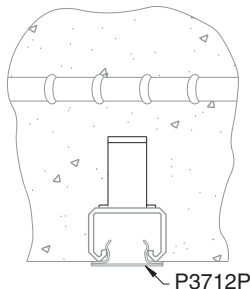
Concrete Inserts - P3253 thru P3270



"NC" Suffix – No Closure Strip, W/End Caps & Back Plates

"WC" Suffix – W/Closure Strip, End Caps & Back Plates

"X" – No Closure Strip, No End Caps, W/Back Plates



-  when used for sprinkler systems.
- Includes closure and end caps unless otherwise requested.
- P3280 end cap used when distance to first anchor is up to 2" (50.8 mm).
- P3704 end cap is used when end distance to first anchor is over 2" (50.8 mm).
- Nail or anchor inserts to forms every 16" (406 mm) to 24" (610 mm).
- Anchors are 8" (203.2 mm) on center.

Part Number	Insert Length In/Ft (mm)	Wt/100 pcs Lbs (kg)	Max. Allowable Point Load Lbs (kg)	Min. Spacing of Pt. Loads In (mm)	Max. Allowable Uniform Load Lbs (kg)
P3253	12" 304.8	227 103.0	2,000 907.2	—	2,000 907.2
P3254	16" 406.4	270 122.5	2,000 907.2	12 304.8	4,000 1,814.4
P3255	20" 508.0	357 161.9	2,000 907.2	12 304.8	4,000 1,814.4
P3256	24" 609.6	399 181.0	2,000 907.2	12 304.8	4,000 1,814.4
P3257	32" 812.8	527 239.0	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3257A	36" 914.4	616 279.4	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3258	40" 1,016.0	661 299.8	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3259	4' 1,219.2	786 356.5	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3260	5' 1,524.0	1,003 455.0	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3261	6' 1,828.8	1,173 532.1	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3262	7' 2,133.6	1,390 630.5	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3263	8' 2,438.4	1,560 707.6	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3264	9' 2,743.2	1,741 789.7	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3265	10' 3,048.0	1,947 883.1	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3266	12' 3,657.6	2,334 1,058.7	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3267	14' 4,267.2	2,717 1,232.4	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3268	16' 4,876.8	3,116 1,413.4	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3269	18' 5,486.4	3,530 1,601.2	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)
P3270	20' 6,096.0	3,882 1,760.8	2,000 907.2	12 304.8	2,000 Lbs./Ft. 2,976.3 (kg/m)

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

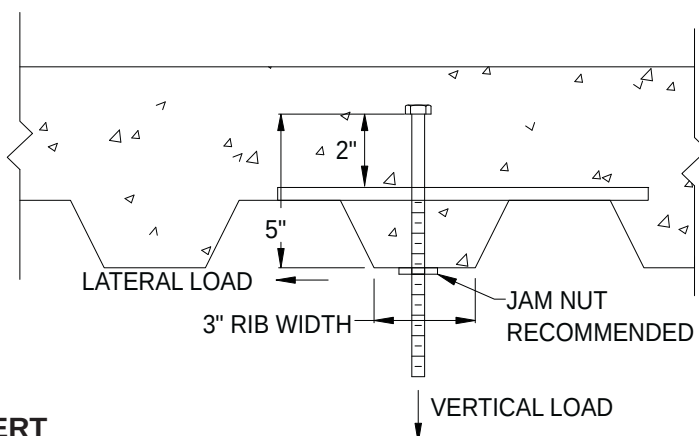
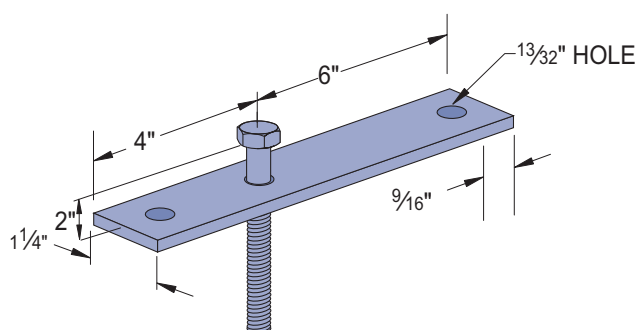
For other materials, see Unistrut General Engineering Catalog

FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)

Concrete Inserts - P3700

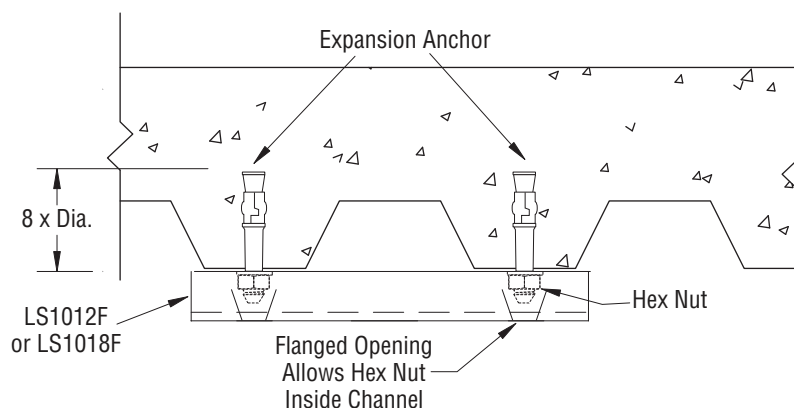
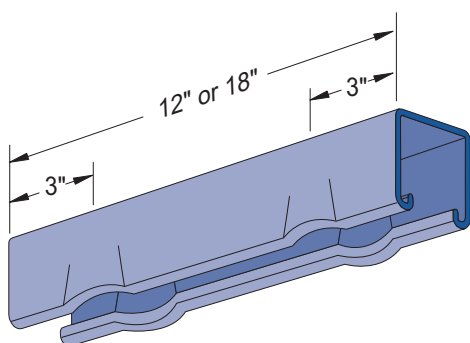


P3700 SERIES CONCRETE INSERT

Part No.	Rod Diameter in	Tension Load		Shear Load	
		lbs	KN	lbs	KN
P3700-37	3/8	850	3,781	600	2,669
P3700-50	1/2	1380	6,138	1000	4,448
P3700-62	5/8	1920	8,540	1760	7,828

Note: 1) Allowable loads have been determined by the manufacturer's testing, analysis, and technical specification.
2) Values are based on a safety factor of 5.

Concrete Inserts - LS1012F & LS1018F



Notes:

1. Channel Section P1000.
2. Holes in back, 2 each, are 1 1/16" for up to 5/8" Anchors.
3. Add -075 to part number for 3/4" anchors (Example LS 1012F-075 PG).

Part Number	Length
LS 1012F	12"
LS 1018F	18"

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: Plain; 12 Ga. (2.7 mm), ASTM A1011 GR33

STEEL: Pre-Galvanized; 12 Ga. (2.7 mm), ASTM A653 GR 33

For other materials, see Unistrut General Engineering Catalog

FINISHES

All channels are available in:

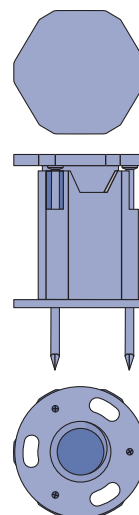
- Perma Green II (GR)
- Pre-Galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)



Concrete Inserts - Wood-Knocker™

Wood-Knocker Concrete Inserts are installed onto wooden forms used to support a newly poured concrete floor slabs, roof slabs or walls. When the forms are stripped, the color-coded flange is easily and visibly embedded in the concrete surface. The inserts allow the attachment of steel threaded rod or threaded bolts in sizes ranging from 1/4" to 3/4" in diameter. The unique six-sided impact plate offers resistance to rotation within the concrete as a steel threaded rod or threaded bolt is being installed.

Wood-Knockers are simply hammered into the wood forms. The concrete is then poured. After the concrete cures the forms are stripped away, the underside of the insert is exposed and ready to receive rod.



WOOD-KNOCKER FORM INSERT - ENGINEERING DATA TABLE											
Rod Hanger Suport Insert for Light-Weight and Normal-Weight Concrete Form Pours											
Average ULTIMATE LOAD CAPACITIES (Installation in Lightweight or Normal-Weight Concrete ^{1,2})											
Part No.	Size (in)	Color Code	Embedment Depth (in)	Min. Spacing	Min. Edge Distance	Normal Weight fc=3,000 psi		Normal Weight fc=4,500 psi		Light Weight fc=3,000 psi	
				(in)	(in)	Tension (lb)	Shear (lb)	Tension (lb)	Shear (lb)	Tension (lb)	Shear (lb)
7550	1/4	Brown	2	9	6	3,720	1,490	4,250	1,610	4,270	1,680
7552	3/8	Green	2	9	6	4,820	5,330	7,190	5,620	4,270	5,280
7554	1/2	Yellow	2	9	6	4,820	7,400	7,190	8,590	4,270	7,180
7556	5/8	Red	2	9	6	4,650	-	8,440	-	4,600	-
				12	9	4,650	11,360	8,440	13,010	4,600	7,590
7558	3/4	Purple	2	9	6	4,650	-	7,350	-	4,600	-
				12	9	4,650	11,360	7,350	14,590	4,600	7,590
¹ Based on Independent Test Results from CEL Consulting,Oakland,CA. Report No.3R116 August 15,2003.Testing with ASTM A 193 Grade B7 rod.											
² Testing was performed in accordance with ASTM E 488-96 for Strength of Anchors in Concrete and Masonry Elements using ASTM A 193 Grade B7 threaded rod.											
Design Notes:											
D											
of 3:1 to determine the allowable working load.											
The allowable working load must be the lesser of insert capacity or steel strength of threaded rod.											

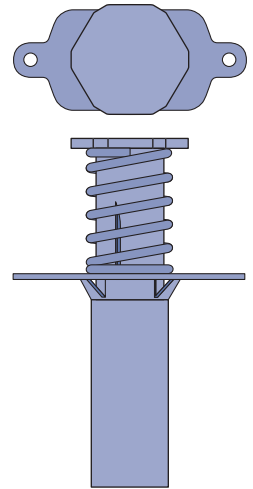
A coil thread design is available for Wood-Knocker upon request in 1/2" and 3/4" sizes for forming applications

Concrete Inserts - Bang-It™

Bang-It Concrete Inserts are designed for installation in and through metal composite deck (i.e. "pan deck") used to support a newly poured concrete floors or roof slabs. After pre-drilling the deck and installing, the protective sleeve of the insert protrudes below the surface of the deck allowing overhead attachment of steel threaded rod in sizes ranging from 1/4" to 3/4" in diameter. The protective sleeve prevents sprayed fireproofing material and acoustical dampening products from clogging the internal threads of the insert. It also prevent burying, masking or losing the insert location. The unique, six-sided impact plat offers resistance to rotation within the concrete as a steel threaded rod is being installed.

Drill the metal pan deck and simply step on the Bang-It. The insert will click into place and fit securely with the deck. After installation, the inserts are ready for the pour. When the concrete is cured the insert is ready to receive rod.

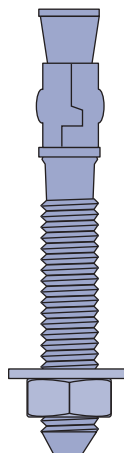
A coil thread design is available for Bang-It upon request in 1/2" and 3/4" sizes for forming applications.



BANG-IT DECK INSERT - ENGINEERING DATA TABLE									
Rod Hanger Support Insert for Light-Weight and Normal-Weight Concrete over Metal Deck									
Average ULTIMATE LOAD CAPACITIES									
(Installation in min. 3000 psi Light-Weight or Normal-Weight Concrete over Metal Deck ^{1,2,3})									
Part No.	Insert Size (In)	Color Code	Predrilled Hole	Embedment Depth (In)	Insert Location In Deck	Min. Spacing (In)	Min. End Distance (In)	F'c= 3000 Psi	
								Tension (Lb)	Shear (Lb)
7540	¼"	Brown	13⁄16"	2	Upper Flute	9	12	4,450	2,500
					Lower Flute	9	12	3,320	2,500
7542	⅜"	Green	13⁄16"	2	Upper Flute	9	12	5,750	3,350
					Lower Flute	9	12	3,320	3,350
7544	½"	Yellow	13⁄16"	2	Upper Flute	9	12	7,110	3,350
					Lower Flute	9	12	3,320	3,350
7546	⅝"	Red	13⁄16"	2	Upper Flute	9	12	8,810	3,350
					Lower Flute	9	12	3,960	-
					Lower Flute	12	12	3,960	3,350
7548	¾"	Purple	13⁄16"	2	Upper Flute	9	12	8,810	3,350
					Lower Flute	9	12	3,960	-
					Lower Flute	12	12	3,960	3,350
¹ Based on Independent Test Data from CEL Consulting, Oakland, CA, Report No. 3R117 August 15, 2003.									
² Testing was performed in accordance with ASTM E 488-96 for Strength of Anchors in Concrete and Masonry Elements using ASTM A 193 Grade B7 threaded rod.									
³ Install minimum distance of 1" from anchor centerline to corner of deck flute.									
Design Notes:									
Dep									
determine the allowable working load. Allowable working load capacities are recommended as:									
Min. SAFETY FACTOR of 3:1 for installations in the UPPER FLUTE									
Min. SAFETY FACTOR of 4:1 for installations in the LOWER FLUTE.									
The allowable working load must be the lesser of insert capacity or steel strength of threaded rod.									



Concrete Inserts - Power-Stud™ Wedge Type Expansion Anchor



The table on the right indicates the various sizes of expansion anchor. The tables on the following page indicate the load characteristics for each size anchor.

Part No.	Size	Thread Len.	Wt./100
7400	1/4" x 1-3/4"	3/4"	3
7402	1/4" x 2-1/4"	1-1/4"	3-1/2
7404	1/4" x 3-1/4"	2-1/4"	4-3/4
7410	3/8" x 2-1/4"	1-1/4"	8-3/4
7412	3/8" x 2-3/4"	1-5/8"	9-1/2
7413	3/8" x 3"	1-7/8"	10-3/4
7414	3/8" x 3-1/2"	2-3/8"	12
7415	3/8" x 3-3/4"	2-5/8"	12-3/4
7416	3/8" x 5"	3-7/8"	15-1/2
7417	3/8" x 7"	5-7/8"	21
7420	1/2" x 2-3/4"	1-3/8"	18
7422	1/2" x 3-3/4"	2-3/8"	23
7423	1/2" x 4-1/2"	3-1/8"	28
7424	1/2" x 5-1/2"	4-1/8"	32
7426	1/2" x 7"	5-5/8"	44
7427	1/2" x 8-1/2"	7-1/8"	46
7430	5/8" x 3-1/2"	2"	40
7432	5/8" x 4-1/2"	3"	54
7433	5/8" x 5"	3-1/2"	57
7434	5/8" x 6"	4-1/2"	64
7436	5/8" x 7"	5-1/2"	72
7438	5/8" x 8-1/2"	7"	84
7439	5/8" x 10"	8-1/2"	100
7440	3/4" x 4-1/4"	2-3/8"	70
7441	3/4" x 4-3/4"	2-7/8"	76
7442	3/4" x 5-1/2"	3-5/8"	85
7444	3/4" x 6-1/4"	4-3/8"	95
7446	3/4" x 7"	5-1/8"	105
7448	3/4" x 8-1/2"	6-5/8"	120
7449	3/4" x 10"	8-1/8"	135
7451	3/4" x 12"	10-1/8"	155
7450	7/8" x 6"	2-3/4"	120
7452	7/8" x 8"	4-3/4"	160
7454	7/8" x 10"	6-3/4"	200
7461	1" x 6"	2-3/8"	170
7463	1" x 9"	5-3/8"	240
7465	1" x 12"	8-3/8"	300
7473	1-1/4" x 9"	4-3/4"	360
7475	1-1/4" x 12"	7-3/4"	480

Concrete Inserts - Power-Stud™ Wedge Type Expansion Anchor [continued]

Insert Size (In)	Embedment Depth (In)	Installation Torque Guide Values (Ft-lbs)	F'c= 2000 Psi			F'c= 4000 Psi			F'c= 6000 Psi		
			Tension (Lb)		Shear (Lb)	Tension (Lb)		Shear (Lb)	Tension (Lb)		Shear (Lb)
			With Sp. ins.	Without Sp. ins.		With Sp. ins.	Without Sp. ins.		With Sp. ins.	Without Sp. ins.	
1/4	1 1/8	8	310	155	395	360	180	405	435	215	405
	2	8	475	235	395	520	260	405	525	260	405
3/8	1 5/8	28	480	240	890	760	380	940	760	380	940
	3	28	1025	510	995	1,505	755	940	1,505	755	940
1/2	2 1/4	60	860	430	1,635	1,390	695	1,700	1,635	820	1700
	4	60	1,425	710	1,635	2,040	1,020	1,700	2,300	1150	1700
5/8	2 3/4	90	1,560	785	2,320	2,075	1,040	2,975	2,465	1235	2975
	5	90	2,660	1330	2,320	3,125	1,565	2,975	4,100	2050	2975
3/4	3 3/8	175	1,855	930	3,095	2,185	1,095	3,765	3,135	1565	3765
	6	175	1,860	930	3,095	3,115	1,560	3,765	5,045	2520	3765
7/8	3 7/8	250	1,475	740	4,490	3,075	1,540	6,040	4,325	2160	6040
	7	250	1,805	900	4,490	5,110	2,555	6,040	7,795	3900	6040
1	4 1/2	300	2,185	1,095	6,605	3,455	1,730	7,775	9,230	4615	7775
	8	300	5,590	2,795	6,605	6,760	3,380	7,775	11,055	5525	7775
1 1/4	5 1/2	450	3,820	1,910	10,205	6,745	3,370	10,205	9,230	4615	10205
	10	450	6,510	3,255	10,205	13,070	6,535	10,205	15,170	7,585	10205

¹ The comprese of installation. Linear interpolation may be used for concrete strengths between those listed.

² The tabulated values are for anchors installed with spacing and edge distance in acc. with table below.

³ The allowable loads may be increased by 33⅓% for short-term loading due to seismic or wind forces.

⁴ Concrete slab thickness must be at least 1½ hv. Compliance with Section 1907.7 of the code must be provided.

POWER-STUD ANCHOR ALLOWABLE SPACING AND EDGE-DISTANCE ^{1,2}			
	Distance for Full Anchor Capacity	Distance for Reduced Anchor Capacity	Reduction Factor
Spacing Between Anchors (S)	4* <i>h_v</i>	2* <i>E</i>	0.5
Edge Distance - Tension Loads (M)	12* <i>D</i>	5* <i>D</i>	0.75
Edge Distance - Shear Loads (M)	12* <i>D</i>	5* <i>D</i>	0.35

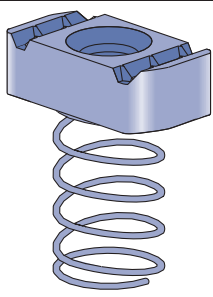
¹ *h_v*= embedment depth; *D*= anchor diameter.

When adjacent anchors are different sizes or embedments, use the largest and deepest values for *D* and *E*.

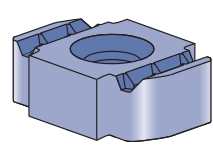
² *L*
spacing or edge distance listed.

Use interpolation for spacing and edge distance between critical and minimum distances. Multiple reduction factors (such as 2 edges, or spacing and edge, etc.) are calculated separately and multiplied.

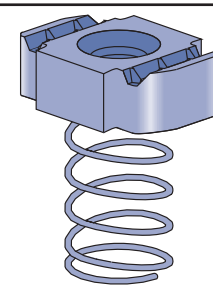
P1006 thru P1010

	Channel nut Part number	Nut Size Thread	Wt/100 pcs Lbs (kg)
	P1006-1420	¼" -20	7 3.2
	P1008	⅜" -16	10 4.5
	P1010	½" -13	12 5.4
For Use With Channel P1000, P1100, P2000, P3000			

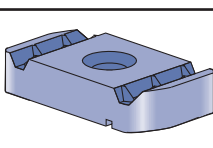
P1012 & P1023

	Channel nut Part number	Nut Size Thread	Wt/100 pcs Lbs (kg)
	P1012	⅝" -11	20 9.1
	P1023	¾" -10	20 9.1
	P1024	⅞" -9	20 9.1
For Use With Channel P1000, P1100, P2000, P3000, P5000, P5500			

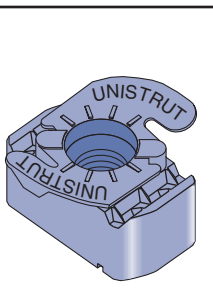
P1012S & P1023S

	Channel nut Part number	Nut Size Thread	Wt/100 pcs Lbs (kg)
	P1012S	⅝" -11	21 9.5
	P1023S	¾" -10	21 9.5
	For Use With Channel P1000, P1100, P2000, P3000		

P3006 thru P3010

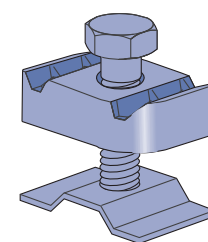
	Channel nut Part number	Nut Size Thread	Wt/100 pcs Lbs (kg)
	P3006-1420	¼" -20	6 2.7
	P3008	⅜" -16	9 4.1
	P3010	½" -13	11 5.0
For Use With all 1-5/8" Channel, except P3010 not for use with P3300, P4000, P4100			

P1006T thru P1010T

	Channel nut Part number	Nut Size Thread	Wt/100 pcs Lbs (kg)
	P1006T1420	¼" -20	7 3.2
	P1008T	⅜" -16	10 4.5
	P1010T	½" -13	12 5.4
For Use With all 1-5/8" Channel, except P1010T not for use with P3300, P4000, P4100			

LS 2485 - Seismic Rod Stiffener

Wt/100 pcs: 16 Lbs (7.2 kg)



For use with ⅜"–⅝" threaded rod.

For Use With Channel
P1000, P1100, P2000, P3000

MATERIAL

Unistrut channel nuts are manufactured from mild steel bars, and after machining operations are completed, they are case hardened, assuring positive biting action into the inturned edge of the Unistrut channel.

The standard channel nut conforms to ASTM A576 GR 1015 modified and A1011 SS GR 45.

Screws conform to SAE J429 GR 2 (also meets and exceeds ASTM A307).

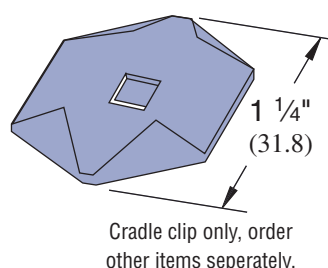
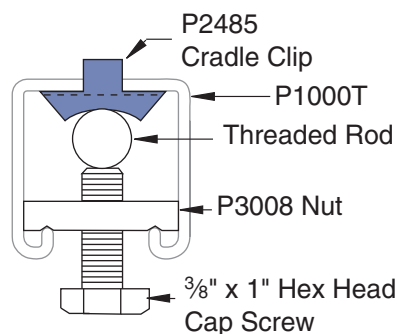
FINISHES

Nuts, bolts and washers are electro-galvanized (EG), ASTM B633 Type III SC1 finish, unless otherwise noted.

Many hardware items are also available in stainless steel. Consult factory for ordering information.

P2485 - Cradle Clip for Seismic Rod Stiffener

Wt/100 pcs: 3.0 Lbs (1.4 kg)



Rod Size In	Root Area In ² (mm ²)	Root Diameter In (mm)	Radius of Gyration In (mm)	Max. Allowable Rod Compression @100% Lbs (kg)	Clip Spacing (L)		
					Rod Stress @50% 4,500 PSI 31,026 kPa In (mm)	Rod Stress @75% 6,750 PSI 46,539 kPa In (mm)	Rod Stress @100% 9,000 PSI 62,053 kPa In (mm)
3/8	0.068 43.87	0.314 7.98	0.0785 1.99	610 277	14 356	12 305	10 254
1/2	0.126 81.29	0.425 10.8	0.1063 2.7	1130 513	20 508	16 406	14 356
5/8	0.202 130.3	0.536 13.61	0.1341 3.41	1810 821	24 610	20 508	16 406
3/4	0.302 194.8	0.652 16.56	0.163 4.14	2710 1,229	30 762	24 610	20 508
7/8	0.419 270.3	0.73 18.54	0.183 4.65	3770 1,710	35 889	28 711	25 635
1	0.552 356.1	0.838 21.29	0.21 5.33	4960 2,250	40 1,016	33 838	28 711

VERTICAL BRACING OR STIFFENER LOAD TABLE

Rod Size In.	Root Area In. ²	Root Diameter In.	Radius of Gyration In.	Max. Allowable Rod Compression Lbs. @ 100%	Clip Spacing L (In.)			Max. Seismic Safe Load* Lbs.
					Rod Stress at 50% 4,500 PSI	Rod Stress at 75% 6,750 PSI	Rod Stress at 100% 9,000 PSI	
3/8	0.068	0.314	0.0785	610	14	12	10	810
1/2	0.126	0.425	0.1063	1,130	20	16	14	1,500
5/8	0.202	0.536	0.1341	1,810	24	20	16	2,410
3/4	0.302	0.652	0.1630	2,710	30	24	20	3,610
7/8	0.419	0.730	0.1920	3,770	35	28	25	5,030
1	0.552	0.838	0.2200	4,960	40	33	28	6,610

- Assumptions:
1. Rod held against translation at location of cradle clips K equals 1.0.
 2. L = Distance between connection points.
 3. Trapeze with braces on alternate members.
 4. Must use U-Bolt detail, shown above.
 - *5. Loads are based on the root area of the thread and at a stress of 9,000 psi.
 - *6. Safe seismic forces are determined by increasing allowable safe loads by 33%

MATERIAL

Unistrut channel nuts are manufactured from mild steel bars, and after machining operations are completed, they are case hardened, assuring positive biting action into the inturned edge of the Unistrut channel.

The standard channel nut conforms to ASTM A576 GR 1015 modified and A1011 SS GR 45.

Screws conform to SAE J429 GR 2 (also meets and exceeds ASTM A307).

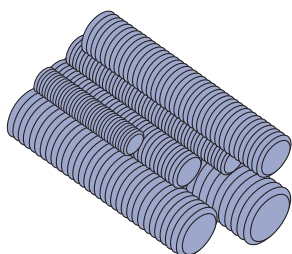
FINISHES

Nuts, bolts and washers are electro-galvanized (EG), ASTM B633 Type III SC1 finish, unless otherwise noted.

Many hardware items are also available in stainless steel. Consult factory for ordering information.

Steel Threaded Rod

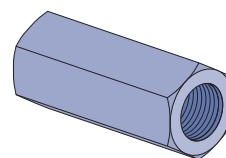
Part No.	Size	Wt/100 Ft. Lbs (kg)
HTHR025	1/4"x20	13 5.9
HTHR037	3/8"x16	30 13.6
HTHR050	1/2"x13	53 24.0
HTHR062	5/8"x11	84 38.1
HTHR075	3/4"x10	124 56.2
HTHR087	7/8"x9	170 77.1
HTHR100	1"x8	223 101.2



Standard Length 12' (3.7m)

Steel Coupler Nuts

Part No.	Size	Length In (mm)	Wt/100 pcs Lbs (kg)
HRCN025	1/4" - 20	7/8" 22.2	1.9 0.9
HRCN037	3/8" - 16	1 1/4" 44.5	9.0 4.1
HRCN050	1/2" - 13	1 3/4" 44.5	10.0 4.5
HRCN062	5/8" - 11	2 1/8" 54.0	18.0 8.2
HRCN075	3/4" - 10	2 1/4" 57.2	28.0 12.7
HRCN087	7/8" - 9	2 1/2" 63.5	55.0 24.9
HRCN100	1" - 8	2 3/4" 69.9	73.0 33.1



Slip-On® Lock Nut



Slip on
Threaded Rod

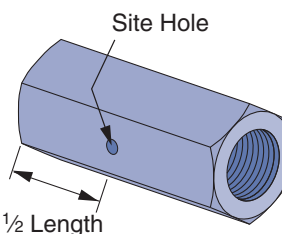


Rotate to
Lock

Part No.	Size	Recommended Load (lbs.)	Recommended Torque (ft. lbs.)	Weight/100 pcs. (lbs.)
1420UNC	1/4"-20	650	6-8	2.08
3816UNC	3/8"-16	2,000	19-25	5.5
1213UNC	1/2"-13	4,000	50-60	9.9
5811UNC	5/8"-11	5,000	100-200	15.6
3410UNC	3/4"-10	8,000	180-200	31

Steel Coupler Nuts w/Site Hole

Part No.	Size	Length In (mm)	Wt/100 pcs Lbs (kg)
IFI128025	1/4" - 20	7/8" 22.2	1.9 0.9
IFI128037	3/8" - 16	1 1/4" 44.5	9.0 4.1
IFI128050	1/2" - 13	1 3/4" 44.5	10.0 4.5
IFI128062	5/8" - 11	2 1/8" 54.0	18.0 8.2
IFI128075	3/4" - 10	2 1/4" 57.2	28.0 12.7
IFI128087	7/8" - 9	2 1/2" 63.5	55.0 24.9
IFI128100	1" - 8	2 3/4" 69.9	73.0 33.1



Load Carrying Capacity Of Threaded Hot Rolled Steel Conforming To Astm A575 & A576

Nominal Diameter	Root Area In² (mm²)	Maximum Safe Load at 650°F (343°C) Lbs (kg)
3/8	0.068 43.9	610 277
1/2	0.126 81.3	1,130 513
5/8	0.202 130.3	1,810 821
3/4	0.302 194.8	2,710 1,229
7/8	0.419 270.3	3,770 1,710
1	0.552 356.1	4,960 2,250
1 1/8	0.693 447.1	6,230 2,826

Nominal Diameter	Root Area In² (mm²)	Maximum Safe Load at 650°F (343°C) Lbs (kg)
1 1/4	0.889 573.5	8,000 3,629
1 3/8	1.053 679.4	9,470 4,296
1 1/2	1.293 834.2	11,630 5,275
1 5/8	1.515 977.4	13,630 6,182
1 3/4	1.714 1,105.8	15,690 7,117
1 7/8	2.048 1,321.3	18,430 8,360
2	2.292 1,478.7	20,690 9,385

MATERIAL

Unistrut channel nuts are manufactured from mild steel bars, and after machining operations are completed, they are case hardened, assuring positive biting action into the inturned edge of the Unistrut channel.

The standard channel nut conforms to ASTM A576 GR 1015 modified and A1011 SS GR 45.

Screws conform to SAE J429 GR 2 (also meets and exceeds ASTM A307).

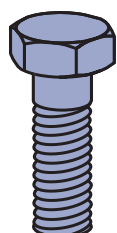
"Extracted from American Standard Code for pressure piping (ASA B31.1-1973, with permission of the publisher, the American Society of Mechanical Engineers, United Engineering Center, 345 E. 47th Street, New York, New York)."

FINISHES

Nuts, bolts and washers are electro-galvanized (EG), ASTM B633 Type III SC1 finish, unless otherwise noted.

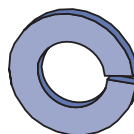
Many hardware items are also available in stainless steel. Consult factory for ordering information.

Hex Head Cap Screws



Part No.	Size	Wt/100 pcs Lbs (kg)
HHCS025044EG	1/4" x 7/16"	1.0 (0.5)
HHCS025075EG	1/4" x 3/4"	1.3 (0.6)
HHCS025150EG	1/4" x 1 1/2"	2.6 (1.2)
HHCS031125EG	5/16" x 1 1/4"	3.6 (1.6)
HHCS037075EG	3/8" x 3/4"	4.0 (1.8)
HHCS037087EG	3/8" x 7/8"	4.4 (2.0)
HHCS037100EG	3/8" x 1"	4.5 (2.0)
HHCS037125EG	3/8" x 1 1/4"	5.3 (2.4)
HHCS037150EG	3/8" x 1 1/2"	6.0 (2.7)
HHCS037200EG	3/8" x 2"	7.6 (3.4)
HHCS037225EG	3/8" x 2 1/4"	8.4 (3.8)
HHCS037250EG	3/8" x 2 1/2"	9.2 (4.2)
HHCS050094EG	1/2" x 1 5/16"	9.1 (4.1)
HHCS050119EG	1/2" x 1 3/4"	10.2 (4.6)
HHCS050150EG	1/2" x 1 1/2"	11.6 (5.3)
HHCS050175EG	1/2" x 1 3/4"	13.1 (5.9)
HHCS050200EG	1/2" x 2"	14.6 (6.6)
HHCS050225EG	1/2" x 2 1/4"	16 (7.3)
HHCS050250EG	1/2" x 2 1/2"	17.5 (7.9)

Lock Washers



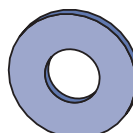
Part No.	Size	Wt/100 pcs Lbs (kg)
HLKW025EG	1/4"	0.25 (0.1)
HLKW031EG	5/16"	0.41 (0.2)
HLKW037EG	3/8"	0.63 (0.3)
HLKW050EG	1/2"	1.32 (0.60)
HLKW062EG	5/8"	2.20 (1.0)
HLKW075EG	3/4"	3.80 (1.7)
HLKW087EG	7/8"	6.00 (2.7)
HLKW100EG	1"	8.80 (4.0)

Hexagon Nuts



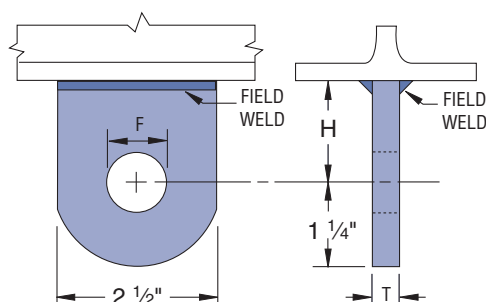
Part No.	Size	Wt/100 pcs Lbs (kg)
HHXN025EG	1/4"	0.6 (0.3)
HHXN031EG	5/16"	1.2 (0.5)
HHXN037EG	3/8"	1.6 (0.7)
HHXN050EG	1/2"	4.8 (2.2)
HHXN062EG	5/8"	7.3 (3.3)
HHXN075EG	3/4"	11.9 (5.4)
HHXN087EG	7/8"	19 (8.6)
HHXN100EG	1"	28.3 (12.8)

Flat Washers



Part No.	Size	Wt/100 pcs Lbs (kg)
HFLW025EG	1/4"	0.8 (0.4)
HFLW031EG	5/16"	1 (0.5)
HFLW037EG	3/8"	1.5 (0.7)
HFLW050EG	1/2"	3.5 (1.6)
HFLW062EG	5/8"	7.7 (3.5)
HFLW075EG	3/4"	11 (5.0)
HFLW087EG	7/8"	15.3 (6.9)
HFLW100EG	1"	18.8 (8.5)

Fig. 55, Fig 55L – Structural Welding Lug



Part No.	Rod Size	Pin or Bolt Size	"A"	"F"	Load	"H"	Wt.
Fig55 (short)	1/2"	5/8"	1 1/16"	1/4"	1,350	1 1/2"	0.48
Fig55 (short)	5/8"	3/4"	1 3/16"	1/4"	2,160	1 1/2"	0.41
Fig55 (short)	3/4"	7/8"	1 5/16"	3/8"	3,230	1 1/2"	0.6
Fig55L (long)	1/2"	5/8"	1 1/16"	1/4"	1,350	3	0.75
Fig55L (long)	5/8"	3/4"	1 3/16"	1/4"	2,160	3	0.68
Fig55L (long)	3/4"	7/8"	1 5/16"	3/8"	3,230	3	1

Material: Carbon steel

Finish: Plain or Galvanized

Note: Welding Lug supplied by others.

MATERIAL

Unistrut channel nuts are manufactured from mild steel bars, and after machining operations are completed, they are case hardened, assuring positive biting action into the inturned edge of the Unistrut channel.

The standard channel nut conforms to ASTM A576 GR 1015 modified and A1011 SS GR 45.

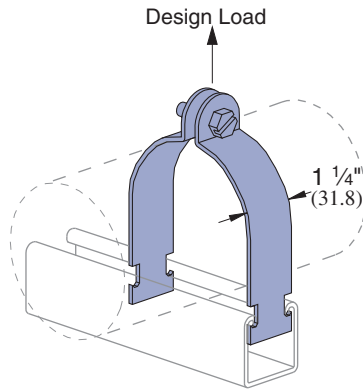
Screws conform to SAE J429 GR 2 (also meets and exceeds ASTM A307).

FINISHES

Nuts, bolts and washers are electro-galvanized (EG), ASTM B633 Type III SC1 finish, unless otherwise noted.

Many hardware items are also available in stainless steel. Consult factory for ordering information.

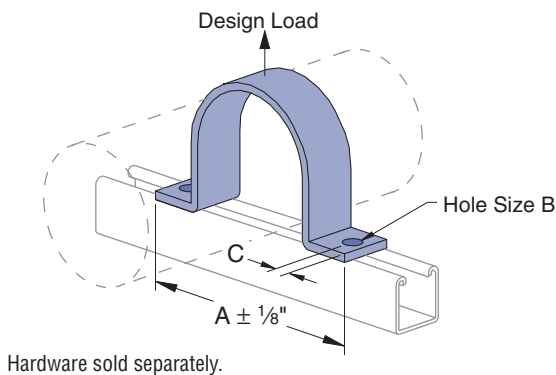
P1109 thru P1126 – Pipe Clamps for Rigid Steel Conduit



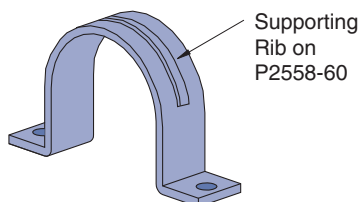
Slotted hex head screw and nut included.
Finish: Electro-galvanized.

Part Number	Pipe Size In	O.D. Size In (mm)	Thickness Gauge (mm)	Wt/100 pcs Lbs (kg)	Design Load Lbs (kg)
P1109	3/8	0.675 17.1	16 1.5	10 4.5	400 181
P1111	1/2	0.840 21.3	16 1.5	11 5.0	400 181
P1112	3/4	1.050 26.7	14 1.9	15 6.8	600 272
P1113	1	1.315 33.4	14 1.9	17 7.7	600 272
P1114	1 1/4	1.660 42.2	14 1.9	19 8.6	600 272
P1115	1 1/2	1.900 48.3	12 2.7	29 13.2	800 363
P1117	2	2.375 60.3	12 2.7	34 15.4	800 363
P1118	2 1/2	2.875 73.0	12 2.7	40 18.1	800 363
P1119	3	3.500 88.9	12 2.7	47 21.3	800 363
P1120	3 1/2	4.000 101.6	11 3.0	62 28.1	1,000 454
P1121	4	4.500 114.3	11 3.0	67 30.4	1,000 454
P1123	5	5.563 141.3	11 3.0	80 36.3	1,000 454
P1124	6	6.625 168.3	10 3.4	102 46.3	1,000 454
P1126	8	8.625 219.1	10 3.4	130 59.0	1,000 454

P2558-5 thru P2558-60 – Single Piece Pipe Strap



Hardware sold separately.



Part Number	Nominal Pipe Size In	A In (mm)	"B" In (mm)	C In (mm)	Thickness In (mm)	Wt/100 pcs Lbs (kg)	Design Load Lbs (kN)
P2558-05	1/2	2 7/8 73.0				23 10.4	
P2558-07	3/4	3 1/8 79.4				26 11.8	
P2558-10	1	3 3/8 85.7	9/32	7/16	1/8	31 14.1	500 2.2
P2558-12	1 1/4	3 3/4 95.3	7.1	11.1	3.2	35 15.9	
P2558-15	1 1/2	3 7/8 98.4				39 17.7	
P2558-20	2	5 3/4 146.1				94 42.6	
P2558-25	2 1/2	6 1/4 158.8				114 51.7	
P2558-30	3	6 7/8 174.6				133 60.3	
P2558-35	3 1/2	7 3/8 187.3	7/16	1 1/16	1/4	152 68.9	1,000 4.4
P2558-40	4	7 7/8 200.0	11.1	17.5	6.4	176 79.8	
P2558-50	5	9 228.6				198 89.8	
P2558-60	6	10 254.0				225 102.1	

MATERIAL

Unistrut pipe clamps, unless noted, are punch-press made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A1008, A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011SS GR 33. The pickling of the steel produces a smooth surface free from scale.

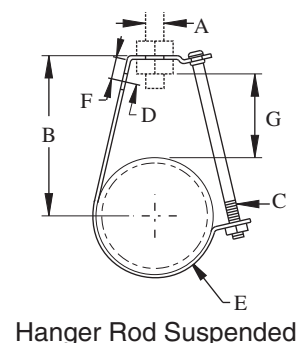
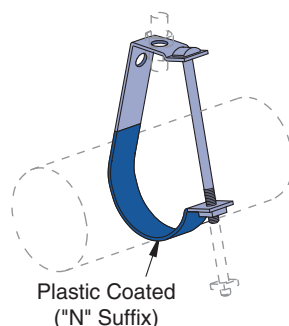
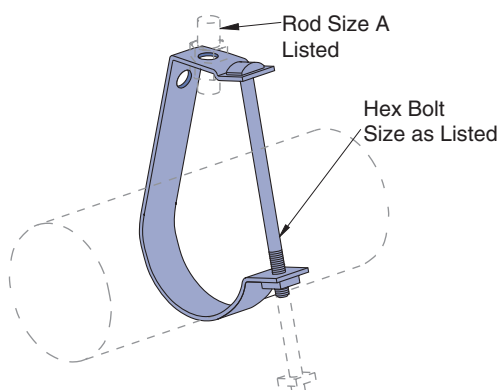
FINISHES

Pipe supports are available in:

- Electro-galvanized (EG), conforming to ASTM B633 Type III SC1
- Hot-dipped galvanized (HG), conforming to ASTM A123 or A153 (hardware)
- Perma-Green II (GR), and plain (PL).

J1205 thru J1280

J1205 N thru J 1280 N (Plastic Coated) – "J" Conduit & Pipe Hanger



NOTE: Maximum operating temperature is 300°F (148.8°C)

Part Number	Wt/100 pcs Lbs (kg)	Part Number	Wt/100 pcs Lbs (kg)	Pipe Size In	"A" In (mm)	"B" In (mm)	"C" In (mm)	"D" In (mm)	"E" In (mm)	"F" In (mm)	"G" In (mm)	Load Lbs (kg)
J1205	20 9.1	J1205N	21 9.5	½	¾ 9.5	1¼ 44.5	¼ x 2¼ 6.4 x 57.2	13/32 10.3	1/8 x ¾ 3.2 x 19.1	9/16 14.3	7/8 22.2	300 136
J1207	21 9.5	J1207N	22 10.0	¾	¾ 9.5	17/8 47.6	¼ x 2¼ 6.4 x 57.2	13/32 10.3	1/8 x ¾ 3.2 x 19.1	9/16 14.3	7/8 22.2	300 136
J1210	24 10.9	J1210N*	25 11.3	1	¾ 9.5	2¼ 57.2	¼ x 2¾ 6.4 x 69.9	13/32 10.3	1/8 x ¾ 3.2 x 19.1	9/16 14.3	1 25.4	300 136
J1212	27 12.2	J1212N	29 13.2	1¼	¾ 9.5	2¾ 69.9	¼ x 3¼ 6.4 x 82.6	13/32 10.3	1/8 x ¾ 3.2 x 19.1	9/16 14.3	1½ 34.9	300 136
J1215	29 13.2	J1215N*	31 14.1	1½	¾ 9.5	3 76.2	¼ x 3½ 6.4 x 88.9	13/32 10.3	1/8 x ¾ 3.2 x 19.1	9/16 14.3	1½ 38.1	300 136
J1220	33 15.0	J1220N*	35 15.9	2	¾ 9.5	3¾ 85.7	¼ x 4 6.4 x 101.6	13/32 10.3	1/8 x ¾ 3.2 x 19.1	9/16 14.3	1¾ 41.3	300 136
J1225	71 32.2	J1225N	74 33.6	2½	1½ 12.7	4 101.6	¾ x 4½ 9.5 x 114.3	9/16 14.3	1/8 x 1¼ 3.2 x 31.8	¾ 19.1	1¾ 47.6	500 227
J1230	78 35.4	J1230N*	81 36.7	3	1½ 12.7	4½ 108.0	¾ x 5 9.5 x 127.0	9/16 14.3	1/8 x 1¼ 3.2 x 31.8	¾ 19.1	1¾ 47.6	500 227
J1235	85 38.6	J1235N	88 39.9	3½	1½ 12.7	4¾ 120.7	¾ x 5½ 9.5 x 139.7	9/16 14.3	1/8 x 1¼ 3.2 x 31.8	¾ 19.1	2½ 54.0	500 227
J1240	178 80.7	J1240N*	182 82.6	4	5/8 15.9	5½ 139.7	¾ x 6½ 9.5 x 165.1	9/16 14.3	1/4 x 1¼ 3.2 x 31.8	¾ 19.1	2¼ 57.2	600 272
J1250	199 90.3	J1250N	203 92.1	5	5/8 15.9	6 152.4	¾ x 7½ 9.5 x 190.5	9/16 14.3	1/4 x 1¼ 3.2 x 31.8	¾ 19.1	2¼ 57.2	600 272
J1260	231 104.8	J1260N*	236 107.0	6	¾ 19.1	7 177.8	¾ x 8½ 9.5 x 215.9	9/16 14.3	1/4 x 1¼ 3.2 x 31.8	¾ 19.1	2½ 66.7	600 272
J1280	449 203.7	J1280N	458 207.7	8	¾ 19.1	10 254.0	¾ x 12 9.5 x 304.8	9/16 14.3	1/4 x 2 3.2 x 50.8	1 25.4	4½ 117.5	700 318

*Standard glass drainline and glass process pipe sizes.
Minimum safety factor of five (5) on ultimate load.

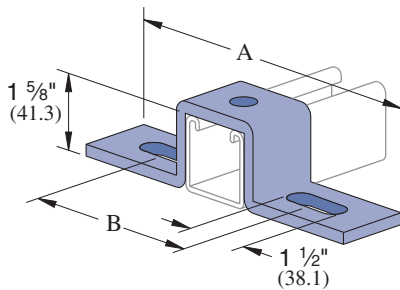
MATERIAL

Unistrut pipe clamps, unless noted, are punch-press made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A1008, A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011SS GR 33. The pickling of the steel produces a smooth surface free from scale.

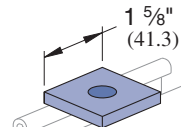
FINISHES

Pipe supports are available in:

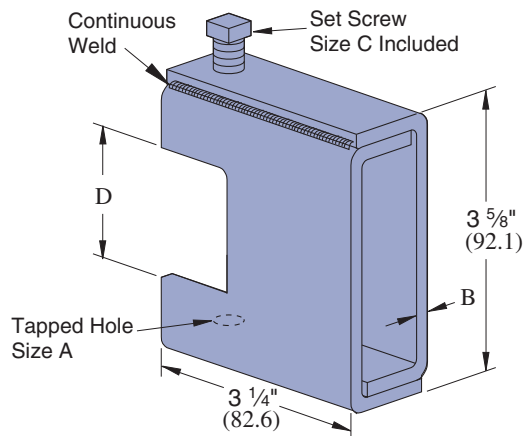
- Electro-galvanized (EG), conforming to ASTM B633 Type III SC1
- Hot-dipped galvanized (HG), conforming to ASTM A123 or A153 (hardware)
- Perma-Green II (GR), and plain (PL).

P1048, P1049, P1050


Part Number	"A" In (mm)	"B" In (mm)	Wt/100 pcs Lbs (kg)
P1048	7 1/4 184.2	4 1/8 104.8	105 47.6
P1049	8 1/2 215.9	5 3/8 136.5	120 54.4
P1050	10 3/8 263.5	7 1/4 184.2	130 59.0

**P1062, P1063, P1064, P1964, P2471, P2490
Square Washer**


Part Number	Bolt Size	Hole Size	Wt/100 pcs Lbs (kg)
P1062	5/16"	11/32"	18 (8.2)
P1063	3/8"	7/16"	18 (8.2)
P1064	1/2"	9/16"	17 (7.7)
P1964	5/8"	1 1/16"	16 (7.3)
P2471	3/4"	1 3/16"	15 (6.8)
P2490	7/8"	1 5/16"	14 (6.4)

P2401S, P2403S – Beam Clamp


Part Number	"A" In	"B" In (mm)	"C" In	"D" In (mm)	Wt/100 pcs Lbs (kg)	Design Load Lbs (kg)
P2401S	3/8 - 16	3/16 4.8	1/2x2	1 1/16 42.9	156 70.8	1,300 589.7
P2403S	1/2 - 13	1/4 6.4	1/2x2	1 1/16 42.9	201 91.2	1,900 861.8

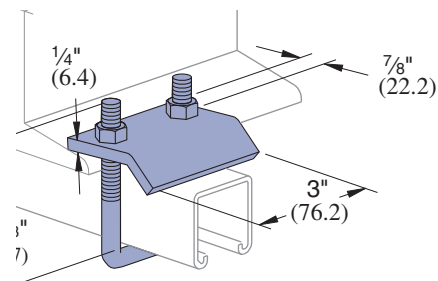
For beams between 3/4" (19.1) to 1 5/8" (41.3) thick flanges.

MATERIAL

Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

P2785 – Beam Clamp

Wt/100 pcs: 83 Lbs (37.6 kg)



- For use with Beams up to 3/4" (19.1) Flanges and with Channels P1000, P1100, P2000, P3000, P3300, P3301, P4000, P4001, P4100, and P4101.

Design Load Each
1000 Lbs (453.6 kg)
Use in Pairs Only

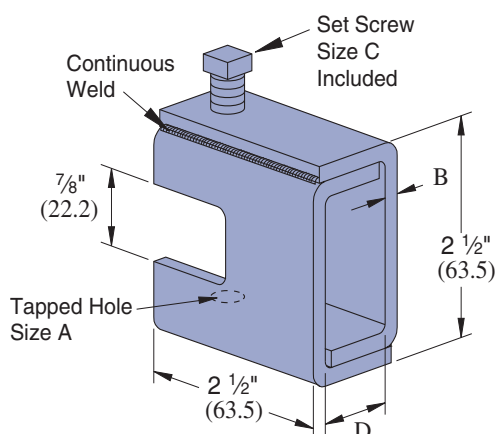
FINISHES

Fittings are available in: Perma-Green II (GR), electro-galvanized (EG), conforming to ASTM B633 Type III SC1; Hot-dipped galvanized (HG), conforming to ASTM A123 or A153 and plain (PL).

Standard Dimensions for 1 1/2" (41 mm) width series channel fittings (Unless Otherwise Shown on Drawing)

Hole Diameter: 5/16" (14.3mm); **Hole Spacing - From End:** 1 1/8" (20.6 mm); **Hole Spacing - On Center:** 1 7/8" (47.6 mm); **Width:** 1 5/8" (41mm); **Thickness:** 1/4" (6.4mm)

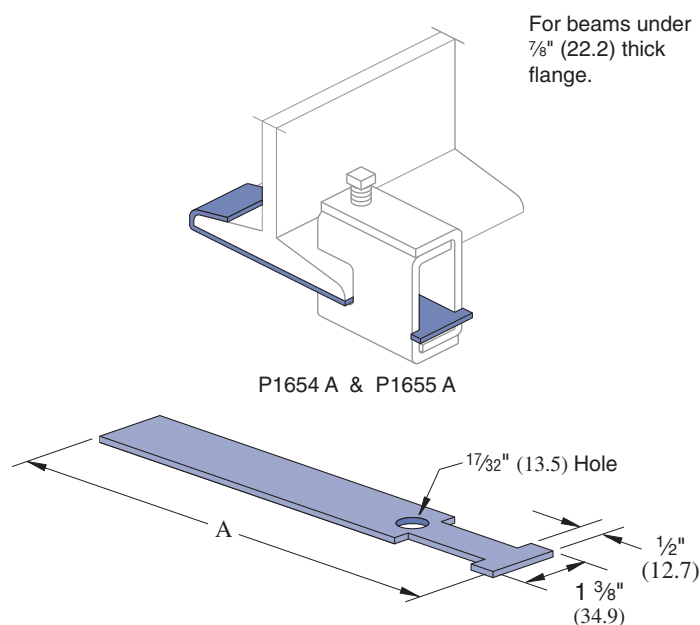
P1648S thru P1653S – Beam Clamp



Part Number	"A" In	"B" In (mm)	"C" In	"D" In (mm)	Wt/100 pcs Lbs (kg)	Design Load Lbs (kg)
P1649AS	3/8 -16	1/8 3.2	3/8 x 1 1/2	7/8 22.2	67 30.4	650 294.8
P1650S	3/8 -16	3/16 4.8	1/2 x 1 1/2	1 5/16 23.8	100 45.4	1,100 499.0
P1651S	1/2 -13	1/4 6.4	1/2 x 1 1/2	1 5/16 23.8	130 59.0	1,600 725.7
P1653S	3/4 -10	5/16 7.9	5/8 x 1 1/2	1 5/16 33.3	160 72.6	2,400 1,088.6

For beams under 7/8" (22.2) thick flange.

P1656A thru P1661A – Beam Clamp Retainer Strap



P1654 A & P1655 A

Strap Part Number	Flange Width In (mm)	"A" In (mm)	Wt/100 pcs Lbs (kg)	Beam Clamp Used With
P1656 A	6 152.4	9 228.6	35 15.9	P1648 S Thru
P1657 A	9 228.6	12 304.8	47 21.3	P1651 AS, and
P1658 A	12 304.8	15 381.0	59 26.8	P2398 S Series
P1659 A	6 152.4	9 228.6	33 15.0	P2676
P1660 A	9 228.6	12 304.8	45 20.4	P2676
P1661 A	12 304.8	15 381.0	57 25.9	P2676

MATERIAL

Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

FINISHES

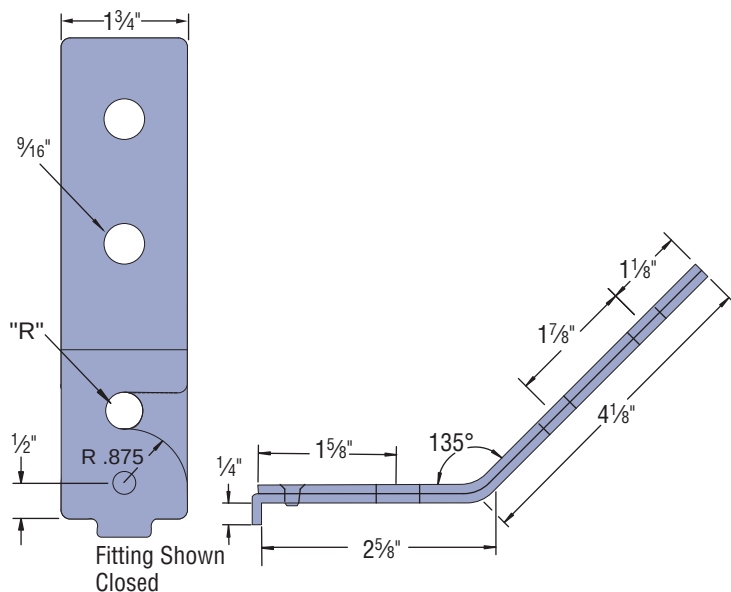
Fittings are available in: Perma-Green II (GR), electro-galvanized (EG), conforming to ASTM B633 Type III SC1; Hot-dipped galvanized (HG), conforming to ASTM A123 or A153 and plain (PL).

Standard Dimensions for 1 5/8" (41 mm) width series channel fittings (Unless Otherwise Shown on Drawing)

Hole Diameter: 9/16" (14.3mm); **Hole Spacing - From End:** 1 3/16" (20.6 mm); **Hole Spacing - On Center:** 1 7/8" (47.6 mm); **Width:** 1 5/8" (41mm); **Thickness:** 1/4" (6.4mm)



Seismic Pivot Fittings - SPF 100



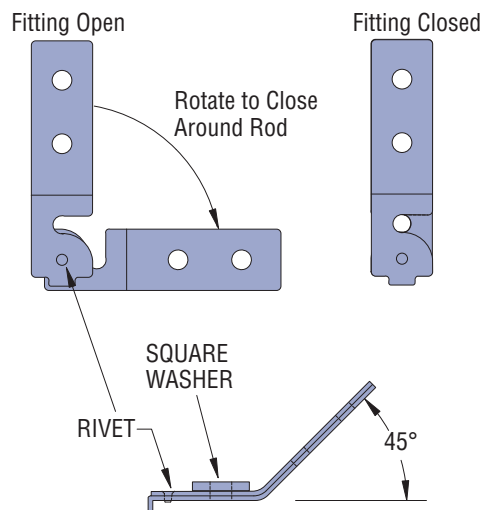
SPF 100 Fitting

Part Number	Rod Size		Hole Diameter "R"	
	in	(mm)	in	(mm)
SPF 100 -037	3/8	9.5	0.438	11.1
SPF 100 -050	1/2	12.7	0.563	14.3
SPF 100 -062	5/8	15.9	0.688	17.5
SPF 100 -075	3/4	19.1	0.813	20.6

Note:

1. The load capacity of the fitting exceeds the slip and pull-out capacity of the channel nut.
2. Allowable loads have been determined by the manufacturers testing, analysis and technical specifications.
3. For retrofit application, engineer of record must verify.
4. Patent Pending.
5. Square washer provided with fitting.
6. When a hanger rod is thru-bolted (in lieu of channel nut installation), higher transverse loads may be transmitted due to the higher allowed rod shear loads compared to channel nut slip values. This higher load may be used with verification through engineering calculations.

*7. A trademark of Lord & Sons, Inc.



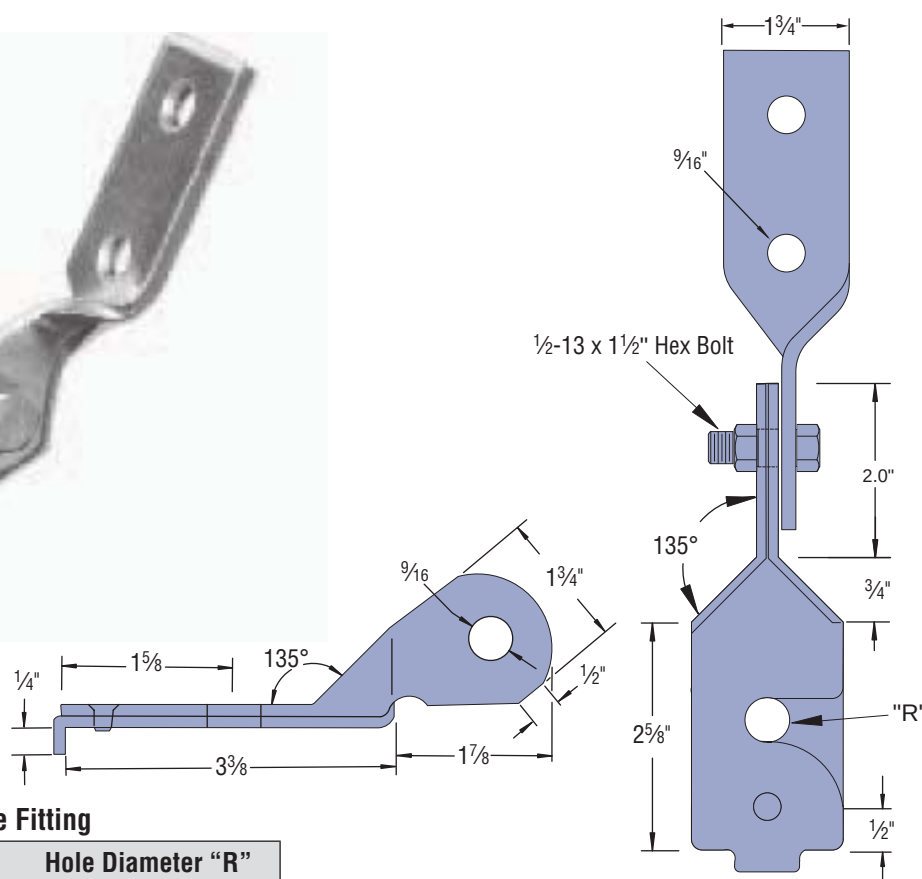
MATERIAL

Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

FINISH

Electro-galvanized (EG), conforming to ASTM B633 Type III SC1.

Seismic Pivot Fittings - SPF 200



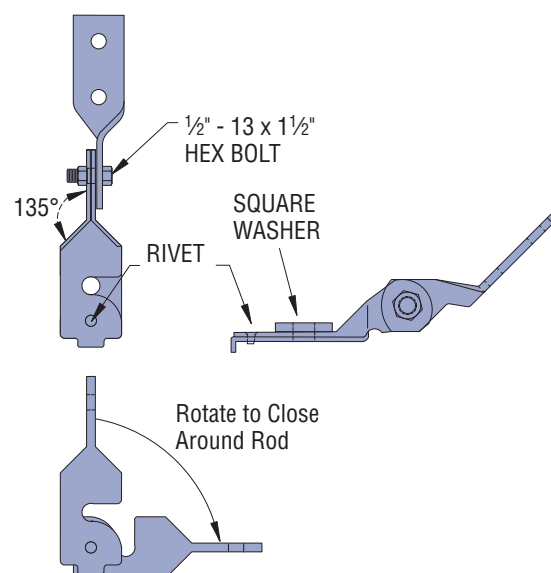
SPF 200 Adjustable Fitting

Part Number	Rod Size		Hole Diameter "R"	
	in	(mm)	in	(mm)
SPF 200 -037	3/8	9.5	0.438	11.1
SPF 200 -050	1/2	12.7	0.563	14.3
SPF 200 -062	5/8	15.9	0.688	17.5
SPF 200 -075	3/4	19.1	0.813	20.6

Note:

1. The load capacity of the fitting exceeds the slip and pull-out capacity of the channel nut.
2. Allowable loads have been determined by the manufacturers testing, analysis and technical specifications.
3. For retrofit application, engineer of record must verify.
4. Patent Pending.
5. Square washer provided with fitting.
6. When a hanger rod is thru-bolted (in lieu of channel nut installation), higher transverse loads may be transmitted due to the higher allowed rod shear loads compared to channel nut slip values. This higher load may be used with verification through engineering calculations.

*7. A trademark of Lord & Sons, Inc.



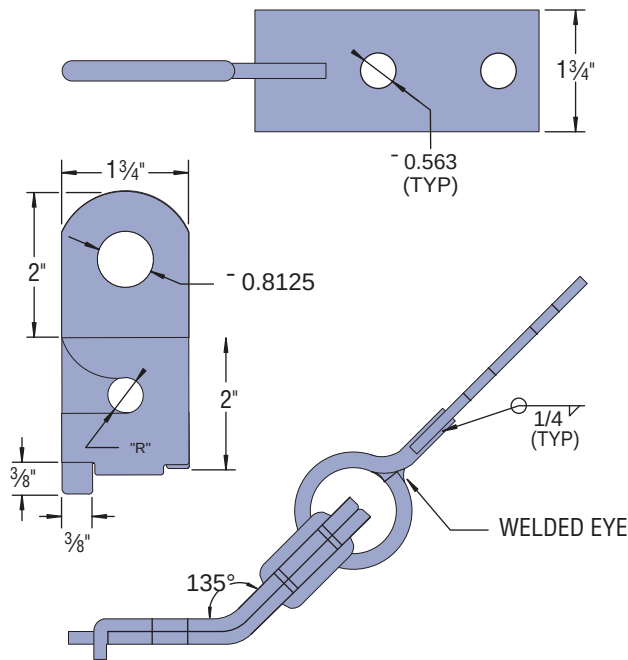
MATERIAL

Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

FINISH

Electro-galvanized (EG), conforming to ASTM B633 Type III SC1.

Seismic Pivot Fittings - SPF 300

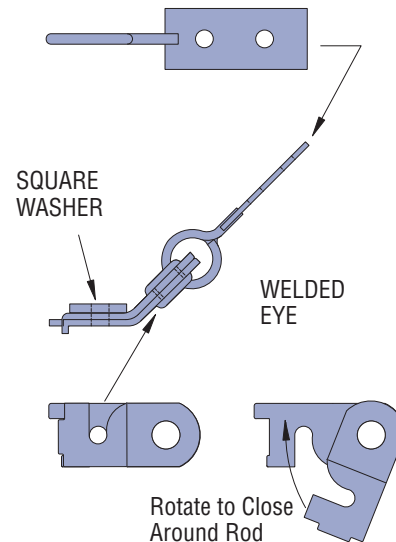


SPF 300 Fitting

Part Number	Rod Size		Hole Diameter "R"	
	in	(mm)	in	(mm)
SPF 300 -037	3/8	9.5	0.438	11.1
SPF 300 -050	1/2	12.7	0.563	14.3
SPF 300 -062	5/8	15.9	0.688	17.5
SPF 300 -075	3/4	19.1	0.813	20.6

Note:

1. The load capacity of the fitting exceeds the slip and pull-out capacity of the channel nut
2. Allowable loads have been determined by the manufacturers testing, analysis and technical specifications.
3. For retrofit application, engineer of record must verify.
4. Patent Pending.
5. Square washer provided with fitting.
6. When a hanger rod is thru-bolted (in lieu of channel nut installation), higher transverse loads may be transmitted due to the higher allowed rod shear loads compared to channel nut slip values. This higher load may be used with verification through engineering calculations.
- *7. A trademark of Lord & Sons, Inc.



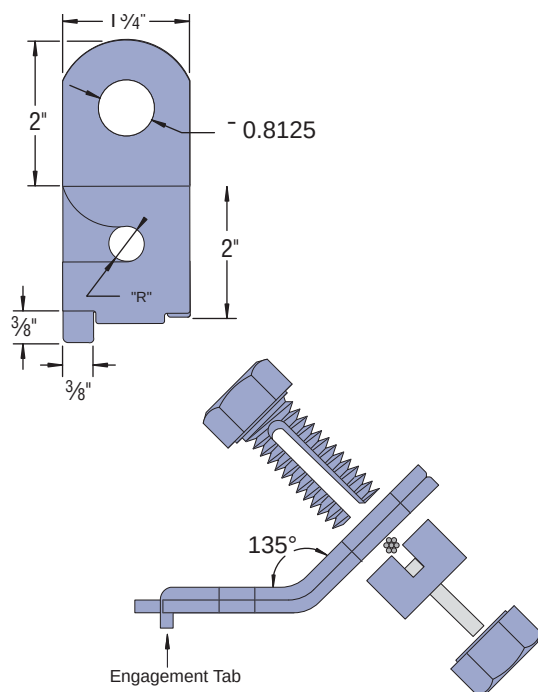
MATERIAL

Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

FINISH

Electro-galvanized (EG), conforming to ASTM B633 Type III SC1.

Seismic Pivot Fittings - SPF 400



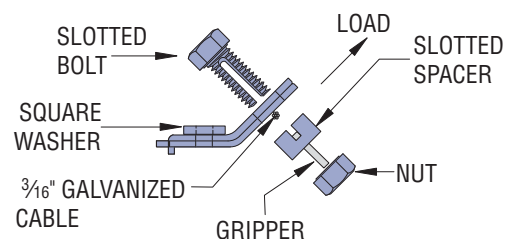
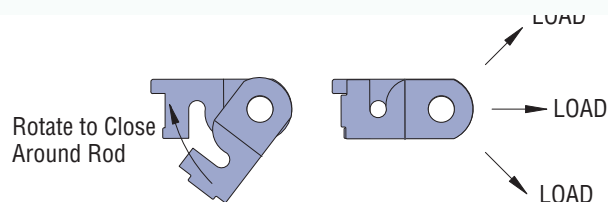
SPF 400 Fitting

Part Number	Rod Size in	Rod Size (mm)	Hole Diameter "R" in	Hole Diameter "R" (mm)
SPF 400 -037	3/8	9.5	0.438	11.1
SPF 400 -050	1/2	12.7	0.563	14.3
SPF 400 -062	5/8	15.9	0.688	17.5
SPF 400 -075	3/4	19.1	0.813	20.6

Note:

1. The load capacity of the fitting exceeds the slip and pull-out capacity of the channel nut.
2. Allowable loads have been determined by the manufacturer's testing, analysis and technical specifications.
3. For retrofit application, engineer of record must verify.
4. When a hanger rod is thru-bolted (in lieu of channel nut installation), higher transverse loads may be transmitted due to the higher allowed rod shear loads compared to channel nut slip values. This higher load may be used with verification through engineering calculations.

*5. A trademark of Lord & Sons, Inc.



SPF 400 Design Load

Wire Rope Diameter in (mm)	4 Way Splayed		Single Cable	
	Transverse Load	Longitudinal Load	Transverse Load	
	lbs	(kN)	lbs	(kN)
3/16 (5)	1050	4.67	1116	4.96
			650	2.89

- Note: 1. Allowable loads have been determined by the manufacturer's testing, analysis, and technical specifications.
 2. Galvanized Wire Rope, 7 x 19 IWSC, RHRL (PRESTRETCHED)
 3. Torque on nut/spacer: 50 ft-lbs.
 4. Safety Factor of 3 for prestretched cable.

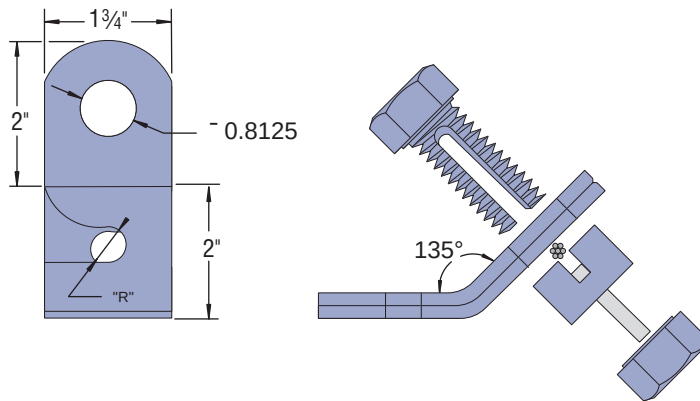
MATERIAL

Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

FINISH

Electro-galvanized (EG), conforming to ASTM B633 Type III SC1.

Seismic Pivot Fittings - SPF 401



Note: This fitting is used where no engagement tab (see SPF 400 for similar fitting with engagement tab) is needed. See single pipe hanger details for an example.

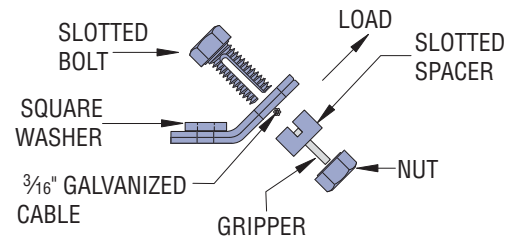
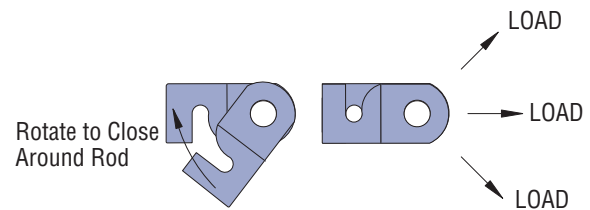
SPF 401 Fitting

Part Number	Rod Size		Hole Diameter "R"	
	in	(mm)	in	(mm)
SPF 401 -037	3/8	9.5	0.438	11.1
SPF 401 -050	1/2	12.7	0.563	14.3
SPF 401 -062	5/8	15.9	0.688	17.5
SPF 401 -075	3/4	19.1	0.813	20.6

Note:

1. The load capacity of the fitting exceeds the slip and pull-out capacity of the channel nut.
2. Allowable loads have been determined by the manufacturers testing, analysis and technical specifications.
3. For retrofit application, engineer of record must verify.
4. When a hanger rod is thru-bolted (in lieu of channel nut installation), higher transverse loads may be transmitted due to the higher allowed rod shear loads compared to channel nut slip values. This higher load may be used with verification through engineering calculations.

*5. A trademark of Lord & Sons, Inc.



SPF 401 Design Load

Wire Rope Diameter in (mm)	4 Way Splayed				Single Cable	
	Transverse Load		Longitudinal Load		Transverse Load	
	lbs	(kN)	lbs	(kN)	(lbs)	(kN)
3/16 (5)	1050	4.67	1116	4.96	650	2.89

Note: 1. Allowable loads have been determined by the manufacturer's testing, analysis, and technical specifications.

2. Galvanized Wire Rope, 7 x 19 IWSC, RHRL (PRESTRETCHED)

3. Torque on nut/spacer: 50 ft-lbs.

4. Safety Factor of 3 for prestretched cable.

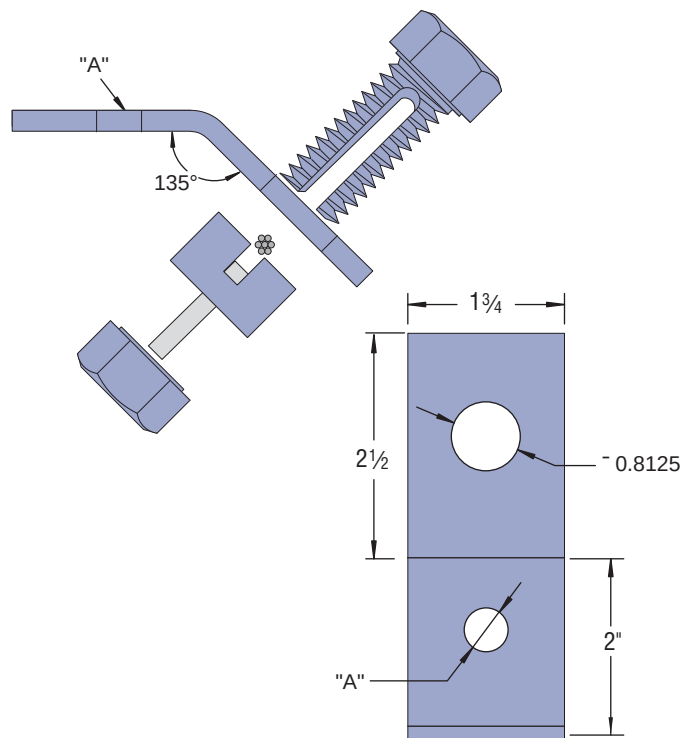
MATERIAL

Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

FINISH

Electro-galvanized (EG), conforming to ASTM B633 Type III SC1.

Seismic Pivot Fittings - LS 410



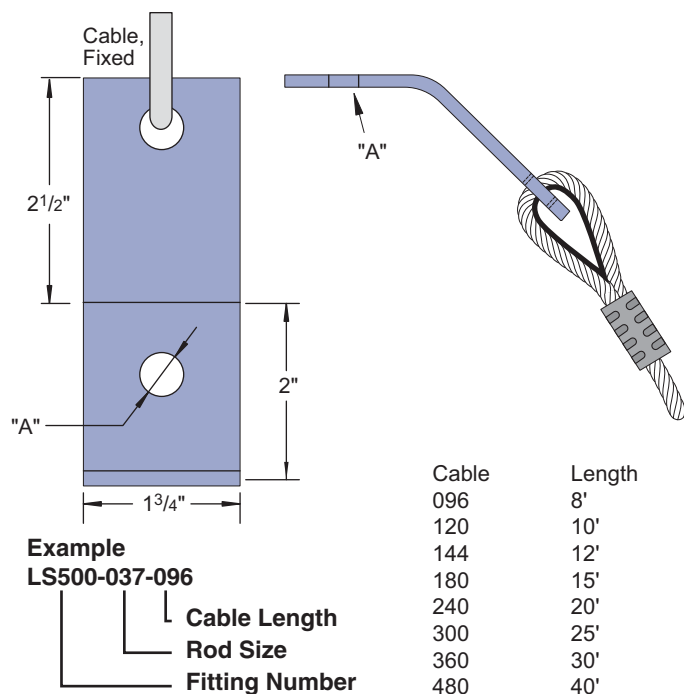
LS 410 Fitting

Part Number	Anchor Size		Hole Diameter "R"	
	in	(mm)	in	(mm)
LS 410 -037	3/8	9.5	7/16	11.1
LS 410 -050	1/2	12.7	9/16	14.3
LS 410 -062	5/8	15.9	11/16	17.5
LS 410 -075	3/4	19.1	13/16	20.6

Note:

1. Allowable loads have been determined by the manufacturers testing, analysis and technical specifications.
2. For retrofit application, engineer of record must verify.
3. Torque on nut/spacer: 50 ft-lbs.
- *5. A trademark of Lord & Sons, Inc.

Seismic Pivot Fittings - LS 500



SPF 500 Fitting

Part Number	Rod Size		Hole Diameter "R"	
	in	(mm)	in	(mm)
SPF 500 -037	3/8	9.5	0.438	11.1
SPF 500 -050	1/2	12.7	0.563	14.3
SPF 500 -062	5/8	15.9	0.688	17.5
SPF 500 -075	3/4	19.1	0.813	20.6

Note:

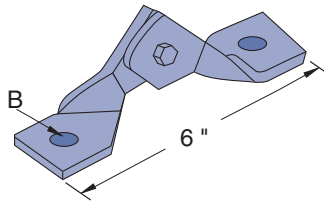
1. Allowable loads have been determined by the manufacturers testing, analysis and technical specifications.
2. For retrofit application, engineer of record must verify.
3. Patent Pending.
4. Square washer provided with fitting.
- *5. A trademark of Lord & Sons, Inc.

MATERIAL

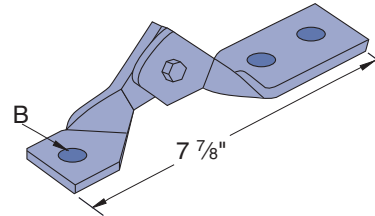
Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

FINISH

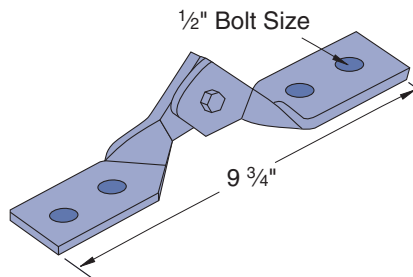
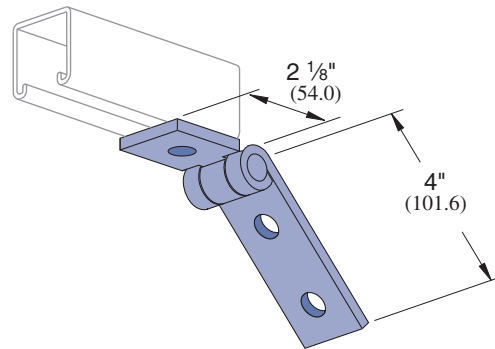
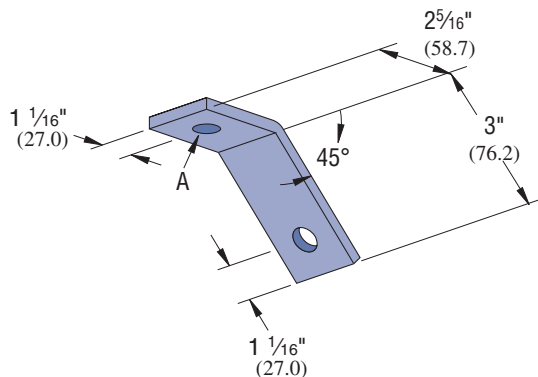
Electro-galvanized (EG), conforming to ASTM B633 Type III SC1.

Seismic Brace / Anchor Fittings - LS 502


"B" Bolt Size	Wt./ 100 pcs
1/2"	90
5/8"	88
3/4"	86

Seismic Brace / Anchor Fittings - LS 503


"B" Bolt Size	Wt./ 100 pcs
1/2"	108
5/8"	107
3/4"	106

Seismic Brace / Anchor Fittings - LS 504

P1843AW – Adjustable Hinge Connection

LS103 – Fixed Angle Connector


"A" Bolt Size	Wt./ 100 pcs
1/2"	58
5/8"	58
3/4"	58

MATERIAL

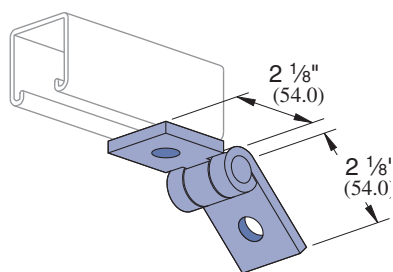
Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

FINISH

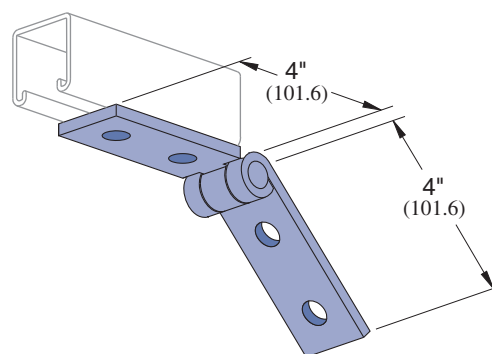
Electro-galvanized (EG), conforming to ASTM B633 Type III SC1.

P1843W – Adjustable Hinge Connection

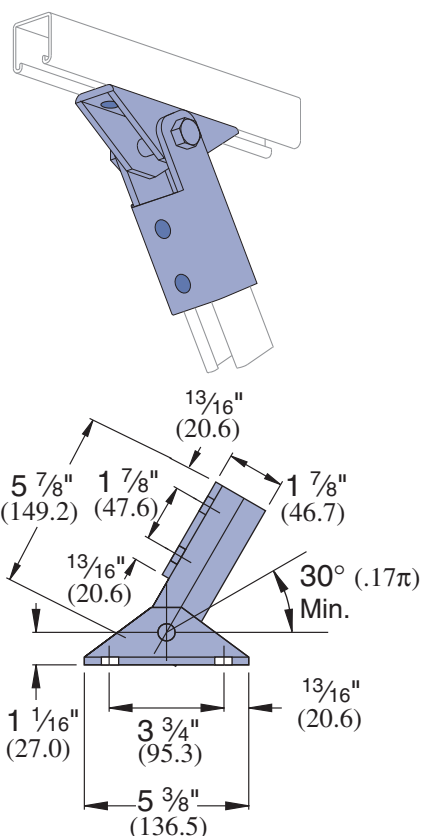
Wt/100 pcs: 68 Lbs (30.8 kg)

**P1354W – Adjustable Hinge Connection**

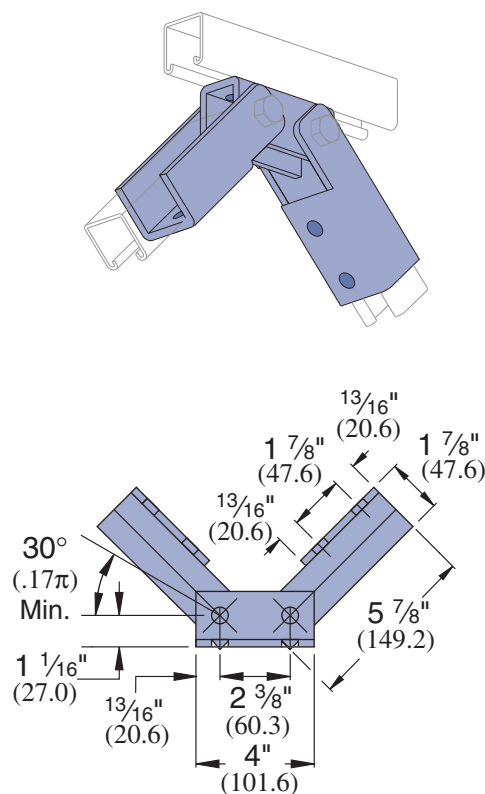
Wt/100 pcs: 109 Lbs (49.4 kg)

**P2815 – Adjustable Brace Fitting**

Wt/100 pcs: 307 Lbs (139.3 kg)

**P2815D – Adjustable Brace Fitting**

Wt/100 pcs: 497 Lbs (225.4 kg)

**MATERIAL**

Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

FINISH

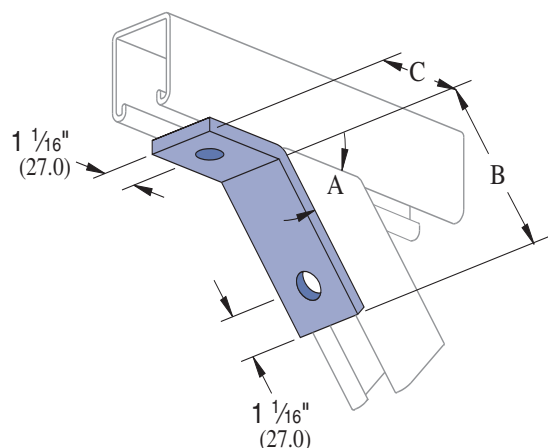
Electro-galvanized (EG), conforming to ASTM B633 Type III SC1.

Standard Dimensions for 1½" (41 mm) width series channel fittings *(Unless Otherwise Shown on Drawing)*

Hole Diameter: ⅝" (14.3mm); **Hole Spacing - From End:** ⅞" (20.6 mm); **Hole Spacing - On Center:** 1⅞" (47.6 mm); **Width:** 1½" (41mm); **Thickness:** ¼" (6.4mm)



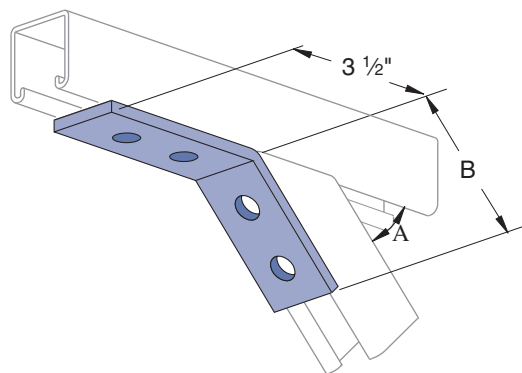
P1546, P2094 thru P2100



Wt/100 pcs: 58 Lbs (26.3 kg)

Part No.	"A" Deg. (rad)	"B" In (mm)	"C" In (mm)
P2094	82½° 1.44	3⅞ 90.5	1⅞ 42.9
P2095	75° 1.31	3⅞ 90.5	1⅞ 42.9
P2096	67½° 1.18	3½ 88.9	1¾ 44.5
P2097	60° 1.05	3⅞ 85.7	1⅞ 47.6
P2098	52½° 0.92	3¼ 82.6	2¼ 52.4
P1546	45° 0.79	3 76.2	2⅝ 58.7
P2099	37½° 0.65	3½ 88.9	1⅞ 46.0
P2100	37½° 0.65	2⅞ 68.3	2⅝ 66.7

P2260 thru P2270



Wt/100 pcs: 78 Lbs (35.4 kg)

Part Number	"A" Degree (rad)	"B" In (mm)
P2270	82½° 1.44	3⅞ 91.1
P2269	75° 1.31	3⅞ 91.1
P2268	67½° 1.18	3⅞ 91.1
P2267	60° 1.05	3⅞ 93.7
P2266	52½° 0.92	3⅞ 93.7
P2265	45° 0.79	3⅞ 93.7
P2264	37½° 0.65	3⅞ 93.7
P2263	30° 0.52	3⅞ 93.7
P2262	22½° 0.39	3¼ 95.3
P2261	15° 0.26	3¼ 95.3
P2260	7½° 0.13	3¼ 95.3

MATERIAL

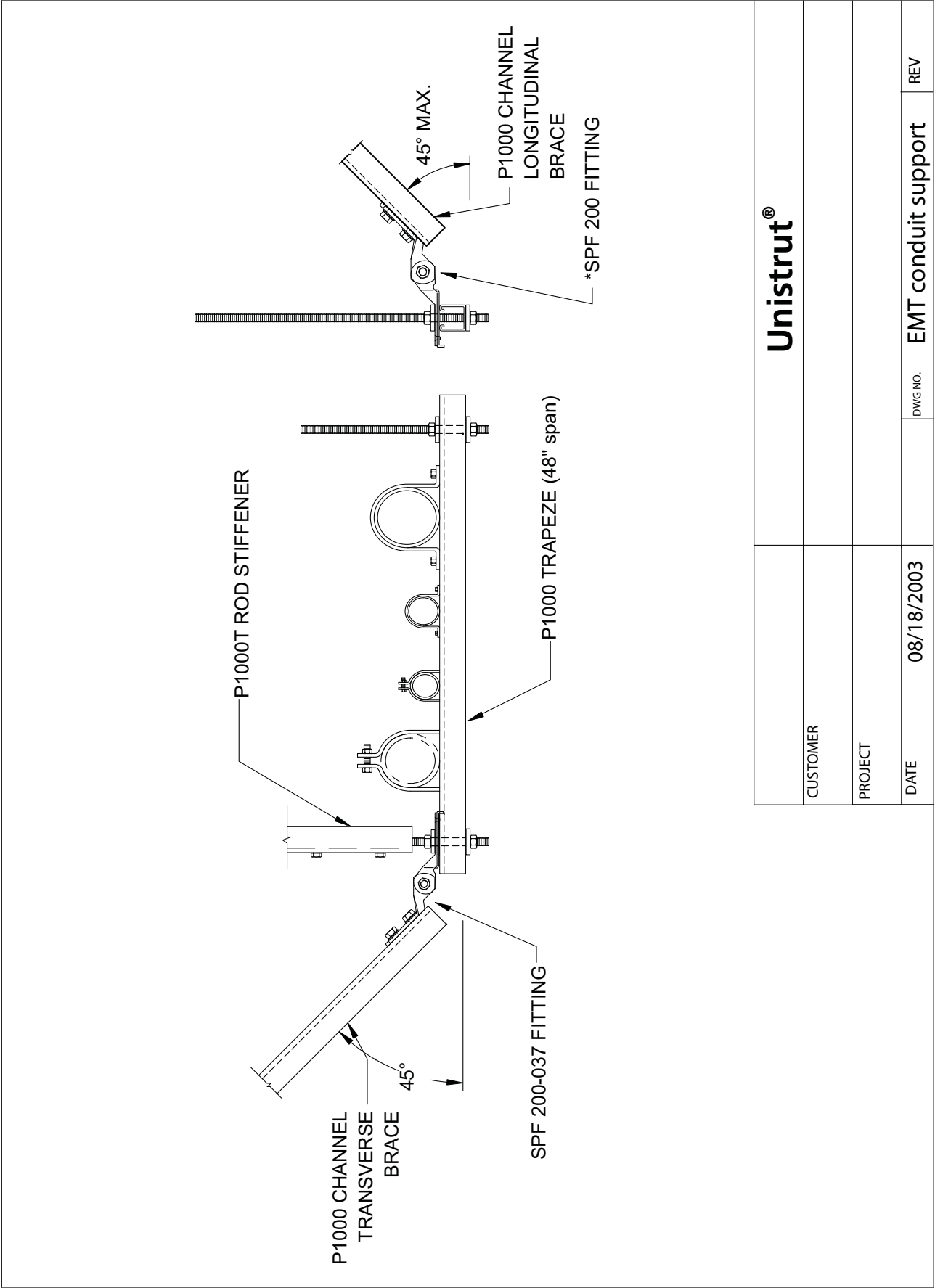
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FINISH

Electro-galvanized (EG), conforming to ASTM B633 Type III SC1.

Standard Dimensions for 1½" (41 mm) width series channel fittings (Unless Otherwise Shown on Drawing)

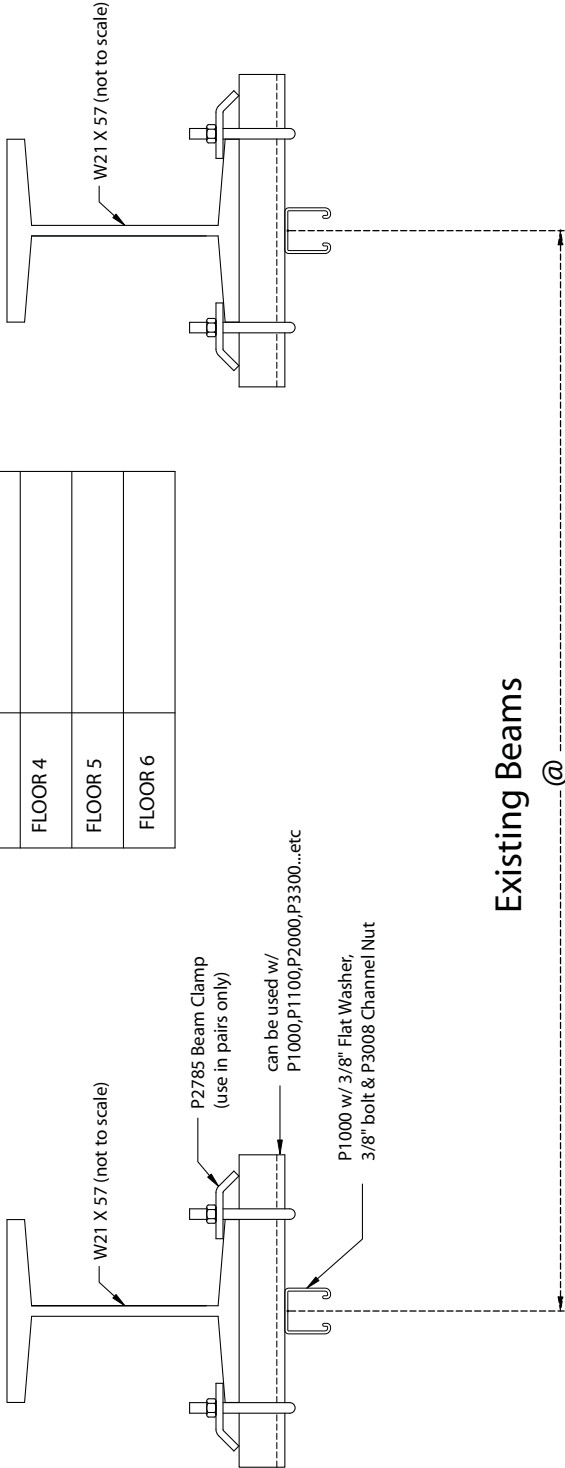
Hole Diameter: ⅞" (14.3mm); Hole Spacing - From End: 1⅞" (20.6 mm); Hole Spacing - On Center: 1⅞" (47.6 mm); Width: 1½"(41mm); Thickness: ¼" (6.4mm)





NOTE: Max Allowable Uniform Loads per P1000T 3'-4" span is limited by supporting trapeze rods,anchors.

Max Allowable Load (lb/ft)	
FLOOR	Allowable Load
FLOOR 2	
FLOOR 3	
FLOOR 4	
FLOOR 5	
FLOOR 6	

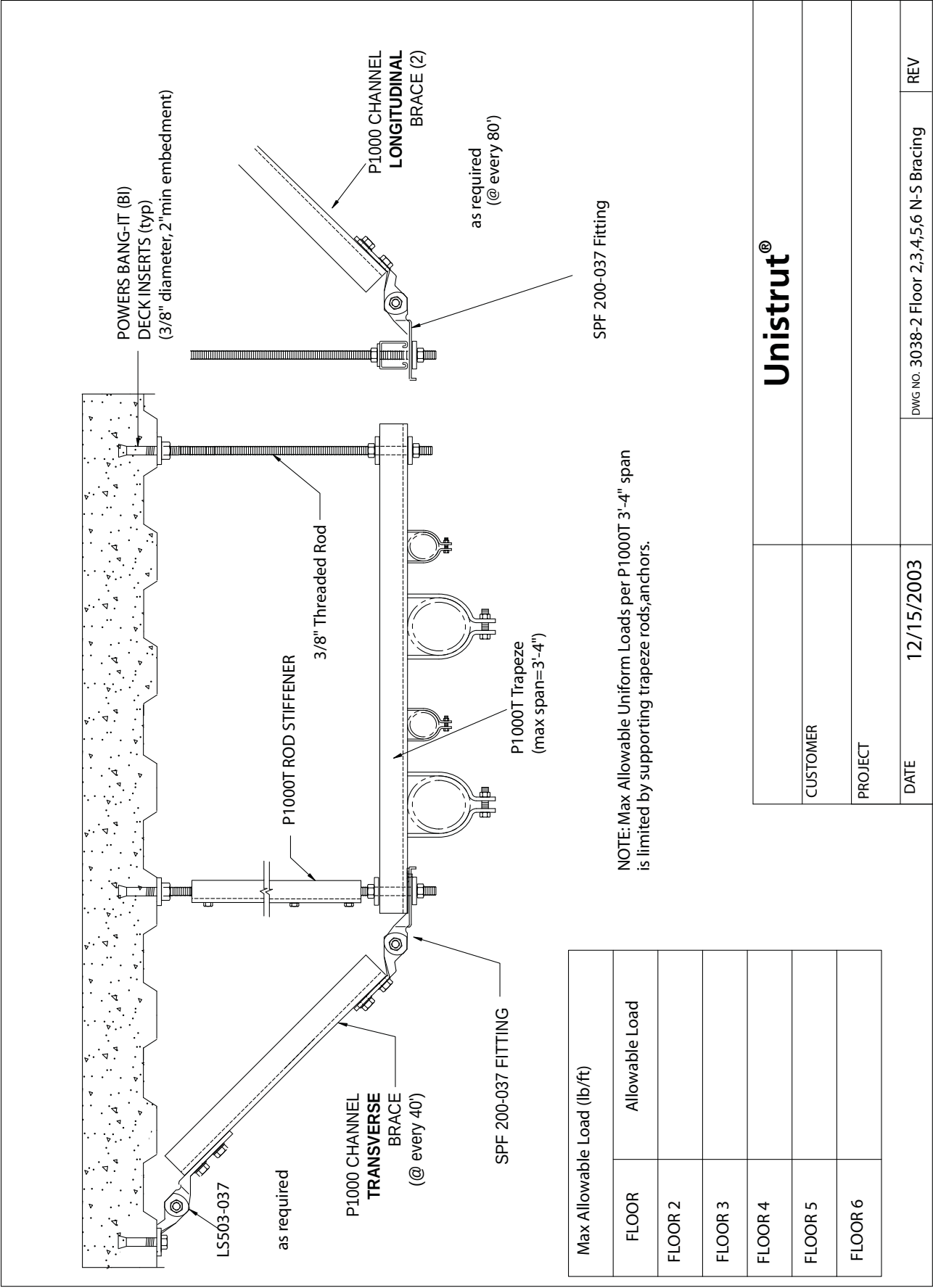


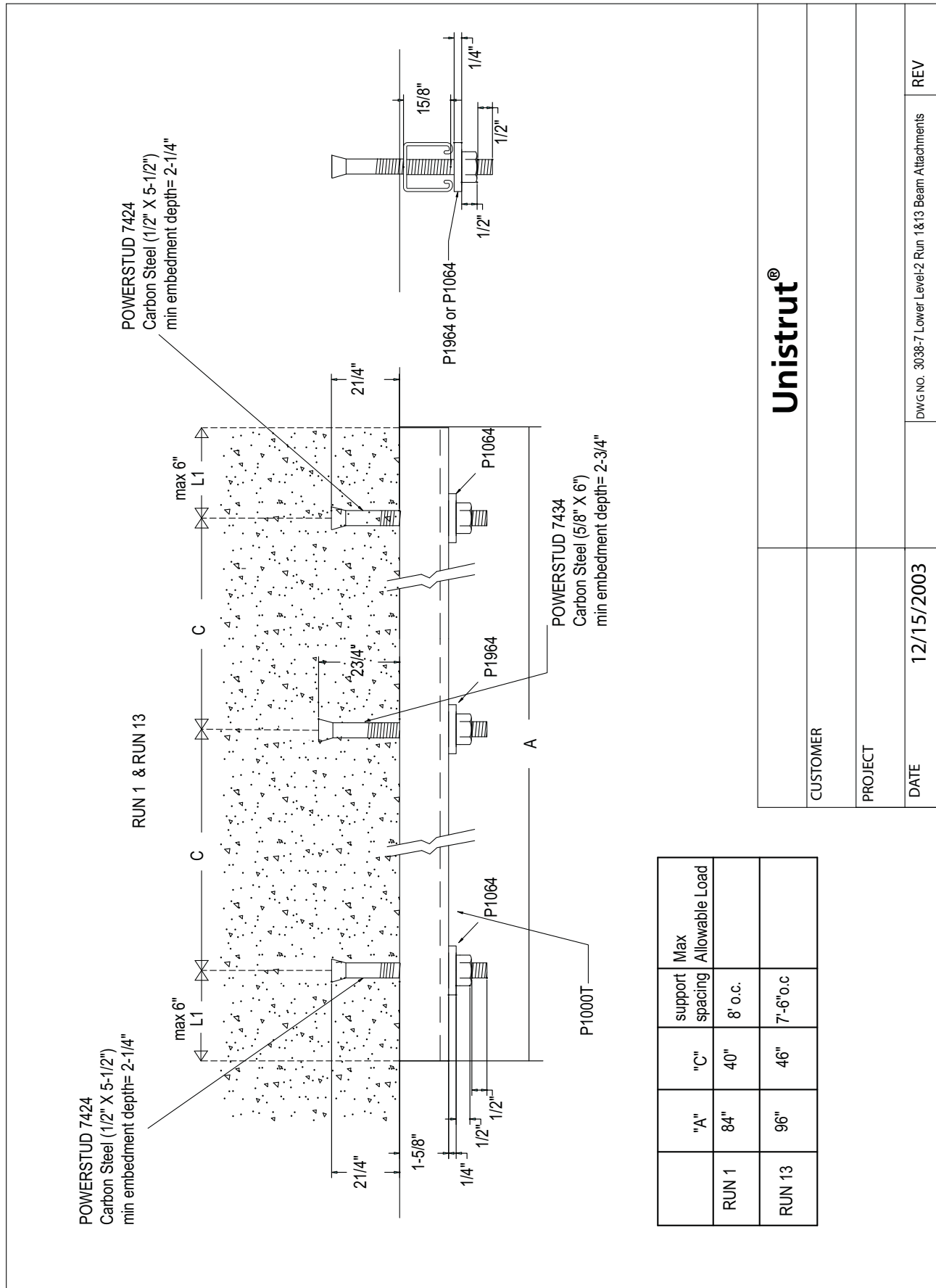
Existing Beams

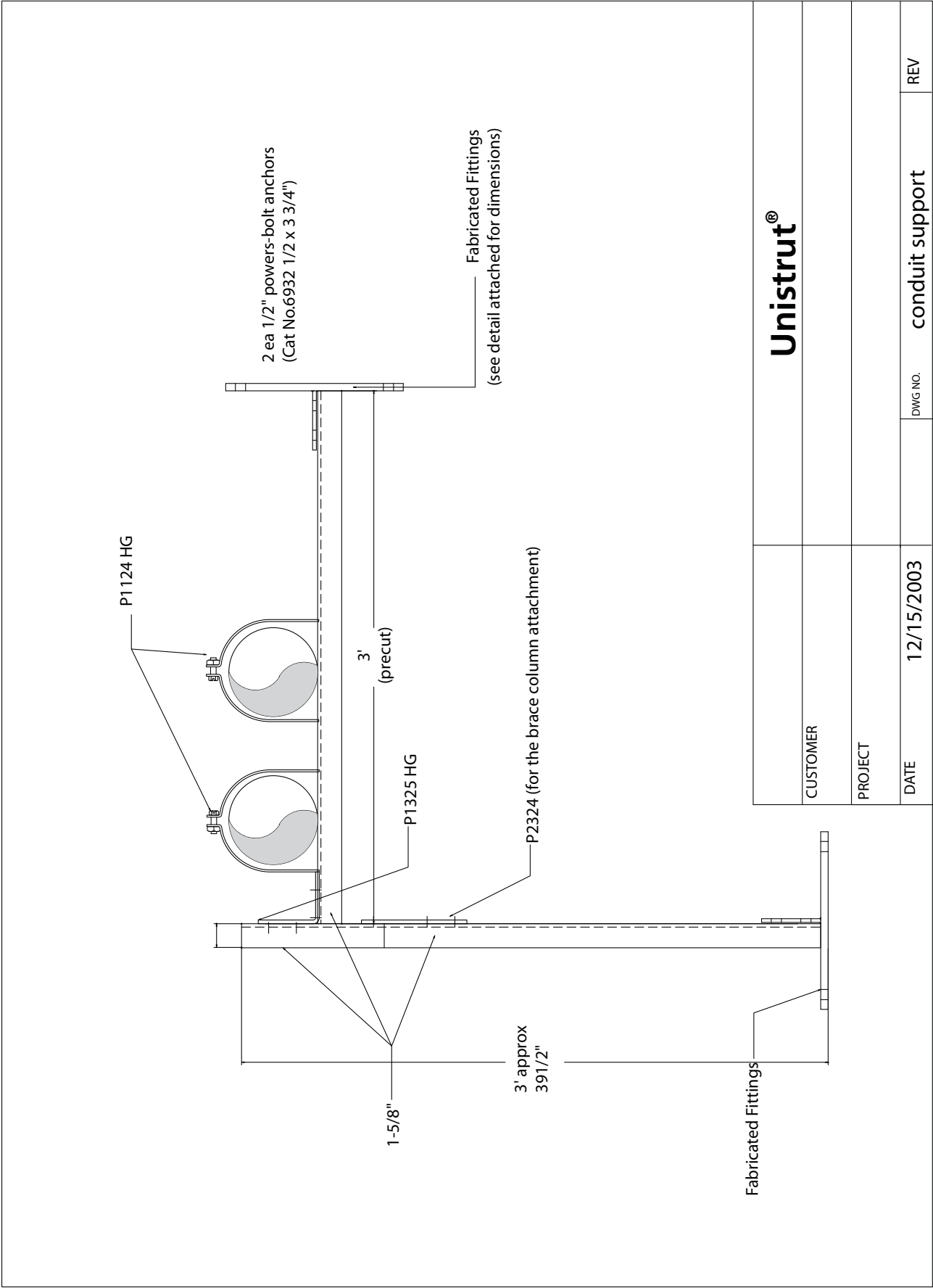
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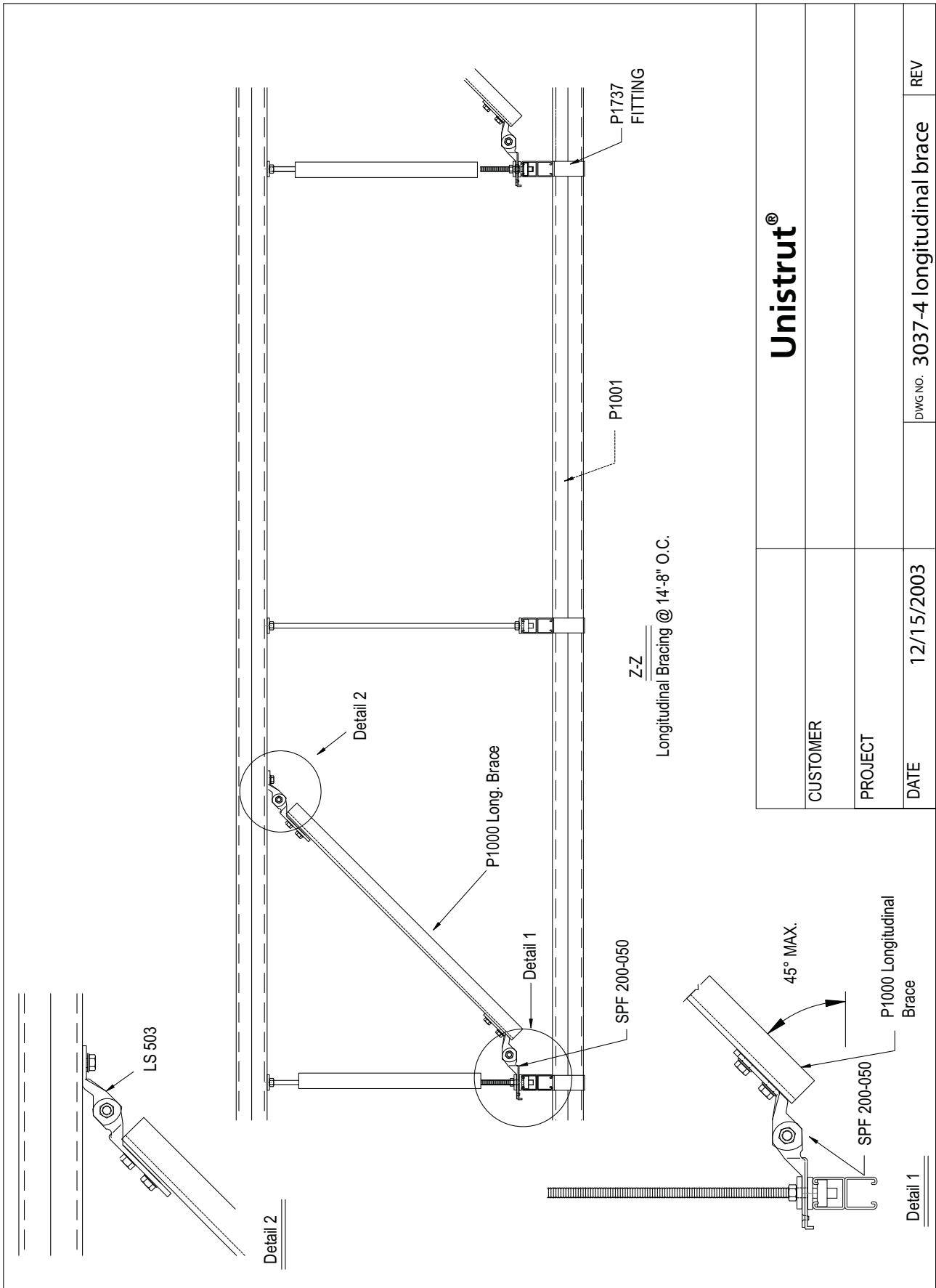
10' o.c.

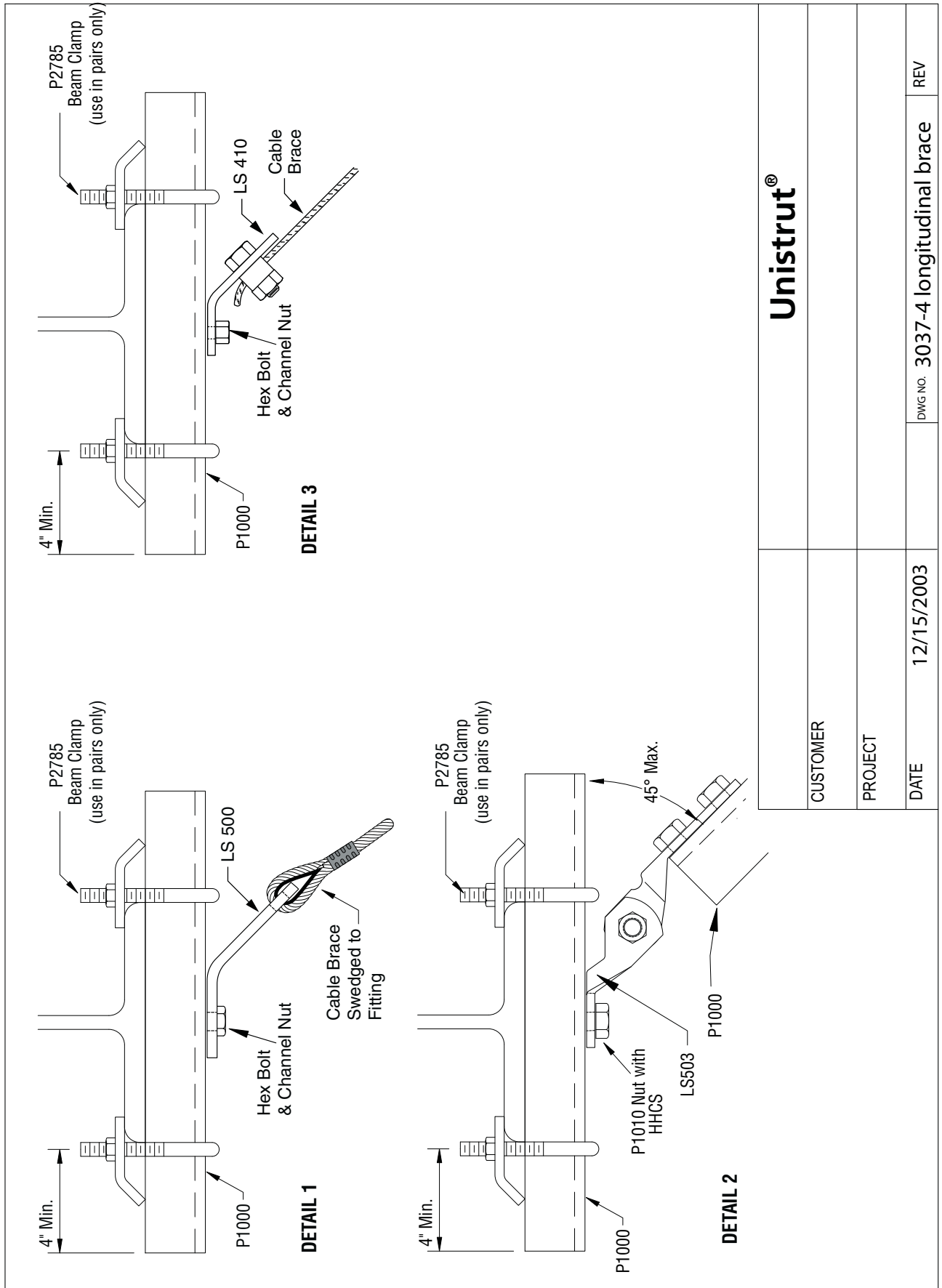
Unistrut®	
CUSTOMER	
PROJECT	
DATE	12/15/2003
DWG NO.	3038-1 Floor 2,3,4,5,6 Beam Clamps
REV	







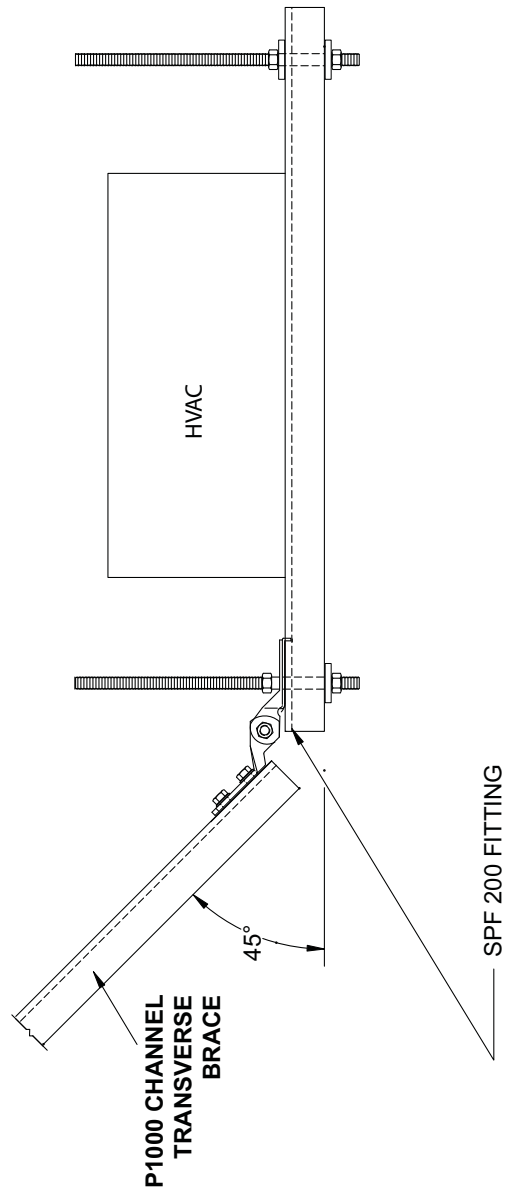




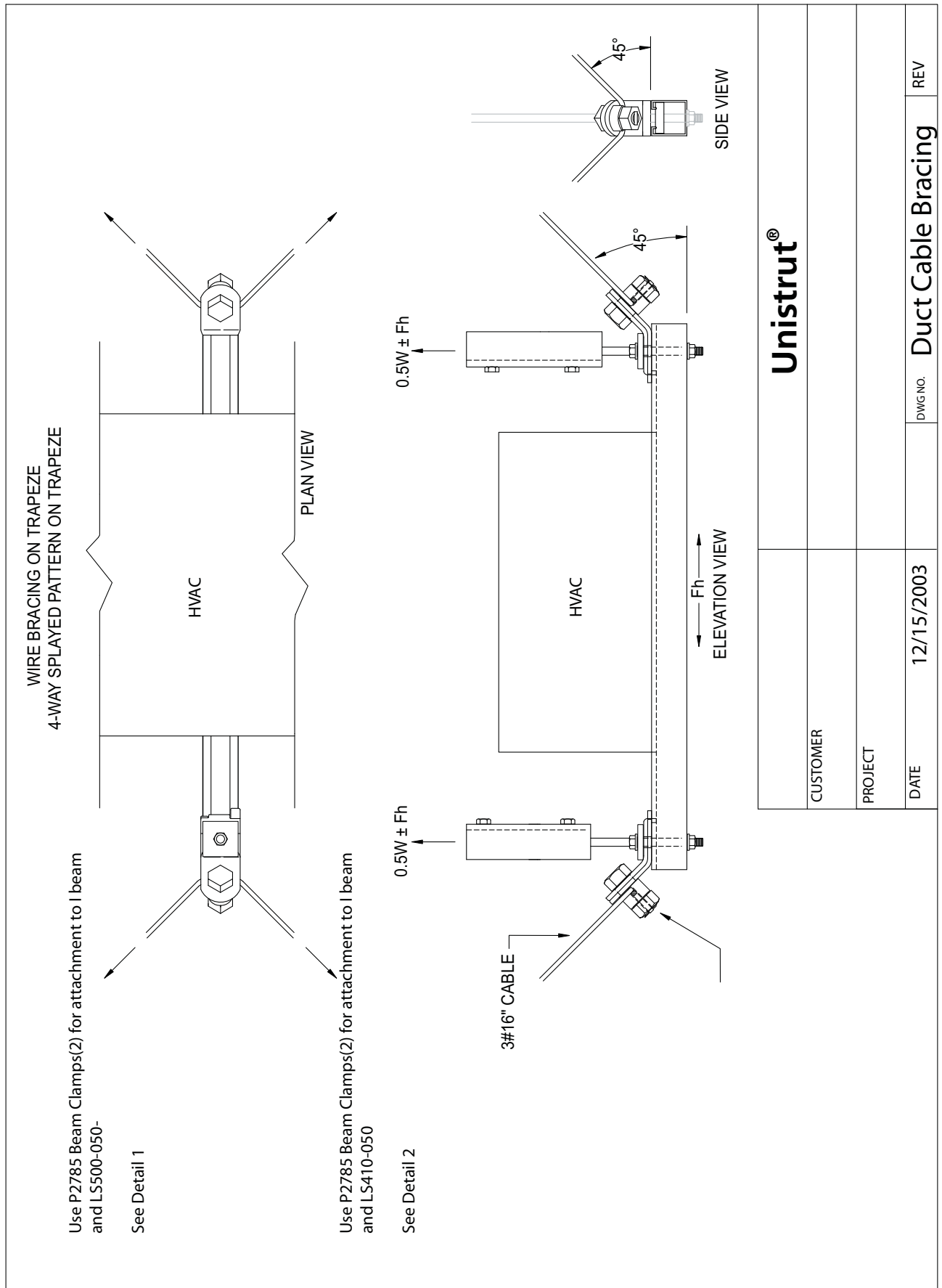


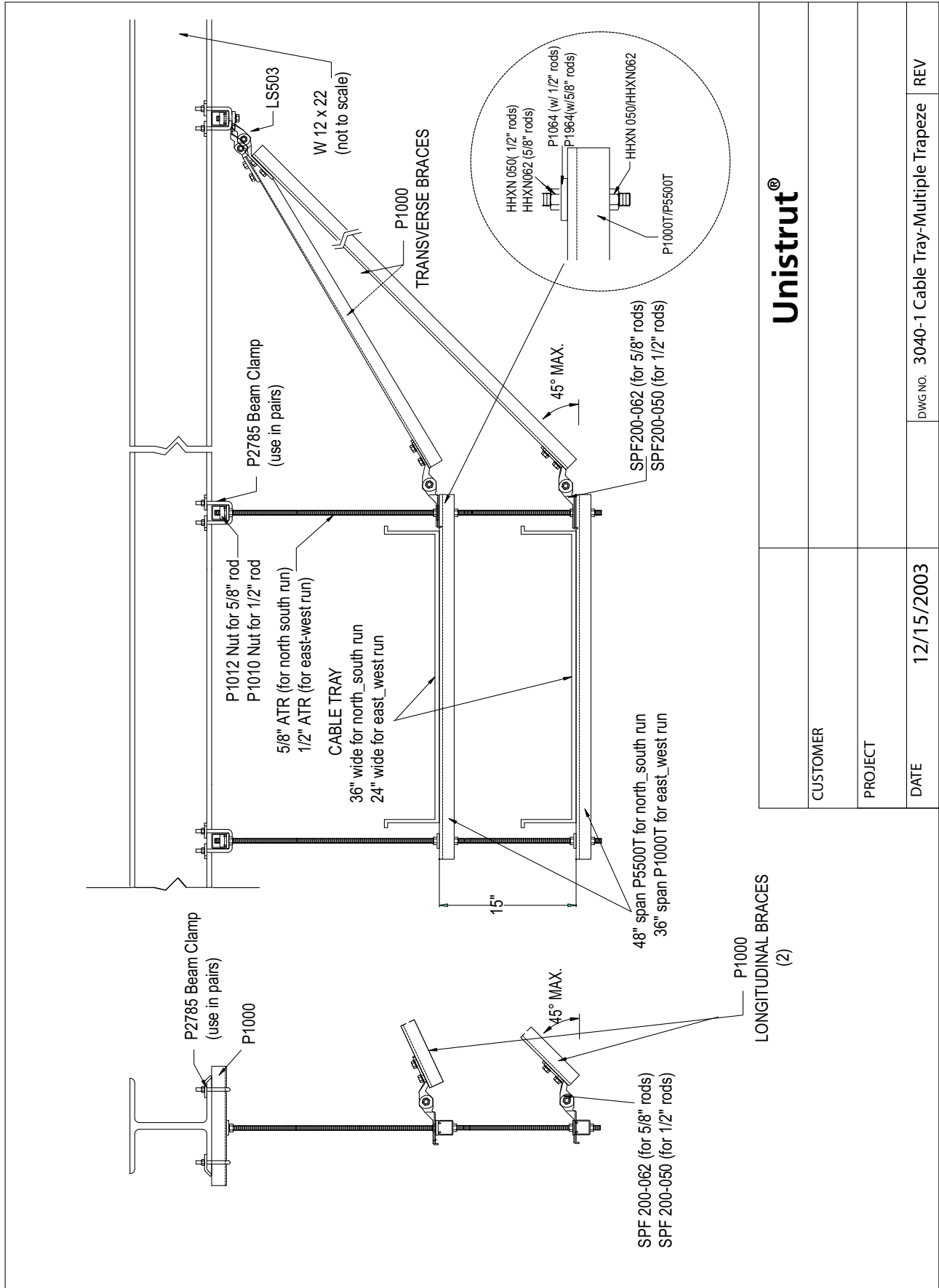
attachment to beam w/ LS503

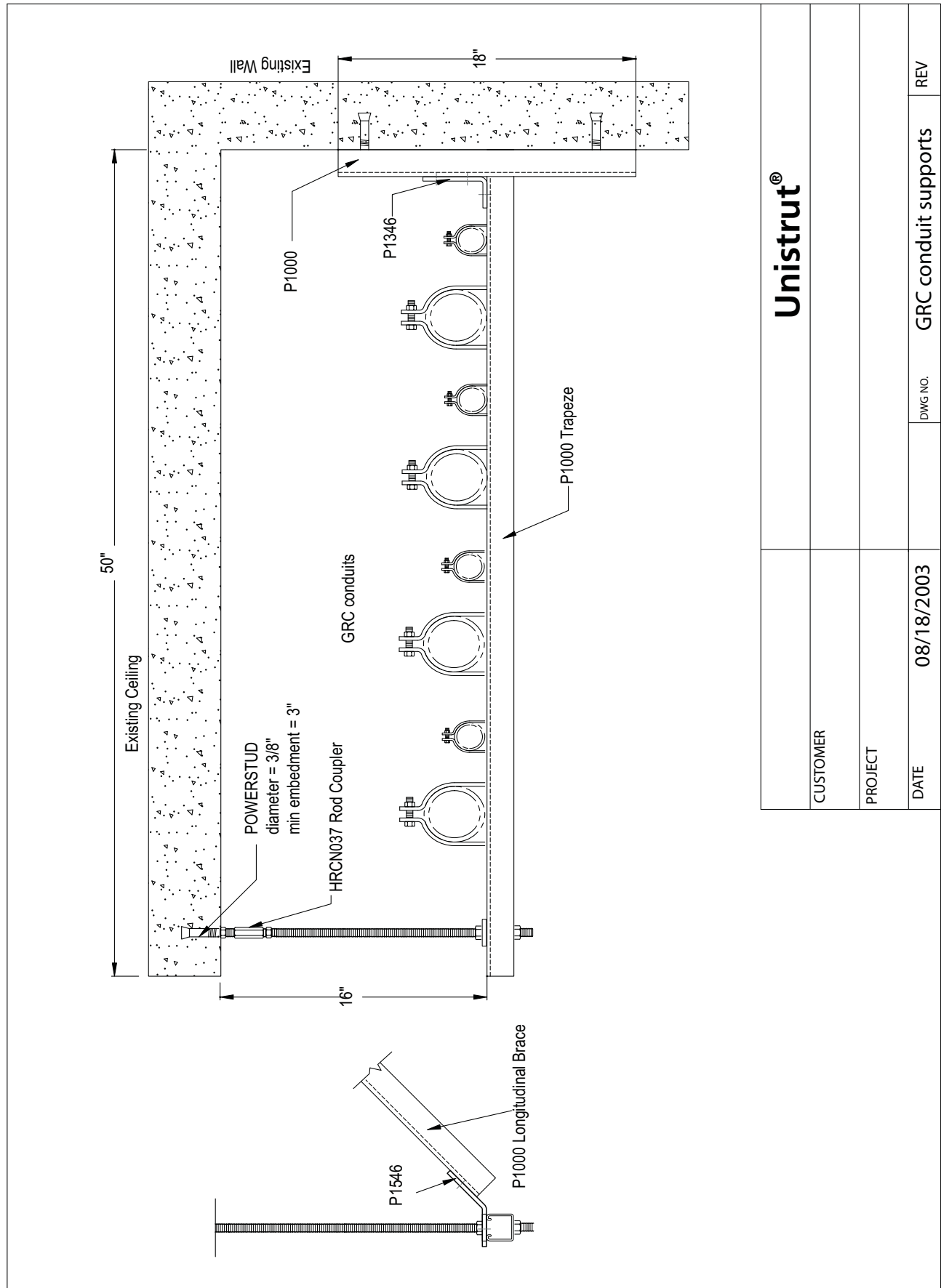
See Detail 3

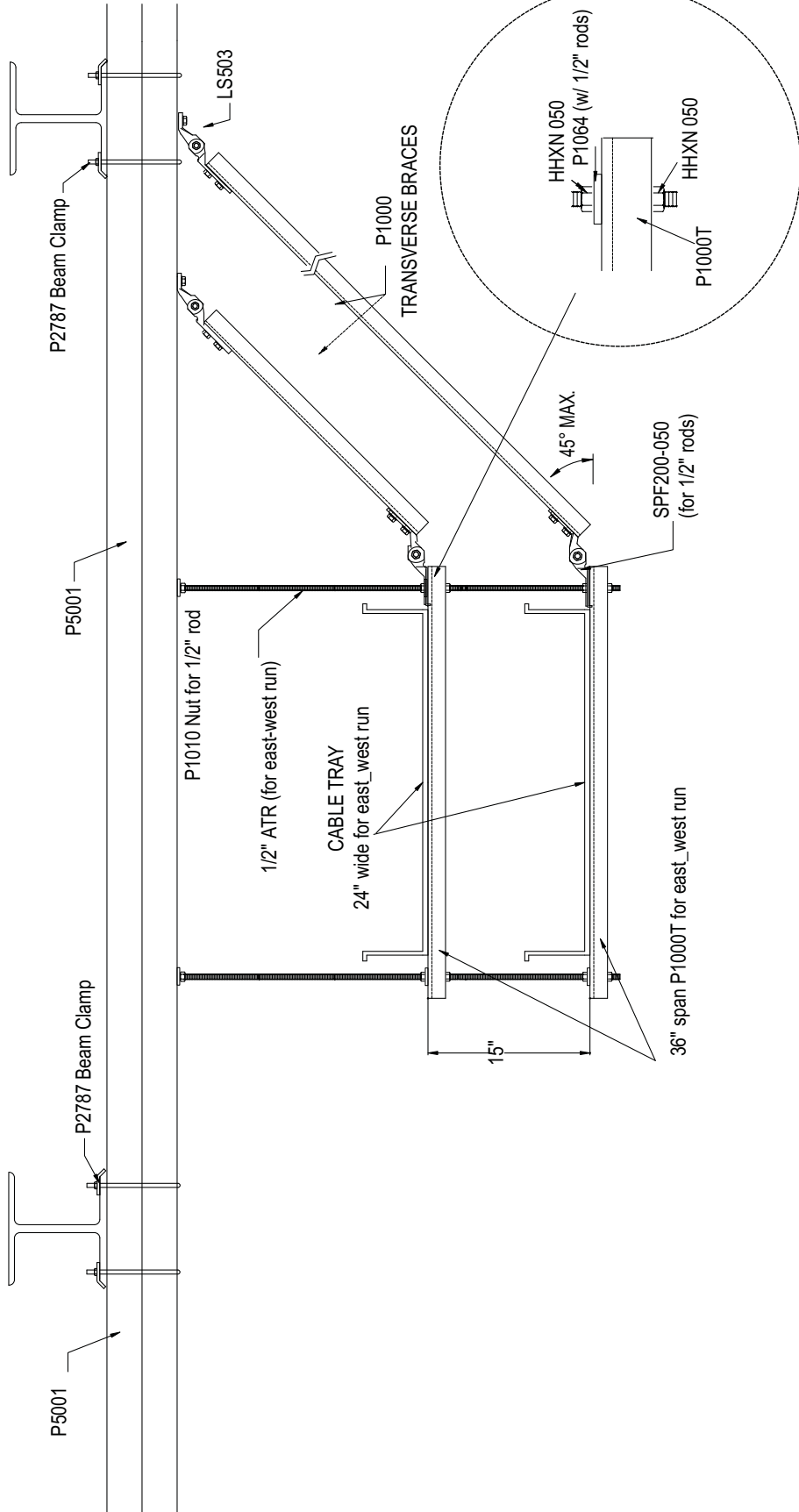


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			REV









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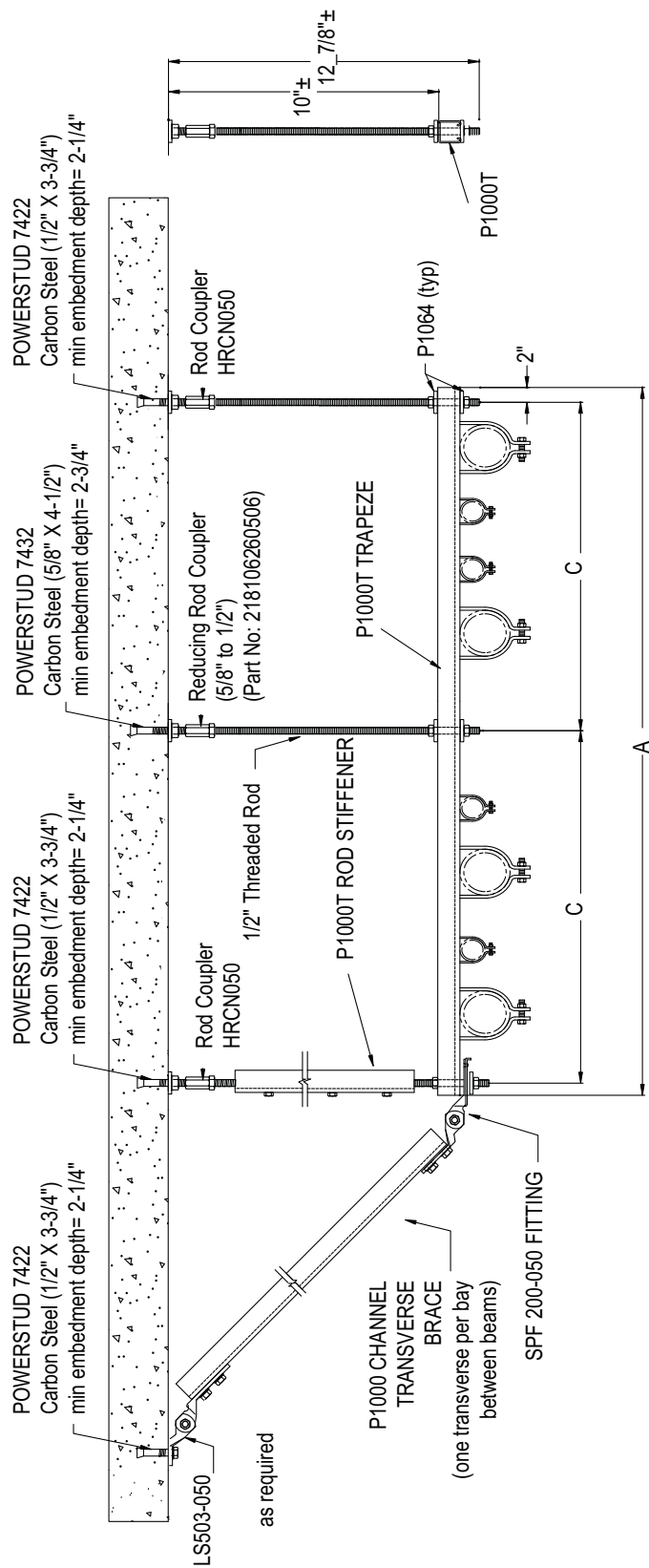
DATE

08/18/2003

DWG NO.

3040-2 Attachment to P5001

REV



	"A"	"C"	support spacing	Max Allowable Load
RUN 1	84"	40"	8' o.c.	
RUN 13	96"	46"	7'-6" o.c	

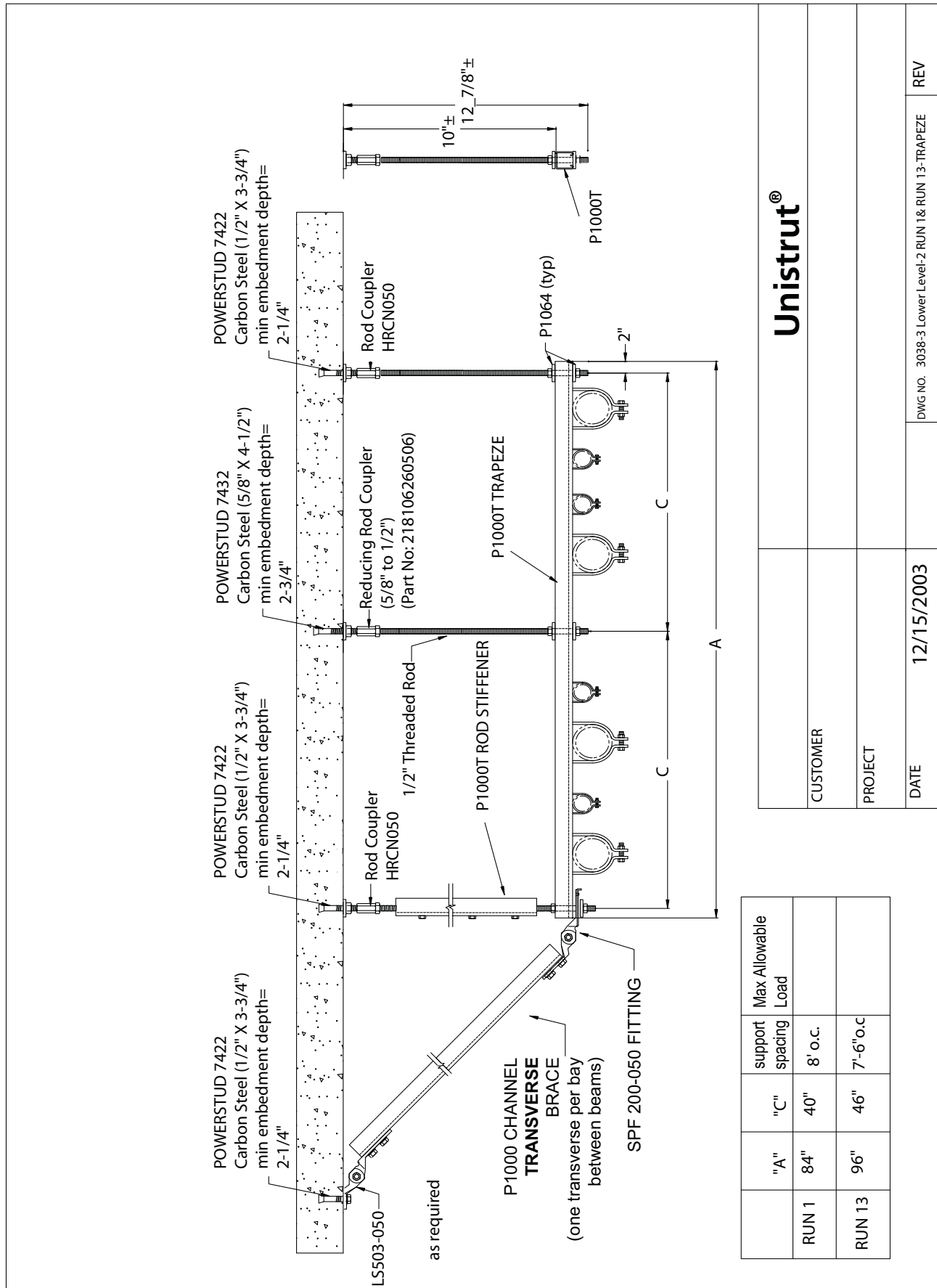
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DATE 08/18/2003

DWG NO. 3038-3 Lower Level-2 RUN 1 & RUN 13-TRAPEZE REV



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PROJECT

DATE 12/15/2003

DWG NO. 3038-3 Lower Level-2 RUN 1& RUN 13-TRAPEZE

REV

Fig. 55.....	E-2, E-27	P 1001HSAW	E-1, E-9	LS 2485	E-2, E-24
SPF 100-37	E-3, E-32	P 1001K	E-1, E-11	P 2485	E-2, E-25
SPF 100-50	E-3, E-32	P 1001T	E-1, E-10	P 2558	E-2, E-28
SPF 100-62	E-3, E-32	P 1001TAW	E-1, E-10	P 2785	E-2, E-30
SPF 100-75	E-3, E-32	P 1006-1420	E-2, E-24	P 2815	E-4, E-37
LS 103-37	E-4, E-38	P 1006T-1420	E-2, E-24	P 2815D	E-4, E-37
LS 103-50	E-4, E-38	P 1008	E-2, E-24	P 3006-1420	E-2, E-24
LS 103-62	E-4, E-38	P 1008T	E-2, E-24	P 3008	E-2, E-24
LS 103-75	E-4, E-38	P 1010	E-2, E-24	P 3010	E-2, E-24
SPF 200-37	E-3, E-33	P 1010T	E-2, E-24	P 3249	E-1, E-17
SPF 200-50	E-3, E-33	LS 1012F	E-1, E-19	P 3253	E-1, E-18
SPF 200-62	E-3, E-33	P 1012	E-2, E-24	3410 UNC	E-2, E-26
SPF 200-75	E-3, E-33	P 1012S	E-2, E-24	P 3700-37	E-1, E-19
SPF 300-37	E-3, E-34	LS 1018F	E-1, E-19	P 3700-50	E-1, E-19
SPF 300-50	E-3, E-34	P 1023	E-2, E-24	P 3700-62	E-1, E-19
SPF 300-62	E-3, E-34	P 1023S	E-2, E-24	3816UNC	E-2, E-26
SPF 300-75	E-3, E-34	P 1050	E-3, E-30	P 5500	E-1, E-12
SPF 400-37	E-3, E-35	P 1063	E-3, E-30	P 5500HS	E-1, E-13
SPF 400-50	E-3, E-35	P 1064	E-3, E-30	P 5500T	E-1, E-14
SPF 400-62	E-3, E-35	P 1100	E-2, E-28	P 5501	E-1, E-15
SPF 400-75	E-3, E-35	J 1205	E-2, E-29	P 5501T	E-1, E-16
SPF 401-37	E-3, E-36	1213UNC	E-2, E-26	P 5501TAW	E-1, E-16
SPF 401-50	E-3, E-36	IFI 1280	E-2, E-26	5811UNC	E-2, E-26
SPF 401-62	E-3, E-36	P 1354W	E-4, E-37	7400	E-1, E-22, E-23
SPF 401-75	E-3, E-36	1420UNC	E-2, E-26	7540	E-1, E-21
LS 500	E-4, E-35	P 1546	E-4, E-36	7550	E-1, E-20
LS 502	E-4, E-36	P 1649AS	E-3, E-31	HFLW	E-2, E-27
LS 503	E-4, E-36	P 1656A	E-2, E-31	HHCS	E-2, E-27
LS 504	E-4, E-36	P 1843AW	E-4, E-36	HHXN	E-2, E-27
P 1000	E-1, E-5	P 1843W	E-4, E-37	HLKW	E-2, E-27
P 1000HS	E-1, E-6	P 1964	E-3, E-30	HRCN	E-2, E-27
P 1000T	E-1, E-7	P 2265	E-4, E-38	HTHR	E-2, E-26
P 1001	E-1, E-8	P 2401	E-2, E-30		
P 1001AW	E-1, E-8	P 2403	E-2, E-30		
P 1001HS	E-1, E-9	P 2471	E-3, E-30		



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