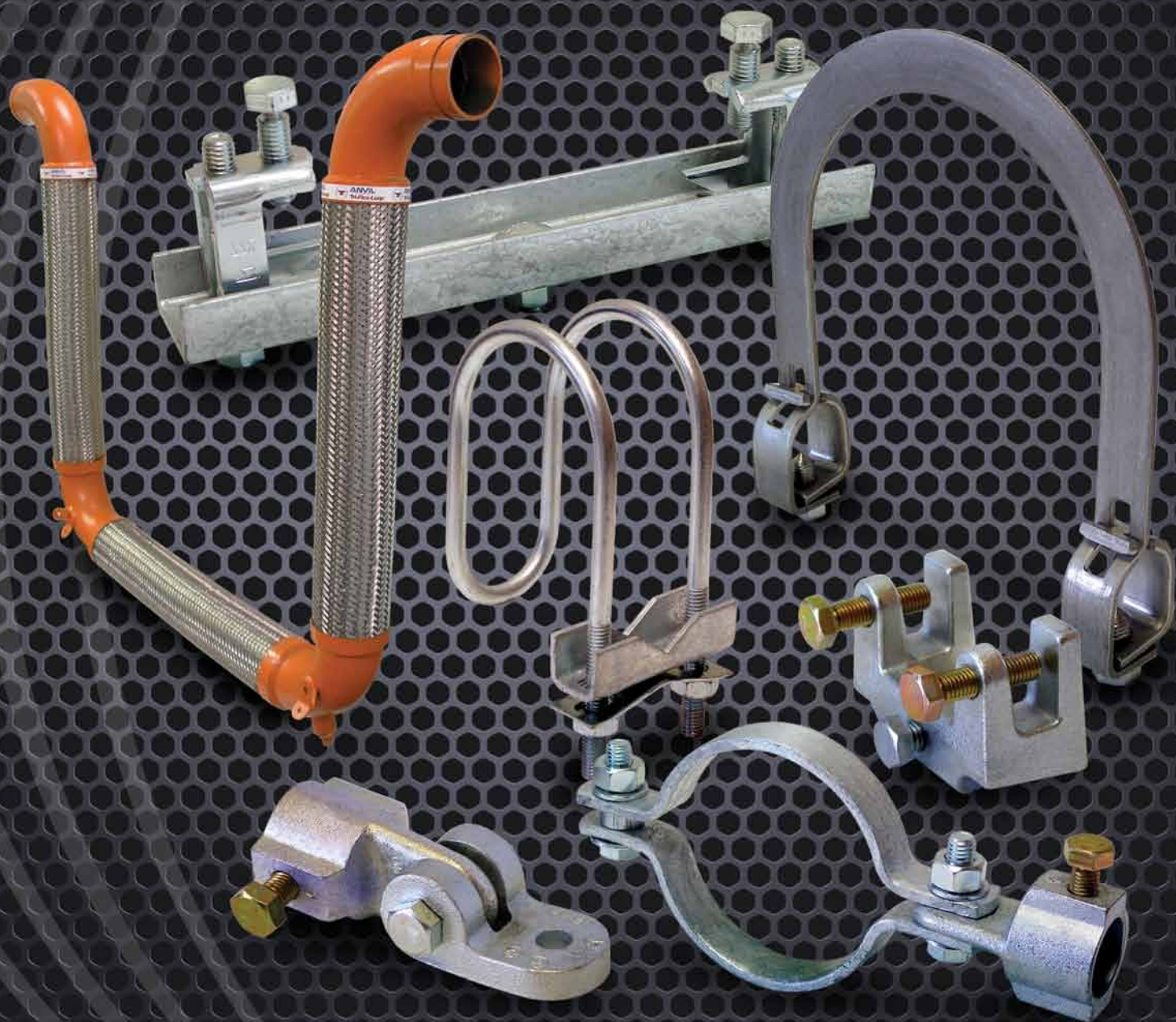


Seismic Solutions

www.anvilintl.com

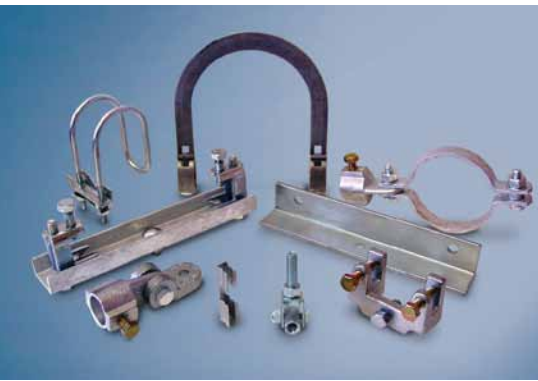


ANVIL[®]
INTERNATIONAL
Building Connections That Last

OCTOBER 2013

For the most current product/pricing information on Anvil products, please visit our website at www.anvilintl.com

PIPE HANGERS, SUPPORTS AND SEISMIC BRACING FOR FIRE PROTECTION



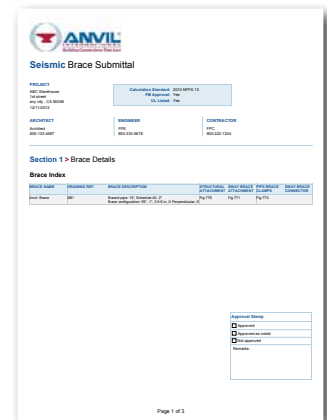
Fire Products - Pipe Hangers

- UL and ULC Listed
- FM Approved
- Seismic Sway Brace
 - OSHPD Manual **NEW**
 - OPA-2804-10 **NEW**
 - Pipe Brace Clamps
 - Seis Brace® Seismic Fire Protection Design Tool
 - Structural Attachments
 - Restraints
 - Sway Brace Attachment

Seis Brace™

Anvil's Seismic Fire Protection Design Tool is provided to our customers free of charge. This seismic calculator tool for fire protection allows you to:

- Specify FM Approval or UL Listed components
- Perform calculation through either the NFPA method ("Fpw") or the IBC code method ("Fp")
- See a selection of product groupings that match your system design
- Generate submittals with figure numbers from Anvil's seismic bracing product line including images and specifications for each product
- You may begin to use **Seis Brace** by visiting www.seisbrace.com



Customer Service

With four key stocking locations throughout North America, you can count on getting all of the product you need - when you need it. When you have installation questions our solid customer service personnel are there to answer all of your questions, backed by our designers or engineers we are there for you - on site if needed.

Manufacturing Excellence

Our manufacturing facility in Henderson, Tennessee has over 1,750,000 square feet of manufacturing capability dedicated to producing a complete line of commercial, light industrial and industrial Pipe Hangers and Supports. These include clamps, braces, inserts, rods and attachments, slides and guides to exacting industry standards and certified to ISO 9001 quality. The products manufactured in Henderson are designed for use in a wide variety of rigid Pipe Hanger or Support applications, in markets including fire protection, electrical, water and waste water treatment, petrochemical, seismic, industrial and commercial. Special fabrication is available from our Henderson facility as well.

PIPE BRACE CLAMPS

 <p>Fig. 770 Q Brace Clamp Size Range: 1" thru 6" Service Pipe Pages 4-5</p>	 <p>Fig. 776 Brace Clamp Size Range: 2 1/2" thru 8" Service Pipe Pages 6-7</p>	 <p>Fig. 775 Lateral/Longitudinal Brace Clamp Size Range: 2 1/2" thru 8" Service Pipe Pages 8-9</p>
--	--	---

STRUCTURAL ATTACHMENTS

 <p>Fig. 778 Bar Joist and Beam Attachment (WF) Size Range: Flange Thickness 1/8" thru 3/4" Pages 10-11</p>	 <p>Fig. 772 Adjustable Steel Beam Attachment Size Range: Flange Widths 4" thru 15" Pages 12-14</p>	 <p>Fig. 779 Multi-Connector Adapter Size Range: 1" thru 8" Service Pipe Page 15</p>
---	---	--

RESTRAINTS

 <p>Fig. 773 Surge Restrainer Size Range: 3/4" thru 2" Swivel Ring Hanger Page 16</p>	 <p>Fig. 777 Swivel Joint Connector - Rod Tap Size Range: 3/8" Rod Diameter Page 17</p>
---	---

SWAY BRACE ATTACHMENT

 <p>Fig. 771 Sway Brace Swivel Attachment Size Range: 1" and 1 1/4" Brace Pipe Pages 18-19</p>
--

Go to www.anvilintl.com/OPA for State of California Office of Statewide Health Planning and Development (OSHPD) for design information relating to OSHPD projects.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

Notes:

- For fire protection installations - sway braces are intended to be installed in accordance with NFPA-13 and Anvil's installations instructions and local codes.
- The required type, number and size of fasteners used for the structural attachment fitting shall be in accordance with NFPA-13.
- To assure proper performance, installer is responsible for:
 - Structural integrity of attachment member to safely handle load requirements.
 - Securely tightening the component on the brace pipe.
- Anvil International® brand bracing components are designed to be compatible ONLY with other Anvil International® brand bracing components, resulting in a Listed seismic bracing assembly.
- Updated UL listing information may be viewed at www.ul.com and FM approvals may be viewed at www.fmgobal.com

Disclaimer: Anvil International ("Anvil") does not provide any warranties and specifically disclaims any liability whatsoever with respect to Anvil bracing products and components that are used in combination with products, parts or systems not manufactured or sold by Anvil. In no event shall Anvil be liable for any incidental, direct, consequential, special or indirect damages or lost profits where non-Anvil bracing components have been, or are used.

TRI-FLEX LOOP

 <p>Pages 20-27</p>
--

Fig. 770

Q Brace Clamp

Size Range: Service Pipe: 1" through 6" Sch. 10 and Sch. 40 IPS UL and FM Approved
 Service Pipe: 1" through 6" Flow Pipe FM Approved
 Brace Pipe: 1" or 1 1/4" Sch. 40 IPS

Material: Carbon steel

Finish: Brace Rod Plain or Galvanized, Channel bracket EG

Service: Used to rigidly brace piping systems subjected to sway and seismic disturbances. Pipe clamp component of Anvil's 700 series sway brace assembly. Primarily a lateral brace clamp and applicable as a riser/four way brace.

Approvals: UL and ULC Listed (UL 203A:2009), and FM Approved (FM 1950:2010). Complies with seismic bracing requirements of NFPA-13. Office of Statewide Health Planning and Development (OSHPD) State of California approved.

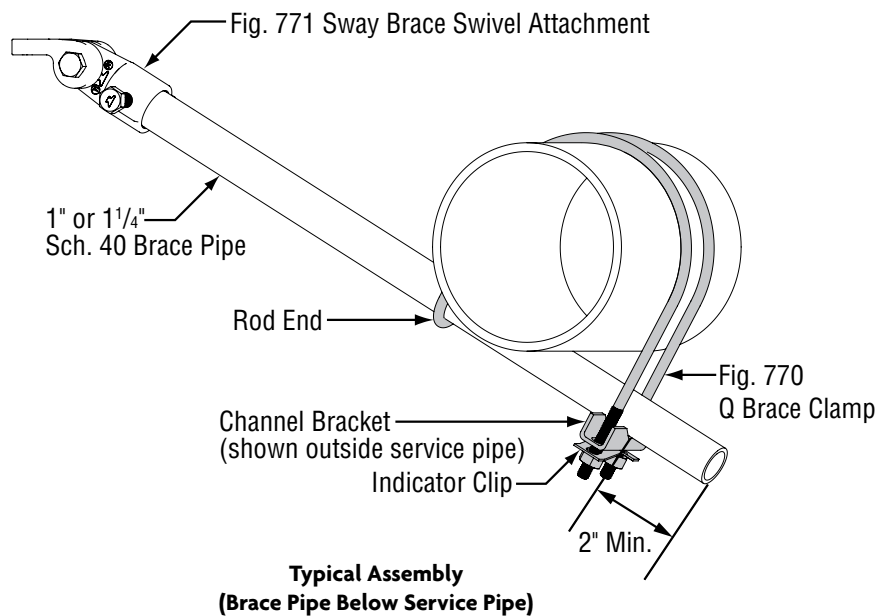
Features:

- Used to brace schedules 10 IPS, 40 IPS (UL and FM), and Sch. 7 IPS flow pipe (FM).
- Field adjustable design requires no threading of bracing pipe
- Can be used as a component of a four-way brace support
- Functions as a lateral brace application

Installation Instructions:

1. Minimum brace pipe extension 2" beyond channel bracket or brace clamp rod end. Note: 6" sizes are supplied with retaining plate that assembles between sprinkler system pipe and brace pipe. Not required for FM applications.
2. The brace clamp channel bracket can be installed inside or outside the service pipe at the end of the brace pipe.
3. The Q brace clamp must be a minimum of 6" away from a pipe joint in order to not weaken the pipe joint.
4. Riser/4-way brace - The Q brace clamps must be installed within 6" of each other.
5. Adjust brace angle as necessary.
6. Tighten hex nuts until spring indicating clip is completely flattened and the required torque of 14 Ft-Lbs is achieved. For sizes 2" - 3", 4" x 1", 5" x 1", and 6" continue tightening to a torque of 16 Ft-Lbs.

Ordering: Specify service pipe diameter, brace pipe diameter, figure number, name and finish.



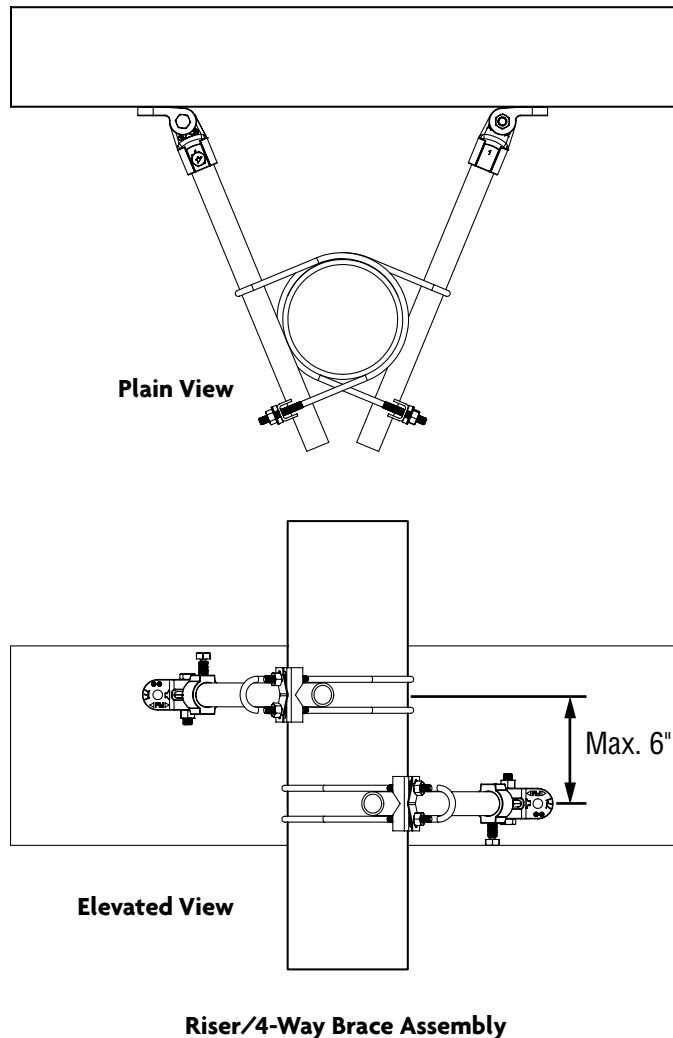
See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

Go to www.anvilintl.com/OPA for State of California Office of Statewide Health Planning and Development (OSHPD) for design information relating to OSHPD projects.

Fig. 770

Q Brace Clamp (cont.)



Riser/4-Way Brace Assembly

FIG. 770 UL MAX LOAD: LOADS (LBS) • WEIGHT (LBS) • DIMENSIONS (IN)			
Service Pipe Size	UL Max Load	Weight	
	Sch. 10 Sch. 40	1" Brace Pipe	1 1/4" Brace Pipe
1 (A, B)	1000	.82	.87
1 1/4 (B)		.86	.90
1 1/2 (B)		.90	.95
2 (B)		.96	1.00
2 1/2		1.02	1.06
3		1.09	1.13
4		1.23	1.26
5		1600	1.32
6	1.49		1.53

A - Schedule 40 only.

B - UL Listed as a restraint and sway brace.

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

**FIG. 770 FM MAX LOAD:
LOADS (LBS) • DIMENSIONS (IN) • ANGLES (DEGREES)**

Service Pipe Size (1" or 1 1/4" Brace Pipe)	Brace Angle***	FM Max Load** (Horizontal)	
		Sch. 10 Sch. 40	Flow Pipe
1	30-44	1110	250
	45-59	1500	360
	60-74	1900	440
	75-90	2100	500
1 1/4	30-44	570	250
	45-59	810	360
	60-74	1000	440
	75-90	1100	500
1 1/2	30-44	570	250
	45-59	810	360
	60-74	1000	440
	75-90	1100	500
2	30-44	570	250
	45-59	810	360
	60-74	1000	440
	75-90	1100	500
2 1/2	30-44	570	250
	45-59	810	360
	60-74	1000	440
	75-90	1100	500
3	30-44	570	250
	45-59	810	360
	60-74	1000	440
	75-90	1100	500
4	30-44	760	410
	45-59	1070	590
	60-74	1320	720
	75-90	1470	800
5	30-44	760	410
	45-59	1070	590
	60-74	1320	720
	75-90	1470	800
6	30-44	770	450
	45-59	1090	630
	60-74	1340	780
	75-90	1490	870

* See FM Approval guide for approved flow pipe.

** The allowable FM approved capacity of brace subassemblies have been determined by resolving the load rating to the horizontal direction and dividing by a safety factor of 1.5 to allow the values to be used directly for Allowable Stress Design.

For Load Resistance Factor Design (LRFD) capacities, the above values will need to be multiplied by 1.5.

*** Brace Pipe Angles are determined from vertical.

FIG. 770: TORQUE VALUE (FT-LBS)

Service Pipe Size	Torque Value
1 thru 1 1/2, 4 x 1 1/4, 5 x 1 1/4	14
2 thru 3, 4 x 1, 5 x 1, 6	16

Fig. 776

Brace Clamp

Size Range: Service Pipe: 2½" through 8" Sch. 10 and Sch. 40 IPS
 Service Pipe: 2½" through 6" FM Approved Flow Pipe
 Brace Pipe: 1" or 1¼" Sch. 40 IPS

Material: Carbon steel

Finish: Plain or Galvanized

Service: Used to rigidly brace piping systems subjected to sway and seismic disturbances. Pipe clamp component of Anvil's 700 series sway brace assembly. Utilized only as a lateral brace clamp.

Approvals: FM Approved (FM 1950:2010). Complies with seismic bracing requirements of NFPA-13. Office of Statewide Health Planning and Development (OSHPD) State of California approved.

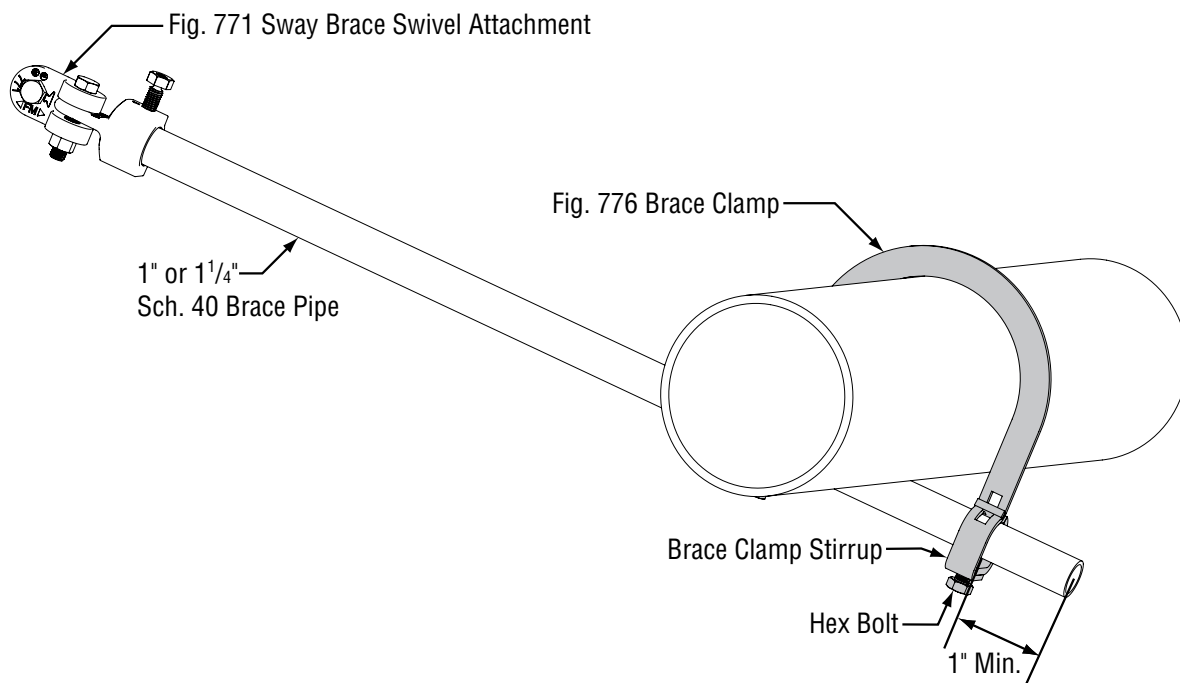
Features:

- Used to brace schedules 10 IPS, 40 IPS, and Flow pipe
- Field adjustable design requires no threading of bracing pipe
- Can be used as a component of a four-way brace support
- Brace clamp design for installation of brace pipe above or below horizontal service pipe.

Installation Instructions:

1. Installation of this component must be a minimum of 6" from any pipe joint, so that any deformation does not affect the pipe joint.
2. Minimum brace pipe extension 1" beyond clamp stirrup.
3. Tighten hex bolt until heads bottom out on surface

Ordering: Specify service pipe diameter x brace pipe diameter, figure number, name and finish.



**Typical Assembly
 (Brace Pipe Below Service Pipe)**

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

Go to www.anvilintl.com/OPA for State of California Office of Statewide Health Planning and Development (OSHPD) for design information relating to OSHPD projects.

Fig. 776

Brace Clamp (cont.)

FIG. 776 FM MAX LOAD: LOADS (LBS) • DIMENSIONS (IN) • ANGLES (DEGREES)			
Service Pipe Size (1" or 1 1/4" Brace Pipe)	Brace Angle***	FM Max Load** (Horizontal)	
		Sch. 10 Sch. 40	Flow Pipe
2 1/2	30-44	620	600
	45-59	880	850
	60-74	1000	1000
	75-90	1200	1100
3	30-44	620	520
	45-59	880	740
	60-74	1000	910
	75-90	1200	1000
4	30-44	690	520
	45-59	980	740
	60-74	1200	910
	75-90	1300	1000
5	30-44	670	520
	45-59	940	740
	60-74	1100	910
	75-90	1200	1000
6	30-44	670	560
	45-59	940	790
	60-74	1100	970
	75-90	1200	1000
8	30-44	540	–
	45-59	770	–
	60-74	940	–
	75-90	1000	–

FIG. 776: WEIGHT (LBS) • DIMENSIONS (IN)		
Service Pipe Size	Weight	
	1" Brace Pipe	1 1/4" Brace Pipe
2 1/2	1.26	1.50
3	1.44	1.58
4	1.55	1.68
5	1.66	1.87
6	1.74	1.95
8	1.98	2.29

* See FM Approvals for approved flow pipe.

** The allowable FM approved capacity of brace subassemblies have been determined by resolving the load rating to the horizontal direction and dividing by a safety factor of 1.5 to allow the values to be used directly for Allowable Stress Design. For Load Resistance Factor Design (LRFD) capacities, the above values will need to be multiplied by 1.5.

*** Brace Pipe Angles are determined from vertical.

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Fig. 775

Lateral / Longitudinal Brace Clamp

Size Range: Service Pipe: 2½" through 8" Sch. 10 and Sch. 40 IPS

Service Pipe: 2½" through 6" Flow Pipe

Brace Pipe: 1" or 1¼" Sch. 40 IPS

Material: Carbon steel clamp, ductile iron brace connector

Finish: Plain or Galvanized

Service: Used to rigidly brace piping systems subjected to sway and seismic disturbances. Pipe clamp component of Anvil's 700 series sway brace assembly. Can be utilized as either a lateral brace clamp or a longitudinal brace clamp.

Approvals: UL and ULC Listed (UL 203A:2009), and FM Approved (FM 1950:2010). Complies with seismic bracing requirements of NFPA-13. Office of Statewide Health Planning and Development (OSHPD) State of California approved.

Features:

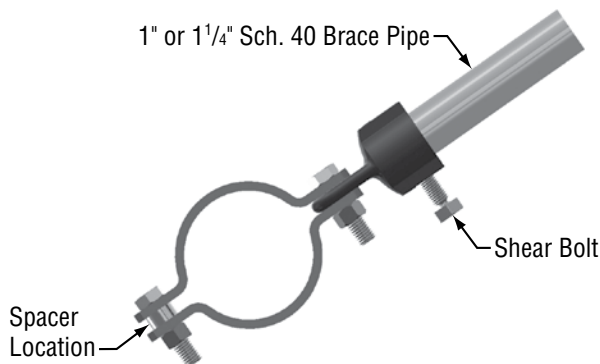
- No threading of bracing pipe
- Functions as a lateral or longitudinal brace clamp

Installation Instructions:

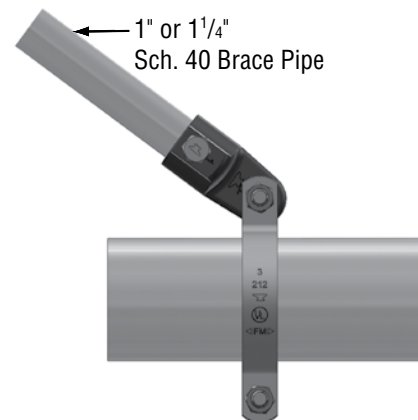
1. Installation of the pipe must be at a minimum 6" away from a pipe joint.
2. Position pipe clamp at desired location and loosely tighten the clamp hex bolts. Ensure that the spacer and brace pipe connector are positioned between the pipe clamp ears.
3. Place the Schedule 40 brace pipe into the brace pipe connector until it bottoms out.
4. Tighten shear bolt until the head shears off. Then position the brace pipe to the appropriate angle. The use of an impact wrench is not recommended.
5. Tighten the pipe clamp hex bolts equally and alternately until metal-to-metal contact is achieved with the following torque values. Clamp Bolt Minimum Torque Values : 2½" thru 3" Dia. Clamps (80 Ft-Lbs) , 4" & 5" Dia. Clamps (100 Ft-Lbs), 6" Dia. Clamp (120 Ft-Lbs), 8" Dia. Clamp (140 Ft-Lbs),
6. Note: For 6" and 8" service pipe, a thread lubricant such as Gruvlok® Xtreme™ Lubricant should be used to ease assembly of pipe clamp hex bolts and nuts.

Ordering: Specify service pipe diameter x brace pipe diameter, figure number, name and finish.

OPA-2804-10



Lateral Brace Orientation
(Brace Pipe Perpendicular to Service Pipe Axis)



Longitudinal Brace Orientation
(Brace Pipe Parallel to Service Pipe Axis)

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

Go to www.anvilintl.com/OPA for State of California Office of Statewide Health Planning and Development (OSHPD) for design information relating to OSHPD projects.

Fig. 775

Lateral / Longitudinal Brace Clamp (cont.)

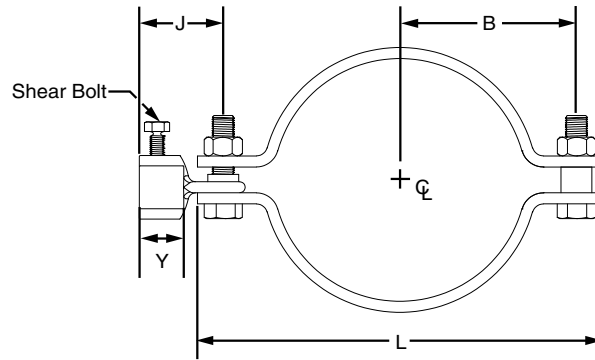


FIG. 775: WEIGHT (LBS) • DIMENSIONS (IN)

Service Pipe Size	B	L	J		Y	Weight	
			Brace Pipe		Brace Pipe	Brace Pipe	
			1"	1 1/4"	1" & 1 1/4"	1"	1 1/4"
2 1/2	2 3/8	6	2.85	2.98	1.38	2.19	2.54
3	2 3/4	6 3/4				2.36	2.71
4	3 1/2	8 1/2				2.62	2.97
5	4	9 1/2				3.74	4.09
6	4 7/8	11 1/2				6.32	6.67
8	6	13 3/4				7.42	7.77

FIG. 775 UL MAX LOAD: LOADS (LBS) • DIMENSIONS (IN)

Service Pipe Size (1" or 1 1/4" Brace Pipe)	UL Max Load* Sch. 10/Sch. 40
2 1/2	1000
3	
4	
5	1600
6	
8	

FIG. 775 FM MAX LOAD: LOADS (LBS) • DIMENSIONS (IN) • ANGLES (DEGREES)

Service Pipe Size (1" or 1 1/4" Brace Pipe)	Brace Angle***	FM Max Load**	
		Sch. 10 Sch. 40	Flow Pipe
2 1/2	30-44	1300	1500
	45-59	2100	2200
	60-74	2300	1600
	75-90	2600	1800
3	30-44	1300	1500
	45-59	2100	2200
	60-74	2300	1600
	75-90	2600	1800
4	30-44	1200	1500
	45-59	1800	1000
	60-74	1600	900
	75-90	1800	1000
5	30-44	1300	1500
	45-59	2100	2200
	60-74	2300	1600
	75-90	2600	1800
6	30-44	1500	1500
	45-59	2100	2200
	60-74	2500	900
	75-90	2800	1000
8	30-44	1500	-
	45-59	2200	-
	60-74	2700	-
	75-90	3100	-

* See FM Approval guide for approved flow pipe.

** The allowable FM approved capacity of brace subassemblies have been determined by resolving the load rating to the horizontal direction and dividing by a safety factor of 1.5 to allow the values to be used directly for Allowable Stress Design. For Load Resistance Factor Design (LRFD) capacities, the above values will need to be multiplied by 1.5.

*** Brace Pipe Angles are determined from vertical.

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Fig. 778

Bar Joist Beam Attachment

Size Range: Structural Steel: Minimum Thickness – $\frac{1}{8}$ " (FM), $\frac{3}{16}$ " (UL), Maximum Thickness – $\frac{3}{4}$ "
Service Pipe: 1" through 8"

Material: Ductile iron beam attachment, shear head bolts and hex head mounting bolt

Finish: Plain or Galvanized

Service: Used to rigidly brace piping systems subjected to sway and seismic disturbances. Structural attachment component of Anvil's 700 series sway brace assembly. Recommended for use under roof installations with bar joist construction or for attachment to the top or bottom flange of structural steel beams. Can be utilized as a structural connection for either a lateral brace or a longitudinal brace.

Approvals: UL and ULC Listed (UL 203A:2009), and FM Approved (FM 1950:2010). Complies with seismic bracing requirements of NFPA-13. Office of Statewide Health Planning and Development (OSHPD) State of California approved.

Features:

- Permits secure quick connection to structural members where drilling and/or welding of brace connection is not allowed or is not easily accomplished
- Shear head bolt design ensures that the proper installation torque is accomplished for a tight non-slip fit to the structural member.
- Bar joist beam attachment is designed for concentric loadings of seismic connections and fasteners.

Installation Instructions:

1. Place Fig. 778 on the structural steel beam. Steel member must fully engage throat of Fig. 778.
2. Tighten the set bolts equally and alternately until bolt heads shear off (30-40 Ft-Lbs).
3. Attach 700 Series Anvil Brace Fittings using the included $\frac{1}{2}$ " mounting bolt and adjust orientation as needed for proper brace angle.

Ordering: Specify figure number, name and finish.



OPA-2804-10

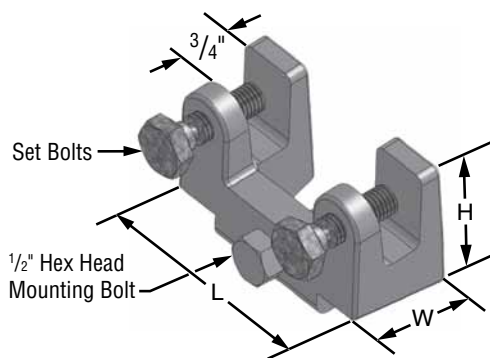
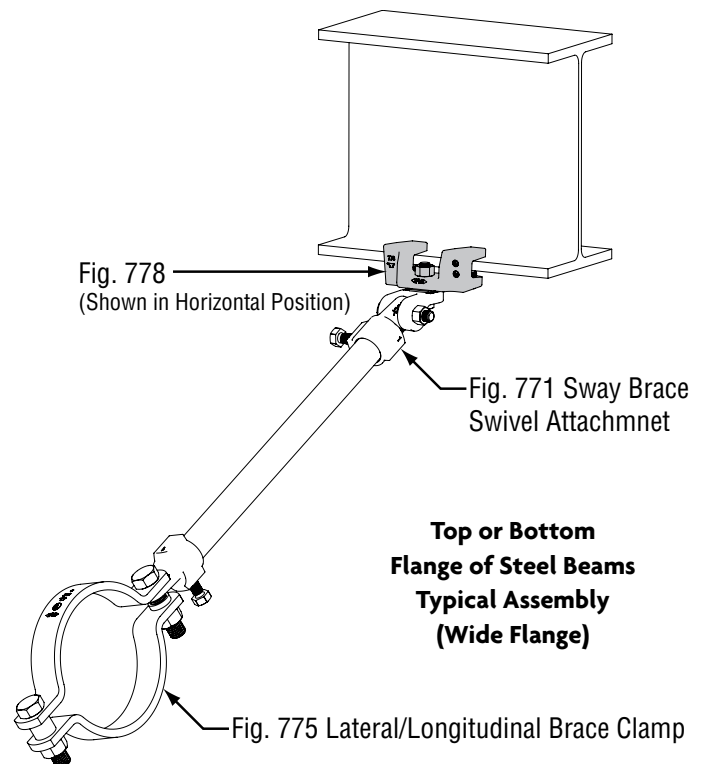


FIG. 778: WEIGHT (LBS) • DIMENSIONS (IN)			
H	L	W	Weight
2.63	4.13	2.25	2.58



See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

Go to www.anvilintl.com/OPA for State of California Office of Statewide Health Planning and Development (OSHPD) for design information relating to OSHPD projects.

Fig. 778

Bar Joist Beam Attachment (cont.)

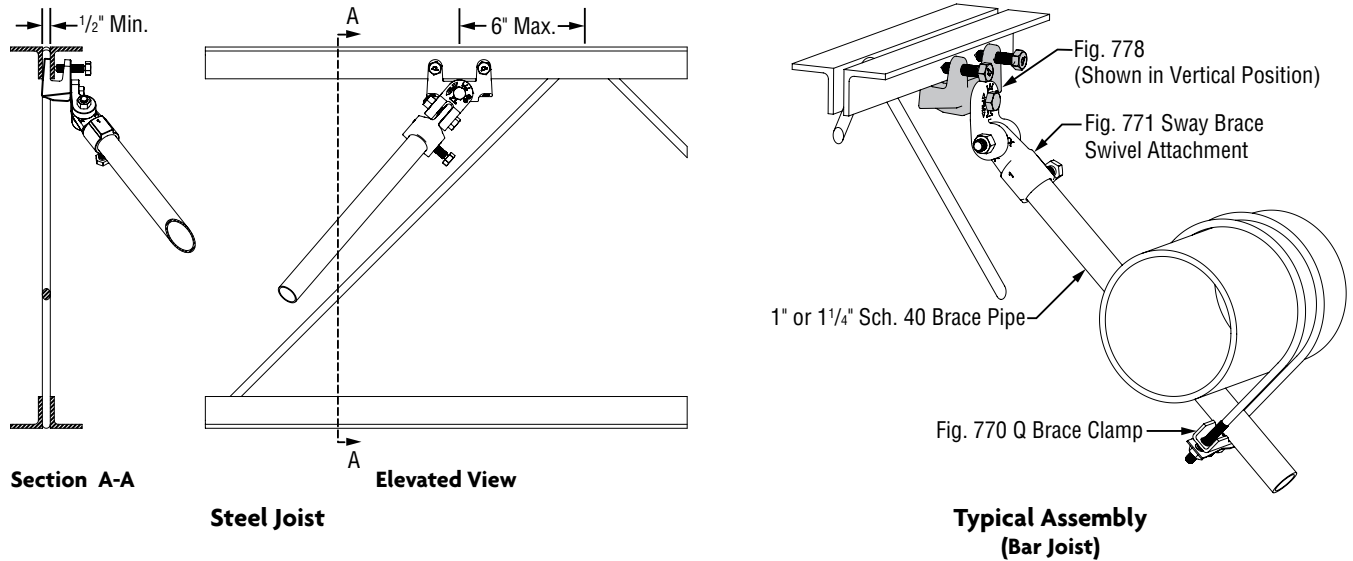


FIG. 778 UL MAX LOADS: LOADS (LBS) • DIMENSIONS (IN)

Beam Flange Thickness	Perpendicluar to Beam	Parallel to Beam
3/16	1000	1000
1/4	1600	1600
1/2	2015	2015

**FIG. 778 FM MAX LOADS*:
LOADS (LBS) • DIMENSIONS (IN) • ANGLES (DEGREES)**

Beam Flange Thickness	Brace Angle **	Perpendicular to Beam	Parallel to Beam
1/8 - 3/4 Bar Joist (Vertical Position)	30-44	440	620
	45-59	740	880
	60-74	920	940
	75-90	1010	1050
1/8 - 3/4 Bar Joist and Wide Flange Beam (Horizontal Position)	30-44	380	370
	45-59	540	520
	60-74	660	640
	75-90	700	720

* The allowable FM approved capacity of brace subassemblies have been determined by resolving the load rating to the horizontal direction and dividing by a safety factor of 1.5 to allow the values to be used directly for Allowable Stress Design. For Load Resistance Factor Design (LRFD) capacities, the above values will need to be multiplied by 1.5.
 ** Brace Pipe Angles are determined from vertical.

Structural Note:

Steel Joist Manufacturers require that all seismic bracing connections be within 6" of the cord panel point. Installation of the Fig. 778 must be limited to the outer third sections of the joist span.

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Fig. 772

Adjustable Steel Beam Attachment

Size Range: Beam Widths: 4" through 15"
 Flange Thickness: 1/2" through 1 1/4"
 Minimum Flange Thickness: 3/8" (FM), 1/2" (UL)
 Type A: Flange Thickness Range: 1/2" - 3/4"
 Type B: Flange Thickness Range: 7/8" - 1 1/4"

Material: Carbon steel
Finish: Plain or Galvanized

Service: Used to rigidly brace piping systems subjected to sway and seismic disturbances. Structural attachment component of Anvil's 700 series sway brace assembly. For attachment to the bottom flange of structural steel beams. Can be utilized as a structural connection for either a lateral brace or a longitudinal brace.

Approvals: UL and ULC Listed (UL 203A:2009), and FM Approved (FM 1950:2010). Complies with seismic bracing requirements of NFPA-13. Office of Statewide Health Planning and Development (OSHPD) State of California approved.

Features:

- Permits secure quick connection to a structural steel beam where drilling and/or welding of a brace connection is not allowed or is not easily accomplished.
- Adjustable sizes to insure a proper fit for a wide range of beam widths and flange thicknesses.
- Steel beam attachment is designed for concentric loadings of seismic connections and fasteners.
- Functions as a lateral or longitudinal structural connection of a sway brace assembly

Installation Instructions:

1. Place Figure 772 on structural beam by loosening 1/2" hex bolts to correctly position C-clamp bodies.
2. C-clamp bodies should fully bottom out on the flange of beam.
3. Tighten 1/2" shear bolt until the head shears off. The use of an impact wrench is not recommended.
4. Tighten 1/2" hex head bolt into C-clamp bodies until lock washers bottom out on C-channel and the required torque of 55 Ft-Lbs is achieved.
5. Attach 700 Series Anvil Brace Fittings to the center bolt and adjust orientation as needed for proper brace angle.

Ordering: Specify figure number, type, L channel Dim. (length), name and finish.

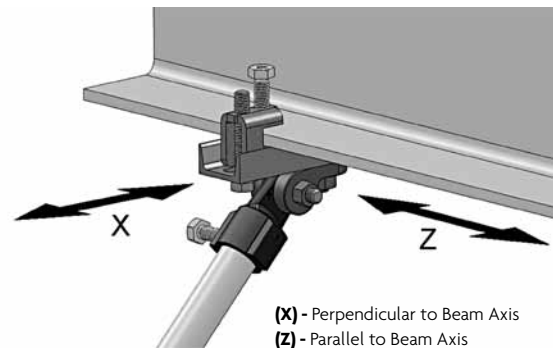
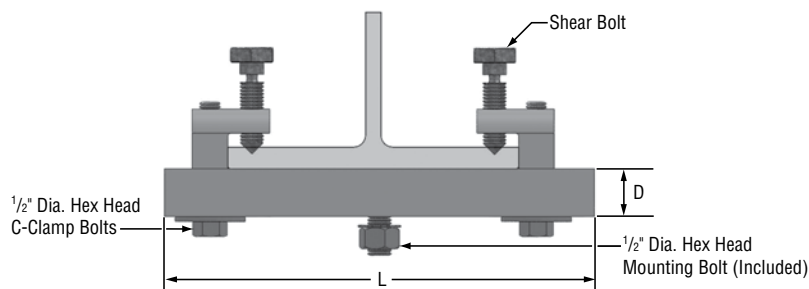
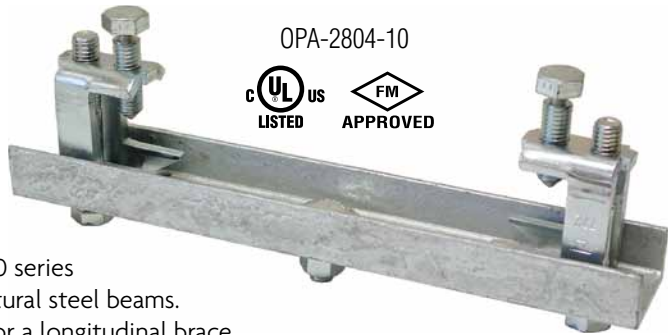


FIG. 772 UL MAX LOADS: LOADS (LBS) • WEIGHT (LBS) • DIMENSIONS (IN)

Type	Length (L)	Beam Flange		Perpendicular to Beam	Parallel to Beam	D	Weight
		Width Range	Thickness Range				
A	9	4 - 7	1/2 - 3/4	1600	1000	1	3.15
	12	7 - 10					3.74
	14	9 - 12					4.19
B	9	4 - 7	7/8 - 1 1/4	1000	1000	1	3.15
	12	7 - 10					3.90
	14	9 - 12					4.35
	17	12 - 14					4.90

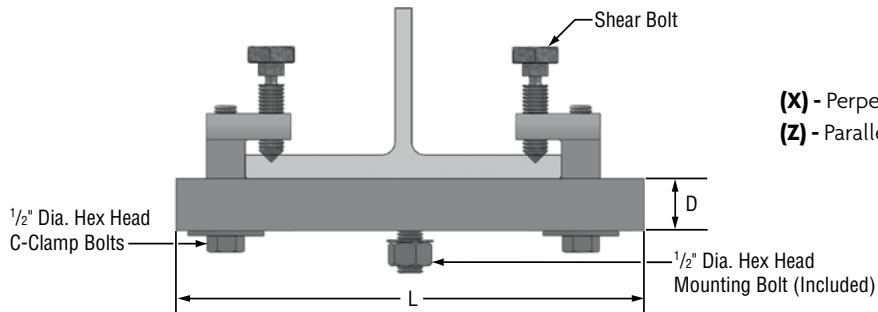
See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

Go to www.anvilintl.com/OPA for State of California Office of Statewide Health Planning and Development (OSHPD) for design information relating to OSHPD projects.

Fig. 772

Adjustable Steel Beam Attachment (cont.)



(X) - Perpendicular to Beam Axis
(Z) - Parallel to Beam Axis

FIG. 772 FM MAX LOADS*								
LOADS (LBS) • WEIGHT (LBS) • DIMENSIONS (IN) • ANGLES (DEGREES)								
Type	Length (L)	Beam Flange		Brace Angle**	X Lateral	Z Longitudinal	D	Weight
		Width Range	Thickness Range					
30° - 44° BRACE ANGLE								
A	9	4 - 7	3/8 - 3/4	30° - 44°	540	470	1	3.15
	12	7 - 10						3.74
	14	9 - 12						4.19
	17	12 - 15						4.74
B	12	7 - 10	7/8 - 1 1/4	30° - 44°	470	330	1	3.90
	14	9 - 12						4.35
	17	12 - 15						4.90
45° - 59° BRACE ANGLE								
A	9	4 - 7	3/8 - 3/4	45° - 59°	710	480	1	3.15
	12	7 - 10						3.74
	14	9 - 12						4.19
	17	12 - 15						4.74
B	12	7 - 10	7/8 - 1 1/4	45° - 59°	740	640	1	3.90
	14	9 - 12						4.35
	17	12 - 15						4.90
60° - 74° BRACE ANGLE								
A	9	4 - 7	3/8 - 3/4	60° - 74°	880	580	1	3.15
	12	7 - 10						3.74
	14	9 - 12						4.19
	17	12 - 15						4.74
B	12	7 - 10	7/8 - 1 1/4	60° - 74°	910	790	1	3.90
	14	9 - 12						4.35
	17	12 - 15						4.90
75° - 90° BRACE ANGLE								
A	9	4 - 7	3/8 - 3/4	75° - 90°	980	640	1	3.15
	12	7 - 10						3.74
	14	9 - 12						4.19
	17	12 - 15						4.74
B	12	7 - 10	7/8 - 1 1/4	75° - 90°	1000	880	1	3.90
	14	9 - 12						4.35
	17	12 - 15						4.90

* The allowable FM approved capacity of brace subassemblies have been determined by resolving the load rating to the horizontal direction and dividing by a safety factor of 1.5 to allow the values to be used directly for Allowable Stress Design. For Load Resistance Factor Design (LRFD) capacities, the above values will need to be multiplied by 1.5.

** Brace Pipe Angles are determined from vertical.

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Fig. 772

Adjustable Steel Beam Attachment (cont.)

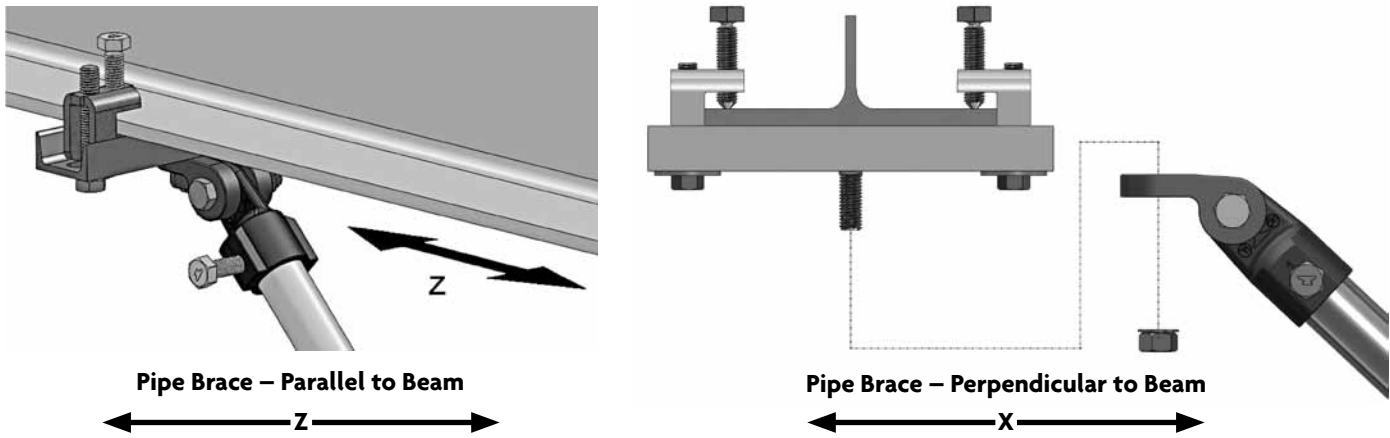


FIG. 772 SIZE CHART: DIMENSIONS (IN)

Type	A (1/2" - 3/4" Flange Thickness)				B (7/8" - 1 1/4" Flange Thickness)		
Channel Length (L)	9"	12"	14"	17"	12"	14"	17"
Beam Width Range	4"-7"	7"-10"	9"-12"	12"-15"	7"-10"	9"-12"	12"-15"
Beam Size	W4x13	W8x35	W10x49	W12x65	W8x67	W10x77	W12x96
	W5x16	W8x40	W10x54	W12x72	W21x93	W10x88	W12x106
	W6x16	W8x48	W10x60	W12x79	W24x94	W10x100	W12x120
	W6x20	W10x39	W10x68	W14x90		W10x112	W12x136
	W8x21	W10x45	W12x58	W14x99		W14x82	W14x109
	W8x24	W10x49	W12x65	W24x104		W16x89	W14x120
	W10x22	W12x40	W14x61			W16x100	W14x132
	W10x30	W12x45	W14x68			W18x97	W21x111
	W12x26	W12x50	W16x67			W18x106	W21x122
	W12x35	W12x53	W16x77			W18x119	W21x132
	W14x30	W12x58	W18x76			W24x94	W21x147
	W14x38	W14x43	W18x86			W27x94	W24x117
	W16x26	W14x48	W24x84			W27x114	W24x131
	W16x40	W14x53	W27x84				W24x146
	W18x40	W14x61	W27x102				W24x162
	W18x46	W14x68					W27x146
	W21x50	W16x45					W27x161
	W21x57	W16x50					W27x178
		W16x57					
		W18x50					
		W18x55					
		W18x60					
		W18x65					
		W21x62					
		W21x68					
		W21x73					
		W24x68					
		W24x76					
	W27x84						
	W27x94						

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Fig. 779

Multi-Connector Adapter

Size Range: Service Line: 1" through 8"

Material: Carbon steel

Finish: Plain or Galvanized

Service: Used to rigidly brace piping systems subjected to sway and seismic disturbances. Structural attachment component of Anvil's 700 series sway brace assembly. The multi-connector's two fasteners distributes the sway brace fitting attachment load to the structure, which maximizes the load capacity of the brace fitting. Can be utilized as a structural connection for either a lateral brace or longitudinal brace.

Approvals: UL and ULC Listed (UL 203A:2009). Complies with seismic bracing requirements of NFPA-13.

Installation Instructions:

1. NFPA 13 guidelines should be followed.
2. UL Maximum Load: 3,740 Lbs.

Ordering: Specify size, figure number, name and finish.

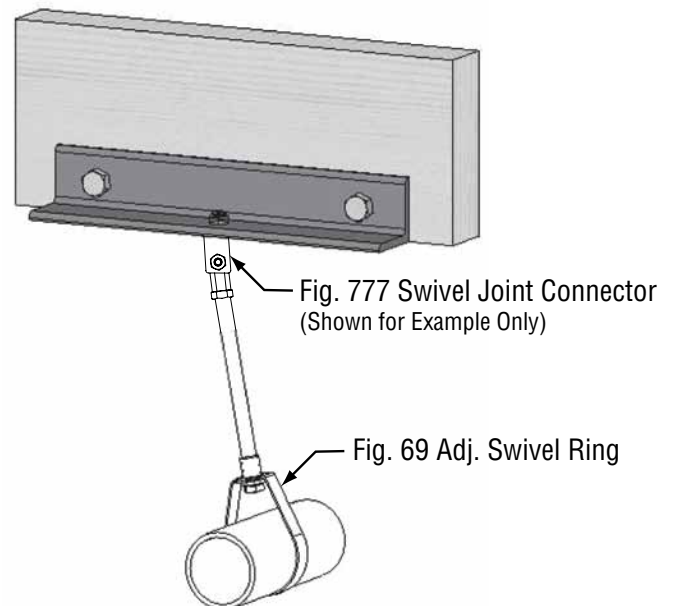
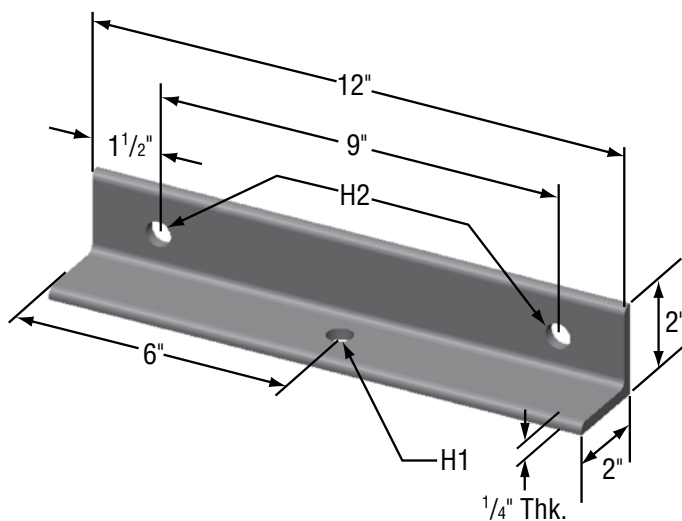


FIG. 779: WEIGHT (LBS) • DIMENSIONS (IN)						
Size	Mounting Bolt Diameter	Fastener (2X) Diameter	H1 Diameter	H2 Diameter	Service Pipe	Weight
1*	3/8*	1/2	7/16	9/16	1 thru 4	3.06
2	1/2**	1/2	9/16	9/16	1 thru 6	3.06
3	1/2**	5/8	9/16	11/16	1 thru 6	3.04
4	1/2**	3/4	9/16	13/16	1 thru 8	3.02

* 3/8" Mounting Bolt – Fig. 777 Swivel Joint Connector

** 1/2" Mounting Bolt – Series 700 Anvil Brace Fittings

• Size #1 with 3/8" mounting bolt is not UL Listed.

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

Fig. 773

Surge Restrainer

Size Range: 3/4" thru 2" Swivel Ring Hanger, Figure 69

Material: Carbon steel

Finish: Galvanized

Service: Designed to be used with Anvil Figure 69, Adjustable Swivel Ring Hanger, for bracing steel service pipe against up thrust during a seismic disturbance or sprinkler head activation.

Approvals: UL and ULC Listed (UL 203A:2009). Complies with seismic bracing requirements of NFPA-13.

Features:

- One universal size accommodates ring hangers from 3/4" to 2".
- Quick and simple to install by just snapping the surge restrainer into a locking position onto the ring hanger.

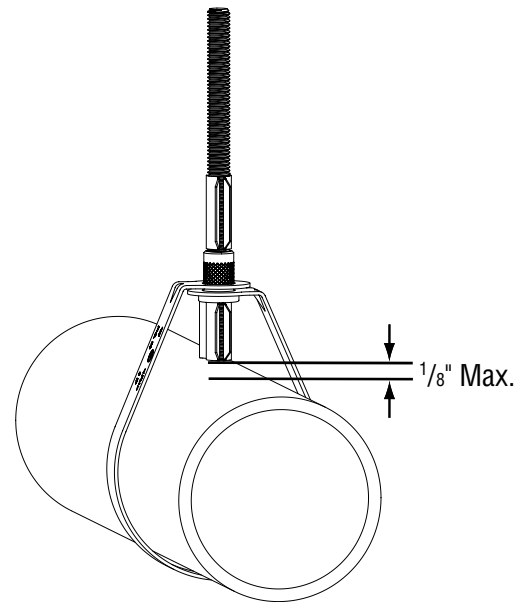
Installation Instructions:

1. The threaded hanger rod must protrude a minimum of 1/2" beyond the bottom of the knurl nut.
2. Snap the surge restrainer onto the threaded rod above and below the knurl nut.
3. When in the proper locking position, the maximum gap between the surge restrainer and the steel service pipe is an 1/8".

Ordering: Specify figure number and name.



FIG. 773: LOADS (LBS) • WEIGHT (LBS) • DIMENSIONS (IN)			
Service Pipe Size	Rod Size	UL Max Load	Weight
3/4 thru 2	3/8	300	.08



See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

Fig. 777

Swivel Joint Connector

Size Range: $\frac{3}{8}$ " rod diameter, Service Line: 1" through 4"

Material: Carbon steel

Finish: Zinc Plated

Restraint Service: Used to restrain pipe systems. A lateral restraint connector that is attached to a structure or structural attachment for a branch line restraint assembly, consisting of a Figure 69 and Figure 773 "Surge Restrainer."

Hanger Service: Used to adapt $\frac{3}{8}$ " threaded rod to angled building structures.

Approvals: UL Listed (UL 203A), cULus Listed (UL203). Complies with hanging and seismic bracing requirements of NFPA-13.

Features:

- Comes assembled and ready for installation
- $\frac{3}{8}$ -16UNC threaded hole to receive threaded rod

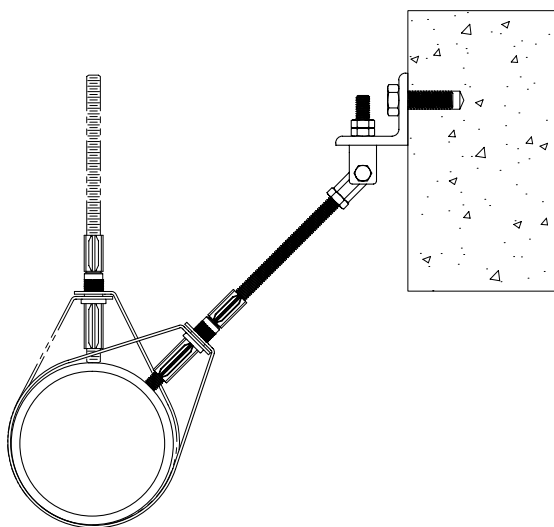
Installation Instructions:

1. Install upper $\frac{3}{8}$ " mounting bolt into structure or structural attachment (restraint only) and tighten upper hex nut with split ring washer, include an additional hex nut to lock the upper nuts into place or thread the upper mounting bolt into a 700 Series attachment (restraint only).
2. Screw the hanger rod into the threaded hex union until it bottoms. Back off one turn and securely tighten rod nut to assure proper performance
3. Must be installed within 6 inches of a vertical hanger, when used as a component of a restraint device.
4. Adjust angle as necessary.

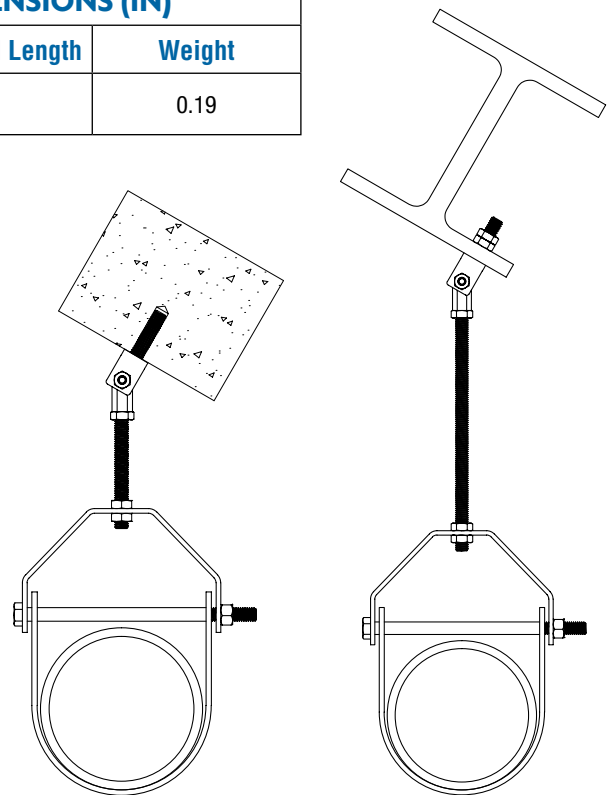
Ordering: Specify rod size, figure number, name and finish.



FIG. 777: LOADS (LBS) • WEIGHT (LBS) • DIMENSIONS (IN)			
Rod Size	UL Max Load	Max Threaded Rod Length	Weight
$\frac{3}{8}$	Restraint: 1,000 Hanger: Up to 4" Pipe	Restraint: 29 Hanger: N/A	0.19



Branch Line Restraint Assembly



Hanger Assembly

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

Fig. 771

Sway Brace Swivel Attachment

Size Range: Brace Pipe: 1" or 1 1/4" Sch. 40 IPS
Service Line: 1" through 8"

Material: Ductile iron, shear head bolts and hex head mounting bolt

Finish: Plain or Galvanized

Service: Used to rigidly brace piping systems subjected to sway and seismic disturbances. Brace pipe fitting component of Anvil's 700 series sway brace assembly. Functions as a sway brace attachment that is directly attached to Fig. 772 Adjustable Beam Attachment, Fig. 778 Bar Joist Attachment and Fig. 779 Multi-Connector Adapter. Can be utilized as a brace fitting for either a lateral brace or a longitudinal brace, that can be mounted on horizontal or vertical structures.

Approvals: UL and ULC Listed (UL 203A:2009), and FM Approved (FM 1950:2010). Complies with seismic bracing requirements of NFPA-13. Office of Statewide Health Planning and Development (OSHPD) State of California approved.

Features:

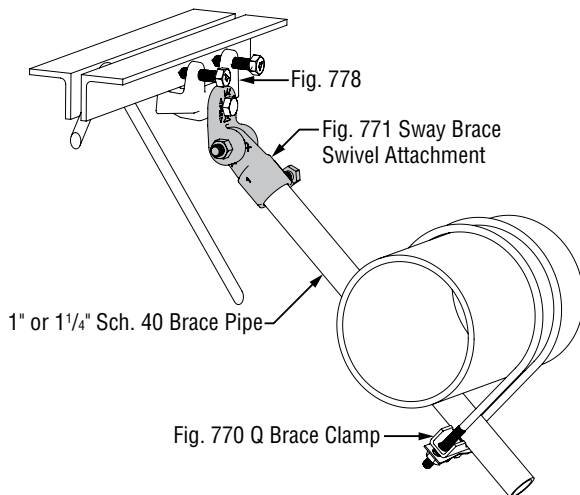
- Requires no threading of bracing pipe
- Sway brace fitting designed for concentric loadings of seismic connections and fasteners.

Installation Instructions:

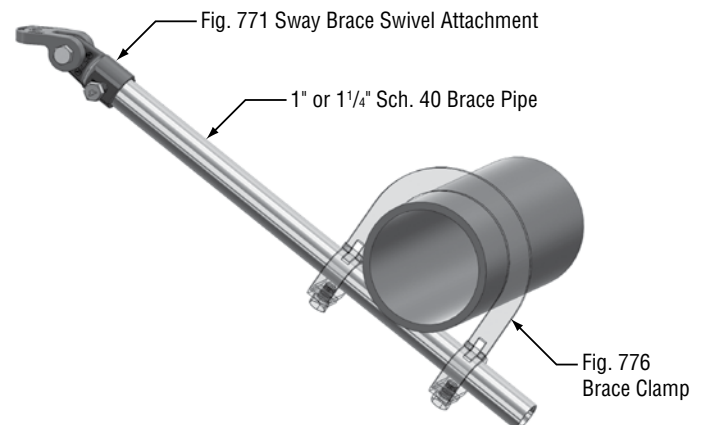
1. Mount Figure 771 Sway Brace Fitting to structure using suitable fasteners as defined by NFPA-13.
2. Place the Schedule 40 brace pipe into the brace pipe connector until it bottoms out.
3. Tighten shear bolt until the head shears off. The use of an impact wrench is not recommended.
4. Then position the brace pipe to the appropriate angle.
5. Ensure that the brace fitting hex bolt is tightened to a minimum torque value of 40 Ft-Lbs.

Ordering: Specify brace pipe diameter, figure number, name and finish.

OPA-2804-10  



**Typical Assembly
(Bar Joist)**



Typical Assembly

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

Go to www.anvilintl.com/OPA for State of California Office of Statewide Health Planning and Development (OSHPD) for design information relating to OSHPD projects.

Fig. 771

Sway Brace Swivel Fitting (cont.)

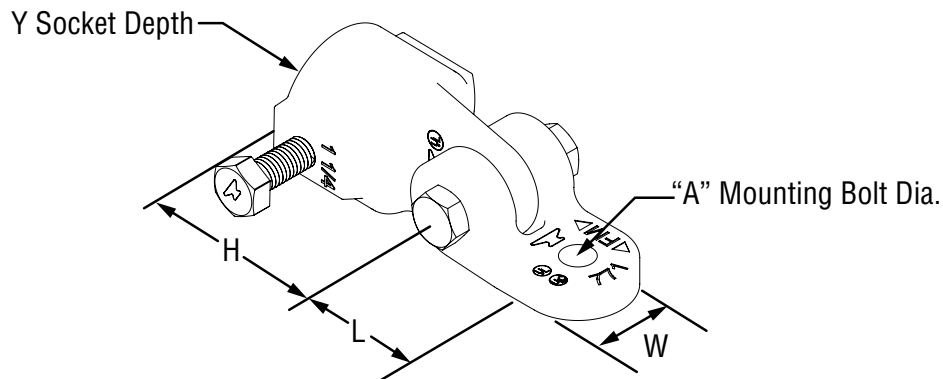


FIG. 771: WEIGHT (LBS) • DIMENSIONS (IN)

Brace Pipe Diameter Sch. 40	Bolt Diameter A	H	L	W	Y	Weight
1	1/2	2.85	1.65	1.69	1.38	1.95
1 1/4		2.98				2.28

**FIG. 771 FM MAX LOADS:
LOADS (LBS) • DIMENSIONS (IN) • ANGLES (DEGREES)**

Brace Pipe Diameter Sch. 40	Brace Angle*	FM Max Load
1 and 1 1/4	30° - 44°	1800
	45° - 59°	2500
	60° - 74°	3100
	75° - 90°	3400

**FIG. 771 UL MAX LOADS:
LOADS (LBS) • DIMENSIONS (IN)**

Brace Pipe Diameter Sch. 40	UL Max Load
1 and 1 1/4	2765

* Brace Pipe Angles are determined from vertical.

The allowable FM approved capacity of brace subassemblies have been determined by resolving the load rating to the horizontal direction and dividing by a safety factor of 1.5 to allow the values to be used directly for Allowable Stress Design.

For Load Resistance Factor Design (LRFD) capacities, the above values will need to be multiplied by 1.5.

See page 3 for notes on sway brace-seismic components concerning – installation, performance and warranty.

PROTECT YOUR STRUCTURE

From Fire Damage & Seismic Activity

Regardless of geography, buildings are susceptible to the damaging effects of seismic activity. The Federal Emergency Management Agency (FEMA) has identified one of the primary causes of property damage from earthquakes as the mechanical failure of gas and water lines contributing to fires.

As damage can occur when pipes move independently of the building, all current building codes now require seismic bracing of certain key pipes to prevent damage to pipe systems by forcing them to move with buildings during seismic activity. The majority of U.S. jurisdictions have now adopted new international codes to ensure financial backing from FEMA following an earthquake.

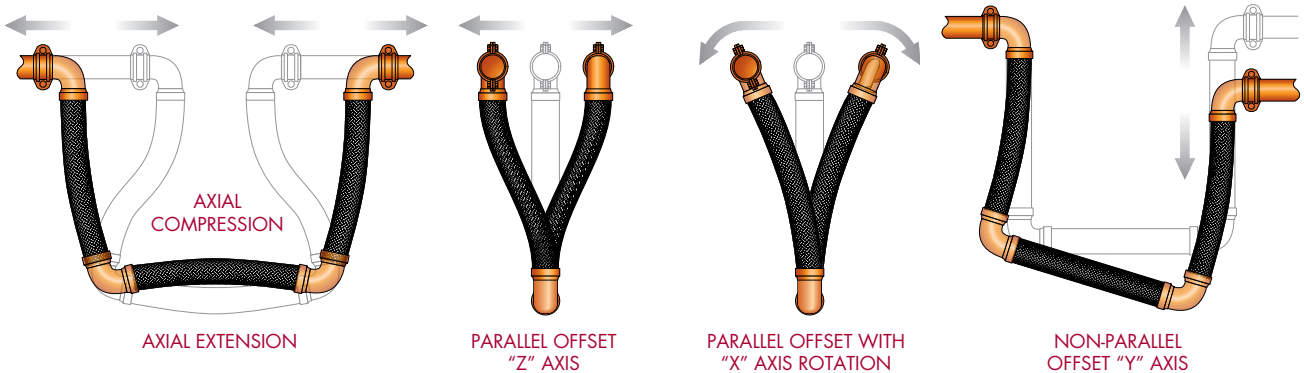
Anvil can help you achieve the proper levels of protection to meet FEMA requirements. With the Anvil Tri-Flex Loop® providing seismic bracing, you can effectively minimize potential problems, such as the incompatibility of piping systems, as well as limit differential structural movement and crossing over building joints.



Anvil Tri-Flex Loop is Factory Mutual tested and approved for use in fire protection piping systems.

MOVEMENT CAPABILITIES

Anvil Tri-Flex Loop® is capable of handling the following movements simultaneously.



ABSORB & COMPENSATE

The patented Anvil Tri-Flex Loop is the only flexible pipe loop that absorbs and compensates for pipe movement in six degrees of freedom, including three coordinate axes, plus rotation about those axes simultaneously. Anvil's Tri-Flex Loop is the safest and most reliable means of absorbing movement resulting from thermal changes and random seismic shifts in a fire protection system.

Quality assurance and precision manufacturing are central to the Anvil Tri-Flex Loop. The Anvil product ensures safety and superior performance as it is specially designed to withstand large and irregular movements, such as those caused by seismic activities. The Anvil Tri-Flex Loop is tested and approved by Factory Mutual from 1"–12" sizes. In sizes 1"–3", this product is approved for up to 300 psi and service assemblies maintained pressure integrity to 1,200 psi, a 4:1 safety factor. In sizes 4"–12", the product is approved for up to 175 psi and service assemblies maintained pressure integrity to 700 psi, also a 4:1 safety factor.

Anvil Tri-Flex Loop is designed and manufactured using state-of-the-art welding technology. The product is 100% dye penetrant tested at the seal welds and pressure-tested prior to release for shipment. The Anvil Tri-Flex Loop has a three-year warranty. Please refer to warranty registration for details.

KEY FEATURES INCLUDE:

- Innovative, patented design
- Simultaneous movement in 3 coordinate axes
- Compensates random seismic shift
- Factory-provided seismic wire cable hanger kit
- Factory built and tested
- 3-year warranty
- Metal tagged with project location
- Ready to install

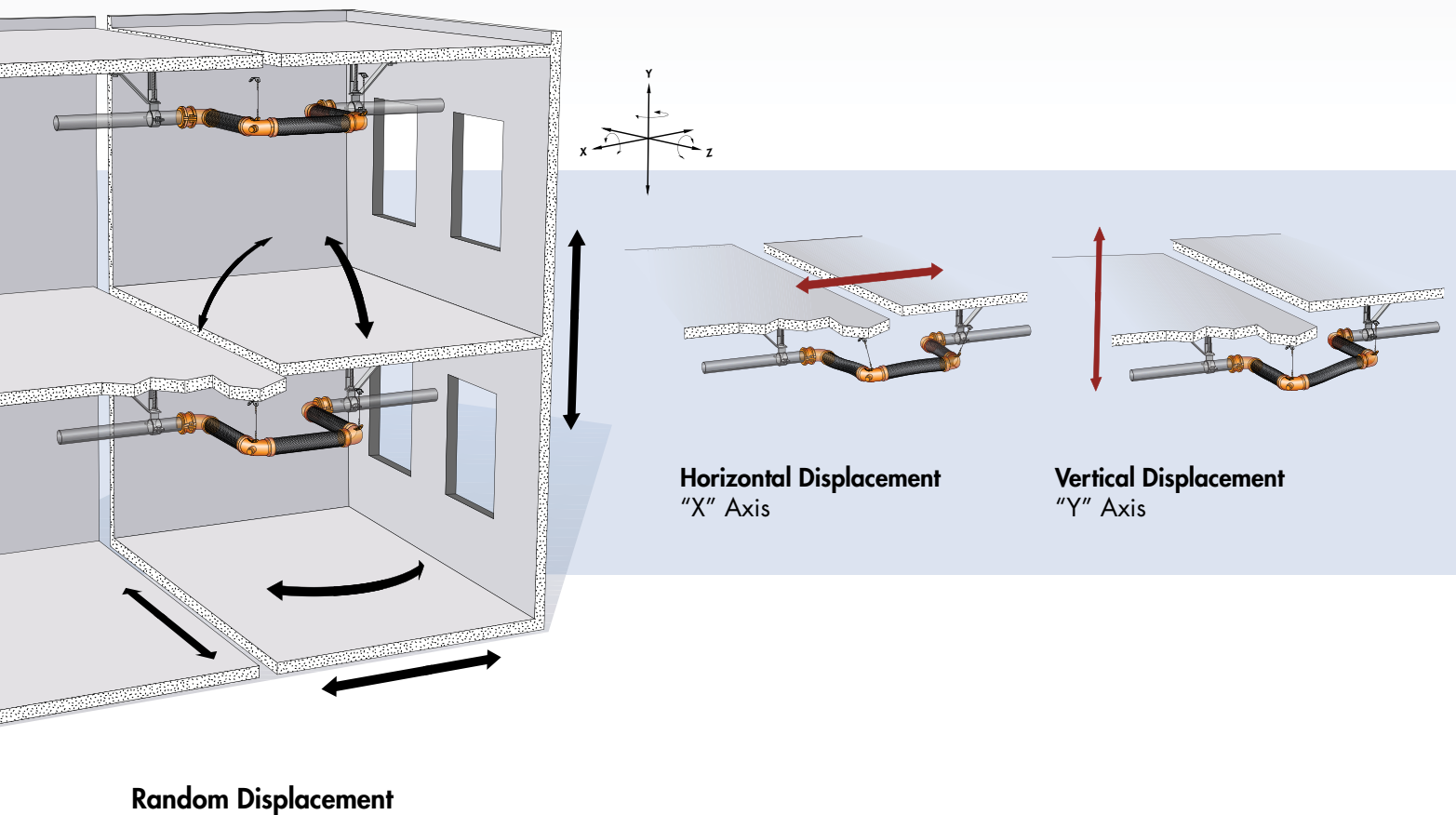


Seismic Displacement APPLICATIONS

The product can accommodate seismic displacements for riser fire protection piping between floors of the building, where sprinkler pipes pass through or bridge building seismic joints. The Anvil Tri-Flex Loop is also used as horizontal fire protection for piping that crosses building seismic and building expansion joints to accommodate building drift of each building unit.

PROPER ISOLATION OF SEISMIC JOINT

Seismic bracing should not pass through building seismic joints and/or expansion joints. Seismic bracing should not connect to or tie together different sides or parts of the building seismic joints.



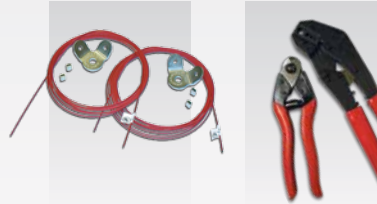
ANVIL TRI-FLEX LOOP HANGER ASSEMBLY KIT & ACCESSORIES

The UL Listed Anvil Tri-Flex Loop Hanger Assembly Kit saves on installation, making it easy to support and hang the revolutionary Anvil Tri-Flex Loop.

The UL Listed Seismic Wire Rope/Cable™ used in our hanger assemblies conforms to the requirements of the ASCE guidelines for structural applications of wire rope, in that the cable is pre-stretched and the permanent end fittings maintain the breakstrength of the cable with a safety factor of two.

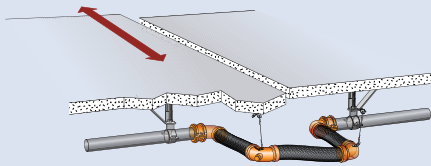
UL Listed Red Cable Assembly Kit and Accessories

UL Listed Hanger Assembly for installation of Anvil Tri-Flex Loops up to 8" diameter

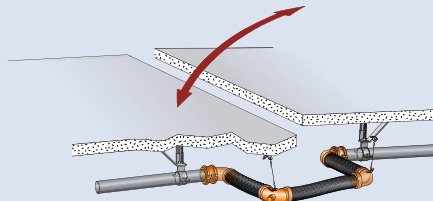


UL Listed Blue Cable Assembly Kit and Accessories

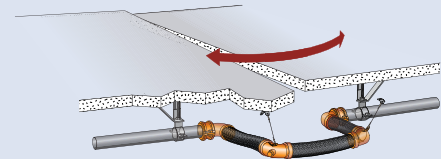
UL Listed Hanger Assembly for installation of Anvil Tri-Flex Loops up to 10"-12" diameter



Horizontal Displacement
"Z" Axis



Isolating Building Drift



Isolating Building Drift
with Rotation

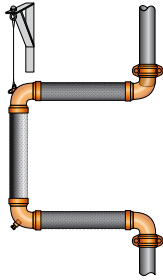


SEISMIC EXPANSION SIZING PROGRAM

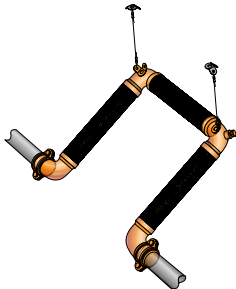
As an added service, Anvil provides our customers with a complimentary Seismic Expansion Loop Sizing Program at www.anvilintl.com. The program helps you:

- Build seismic joints
- Calculate the forces to deflect the seismic expansion loop
- Design Auto CAD drawings as you create piping systems
- Select a Seismic Hanger Assembly Kit
- Create a detailed schedule of submittals
- Allow for saving of projects, opening new projects, and editing projects
- Identify specifications and relevant industry terminology
- Refer to: www.anvilintl.com/Product/TriFlexLoop.aspx

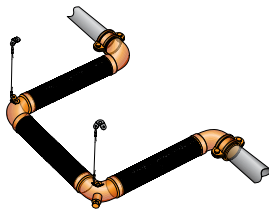
INSTALLATION OPTIONS



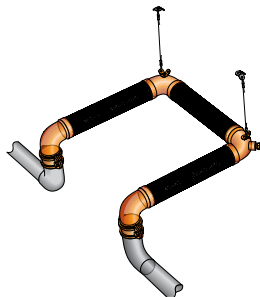
VERTICAL INSTALLATION



DIAGONAL INSTALLATION



HORIZONTAL INSTALLATION



OVER/UNDER PIPE INSTALLATION

INSTALLATION & MAINTENANCE TIPS

Anvil can help you achieve maximum protection for your piping system during seismic activity. We will work closely with you to make sure that our products are properly installed to meet the needs of your building.

Be sure that all pipelines are supported, so the Anvil Tri-Flex Loop does not carry the pipe load. Initial pipe misalignment should not exceed 1/8" in any direction as any misalignment, compression, or extension will reduce the maximum allowable movements of the product. However, in the event that the product must be installed with an initial misalignment, compression, or extension, then the maximum allowable movements will be reduced by the amount of the initial deflection.

Install the product with neutral face-to-face dimension as shown in submittal drawings. If seismic snubbers are designed into the piping system, they should be sized to accommodate the forces of the piping system, since the product will not impose additional thrust forces.

Verify that the movements of the system are within the design parameters of the product being installed. Be sure to check that system pressure and temperature do not exceed recommended performance limits as operation beyond design limits could result in premature failure.

Consider that the alloy of any product installed must be chemically compatible with the media of the existing piping system.

The Anvil Tri-Flex Loop flanges and the mating flanges on a flanged product should straddle the centerline to avoid torque.

When welding in the area of product, extreme care is necessary to ensure that no weld spatter comes in contact with the braided hose sections.

If you have any questions about installation options or how to best protect your piping systems, please contact your Anvil representative for guidance.

Visit www.anvilintl.com

To install a thread end, the Anvil Tri-Flex Loop unions must be used cautiously. Do not place wrenches on the braided portion or the collar of the product. Use care not to torque the product while tightening the union.

Use care when handling the Anvil Tri-Flex Loop during transport, storage, and installation. The braided hose sections must not be allowed to bend, deflect, sag, or otherwise extend beyond their rated capabilities. The shipping bar is to keep the Anvil Tri-Flex Loop in its neutral end-to-end dimension during shipping and installation. After installation, the shipping bar must be removed.

Because the product is rated for motion on either side of its neutral face-to-face, the capability can be doubled by pre-compressing or pre-extending based on requirements. With the product's extreme flexibility, this can be easily done in the field.

When installing in any configuration other than with the product hanging down (vertical), the weight of the Anvil Tri-Flex Loop must be supported utilizing the support hanging lugs which are factory-welded at the two 90° elbows. The product's pre-stretched seismic wire/rope cable assembly must be used in accordance with the installation instructions included with the Cable Kit in order to ensure optimal performance of the product.

In the event of seismic activity or if excessive movement beyond design capability has occurred, the product should be inspected to ensure that it has not incurred damage. If there is any question as to whether or not excessive motion has occurred, the product should be replaced. The product should be also inspected during routine maintenance to ensure there are no signs of external damage.

RECOMMENDED ENGINEERING SPECIFICATIONS

PART 1: GENERAL

1.01 Section Includes

- A. Anvil Tri-Flex Loop[®], model ANVL2 (ffl2" movement) or ANVL4 (ffl4" movement) or ANVL8 (ffl8" movement), which provides a flexible pipe loop that will absorb and compensate multi-plane movements simultaneously, resulting in reduced piping stress.
- B. Application
The Anvil Tri-Flex Loop shall be used to accommodate seismic displacement/building drift of: riser fire protection piping between floors of the building, sprinkler pipes that either pass through or bridge building seismic joints, and building expansion joints. They are to be used on horizontal fire protection piping that crosses building seismic and expansion joints to accommodate building drift of each building.
- C. Approval
They must be Factory Mutual (FM) tested and approved for use in fire protection piping systems from 1"–12".
Sizes 1"–3" shall be FM Approved for 300 psi working pressure at ambient temperature, and sizes 4"–12" are to be FM Approved for 175 psi working pressure.

1.02 Manufactures

Anvil Tri-Flex Loop shall be provided by Anvil International.

PART 2: PRODUCTS

2.01 Anvil Tri-Flex Loop

- A. Construction to be three equal-length sections of annular, corrugated, stainless steel, close-pitch hose (made in USA), with stainless steel over braid (made in USA) that will absorb or compensate for pipe movements in all six degrees of freedom (three coordinate axes, plus rotation about those axes) simultaneously.
- B. The corrugated metal hose, braid(s), and a stainless steel ring-ferrule/band (material gauge not less than .048") must be integrally seal-welded using 100% circumferential, full-penetration TIG welds. End fitting connections shall be selected as grooved, threaded, or flanged per application. Fittings must be attached to the corrugated metal hose and braid(s) using a 100% circumferential TIG weld.
- C. Anvil Tri-Flex Loop must be designed for a one-time pressure testing at 1.5 times their maximum rated working pressure and have a minimum 4:1 (burst to working) safety factor.
- D. Each braided Anvil Tri-Flex Loop shall be individually leak-tested by the manufacturer using a minimum of 80 psi air-under-water or hydrostatic pressure to 1.5 times the rated working pressure.
- E. Anvil Tri-Flex Loops shall be prepared for shipment using a cut-to-length metal shipping bar, tacked securely between the elbows of the two parallel legs, to maintain the manufactured length during shipping. Shipping bar must be removed prior to system start-up.
- F. The Anvil Tri-Flex Loop hanger assembly kit shall be used to support and hang the Anvil Tri-Flex Loop. The FM Approved and UL Listed seismic wire/cable assemblies conform to the requirements of the ASCE (American Society of Civil Engineers) guidelines for structural applications of wire rope, in that the cable is pre-stretched and the permanent end fittings maintain the break strength of the cable with a safety factor of two.

WARRANTY

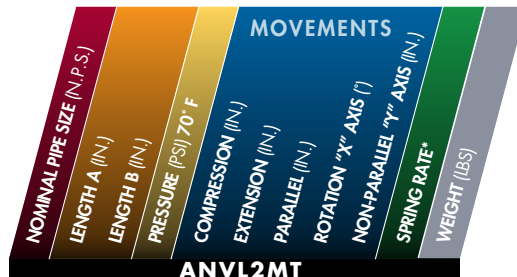
The Anvil Tri-Flex Loop must have a three-year product warranty when installed in accordance with all specifications and installation instructions described in the Anvil Tri-Flex Loop Installation and Maintenance Section.

For an electronic version, please contact your Anvil International Sales Representative.

ANVIL TRI-FLEX LOOP® DESIGN SPECIFICATIONS

Threaded ends (MT)

(Sch 40 Carbon Steel Male N.P.T.)

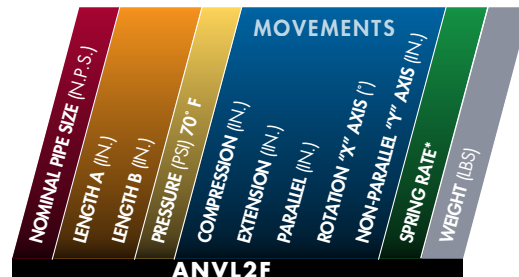


ANVIL2MT										
1.0	21.00	15.75	300	2	2	2	20°	1	7	6
1.25	25.00	18.00	300	2	2	2	15°	1	9	8
1.5	27.00	19.50	300	2	2	2	15°	1	10	11
2.0	31.00	22.25	300	2	2	2	10°	1	13	15
2.5	35.00	25.00	300	2	2	2	10°	1	23	27
3.0	39.25	28.00	300	2	2	2	10°	1	33	37
4.0	48.75	33.00	175	2	2	2	5°	1	53	64

ANVIL4MT										
1.0	25.75	20.50	300	4	4	4	30°	2	7	7
1.25	29.38	22.50	300	4	4	4	25°	2	9	9
1.5	32.00	24.50	300	4	4	4	25°	2	10	13
2.0	37.00	28.25	300	4	4	4	20°	2	13	18
2.5	41.00	31.00	300	4	4	4	20°	2	23	30
3.0	45.25	34.00	300	4	4	4	15°	2	33	40
4.0	55.75	40.00	175	4	4	4	10°	2	53	70

Flanged ends (F)

(Plate Steel Flange ANSI Class 150 Hole Pattern)



ANVIL2F										
2.0	31.50	22.25	300	2	2	2	10°	1	13	22
2.5	35.50	25.00	300	2	2	2	10°	1	23	37
3.0	39.75	28.00	300	2	2	2	10°	1	33	48
4.0	43.25	33.00	175	2	2	2	5°	1	53	79
5.0	54.00	41.25	175	2	2	2	5°	1	66	125
6.0	60.25	45.00	175	2	2	2	3°	1	79	177***
8.0	73.50	53.25	175	2	2	2	3°	1	105	340**
10.0	88.50	63.38	175	2	2	2	2°	1	132	576**
12.0	102.50	72.38	175	2	2	2	0°	1	158	855**

ANVIL4F										
2.0	37.50	28.25	300	4	4	4	20°	2	13	25
2.5	41.50	31.00	300	4	4	4	20°	2	23	40
3.0	45.75	34.00	300	4	4	4	15°	2	33	51
4.0	50.25	40.00	175	4	4	4	10°	2	53	85
5.0	63.75	51.00	175	4	4	4	10°	2	66	137
6.0	69.50	54.25	175	4	4	4	5°	2	79	189***
8.0	83.50	63.25	175	4	4	4	5°	2	105	372**
10.0	99.50	74.38	175	4	4	4	5°	2	132	621**
12.0	114.50	84.38	175	4	4	4	3°	2	158	936**

ANVIL8F										
2.0	37.50	37.00	300	8	8	8	20°	2	13	27
2.5	41.50	39.75	300	8	8	8	20°	2	23	44
3.0	45.75	43.25	300	8	8	8	15°	2	33	55
4.0	50.25	50.50	175	8	8	8	10°	2	53	91
5.0	63.75	64.00	175	8	8	8	10°	2	66	146
6.0	69.50	67.50	175	8	8	8	5°	2	79	203***
8.0	83.50	77.00	175	8	8	8	5°	2	105	396**
10.0	99.50	90.00	175	8	8	8	5°	2	132	666**
12.0	114.50	101.00	175	8	8	8	3°	2	158	1004**

PRESSURES

MAXIMUM WORKING PRESSURE:

Maximum operating pressure to which the assembly should be subjected. It is established at 25% of the nominal design burst pressure. Anvil Tri-Flex Loop sizes 1"–3" are Factory Mutual tested and approved for 300 psi working pressure and sizes 4"–12" are Factory Mutual tested and approved for 175 psi working pressure.

MAXIMUM PROOF PRESSURE:

Maximum test pressure to which the assembly should be subjected. It is established at 150% of the maximum working pressure with the Anvil Tri-Flex Loop installed in its neutral position.

No harmful deformation shall occur.

MOTION CLASSIFICATIONS

The Anvil Tri-Flex Loop is the only flexible pipe loop that absorbs and compensates pipe movement in six degrees of freedom (three coordinates axes, plus rotation about those axes simultaneously.)

The patented multi-plane movement design make the Anvil Tri-Flex Loop the safest and most reliable means of absorbing movement resulting from random seismic shifts in a fire protection system.

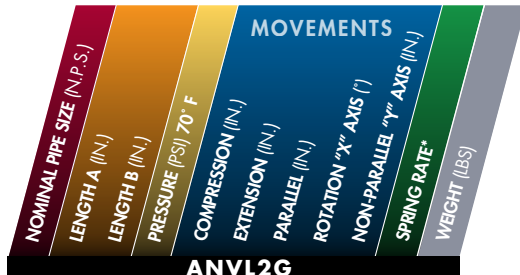
Anvil Tri-Flex Loop manufactured with a 4:1 safety factor.

For an electronic version of these engineering specifications, please contact your Anvil International Sales Representative.



CSA standard B51 certified.
Inspected and tested by the
Technical Standards and Safety
Authority of Canada.

Grooved (G) (Sch 40 Carbon Steel)



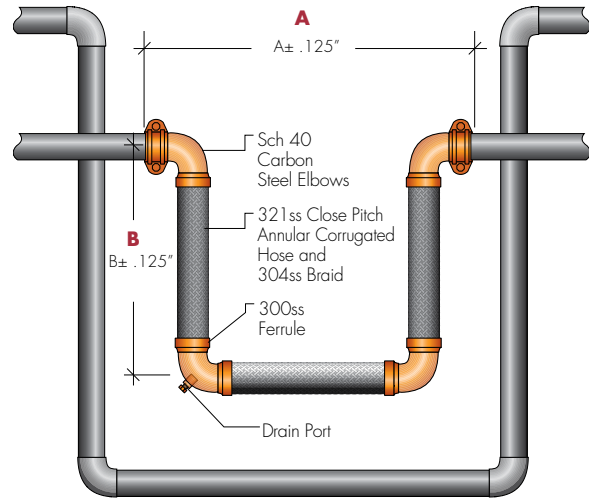
ANVL2G										
NOMINAL PIPE SIZE (N.P.S.)	LENGTH A (IN.)	LENGTH B (IN.)	PRESSURE (PSI) 70°F	COMPRESSION (IN.)	EXTENSION (IN.)	PARALLEL (IN.)	ROTATION "X" AXIS (°)	NON-PARALLEL "Y" AXIS (IN.)	SPRING RATE*	WEIGHT (LBS)
2.0	31.00	22.25	300	2	2	2	10°	1	13	15
2.5	35.00	25.00	300	2	2	2	10°	1	23	27
3.0	39.25	28.00	300	2	2	2	10°	1	33	37
4.0	48.75	33.00	175	2	2	2	5°	1	53	64
5.0	61.50	41.25	175	2	2	2	5°	1	66	105
6.0	67.75	45.00	175	2	2	2	3°	1	79	154
8.0	82.00	53.25	175	2	2	2	3°	1	105	298
10.0	99.00	63.38	175	2	2	2	2°	1	132	526
12.0	113.00	72.38	175	2	2	2	0°	1	158	775

ANVL4G										
NOMINAL PIPE SIZE (N.P.S.)	LENGTH A (IN.)	LENGTH B (IN.)	PRESSURE (PSI) 70°F	COMPRESSION (IN.)	EXTENSION (IN.)	PARALLEL (IN.)	ROTATION "X" AXIS (°)	NON-PARALLEL "Y" AXIS (IN.)	SPRING RATE*	WEIGHT (LBS)
2.0	37.00	28.25	300	4	4	4	20°	2	13	18
2.5	41.00	31.00	300	4	4	4	20°	2	23	30
3.0	45.25	34.00	300	4	4	4	15°	2	33	40
4.0	55.75	40.00	175	4	4	4	10°	2	53	70
5.0	71.25	51.00	175	4	4	4	10°	2	66	117
6.0	77.00	54.25	175	4	4	4	5°	2	79	166
8.0	92.00	63.25	175	4	4	4	5°	2	105	330
10.0	110.00	74.38	175	4	4	4	5°	2	132	571
12.0	125.00	84.38	175	4	4	4	3°	2	158	856

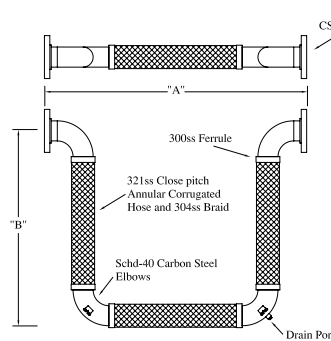
ANVL8G										
NOMINAL PIPE SIZE (N.P.S.)	LENGTH A (IN.)	LENGTH B (IN.)	PRESSURE (PSI) 70°F	COMPRESSION (IN.)	EXTENSION (IN.)	PARALLEL (IN.)	ROTATION "X" AXIS (°)	NON-PARALLEL "Y" AXIS (IN.)	SPRING RATE*	WEIGHT (LBS)
2.0	37.00	37.00	300	8	8	8	20°	2	13	20
2.5	41.00	39.75	300	8	8	8	20°	2	23	33
3.0	45.25	43.25	300	8	8	8	15°	2	33	44
4.0	55.75	50.50	175	8	8	8	10°	2	53	75
5.0	71.25	64.00	175	8	8	8	10°	2	66	126
6.0	77.00	67.50	175	8	8	8	5°	2	79	179
8.0	92.00	77.00	175	8	8	8	5°	2	105	354
10.0	110.00	90.00	175	8	8	8	5°	2	132	616
12.0	125.00	101.00	175	8	8	8	3°	2	158	924

*Force (lbs.) required to compress TriFlex Loop to full movement capability.
 **Double Braided
 ***High Pressure Braid (Single Layer)

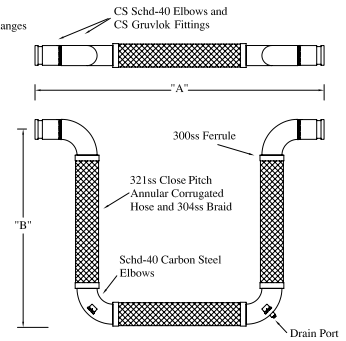
ANVL 8F



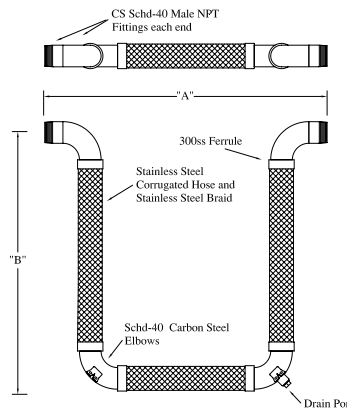
ANVL 2F, ANVL 4F, ANVL 8F



ANVL 2G, ANVL 4G



ANVL 2MT, ANVL 4MT



ANVL 8G

