Osburn Associates, Inc.
A Manufacturing Company

CONDUIT SUPPORT SYSTEMS

GLOSSARY

Following are acronyms which appear throughout this publication.

HDG	Hot Dipped Galvanized
FGL	Fiberglass
304SS	304 Grade Stainless Steel
316SS	316 Grade Stainless Steel
EG	Electro Galvanized
GIP	Galvanized Iron Pipe
BIP	Black Iron Pipe
S&H	Split & Hinged
FRE	Fiberglass Reinforced Epoxy
ID	Inside Diameter
IPS	International Pipe Standard
XHW	Extra Heavy Wall
I/O	Inner Outer Multiple Duct

INDEX

I. GENERAL INFORMATION

1:01 This guide includes construction information for installing conduit systems under bridges. It contains data on installation of support structures as well as the conduits.

1:02 Suspending conduit under bridge structures offers significant economic advantages over underwater installations. The initial installation is less costly and the conduit is more accessible for repair work.

1:03 Each bridge crossing must be individually designed to conform to local conditions and restraints imposed by the bridge site, design and construction.

Note: The dimensions and accessories in this bulletin are for standard IPS size 4" (4.500" O.D.), 5" (5.563" O.D.) or 6" (6.625" O.D.) conduit.

II. PRECAUTIONS

2:01 When considering a bridge crossing it is imperative that the regulating body for the existing or planned structure be consulted early to secure occupancy rights and assure the load limits of the structure.

2:02 When a conduit run is suspended from a bridge, hanger locations are governed by the maximum unsupported distance that occupied conduits can span without experiencing excessive deflections.

2:03 During temperature changes, exposed conduit will change length in proportion to the magnitude of the temperature change. Consequently, the conduit system must be designed so that length changes can take place without disengaging at the expansion coupling or developing excessive stresses or deflections.

To ensure that each expansion coupling controls the movement of its associated section, each end of the section must be restrained (anchored). Although some anchoring points may occur naturally (i.e. where conduit passes through an abutment), anchor point hangers normally are required at the expansion coupling locations and restraint points to provide a control point for expansion and contraction of the conduit. The following tables give you the thermal characteristics of conduit.

EXPANSION CHART

Temperature Change (deg F)	Approximate Length of Change in inches (per 100 feet)		
	FGL	Steel	PVC
40	.48	.30	1.6
60	.72	.45	2.4
80	.96	.60	3.2
100	1.20	.76	4.1
120	1.44	.91	4.8
140	1.68	1.07	5.6
160	1.92	1.22	6.4
180	2.16	1.40	7.2

III. CONDUIT SUPPORT SYSTEMS FOR BRIDGES

3:01 Conduit supports are modular type hangers designed to support and maintain the integrity of conduit systems on bridge crossings.

3:02 There are two types of conduit supports:

3:02.1 Intermediate type supports are the standard units for the normal runs and support points.

3:02.2 Anchor Point supports are similar in design and dimensions but with extra brace members. These are used as anchor points to support expansion joints and stop rings. On these units, provisions are included for the attachment of angle braces and bracing strands.

3:03 Several mounting arrangements of supports are provided as shown in Figure 1.

3:03.1 Hanging type conduit supports are designed to attach to inserts in the bridge deck or to bridge members and suspend the conduit system on 3/4" diameter bolts which extend through the hanger. Unless otherwise specified, these suspension bolts are supplied to position the top of the hanger unit 18" below the deck.

3:03.2 Base mounted conduit supports are designed for mounting on top of bridge members. These are furnished with 3/4" diameter attachment bolts that are 3" longer to extend through the bridge member and attach the support to the bridge structure.

FIGURE 1-Typical Assemblies

Shown are typical hanger type and base mounted conduit supports. Units are factor pre-assembled ready for mounting. They can be furnished in any configuration and made to carry as many conduits as required for the job.

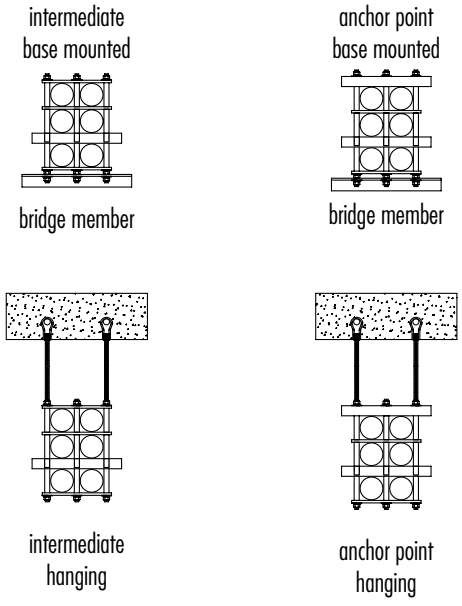
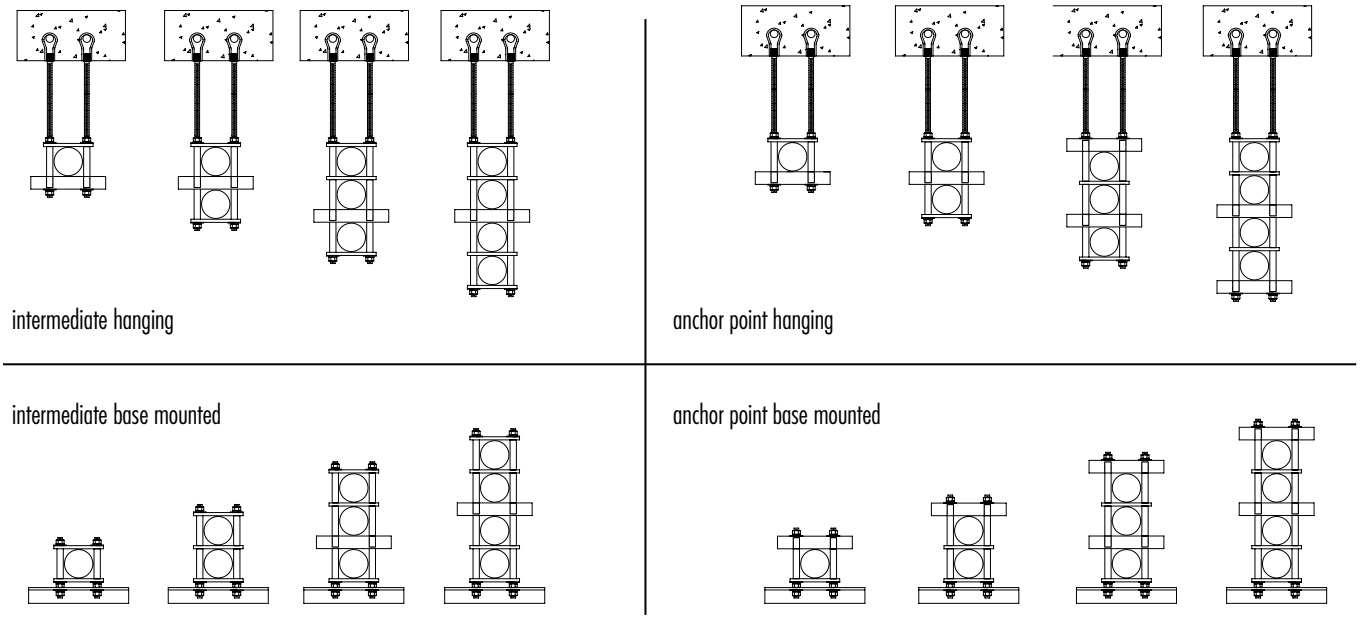


FIGURE 2 - typical assemblies (only one column wide shown)



3:03.3 Other mounting methods are available to meet special job site requirements. For details, consult Osburn Associates, Inc.

3:03.3 Other mounting methods are available to meet special job site requirements. For details, consult Osburn Associates, Inc.

3:03.4 Standard positioning of the 2" x 2" brace members. Unless otherwise specified, hanger units are assembled as shown in Figure 2.

IV. LOCATING SUPPORTS

4:01 To provide secure support of the conduit system, conduit hangers should be located at specific intervals along the structure, They should be spaced at 6 to 8 foot intervals for PVC conduit and 10 to 12 foot intervals for fiberglass conduit, depending on ambient temperature ranges.

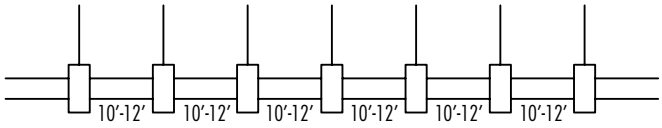
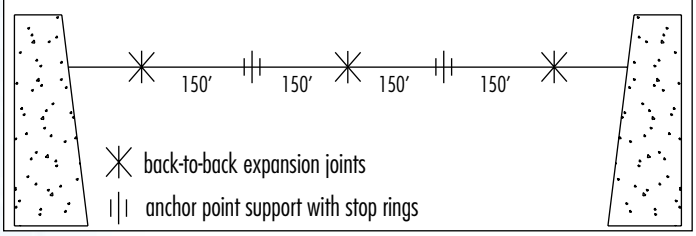


FIGURE 3-support spacing for FRE conduit

4:02 Because of the inherent thermal expansion and contraction of the conduit materials, expansion joints must be provided for each 100 feet of PVC conduit, and 150 feet of fiberglass conduit.

4:03 Figure 4 illustrates a typical mounting layout. Note that an expansion joint is not placed at bridge abutments due to possible misalignment.

FIGURE 4-location of expansion joints for FRE



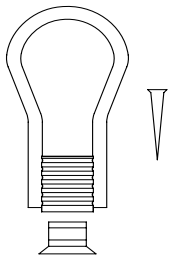
4:04 Special Conduit Configurations Normally units are specified and furnished in square or rectangular configurations. However, the flexibility of this conduit support system permits a wide variety of design options. This makes it possible for you to take full advantage of the space available for conduit runs. It also helps you solve the difficult structure problems without resorting to special support hardware.

4:05 4" Fiberglass Reinforced Conduit requires a support with a 4 3/4" square "window" to accommodate its 4 1/2" OD.

V. INSTALLING SUPPORTS

5:01 Loop Type Conduit Insert Assembly is an alternate method of suspending supports in new bridge construction. Loop-type insert assemblies include a threaded insert with loop, a threaded plug and a special nail is available for attaching plug to wooden deck forms. (see Figures 5 and 6)

FIGURE 5

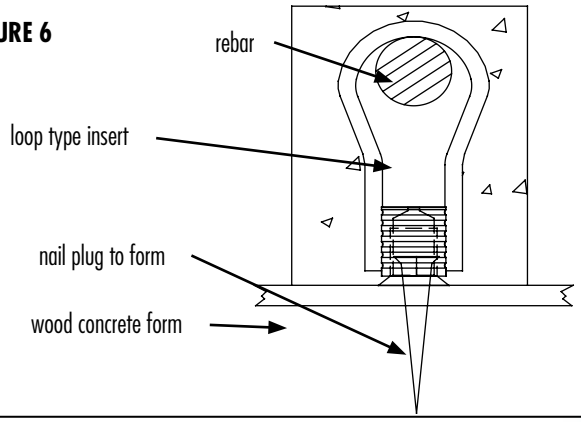


loop-type threaded insert screws onto threaded plug

special nail for attaching plug to deck

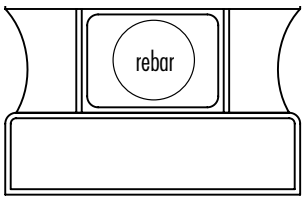
threaded plug is nailed into position on wood bridge deck

FIGURE 6



5:02 Adjustable Type Concrete Insert May be specified in place of loop-type inserts. Movable nut permits lateral adjustment to receive attachment bolts. Threaded 3/4" may be used with concrete reinforcement rods. (Figure 7).

FIGURE 7

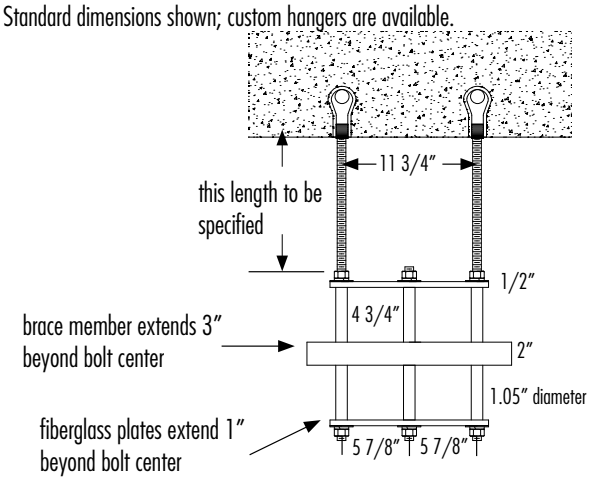


5:03 Procedure for installing hanging type

5:03.1 Hanger units are shipped completely assembled with nuts just tight enough to sustain shipping and handling. Before attempting to screw the attachment bolts into the threaded inserts, loosen the top nut on each attachment bolt enough to allow the bolt to turn easily so that the bolt can be threaded into the insert. The double jam nuts at the base of each attachment bolt are for use in tightening the bolts into the inserts and to prevent the nuts from loosening due to bridge vibration. (See Figure 8). After all attachment bolts are bottomed into the inserts, tighten all nuts on the assembly, making certain the unit is level.

FIGURE 8

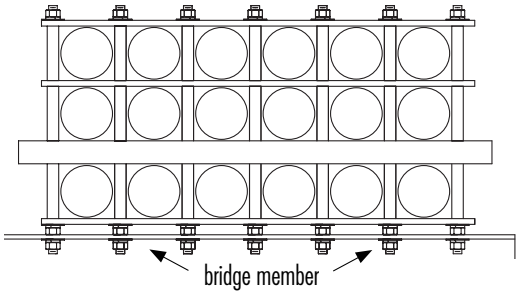
Standard dimensions shown; custom hangers are available.



5:04 Procedure for installing base-mounted

5:04.1 Remove the extra set of nuts and washers from the attachment bolts and insert the attachment bolts through the pre-drilled holes in the mounting plate. Thread the extra set of nuts and washers back on the attachment bolts and tighten all nuts.

FIGURE 9



remove the nuts and washers on the underside to mount

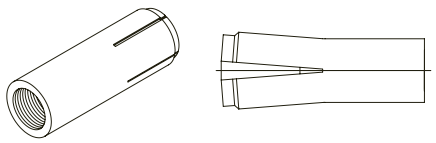
Note: Should it be necessary to push the belled end of the conduit through a support during conduit installation, all bolts can be loosened enough to allow the larger diameter of the belled end to pass through the opening. However, after the conduit is installed, be sure to retighten all nuts.

EXISTING BRIDGES

5:05 Procedure for installing supports in concrete on bridges where drilling is permitted

5:05.1 This method utilizes threaded anchors designed to receive the threaded steel hanger bolts as well as angle brace bolts. Epoxy inserts may also be used for the same applications.

FIGURE 10 - anchor for pre-drilled holes



drop-in anchor

5:06 Note: In all concrete drilling, do not drill through steel reinforcing bars. If steel is encountered, move bolt holes equally to avoid the steel. Plug the unused hole with concrete.

5:07 Mounting supports on steel structures where drilling is permitted (or on a special steel structural member provided). Drill 13/16" holes at the prescribed centers.

5:08 Installation of supports where drilling is prohibited. Several clamping methods can be used. Obtain exact dimensions of the structural members and contact Osburn Associates, Inc. for suggestions.

5:09 Special Attachment Arrangements. In many cases hardware may be custom designed and fabricated to solve attachment problems. When this is done, the system must be engineered to be compatible with the attachment arrangements.

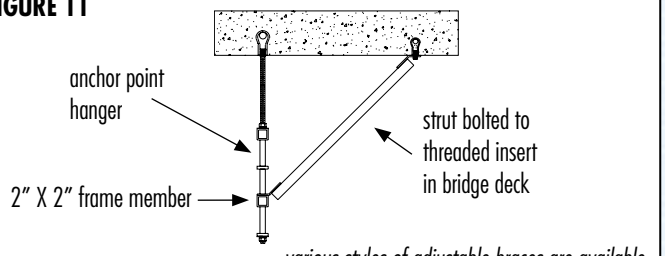
5:09.1 Osburn Associates, Inc. can supply a range of special channels and fittings that can be used in most of these cases. These structural components provide wide design latitude, required strength and easy, on-the-job assembly.

VI. BRACING

GENERAL

There are two types of bracing:
(1) Angle bracing shown in Figure 11
(2) Longitudinal bracing shown in Figure 12

FIGURE 11



various styles of adjustable braces are available

The following is a guide for the use and installation of these types of braces. Braces and strands should be sized according to loads imposed on the supports.

For a schematic drawing of these forces, also see Figure 12

6.01 Intermediate Conduit Supports experience primarily three different loadings:
(1) Loads in vertical direction from the weight of the conduit, cable and hangers.
(2) Load in transverse direction imposed by wind
(3) Load in longitudinal direction imposed by the frictional force developed by the expansion and contraction of the conduit.

6.02 Intermediate hangers transfer these forces at two points.
(1) The attachment bolts.
(2) The longitudinal bracing.

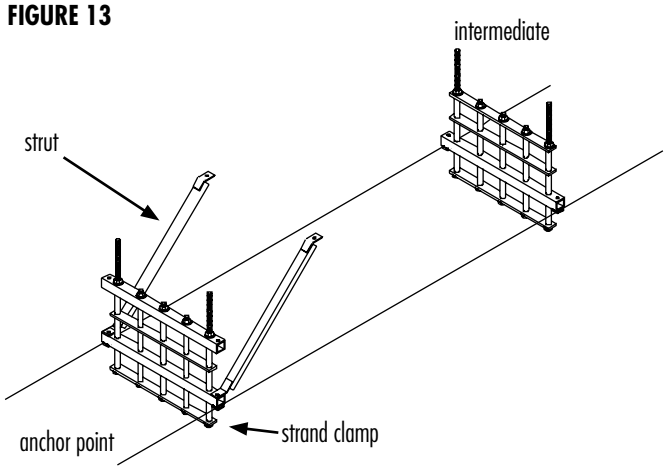
6.03 Anchor-Point experience the same loading as Intermediate type supports except forces due to friction. These units must also be able to withstand the following additional stresses:
(1) Cable-pulling force (longitudinal). Because this is the only point where the conduit is restrained, it is also the point where resistance to cable pulling will be transferred to the supports from the conduit. Also, if the cable were to become hung up in the conduit run, the entire cable-pulling force would be applied to the conduit and transferred to this anchor point.
(2) Longitudinal strand loads are also imposed on anchor point supports when stranding is used to brace intermediate hangers. The total longitudinal stranding load will be the summation of the intermediate loads on the strand.

6.04 Angle Bracing The purpose of the angle bracing is to enable supports to resist the forces developed from expansion and contraction, cable pulling and longitudinal stranding. Note: Heavy duty angle bracing available.

6:04.1 Angle bracing is required on both sides of all Anchor Point Supports. (See Figure 13)

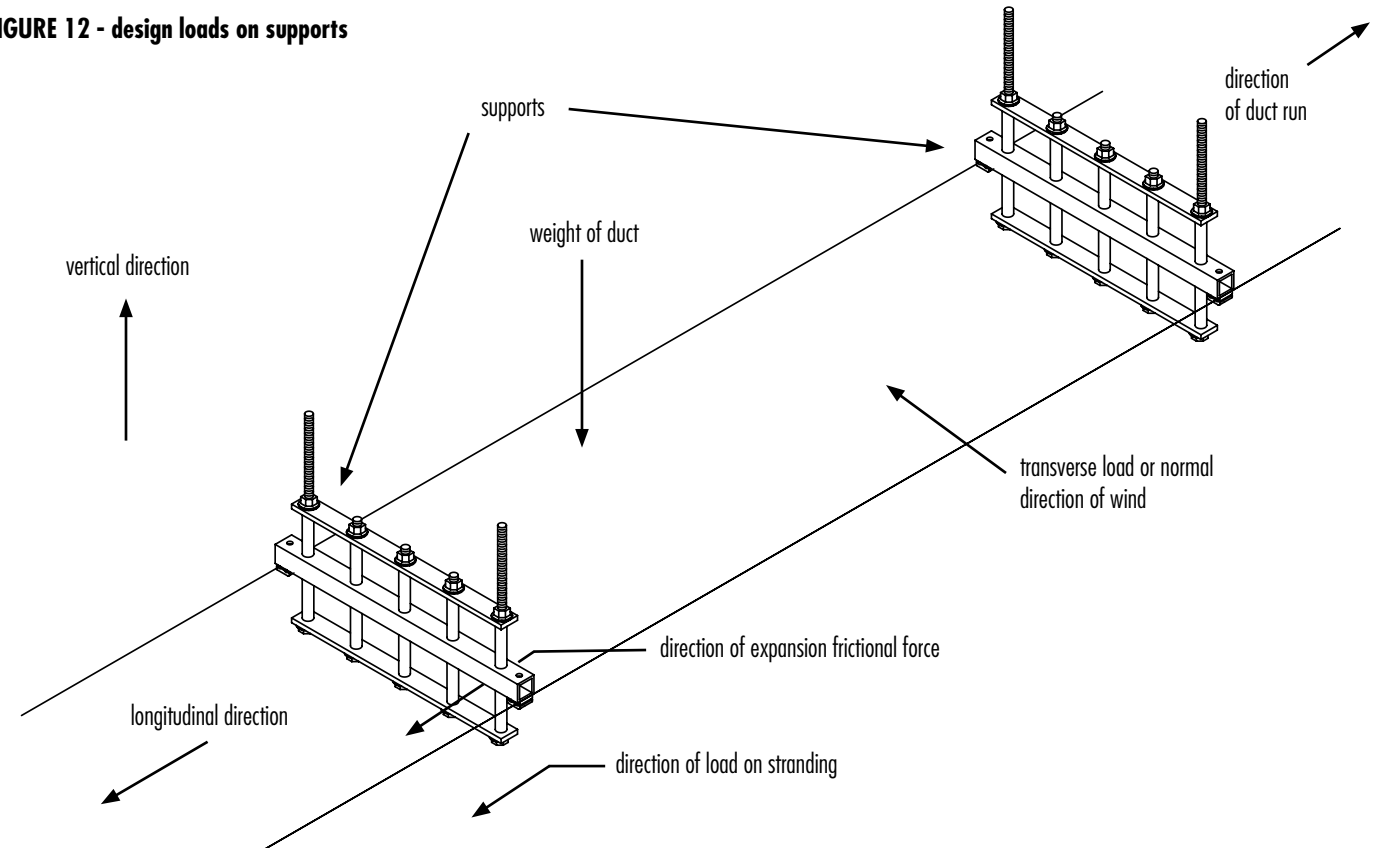
6:04.2 Anchor Point supports are used at the following locations:
(1) Conduit expansion joints
(2) Fixed points where conduit is restrained with stop rings
Exceptions: Angle bracing is not required where the support is not stranded, is close coupled and not more than two conduits high.

FIGURE 13



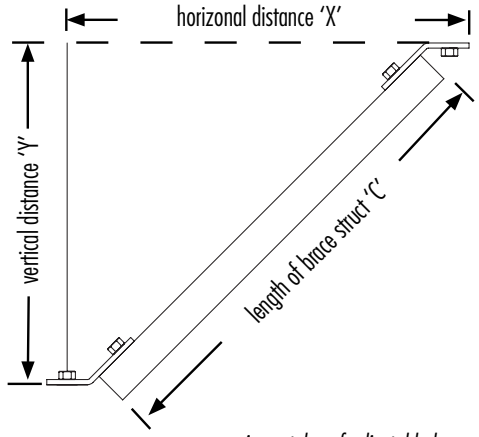
note: angle and longitudinal strand bracing should be installed on both sides of supports when bracing is required.

FIGURE 12 - design loads on supports



6:04.3 When ordering, supply the "X" and "Y" distances and angle of the fittings as shown in Figure 14.

FIGURE 14 - dimensions for determining length of braces

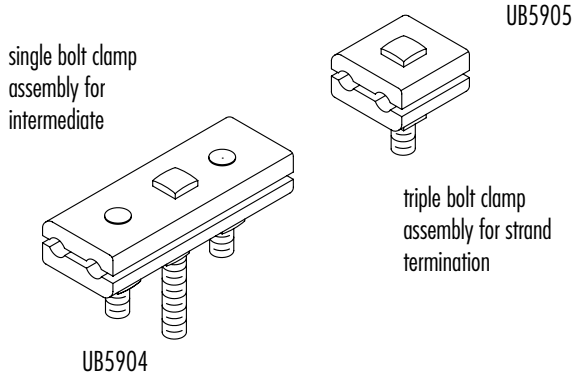


various styles of adjustable braces are available.

6:05 Longitudinal Bracing The purpose of longitudinal strand bracing is to enable intermediate supports to carry the loads developed primarily by expansion and contraction on the conduit.

6:05.1 Hangers are equipped with a 2" x 2" square tube with bolt holes for the attachment of the strands. The fittings shown in Figure 15 accommodate the different strand sizes normally used on intermediate hangers. Note that a special "triple" clamp fitting is used for dead-ending strand.

FIGURE 15 - guy clamps for longitudinal bracing



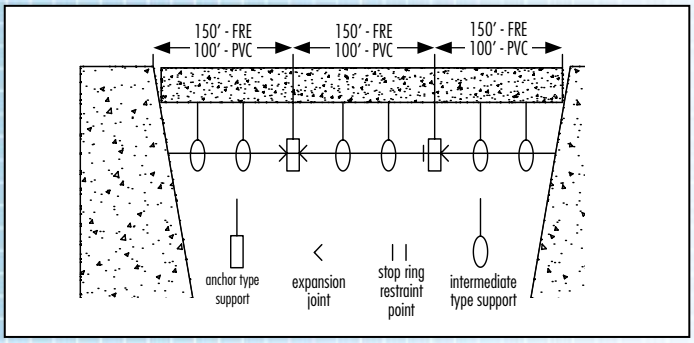
for installation of these clamps see figure 16

6:05.2 The size and strength of the strand used will depend on the number of conduits plus the distance between angle-braced supports. A 3/16" strand (with an ultimate tensile strength of 2200 lbs) or a 3/8" strand (with an ultimate tensile strength of 8700 lbs) can be used depending on the anticipated forces encountered. Guy clamps accommodate both of these strand sizes.

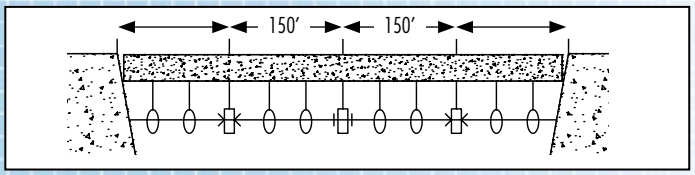
6:05.3 Longitudinal bracing should be terminated:
(1) At both sides of bridge expansion joints.
(2) At every stop ring location.
(3) At a maximum strand length of 200'.

VII. EXPANSION JOINT INSTALLATION

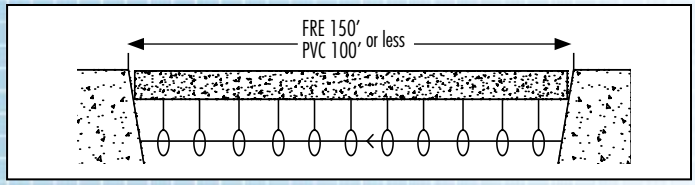
7:01 Units are located at anchor point hangers and control expansion and contraction of the conduit run 100 feet in each direction for PVC and 150 feet for fiberglass. This provides control with minimum strain on both conduit supports. (See Figures 17 and 20).



7:01.1 In some cases (spans of 300', 500', 700', etc) make it necessary to combine the back-to-back system with one "in-line" single expansion joint assembly as shown in Figure 17.



7:01.2 In short crossings, under 100 feet, only one expansion joint is required. In this case, the expansion joint should be located near the center of the bridge between supports as shown in Figures 19 and 21. As both ends of the conduit run is restrained in the abutment walls, the expansion joint can float between the supports.

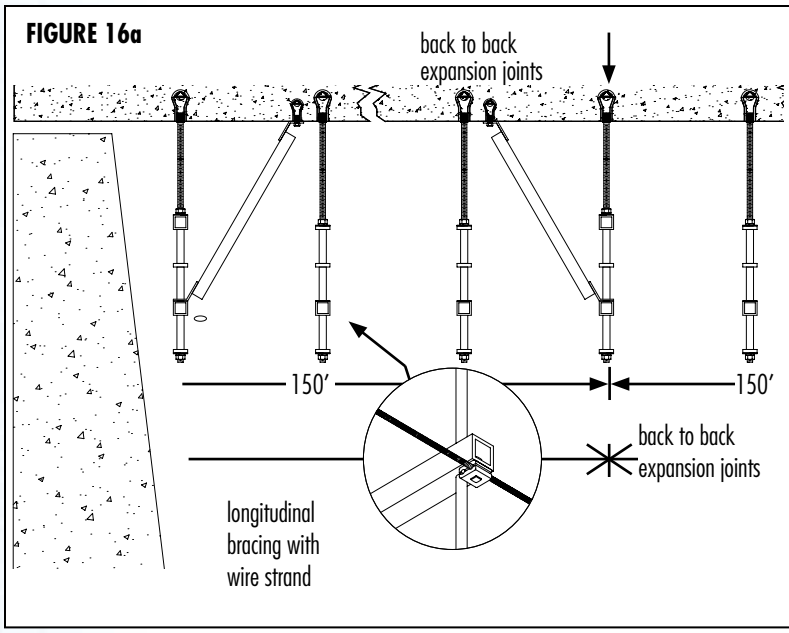


7:02 Installation of back-to-back expansion joint systems. The double-acting, back-to-back system should be used whenever possible as it eliminates much of the strain on the anchor point supports by equalizing the forces of expansion and contraction.

7:02.1 Assembly procedure. Cut a 8″ (PVC) or 12″-16″ (FGL) piece from a length of conduit to use as a joiner piece between the two expansion sleeves.

7:02.2 Apply adhesives (3″ wide) to one end of the joiner piece and inside the back end of the expansion joint sleeve.

FIGURE 16a



VII. INSTALLATION OF CONDUITS-GENERAL

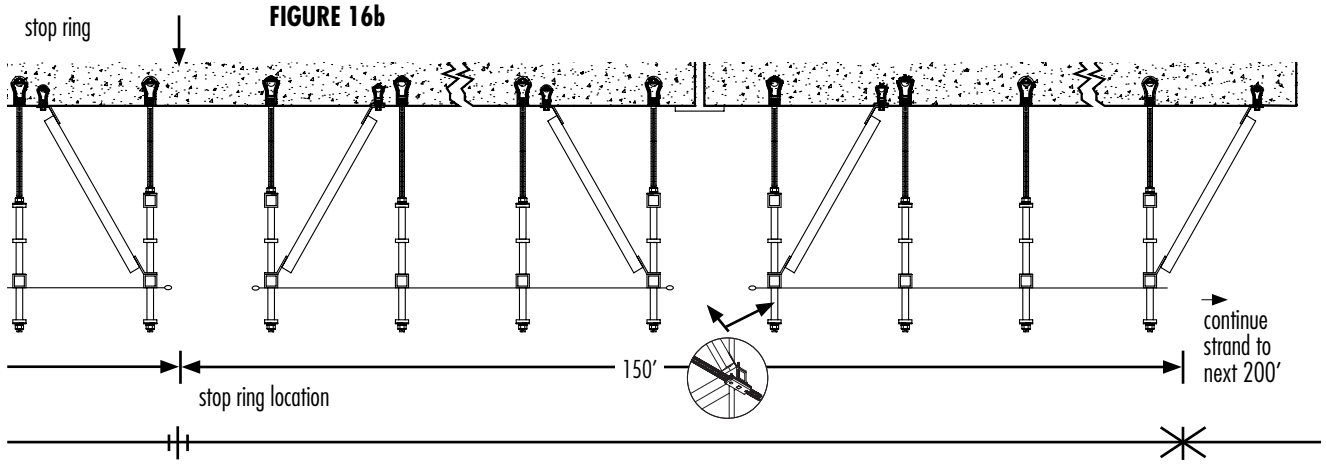
8:01 Generally, installation of conduit and supports can proceed simultaneously from one end of the bridge to the other. Restrictions regarding access to the bridge understructure (such as traffic flow) may dictate the type and extent of scaffolding required.

8:02 Normally just enough supports should be installed to accommodate each 20′ length of conduit because the belled end will not pass through the openings unless purposely loosened. For the same reason, installation should begin and proceed with the belled ends facing “downstream” as you go.

8:03 The male ends of the conduit are inserted through the hanger openings and joined to the female or belled ends of the preceding conduit sections. This procedure is repeated up to the first expansion joint.

Note 1: For easiest procedure, install conduits in the support starting in the lower outside opening, then work up and in toward you. This provides clear working space when joining each section of conduit as shown in Figure 22.

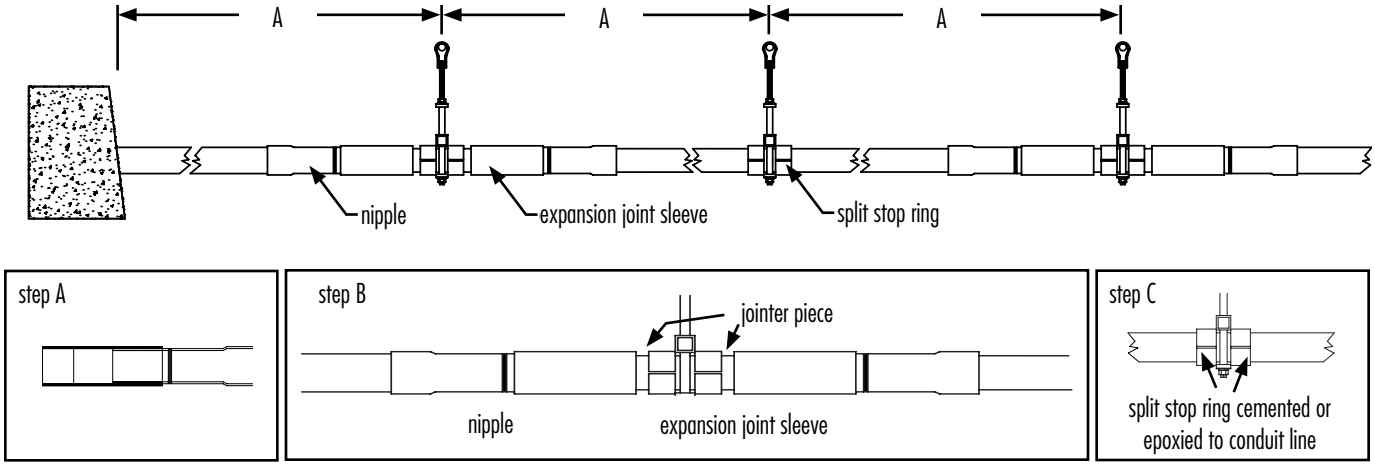
FIGURE 16b



stranding can begin and end at intermediate hangers- do not cross bridge expansin joints-stranding cableshould never be longer than 200 feet

brace angle not to exceed 45 deg from horizontal

anchor type supports should be used at all stop ring and expansion joint locations



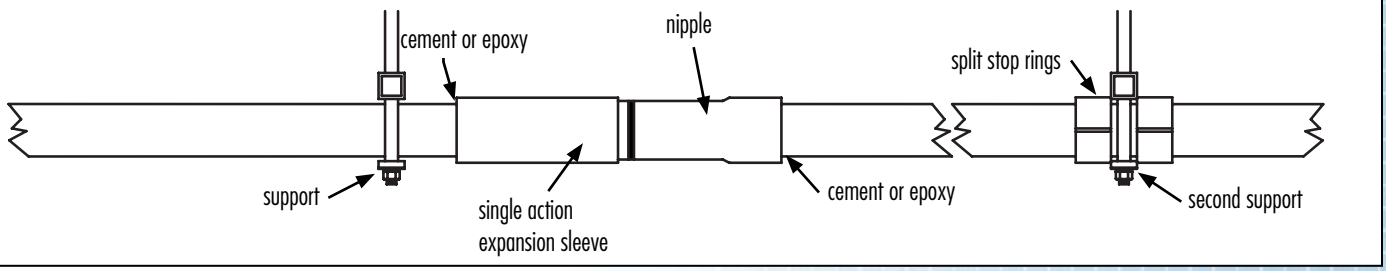
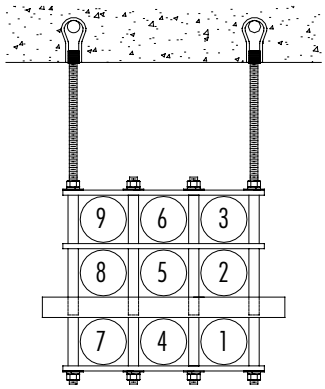


FIGURE 22
recommended order of conduit installation



Note 2: A belled end or coupling of conduit should be no closer than 6″ on either side of a support as shown in Figure 24. A tape measure can be used to pre-determine these locations and the conduit can be saw cut to the proper length before it is threaded through the hangers as shown in Figure 23.

FIGURE 23

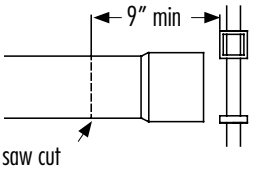
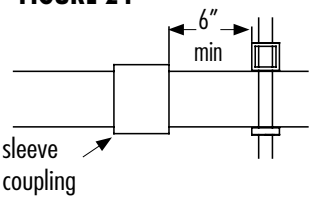


FIGURE 24



IX. CEMENTING PROCEDURE

9:01 Note: The joints in an exposed line of conduit can be subjected to over 1200 pounds of force due to cable pulling as well as expansion and contraction. Properly cemented joints are essential to ensure trouble-free operation of the system.

9:02 Use only fresh cement. Check the cement before using to make sure it has not become thick and tacky.

9:03 With a clean cloth, wipe mud, dirt and other foreign substances from the surface of the conduit to the depth of insertion.

9:04 Procedure for FRE conduit

9:04.1 All pipe and fitting bonding surfaces should be abraded with sandpaper to break the resin 'glaze'. All bonding surfaces must be dry prior to adhesive application.

9:04.2 Epoxy is applied with a dual cartridge, mixing tube and application gun. When using epoxy, you must limit the time between trigger pulls due to the setting process inside the mixing tube. It is recommended that you pull the trigger every 5 minutes in order to avoid epoxy mixing tube failure due to hardening or setting inside the mixing tube. Additional mixing tubes are available but only 1 is supplied for each dual cartridge. The application gun can be used from job to job when using the same manufacturer's epoxy.

9:04.3 Curing the joint. When the joint is made, make sure it is cured before moving the conduit.

Cure Temperature	**Cure Time**
77°F (25 °C)	2 hrs
41°F (5 °C)	4 hrs

For an installation at <41°F (5°C), use a heating strap installed around the bell.

9:05 Procedure for PVC conduit

9:05.1 Apply cleaner to the inside of the belled end or coupling and to the outside surface to the depth on insertion.

9:05.2 Immediately apply cement generously to the end of the conduit and sparingly inside the belled end or coupling. Excess cement inside the bell or coupling can be pushed into the conduit causing a rough or sharp obstruction.

9:05.3 Immediately insert the conduit into the socket using a quarter turn to spread the cement evenly and avoid future leaks.

9:05.4 Avoid moving the freshly epoxied joint until the cement has firmly set (approx 20 minutes).

X. SUMMARY

The foregoing information covers only normal installation and standard materials. Contact Osburn Associates, Inc., if you require information not included in this publication.

The information contained herein is correct to the best of our knowledge. The recommendations or suggestions contained in this bulletin are made without guarantee or representation as to results. We suggest that you evaluate these recommendations and suggestions prior to your use of the product.

XI. PRODUCT SPECIFICATIONS

Fiberglass conduit NEMA TC-14

Part #	Nom. Size	Outside Diameter Inches	Inside Diameter Inches	Std Wall	Heavy Wall	XH Wall	Length	Std Wall lbs/ft	Hvy Wall lbs/ft	XH Wall lbs/ft
7155HW	2″ IPS	2.375	2.200		0.070		20′		0.500	
7155XHW	2″ XHW	2.480	2.000			0.250	20′			1.250
7156HW	2″ ID	2.140	2.000		0.070		20′		0.380	
7157HW	3″ IPS	3.500	3.310		0.070		20′		0.700	
7157XHW	3″ XHW	3.480	3.000			0.250	20′			1.183
7158HW	3″ ID	3.140	3.000		0.070		20′		0.560	
7160 SW/HW	4″ IPS	4.500	4.360	0.070	0.090		20′	0.800	1.030	
7160XHW	4″ XHW	4.480	4.000			0.250	20′			2.600
7159 SW/HW	4″ ID	4.140	4.000	0.070	0.090		20′	0.740	0.950	
7161 SW/HW	5″ IPS	5.563	5.420	0.070	0.110		20′	1.060	1.560	
7161XHW	5″ XHW	5.480	5.000			0.250	20′			3.470
7163 SW/HW	5″ ID	5.140	5.000	0.070	0.110		20′	0.920	1.450	
7167 SW/HW	6″ IPS	6.625	6.420	0.070	0.110		20′	1.250	1.850	
7167XHW	6″ XHW	6.480	6.000			0.250	20′			3.830
7166 SW/HW	6″ ID	6.140	6.000	0.070	0.110		20′	1.100	1.730	

Note: Other sizes available upon request. For SW or HW, add this to the end of your part number or ask customer service.
Joining methods available: bell & spigot, gasketed & split w/h-strip.
Standard 20 foot lengths.

Fiberglass bends

	Part #						Part #				
	2″	3″	4″	5″	6″		2″	3″	4″	5″	6″
11 1/4° x 36″						45° x 36″					
IPS	112982	112983	112984	112985		IPS	113282	113283	113284	113285	
ID	122982	122983	122984	122985		ID	123282	123283	123284	123285	
XHW	132982	132983	132984	132985		XHW	133282	133283	133284	133285	
11 1/4° x 48″						45° x 48″					
IPS	113002	113003	113004	113005	113006	IPS	113312	113313	113314	113315	113316
ID	123002	123003	123004	123005	123006	ID	123312	123313	123314	123315	123316
XHW	133002	133003	133004	133005	133006	XHW	133312	133313	133314	133315	133316
22 1/2° x 36″						90° x 36″					
IPS	113062	113063	113064	113065		IPS	113542	113543	113544		
ID	123062	123063	123064	123065		ID	123542	123543	123544		
XHW	133062	133063	133064	133065		XHW	133542	133543	133544		
22 1/2° x 48″						90° x 48″					
IPS	113052	113053	113054	113055	113056	IPS	113572	113573	113574	113575	113576
ID	123052	123053	123054	123055	123056	ID	123572	123573	123574	123575	123576
XHW	133052	133053	133054	133055	133056	XHW	133572	133573	133574	133575	133576

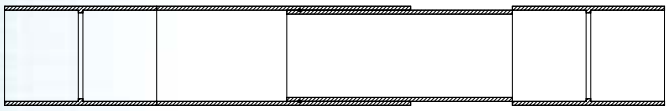
Note: Other sizes and radii available upon request.
Bends are shipped as plain end.

FGL Single Expansion Joint

	2″	3″	4″	5″	6″
IPS	112352	112353	112354	112355	112356
ID	122352	122353	122354	122355	122356
XHW	132352	132353	132354	132355	132356

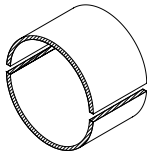
FGL Single Expansion Joint with O Ring

	2″	3″	4″	5″	6″
IPS	1123502	1123503	1123504	1123505	1123506
ID	1223502	1223503	1223504	1223505	1223506
XHW	1323502	1323503	1323504	1323505	1323506



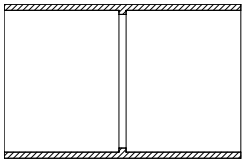
FGL Split Stop Ring

	2″	3″	4″	5″	6″
IPS	112602	112603	112604	112605	112606
ID	122602	122603	122604	122605	122606
XHW	132602	132603	132604	132605	132606



FGL Stop Coupling

	2″	3″	4″	5″	6″
IPS	110062	110063	110064	110065	110066
ID	120062	120063	120064	120065	120066
XHW	130062	130063	130064	130065	130066

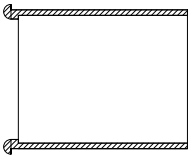


FGL Sleeve Coupling

	2″	3″	4″	5″	6″
IPS	110082	110083	110084	110085	110086
ID	120082	120083	120084	120085	120086
XHW	130082	130083	130084	130085	130086

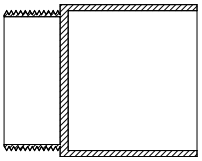
FGL End Bell

	2″	3″	4″	5″	6″
IPS	112032	112033	112034	112035	112036
ID	122032	122033	122034	122035	122036
XHW	132032	132033	132034	132035	132036



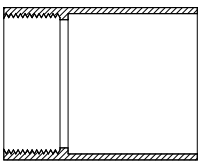
FGL Male Threaded Adapter

	2″	3″	4″	5″	6″
IPS	110302	110303	110304	110305	110306
ID	120302	120303	120304	120305	120306
XHW	130302	130303	130304	130305	130306



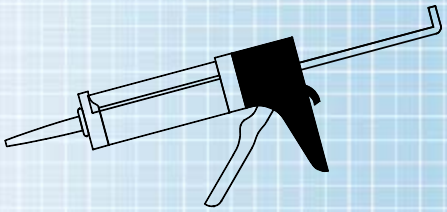
FGL Female Threaded Adapter

	2″	3″	4″	5″	6″
IPS	110312	110313	110314	110315	110316
ID	120312	120313	120314	120315	120316
XHW	130312	130313	130314	130315	130316



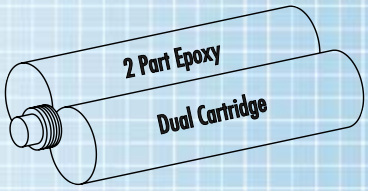
Epoxy Application Gun

11258-GUN



Dual Epoxy Cartridge

11258-20oz



The dual cartidge is reusable if cap is placed after removing mixing nozzle. There is a limited shelf life once opened. This is supplied with 1 mixing nozzle per order.

It is recommended to avoid freezing.

Mixing Nozzle

11258-Nozzle

Epoxy Joint Table

IPS Based			ID Based			XHW Based		
Dia	Joints per kit	Pull-Out Strength	Dia	Joints per kit	Pull-Out Strength	Dia	Joints per kit	Pull-Out Strength
2	16	2000 lbs	2	18	2000 lbs	2	18	2000 lbs
3	11	3000 lbs	3	13	3000 lbs	3	13	3000 lbs
4	8	4000 lbs	4	10	4000 lbs	4	10	4000 lbs
5	6	5000 lbs	5	7	5000 lbs	5	7	5000 lbs
6	5	6000 lbs	6	6	6000 lbs	6	6	6000 lbs

Schedule 40 UL & NonUL PVC Conduit

Part #	Nom. Size	Average Outside Diameter	Maximum Inside Diameter	Minimum Wall Thickness	Average Weight per 100 ft.
7100	1/2″	0.840	0.546	0.109	16
7101	3/4″	1.050	0.742	0.113	21.3
7102	1″	1.315	0.957	0.133	31.4
7103	1 1/4″	1.660	1.278	0.140	42.4
7104	1 1/2″	1.900	1.500	0.145	50.7
7105	2″	2.375	1.939	0.154	60.1
7106	3″	3.500	2.900	0.216	140.1
7107	4″	4.500	3.826	0.237	198.8
7108	5″	5.563	4.813	0.258	269.1
7109	6″	6.625	5.761	0.280	348.8

Available in 10′ & 20′ lengths

Schedule 80 UL & NonUL PVC Conduit

Part #	Nom. Size	Outside Diameter	Avg Inside Diameter	Avg Wall Thickness	Avg Weight per ft.
7110	1/2″	0.840	0.546	0.147	.20
7111	3/4″	1.050	0.742	0.154	.28
7112	1″	1.315	0.957	0.179	.40
7113	1 1/4″	1.660	1.278	0.191	.55
7114	1 1/2″	1.900	1.500	0.200	.67
7115	2″	2.375	1.939	0.218	.93
7116	3″	3.500	2.900	0.300	1.88
7117	4″	4.500	3.826	0.337	2.74
7118	5″	5.563	4.813	0.375	3.80
7119	6″	6.625	5.761	0.432	5.22

Available in 10′ & 20′ lengths

Schedule 40 UL & NonUL Galvanized Pipe

Part #	Nom. Size	Outside Diameter	Avg Inside Diameter	Avg Wall Thickness	Avg Weight per ft.
7190	2″	2.375	2.07	0.154	3.34
7193	3″	3.500	3.07	0.216	6.79
7192	4″	4.500	4.03	0.237	8.76
7195	5″	5.563	5.05	0.258	13.20
7196	6″	6.625	6.07	0.280	17.16

Note: Also available in black, Non-UL. UL-standard 10 foot lengths. NonUL-standard 21 foot lengths.

Schedule 40 Split & Hinged Galvanized Pipe

Part #	Nom. Size	Outside Diameter	Avg Inside Diameter	Avg Wall Thickness	Avg Weight per ft.
7190S	2″	2.38	2.07	0.15	3.34
7193S	3″	3.50	3.07	0.22	6.79
7192S	4″	4.50	4.03	0.24	8.76
7195S	5″	5.56	5.05	0.26	13.20
7196S	6″	6.63	6.07	0.28	17.16

Note: Also available in black. Fittings are available as well.

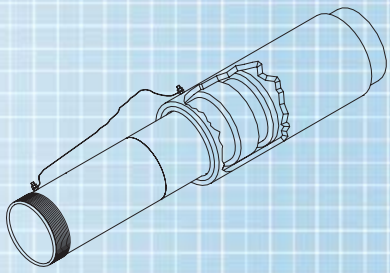
Flanged Split Pipe

Part #				Gauge-Thickness		Cross Section	Galv	Aluminum
Galv. Steel	Aluminum	Nom. Size	Length	Galv Steel	Aluminum	Area (sq. in)	Avg Weight	Avg Weight
QP25-10	AQP25-10	2 1/2″	10′	14	0.080	4.91	320	110
QP35-10	AQP35-10	3 1/2″	10′	14	0.080	9.62	360	130
QP40-10	AQP40-10	4″	10′	14	0.080	12.57	390	150
QP50-10	AQP50-10	5″	10′	14	0.080	19.64	470	160

Fabricated Steel Expansion Joints

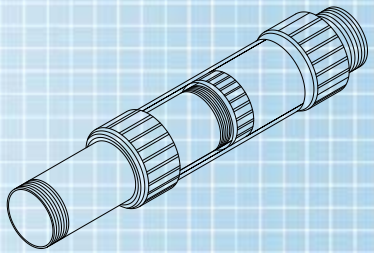
8″ Movement			8″ Movement		
Part #	Nom. Size	Weight Lbs.	Part #	Nom. Size	Weight Lbs.
1235GIP2	2″	10.130	1235BIP2	2″	10.13
1235GIP3	3″	15.550	1235BIP3	3″	15.55
1235GIP4	4″	21.960	1235BIP4	4″	21.96
1235GIP5	5″	30.360	1235BIP5	5″	30.36
1235GIP6	6″	47.500	1235BIP6	6″	47.5

Note: GIP Galvanized Iron Pipe, BIP Black Iron Pipe



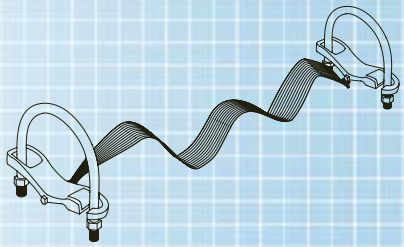
UL Rated Steel Expansion Joints

4″ Movement			8″ Movement		
Part #	Nom. Size	Weight Lbs.	Part #	Nom. Size	Weight Lbs.
1235AX2	2″	7.000	1235AX82	2″	10.300
1235AX3	3″	11.000	1235AX83	3″	15.500
1235AX4	4″	18.500	1235AX84	4″	24.000
1235AX5	5″	25.500	1235AX85	5″	33.000



Bonding Jumper

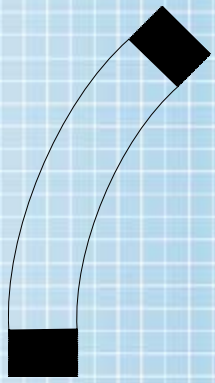
4″ Movement	8″ Movement
Part #	Part #
BJ14	BJ24



Steel Bends

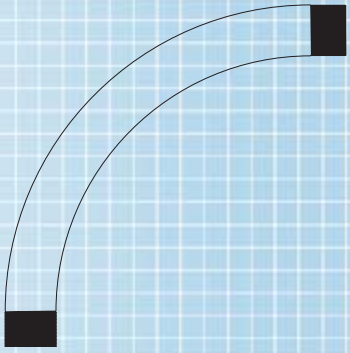
45 Degree Rigid Elbows

	Part #				
	2″	3″	4″	5″	6″
45° x 12″	1321GIP2				
45° x 15″	1322GIP2	1322GIP3			
45° x 18″	1324GIP2	1324GIP3	1324GIP4		
45° x 24″	1325GIP2	1325GIP3	1325GIP4		
45° x 30″					
45° x 36″	1328GIP2	1328GIP3	1328GIP4	1328GIP5	1328GIP6
45° x 48″	1331GIP2	1331GIP3	1331GIP4	1331GIP5	1331GIP6



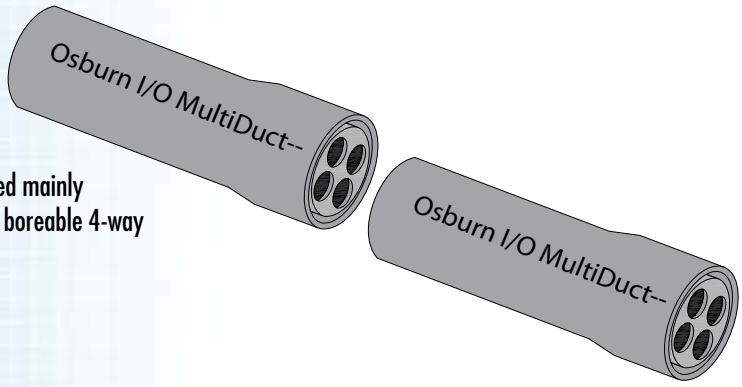
90 Degree Rigid Elbows

90° x 12″	1324GIP2				
90° x 15″	1343GIP2	1343GIP3			
90° x 18″	1345GIP2	1345GIP3	1345GIP4		
90° x 24″	1348GIP2	1348GIP3	1348GIP4		
90° x 30″	1351GIP2	1351GIP3	1351GIP4	1351GIP5	
90° x 36″	1354GIP2	1354GIP3	1354GIP4	1354GIP5	1354GIP6
90° x 48″	1357GIP2	1357GIP3	1357GIP4	1357GIP5	1357GIP6



Note: GIP-Galvanized Iron Pipe, BIP-Black Iron Pipe

XII. MULTIPLE CONDUIT



Standard PVC Duct

The Standard 4-way or 3-way PVC I/O MultiDuct is available in several configurations. We can provide a I/O MultiDuct assembly with an outer shell of Type C duct, Schedule 40 or Schedule 80 conduit. These are intended mainly for direct burial installations. (See Figures 1 and 2) We can also provide a boreable 4-way or 3-way I/O MultiDuct with a locking Schedule 40 Outer duct.

Fiberglass Duct

For aerial and underground installations.

This I/O MultiDuct system is also manufactured with a fiberglass outer duct.
The outer duct is available with a .070 inch wall, .090 inch wall, or .250 inch wall thickness in bullet resistant fiberglass.
Fiberglass installed above ground is joined with a 2-part epoxy.

Steel Duct

For underground boring or underbridge applications.

Provides extra tough protections with either three or four inner ducts inside a 4" Schedule 40 galvanized steel outer duct. Expansion joints for underbridge applications are readily available. (See Figures 3 and 4)

Osburn I/O MultiDuct engineers will review any specifications for a custom I/O MultiDuct proposal.

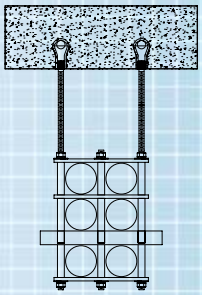
Part Number	No. of Inner Ducts	Description	Max. Inner Dimension (in.)	Min. Wall Thickness (in.)
I/O44-P				
I/O44100-PVC-SCH40	4	MultiDuct 4" X 4 Way	1.194"	.063
I/O44100-PVC-SCH80	4	MultiDuct 4" X 4 Way	1.194"	.063
I/O44100-PVC-C	4	MultiDuct 4" X 4 Way	1.194"	.063
I/O43-P				
I/O43150-PVC-SCH40	3	MultiDuct 4" X 3 Way	1.507"	.079
I/O43150-PVC-SCH80	3	MultiDuct 4" X 3 Way	1.507"	.079
I/O43150-PVC-C	3	MuiltiDuct 4" X 3 Way	1.507"	.079
I/O44-G				
I/O44100-Galv-SS	4	MultiDuct 4" X 4 Way	1.194"	.063
I/O44100-Galv-QC	4	MultiDuct 4" X 4 Way	1.194"	.063
I/O43-G				
I/O43150-Galv-SS	3	MultiDuct 4" x 3 Way	1.507"	.079
I/O43150-Galv-QC	3	MultiDuct 4" x 3 Way	1.507"	.079
I/O44-F				
I/O44100-FGL-XHW	4	MultiDuct 4" x 4 Way	1.194"	.063
I/O44100-FGL-HW	4	MultiDuct 4" x 4 Way	1.194"	.063
I/O44100-FGL-SW	4	MultiDuct 4" x 4 Way	1.194"	.063
I/O43-F				
I/O43150-FGL-XHW	3	MultiDuct 4" x 3 Way	1.507"	.079
I/O43150-FGL-HW	3	MultiDuct 4" x 3 Way	1.507"	.079
I/O43150-FGL-SW	3	MultiDuct 4" x 3 Way	1.507"	.079

HDPE Inner Ducts and multiple colors are available upon request. Std Lengths are 20 Feet. Call office for additional information.

XIII. DUCT SUPPORTS

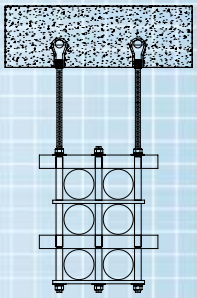
Hanging supports

Intermediate support for suspension from bridge deck



Duct	Duct Wide					
High	1	2	3	4	5	6
1	UB3530	UB3531	UB3532	UB3533	UB3534	UB3535
2	UB3541	UB3542	UB3543	UB3544	UB3545	UB3546
3	UB3552	UB3553	UB3554	UB3555	UB3556	UB3557
4	UB3563	UB3564	UB3565	UB3566	UB3567	UB3568

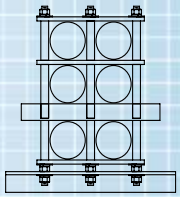
Anchor point supports for suspension from bridge deck



Duct	Duct Wide					
High	1	2	3	4	5	6
1	UB3575	UB3576	UB3577	UB3578	UB3579	UB3580
2	UB3587	UB3588	UB3589	UB3590	UB3591	UB3592
3	UB3599	UB3600	UB3601	UB3602	UB3603	UB3604
4	UB3611	UB3612	UB3613	UB3614	UB3615	UB3616

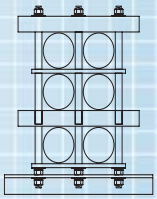
Base supports

Intermediate supports for mounting close-coupled to bridge member



Duct	Duct Wide					
High	1	2	3	4	5	6
1	UB3619	UB3620	UB3621	UB3622	UB3623	UB3624
2	UB3631	UB3632	UB3633	UB3634	UB3635	UB3636
3	UB3643	UB3644	UB3645	UB3646	UB3647	UB3648
4	UB3655	UB3656	UB3657	UB3658	UB3659	UB3660

Anchor point support for mounting close-coupled to bridge member



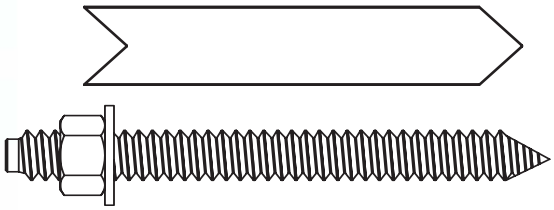
Duct	Duct Wide					
High	1	2	3	4	5	6
1	UB3663	UB3664	UB3665	UB3666	UB3667	UB3668
2	UB3675	UB3676	UB3677	UB3678	UB3679	UB3680
3	UB3687	UB3688	UB3689	UB3690	UB3691	UB3692
4	UB3699	UB3700	UB3701	UB3702	UB3703	UB3704

XIV. ANCHORS AND INSERTS

Epoxy Inserts

Two part epoxy contained in plastic sheath. Beveled chisel rod attached to hammerdrill penetrates and mixes epoxy. Order rod separately.

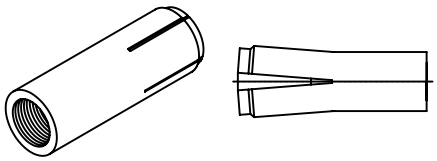
Part #	Size	Anchor Rod Size	Tensile (lbs.)	Shear (lbs.)
UB5713	3/8″	3/8″-16 X 5″ lg.	1560	1070
UB5714	1/2″	1/2″-13 x 6 1/2″ lg.	2840	2090
UB5715	5/8″	5/8″-11 x 7 5/8″ lg.	4520	3000
UB5716	3/4″	3/4″-10 x 9 5/8″ lg.	6680	4800
UB5717	7/8″	7/8″-9 x 10″ lg.	9240	6350



Drop-in Anchor

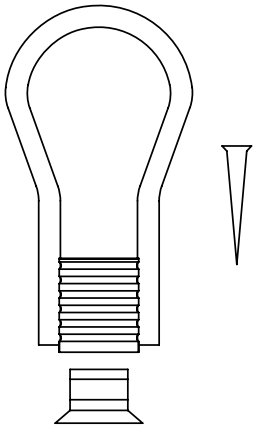
Part #	Size	Thread Depth	Min. Hole Depth	Ultimate Pull Out (lbs.)	Ultimate Shear (lbs.)
UB3901	1/2″-13	3/4″	2 ″	8,544	6,502
UB3968	5/8″-11	1″	3 1/2″	15,218	10,380
UB3213	3/4″-10	1 1/4″	3 3/16″	17,255	13,962

Note: Available in 304SS



Loop Type Concrete Insert

Part #	Thread Size	Type	Thread Depth	Height A
UB3315	1/2″	Galv.	1 1/4″	2 7/8″
UB3314	1/2″	Stainless	1 1/4″	2 7/8″
UB3625	5/8″	Galv.	1 3/8″	3 3/8″
UB3626	5/8″	Stainless	1 3/8″	3 3/8″
UB3234	3/4″	Galv.	1 3/8″	3 3/8″
UB3235	3/4″	Stainless	1 3/8″	3 3/8″



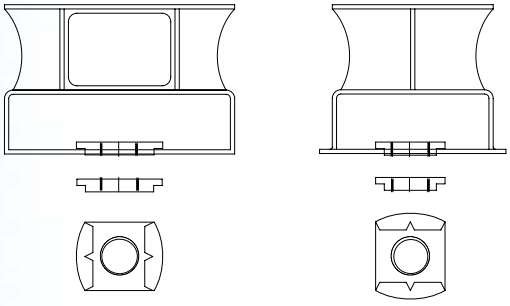
Stud Wedge Anchor

Part #	Size	Overall Length	Thread Length	Min. Hole Depth	Ultimate Pullout (lbs.)	Ultimate Shear (lbs.)
UB3308	1/2″-13	4 1/4″	2 3/4″	2 1/4″	5,384	6,900
UB3309	5/8″-11	6″	3 1/2″	2 3/4″	8,000	12,478
UB3310	3/4″-10	7″	4 1/2″	3 1/4″	9,921	18,128

Adjustable Concrete Insert

Part #	Rod Size	Load Rating (lbs.)
UB3305	1/2″	1130
UB3217	5/8″	1140
UB3117	3/4″	1140
UB3218	7/8″	1140

Note: Available in EG, HDG, 304SS & 316SS.



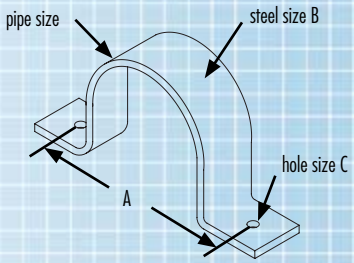
XV. HARDWARE

Pipe Strap

Dimensions in Inches Std Pipe Size

Part #	Nom. Pipe Size	A	B	C	Weight per 100
1583	2	4 1/2	1/4 X 1 1/2	7/16 X 3/4	94
1584	3	5 5/8	1/4 X 1 1/2	7/16 X 3/4	133
1581	4	6 5/8	1/4 X 1 1/2	9/16 X 3/4	176
1596	5	7 3/4	1/4 X 1 1/2	9/16 X 3/4	198
1597	6	8 3/4	1/4 X 1 1/2	9/16 X 3/4	225

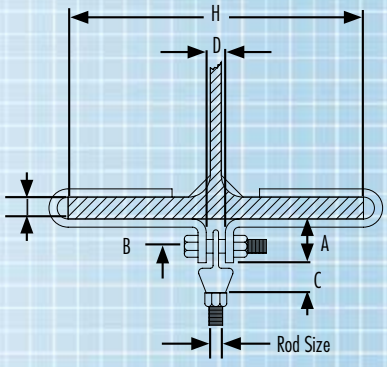
Note: Available in EG, HDG, 304SS and 316SS



Beam Clamp with Swing Nut

			Dimensions in Inches					Steel Size	
Part #	Type No.	Rec. Load Pounds	A	B	C	D	E	F	G
UB5215	1	500	1 5/8	1	3/4	5/8	3/8	3/16 X 1 1/4	3/8
UB5216	2	1,000	1 3/4	1 1/8	1	3/4	1/2	1/4 X 1 1/4	1/2
UB5217	3	1,500	2	1 1/4	1 1/4	7/8	5/8	3/8 X 1 1/2	5/8
UB5218	4	2,000	2 3/8	1 3/8	1 1/2	1	3/4	3/8 X 2	3/4
UB5219	5	3,000	2 5/8	1 5/8	1 3/4	1 1/4	7/8	1/2 X 2	7/8
UB5220	6	3,250	3 1/4	1 3/4	2	1 1/4	1	1/2 X 3	1
UB5221	7	5,000	4 1/8	2 1/8	2 1/4	1 3/8	1 1/8	5/8 X 4	1 1/8

Note: Available in EG and HDG. Customer to supply dimensions 'H' and 'I'



AngleLock

AngleLock is an angle iron clamp designed for use with 1" thru 4" angle iron of typical thickness.
AngleLock acccepts a 3/4" threaded rod for the attachment of hanger hardware, cable support strand, etc.

Part # **Standard Material**

ALC 1000

Low carbon ASTM A-36 structural steel angle, tensile strength 58,000-80,000PSI

Finishes

Zinc plating ASTM B-633

HDG ASTM A-123, A-153

Painted per Specifications

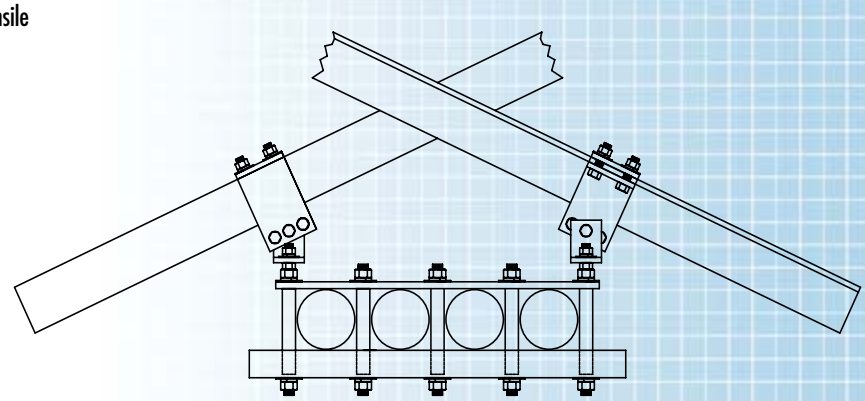
Options

High strength structural steel

304 stainless 18-8 allow

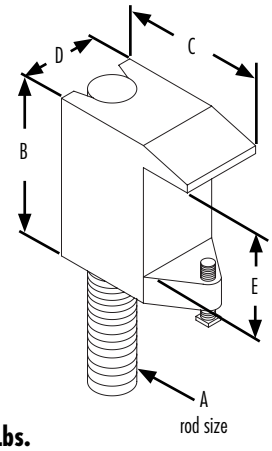
316 stainless 18-8 allow

Insulating bushings



Wide Jaw Top "C" Clamp

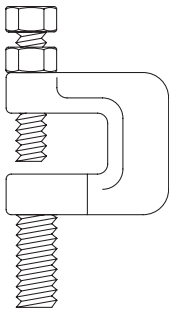
Material:
Malleable iron
Finish:
Plain or plated
Service:
Designed for attaching a hanger rod to the top flange of a bar joist or other structural shapes.
See charge for setscrew torque.



Setscrew Size	1/4"-20	3/8"-16	1/2"-13	5/8"-11	3/4"-10
Setscrew Torque Foot/lbs.	4	5	11	21	34

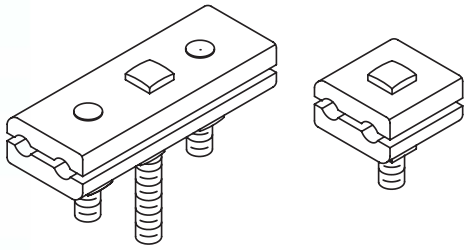
Part #	Rod Size A	B	C	D	E	Design Load lbs.	Wt./C Lbs.
UB5636-3/8	3/8"-16	2 1/8"	1 15/16"	1"	1 1/4"	500	54
UB5637-1/2	1/2" - 13	2 1/8"	1 15/16"	1"	1 1/4"	700	51
UB5638-5/8	5/8" - 11	2 3/8"	2 3/16"	1 3/6"	1 5/16"	900	70
UB5639-3/4	3/4" - 10	2 1/2"	2 7/16"	1 1/4"	1 5/16"	900	98

'C' Clamp with Locking Nut



Part #	Size	Max Load, lbs.	Rod Size	Set Screw Size	Approx. Weight per 100
UB5010	3/8	400	3/8	3/8 X 2	44
UB5011	1/2	500	1/2	1/2 X 2	52
UB5012	5/8	550	5/8	5/8 X 2	63
UB5013	3/4	630	3/4	3/4 X 2	87

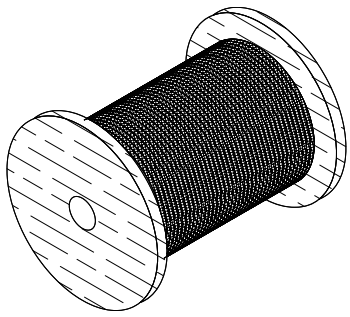
Guy Clamp



Part #	Description
UB5903	1 Bolt Clamp 3/32-1/8 cable
UB5904	1 Bolt Clamp 3/16-3/8 cable
UB5905	3 Bolt Clamp 3/16-3/8 cable

Note: Available in 304SS and 316SS

Galvanized Strand Wire



Part #	Description
WR316	3/16" Strand
WR250	1/4" Strand
WR375	3/8" Strand

Note: Available in 304SS and 316SS

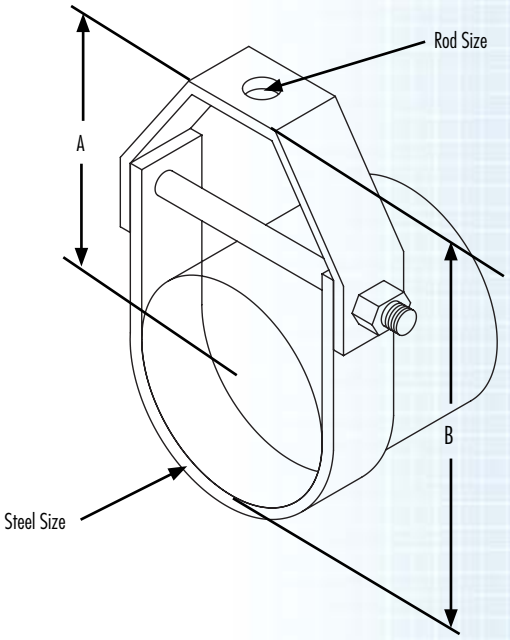
Strand is available on reels only. Minimum reel lengths may be available upon request. Call office for additional information.

Standard Clevis Hanger

Dimensions in inches

Part #	Nominal Pipe Size	Rod Size	Steel Size Upper	Steel Size Lower	A	B	Design Load lbs.	Weight/C Lbs.
UB3100-1/2	1/2	3/8-16	1/8 X 1	1/8 X 1	1 11/16	2 1/8	610	25
UB3100-3/4	3/4	3/8-16	1/8 X 1	1/8 X 1	1 7/8	2 7/16	610	29
UB3100-1	1	3/8-16	1/8 X 1	1/8 X 1	2 1/8	2 13/16	610	35
UB3100-1 1/4	1 1/4	3/8-16	1/8 X 1	1/8 X 1	2 9/16	3 7/16	610	40
UB3100-1 1/2	1 1/2	3/8-16	1/8 X 1	1/8 X 1	3	4	610	42
UB3100-2	2	3/8-16	1/8 X 1	1/8 X 1	3 11/16	4 15/16	610	52
UB3100-2 1/2	2 1/2	1/2-13	3/16 X 1 1/4	3/16 X 1 1/4	4 1/2	6	1130	120
UB3100-3	3	1/2-13	3/16 X 1 1/4	3/16 X 1 1/4	4 3/4	6 9/16	1130	133
UB3100-3 1/2	3 1/2	1/2-13	3/16 X 1 1/4	3/16 X 1 1/4	5	7	1130	142
UB3100-4	4	5/8-11	1/4 X 1 1/4	3/16 X 1 1/4	5 7/16	7 3/4	1430	173
UB3100-5	5	5/8-11	1/4 X 1 1/4	3/16 X 1 1/4	6 1/4	9 1/16	1430	245
UB3100-6	6	3/4-10	1/4 X 1 1/2	3/16 X 1 1/4	6 15/16	10 5/16	1940	320
UB3100-8	8	7/8-9	1/4 X 1 3/4	3/16 X 1 1/4	8 3/8	12 3/4	2000	485
UB3100-10	10	7/8-9	3/8 X 1 3/4	1/4 X 1 3/4	9 13/16	15 1/4	3600	846
UB3100-12	12	7/8-9	3/3 X 2	1/4 X 2	11 3/16	17 5/8	3800	1083
UB3100-14	14	1-8	1/2 X 2	1/4 X 2	12 1/2	19 9/16	4200	1432
UB3100-16	16	1-8	1/2 X 2 1/2	1/4 X 2 1/2	13 5/16	21 7/16	4600	2200
UB3100-18	18	1-8	1/2 X 2 1/2	1/4 X 2 1/2	15 7/8	25	4800	2500
UB3100-20	20	1 1/4 - 7	5/8 X 3	3/8 X 3	17 3/8	27 1/2	4800	4400
UB3100-24	24	1 1/4 - 7	5/8 X 3	3/8 X 3	19 5/8	31 3/4	4800	5000
UB3100-30	30	1 1/4 - 7	3/4 X 3	3/8 X 3	23 3/4	38 7/8	6000	6600

Note: Available in EG, HDG, 304SS and 316SS

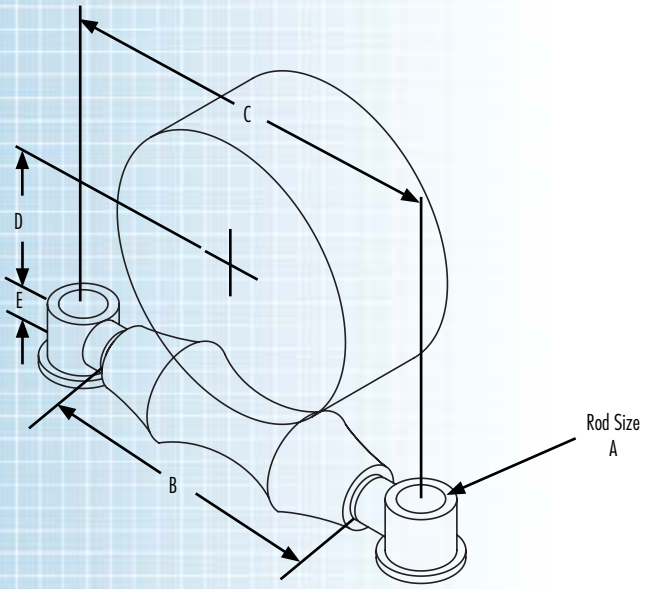


Pipe Roll with Sockets

Dimensions in inches

Part #	Nominal Pipe Size	Rod Size A	B	C	D	E	Maximum OD Covering	Design Load Lbs.	Weight/C Lbx.
UB3114-2	2	3/8 -16	2 5/8	4 1/8	1 9/16	3/4	3 1/4	600	119
UB3114-2 1/2	2 1/2	1/2 -13	3 1/8	4 7/8	1 7/8	3/4	3 3/4	660	140
UB3114-3	3	1/2 -13	3 3/4	5 1/2	2 3/16	3/4	4 1/2	700	158
UB3114-3 1/2	3 1/2	1/2 -13	4 1/4	6 1/8	2 1/2	3/4	5	750	170
UB3114-4	4	5/8 -11	4 3/4	6 3/4	2 3/4	3/4	5 7/8	750	188
UB3114-5	5	5/8 -11	5 13/16	8 1/16	3 3/8	3/4	7	750	246
UB3114-6	6	3/4 -10	6 7/8	9 9/16	3 15/16	1 1/8	8 1/4	1070	504
UB3114-8	8	7/8 -9	8 7/8	11 15/16	5 1/16	1 1/8	10 1/2	1350	658
UB3114-10	10	7/8 -9	11	14 1/16	6 1/4	1 1/8	12 3/4	1730	849
UB3114-12	12	7/8 -9	13	15 13/16	7 3/8	1 1/8	14 3/4	2400	1200
UB3114-14	14	1-8	14 1/4	17 3/4	8 1/4	1 1/2	16 1/4	3130	2289
UB3114-16	16	1-8	16 1/4	19 3/4	9 1/4	1 1/2	18	3970	2497
UB3114-18	18	1-7	18 1/4	21 7/8	10 3/8	1 1/2	20 1/4	4200	2899
UB3114-20	20	1 1/4-7	20 1/4	24 1/4	11 1/2	1 1/2	22 1/2	4550	3637
UB3114-24	24	1 1/2-6	24 1/4	28 7/8	13 13/16	2	26 1/2	6160	5664
UB3114-30	30	1 1/2-6	30 1/4	35 1/2	17 1/4	2	32 1/2	7290	9437

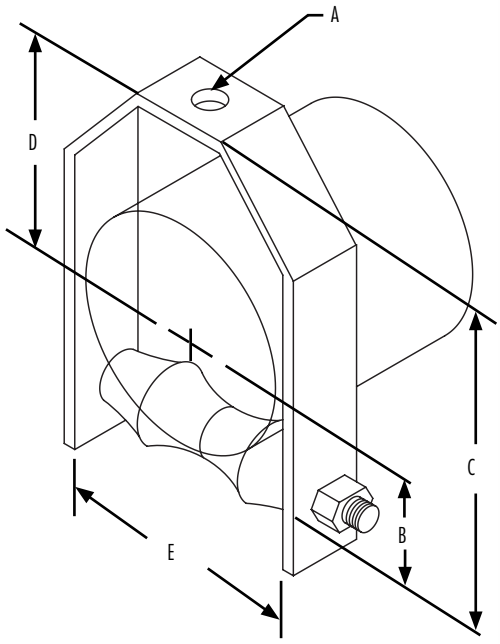
Note: Available in EG, HDG, 304SS and 316SS

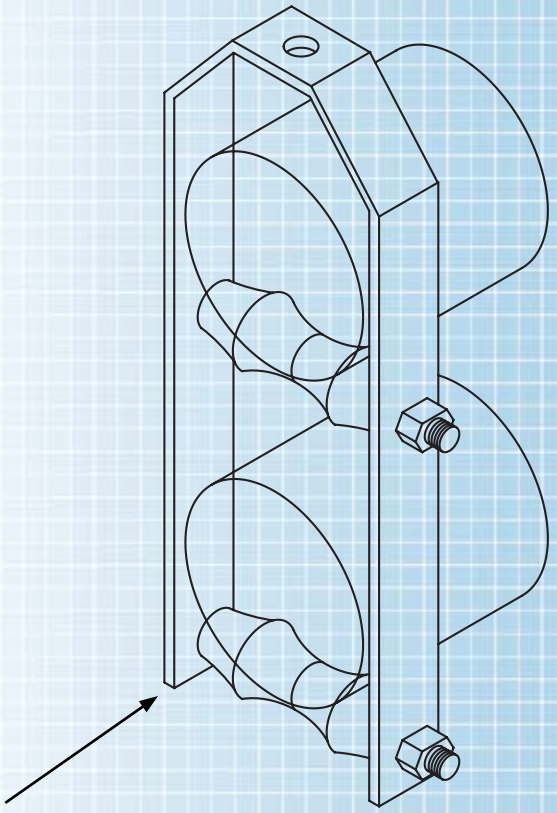


Adjustable Steel Yoke Pipe Roll

Part #	Nominal Pipe Size	Dimensions in inches A	B	C	D	E	Steel Size	Maximum O.D. Covering	Design Load Lbs.	Weight/C LBS.
UB3110-2	2	3/8-16	1 9/16	4 3/4	2 3/8	2 7/8	3/16 X 1 1/4	2 5/8	150	123
UB3110-21/2	2 1/2	1/2-13	1 7/8	6	8 1/6	3 1/4	3/16 X 1 1/4	3	225	178
UB3110-3	3	1/2-13	2 3/16	6 5/8	3 1/2	3 7/8	3/16 X 1 1/4	3 5/8	310	206
UB3110-31/2	3 1/2	1/2-13	2 1/2	7 1/4	3 3/4	4 3/8	1/4 X 1 1/4	4 1/8	390	267
UB3110-4	4	5/8-11	2 3/4	7 7/8	4	4 7/8	1/4 X 1 1/2	4 11/16	475	344
UB3110-5	5	5/8-11	3 3/8	9 3/16	4 9/16	5 15/16	3/8 X 1 3/4	5 3/4	685	600
UB3110-6	6	3/4-10	3 15/16	10 3/8	5 1/16	7	3/8 X 2	6 3/4	780	800
UB3110-8	8	7/8-11	5 1/16	12 5/8	6 1/16	9	3/8 X 2 1/2	8 3/4	780	1300
UB3110-10	10	7/8-11	6 1/4	14 15/16	7 3/16	11 1/8	3/8 X 2 1/2	10 3/4	965	1600
UB3110-12	12	7/8-11	7 3/8	17 3/8	8 3/8	13 3/8	1/2 X 2 1/2	13	1200	2600
UB3110-14	14	1-8	8 1/4	19	8 3/4	14 1/2	1/2 X 2 1/2	14 1/4	1200	3400
UB3110-16	16	1-8	9 1/4	20 3/4	9 3/4	16 3/8	1/2 X 2 1/2	16 1/8	1200	3900
UB3110-18	18	1-8	10 3/8	23 11/16	11 7/16	18 3/8	1/2 X 3	18 1/8	1400	4900
UB3110-20	20	1 1/4-7	11 1/2	25 7/8	12 1/4	20 3/8	5/8 X 3	20 1/8	1600	6686

Note: Available in EG, HDG, 304SS and 316SS; insulated rollers available





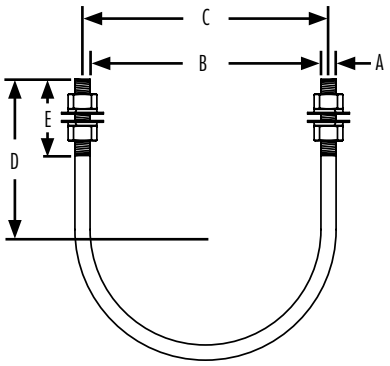
Call us for special configurations such as stacked rollers in various sizes

U Bolts

Dimensions in inches

Part #	Pipe Size	Max. Load, lbs.	A	B	C	D	E	Weight per 100
UB5000	2	1200	3/8	2 1/2	2 7/8	3 1/4	2 1/2	42
UB5001	2 1/2	2200	1/2	3	3 1/2	3 3/4	3	980
UB5002	3	2200	1/2	3 5/8	4 1/8	4	3	99
UB5003	4	2200	1/2	4 5/8	5 1/8	4 1/2	3	115
UB5004	5	2200	1/2	5 5/8	6 1/8	5	3	128
UB5005	6	3600	5/8	6 3/4	7 3/8	6 1/8	3 3/4	239

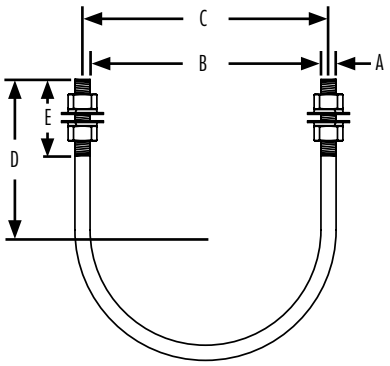
Note: Available in EG, HDG, 304SS and 316SS.



AWWA U Bolts

Part #	Pipe Size	Load A Lbs.	A	B	C	D	E
UB5003DI	3	2200	1/2	4 1/8	4 5/8	4 1/2	3
UB5004DI	4	2200	1/2	5	5 1/2	4 3/4	3
UB5006DI	6	3600	5/8	7	7 5/8	6 3/8	4
UB5008DI	8	3600	5/8	9 1/4	9 7/8	7 3/8	4
UB50010DI	10	5400	3/4	11 1/4	12	8 5/8	4
UB50012DI	12	7500	7/8	13 3/8	14 1/4	9 7/8	4 1/2
UB50014DI	14	7500	7/8	15 1/2	16 3/8	10 15/16	4 1/2
UB50016DI	16	7500	7/8	17 1/2	18 3/8	12	4 1/2
UB50018DI	18	9900	1	19 5/8	20 5/8	13 3/8	5
UB50020DI	20	9900	1	21 3/4	22 3/4	14 1/2	5
UB50024DI	24	9900	1	28	27	16 5/8	5

Note: Available in EG, HDG, 304SS and 316SS.

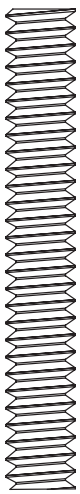


Threaded Rod

Size	EG	HDG	304SS	316SS
1/4″-20	TR2501	TR2502 T	TR2503	TR2504
3/8″-16	TR3751	TR3752	TR3753	TR3754
1/2″-13	TR5001	TR5002	TR5003	TR5004
5/8″-11	TR6251	TR3252	TR253 T	TR2746
3/4″-10	TR7501	TR7502	TR7503	TR7504
7/8″-9	TR8751	TR8752	TR8753 T	TR8754
1″-8	TR1001	TR1002	TR1003	TR1004
1 1/8″-7	TR11251	TR11252	TR11253	TR11254
1 1/4″-7	TR12501	TR12502	TR12503	TR12504

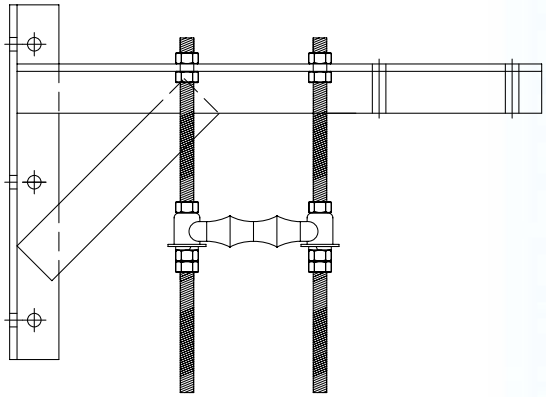
Note: Available in 3′, 6′ and 12′ standard lengths.
Please specify when ordering.

Note: We have available all associated hardware for bolts and threaded rods in all grades and finishes.

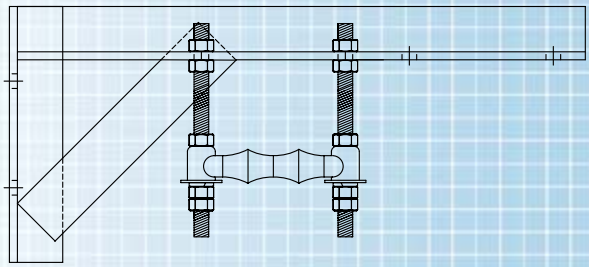


Angle Welded Bracket

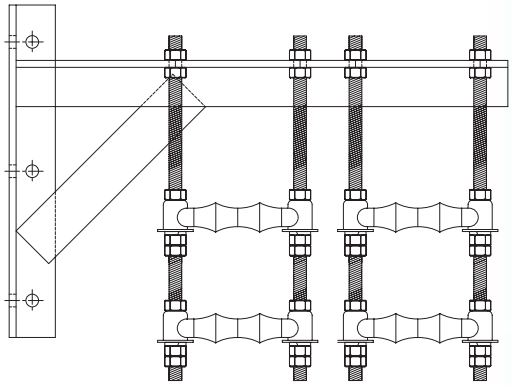
Part #
UB5310



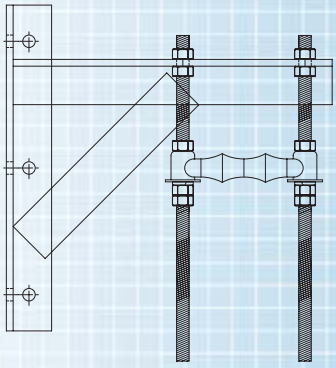
Part #
UB5311



Part #
UB5312



Part #
UB5313

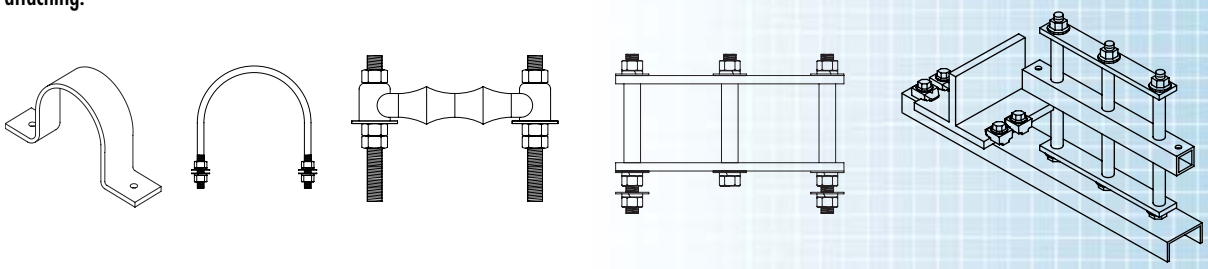


Note: Available in EG, HDG, 304SS and 316SS and Insulated.
Roller sizes are available in 2" thru 6".

Side Mounting Bracket

Part #
SMB 1000

For attaching:



Note: When ordering, please specify beam width (A), flange thickness (B) and threaded rod size (C).

Osburn Associates, Inc. is a manufacturer and distributor of materials and tools for the communication, CATV and electrical industries. With over 25 years as a leader in Underbridge/Underground applications, our staff will assist you and your engineers to help determine design and product choice. While we are not an engineering firm, we are here to help. We have the equipment and facilities to supply nearly all specified items for your projects.

Conduit For Bridges

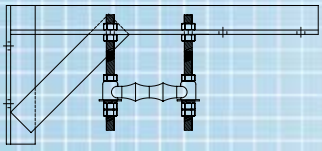
Material	Type	Description
Fiberglass	ID/IPS/Bullet Resistant	2″ - 6″
Steel	Galvanized/Black Iron T&C	2″ - 6″
PVC	Type D	4″

Fittings for conduit include but not limited to, Bends, Couplings, Expansion Joints, Split Stop Rings, Epoxy, Threaded Adapters.

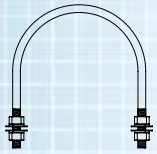
Concrete Inserts

Type	Description
Mechanical	1/2″ -3/4″
Encased Loop Ferrule	1/2″ - 3/4″

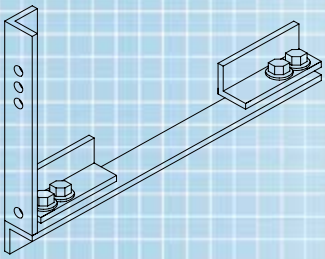
Anchors are available in various finishes; Electro Galvanized, Hot Dip Galvanized, 304 SS and 316 SS. Call our sales associates to ensure the anchor you are looking for is available in the finish you need.



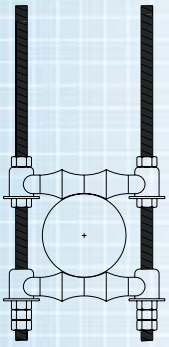
Right Angle Bracket with Roller



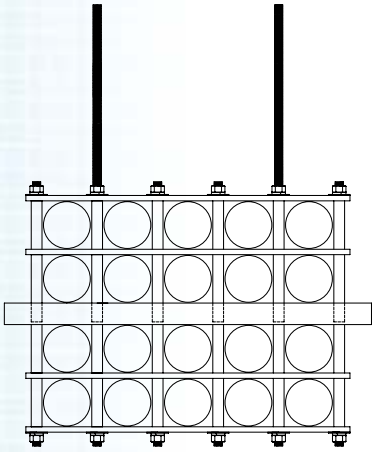
U-Bolts



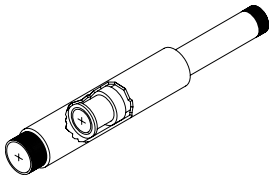
Side Mount I-Beam Bracket



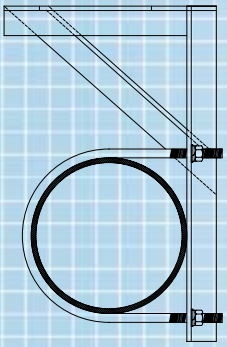
2 Rod Roller Assembly



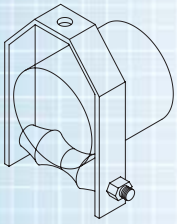
Intermediate Hanging Grid Hanger



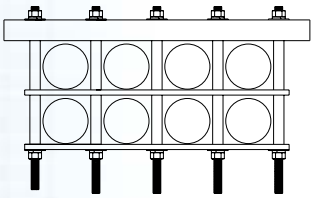
Steel Expansion Joint Exploded View



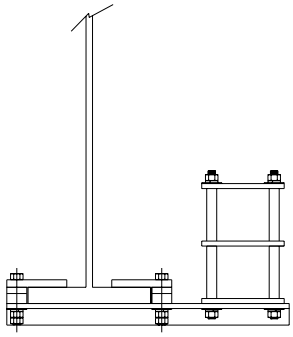
Top or Side Mount Bracket with U-Bolt



Yoke Roller Bracket



Base Mount Grid Hanger



Side Mount Bracket with Grid Hanger

The hangers listed are common for the various utilities. It is nearly impossible to catalog all the different styles of hangers. Call us with your design requirement and we will help you.

XVI. WORKZONE / SAFETY

Roll Up Signs & Stands

Traffic Cones
Standard or Trimline
Reflective Collar or No Collar
Height 6" thru 36"
Weight 1/4# thru 12#

Plastic Drums & Bases

Barricades Type I, II & III

Poly-Dome™ Markers

Line Markers

Reflective Shirts & Safety Vests

Warning Tape

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