UNISOURCE MFG.

your single source supplier

Flexible Products for HVAC Applications

UNISOURCE MFG.

Your single source for flexible connectors and expansion joints

Unisource is your single source for all types of flexible connectors and expansion joints for the HVAC marketplace.

Our product line includes all styles of braided connectors, including stainless steel and bronze braided hose assemblies, and stainless steel braided rubber heat pump/fan coil assemblies. These braided assemblies solve problems such as vibration and noise control, as well as providing the ability to accommodate offset pipe motion.

Rubber spherical expansion joints in single or double sphere style are the industry's best option for absorbing noise and vibration generated by mechanical equipment such as pumps, chillers, and air handlers. These products are also capable of taking up limited amounts of thermal pipe growth.

Bellows pump connectors, expansion compensators, externally pressurized expansion joints, PTFE bellows, and stainless steel bellows expansion joints are available for a variety of pipe expansion applications and equipment connections.

Unisource Uni-Loop V-configuration connectors are manufactured and designed for both seismic and thermal expansion problem solving. Uni-Loops are available for steel or copper piping for a wide range of services, such as mechanical, plumbing, and medical gases.

Unisource has been serving the HVAC industry since 1980. Our line of flexible connectors, expansion joints, and accessories is the most complete offering in the market because we provide all styles and also all materials – stainless steel, bronze, rubber, and PTFE. In many cases, we can offer products that may be a combination of these materials to provide the optimum product for the intended service.

Unisource products are marketed through an organization of manufacturers' representatives and mechanical equipment distributors throughout the United States and Canada. These representatives stock a wide variety of our standard products. Unisource provides rapid backup inventory of these products along with all the other products found in this catalog. We also pride ourselves on the ability to fabricate special design connectors and expansion joints according to customer specification.

A complete set of suggested engineering specifications is available from your local representative. In addition, individual product submittal forms are provided in both hard copy and PDF format.

Rubber, Metallic, PTFE... We've got it!

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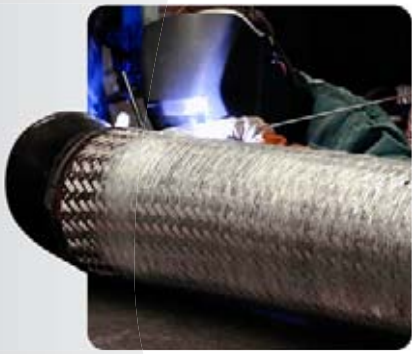


UNISOURCE MFG.

Rubber Spheres

U301 & U302 "Ultra-Sphere" Flanged Connectors

Precision molded **Ultra-Sphere** connectors will perform double duty as a vibration elimination pump connector, or as an expansion joint absorbing pipe movements.

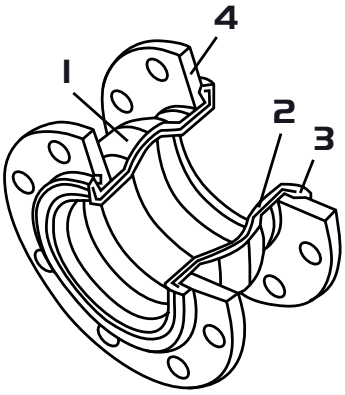
Ultra-Sphere connectors are perfect for HVAC or industrial applications where a flexible connector is needed to absorb axial, transverse, or angular pipe movements. **Ultra-Sphere** rubber connectors are also superior to braided metal connectors for absorbing vibration and noise generated by mechanical equipment.

Ultra-Sphere connectors are precision molded in hydraulic presses. The spherical design insures that internal pressures are exerted in all directions, distributing the forces evenly over a large area. The spherical design acts as a free-flowing arch, reducing turbulence and growth due to pressure thrust forces.

These connectors are manufactured with a high quality EPDM rubber tube and cover, and nylon tire cord reinforcing. Special elastomers such as Neoprene, Nitrile, Hypalon, and Butyl are also available. The standard EPDM material is superior to competitive connectors made of Neoprene due to their higher temperature resistance and physical properties. Zinc plated steel floating flanges are recessed to engage the rubber beaded end of the expansion joint and rotate easily for speed of installation.

Style U301 single sphere connectors are ideal for absorbing small stress motions and absorbing the noise and vibration emitted by mechanical equipment. The face-to-face dimensions of these single sphere connectors match the corresponding dimensions of spool type expansion joints, facilitating direct replacements. This short face-to-face dimension translates to economy of space in the piping system and ease of handling and installation.

Style U302 double sphere connectors are similar in construction to the single sphere style, but with a second sphere to provide even more pipe movement absorbing capability and even greater efficiency for noise and vibration control. In fact, **Style U302** connectors offer the industry's best option for vibration reduction—up to 98%, depending on pressure and frequency. A plated steel external root ring surround the connector between the spheres prevents ballooning or swelling under pressure.



1. Rubber tube
2. Rubber cover
3. Nylon tire cord throughout w/steel bead reinforcing at ends
4. Plated steel rotating 150# flanges

Control units are recommended for use on Ultra-Sphere connectors when it is not possible to install solid anchors in the piping system. Although it is theoretically possible to pre-elongate spherical connectors to avoid the effects of extension due to pressure thrust forces, Unisource does not recommend this practice in lieu of anchors and control units due to the unpredictability of subsequent pressure spikes and system pressure tests. To isolate vibration that could travel across solid control rods, Unisource utilizes minimum 1/4" thick reinforced grommets on each end of our control unit rods.

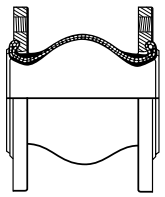
Ultra-Sphere U301 & U302 connectors are manufactured to meet or exceed the pressure, movement, and dimensional ratings of the Rubber Expansion Joint Division, Fluid Sealing Association.

"The industry's best option for vibration and noise reduction."

Rubber Spheres

U301 & U302 "Ultra-Sphere" Flanged Connectors

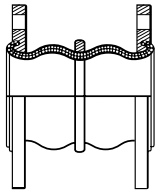
U301 SINGLE SPHERE FLANGED CONNECTOR



Tube & Cover: EPDM Rubber
Reinforcing: Nylon Tire Cord
Ends: Beaded Rubber Ends w/Steel Insert. Rotating Steel Flanges, 150#.

Size (Inches)	F/F (Inches)	Allowable Movements				Operating Pressure (Inches)	Weight (Lbs)	Rods (Lbs)
		Compression (Inches)	Elongation (Inches)	Lateral (Inches)	Angular (Degrees)			
1-1/2	6	0.50	0.38	0.50	15	225	6.0	4.5
2	6	0.50	0.38	0.50	15	225	9.0	6.5
2-1/2	6	0.50	0.38	0.50	15	225	12.0	7.5
3	6	0.50	0.38	0.50	15	225	14.0	8.3
4	6	0.63	0.38	0.50	15	225	18.0	8.3
5	6	0.63	0.38	0.50	15	225	23.0	8.3
6	6	0.63	0.38	0.50	15	225	27.0	10.5
8	6	0.63	0.38	0.50	15	225	41.0	13.5
10	8	0.63	0.50	0.75	15	225	57.0	21.3
12	8	0.75	0.50	0.75	15	225	83.0	27.0
14	8	0.75	0.50	0.75	15	115	115.0	28.0
16	8	0.75	0.50	0.75	15	115	165.0	28.0
18	8	0.75	0.50	0.75	15	115	167.0	31.5
20	8	0.75	0.50	0.75	15	115	168.0	32.5
24	10	0.75	0.50	0.75	15	115	255.0	40.0

U302 DOUBLE SPHERE FLANGED CONNECTOR



Tube & Cover: EPDM Rubber
Reinforcing: Nylon Tire Cord
Ends: Beaded Rubber Ends w/Steel Insert. Rotating Steel Flanges, 150#.

Size (Inches)	F/F (Inches)	Allowable Movements				Operating Pressure (Inches)	Weight (Lbs)	Rods (Lbs)
		Compression (Inches)	Elongation (Inches)	Lateral (Inches)	Angular (Degrees)			
1-1/2	7	2.0	1.0	1.75	35	225	7.0	4.8
2	7	2.0	1.0	1.75	35	225	9.0	7.0
2-1/2	7	2.0	1.0	1.75	35	225	13.0	8.0
3	7	2.0	1.38	1.75	35	225	14.0	8.6
4	9	2.0	1.38	1.50	35	225	20.0	8.0
5	9	2.0	1.38	1.50	30	225	25.0	8.3
6	9	2.0	1.38	1.50	30	225	30.0	11.8
8	13	2.5	1.38	1.25	30	225	44.0	15.5
10	13	2.5	1.38	1.25	30	225	64.0	24.5
12	13	2.5	1.38	1.25	20	225	95.0	31.0
14	13.75	1.50	1.10	1.10	20	115	135.0	32.0
16	13.75	1.50	1.10	1.10	20	115	175.0	30.8
18	13.75	1.50	1.10	1.10	20	115	185.0	36.0
20	13.75	1.50	1.10	1.10	20	115	285.0	35.5

Maximum Operating Temperatures For U301 & U302 Connectors:
Neoprene: 170 Deg. F.
EPDM: 250 Deg. F. for blower service; 212 Deg. F. for pressure service.

Note: The operating pressures listed on the tables above are rated up to 110 degrees F. for Neoprene, and 125 degrees F. for EPDM. Contact Unisource for pressure ratings at higher temperatures. Neoprene connectors are not recommended for heating water service.

Rubber Spheres

U303 Double Sphere Female Union Connectors

Unisource Style U303 female union connectors are ideal for isolating small diameter piping from vibrating mechanical equipment.

In smaller size applications where threaded connectors are normally used, **U303** double sphere union connectors will accommodate both pipe motions and vibration. **U303** connectors will provide over 1" of axial compensation, as well as impressive ratings for lateral and angular deflection. The Neoprene or EPDM rubber body construction is also far superior to metallic connectors for eliminating noise and vibration generated by equipment such as pumps, chillers, and air handlers. These connectors are extremely versatile and can be used in a variety of services, and are available in designs to handle up to 150 PSIG and temperatures up to 200° F.

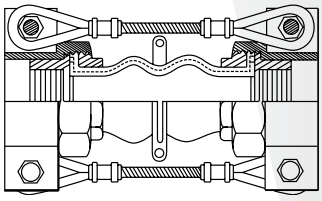
Ultra-Sphere expansion joints are precision molded in hydraulic presses. The spherical design ensures that internal pressures are exerted in all directions, distributing the forces evenly over a large area. The spherical design acts as a free-flowing arch, reducing turbulence and growth due to pressure thrust forces.

Style U303 Ultra-Sphere connectors are constructed with a high quality EPDM tube and cover and nylon tire cord reinforcing w/cables.

Style U303EPDM connectors offer high-temperature EPDM rubber for tube and cover construction. Malleable iron threaded female union ends are standard. Special **cable restraint attachments** surround each end to prevent the connector from over-extending due to pressure thrust. A steel body ring encircles the rubber between the spheres to provide stability under pressure.

U303EPDM DOUBLE SPHERE FEMALE UNION CONNECTOR (200° F Max. Temp.)

Tube & Cover: EPDM Rubber
Reinforcing: Nylon Tire Cord
Ends: Malleable Iron Threaded Female Unions
Restraints: Plated Steel Anchors w/Airline Cable
Root Ring: Plated Steel



Size (Inches)	F/F (Inches)	Allowable Movements				Operating Pressure (PSIG)	Weight (Lbs)
		Compression (Inches)	Elongation (Inches)	Lateral (Inches)	Angular (Degrees)		
3/4	8	0.87	0.23	0.87	30	150	2.6
1	8	0.87	0.23	0.87	25	150	3.6
1-1/4	8	0.87	0.23	0.87	25	150	4.3
1-1/2	8	0.87	0.23	0.87	20	150	5.5
2	8	0.87	0.23	0.87	15	150	7.0
2-1/2	8	0.87	0.23	0.87	12	150	11.0
3	8	0.87	0.23	0.87	10	150	12.6

Select either U303EPDM or metallic connectors depending on service conditions and requirements for heating water. For U303EPDM, operating pressures are rated up to 165° F. Consult Unisource for pressure ratings at higher temperatures.

Stainless Steel Braided

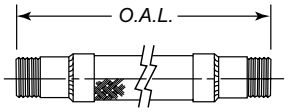
UPCS-MMT & UPCS-FLG Series Pump Connectors

Unisource Style UPCS stainless steel braided pump connectors are the standard of the industry for a rugged, versatile flex product to connect piping to vibrating mechanical equipment.

UPCS stainless steel connectors combine 300 series corrugated stainless steel hose and braid with weld-on carbon steel end fittings for a high-pressure assembly. Standard connectors with stainless steel end fittings are also available. Unisource starts with a high corr-count inner hose for greater flexibility and better noise and vibration control efficiency. Many manufacturers utilize a less expensive wide-pitch corrugated hose. A tightly woven stainless steel braid provides high pressure ratings, even in high temperature heating water applications. In sizes 8" and larger, Unisource provides braided-braid reinforcing. This style of premium braiding translates to better strength and safety—vital considerations in large size pipelines where pressure thrust forces are greatest.

Style UPCS-MMT threaded, and **UPCS-FLG flanged** are made to traditional industry standard overall lengths. These connectors are designed to provide good efficiency for noise and vibration control. **Style UPCS-XL-MMT** and **UPCS-XL-FLG** are longer length connectors, built for even greater noise and vibration control, and a minimum of 2" permanent lateral offset.

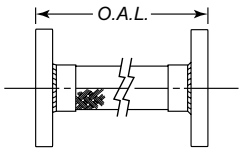
UPCS-MMT & UPCS-XL-MMT THREADED CONNECTORS



Hose & Braid: 300 Series Stainless Steel
Ends: Painted Carbon Steel Male NPT-welded to hose, braid & collar

Size (Inches)	MMT OAL (Inches)	XL OAL (Inches)	WP @ 70° F (PSI)	WP @ 250° F (PSI)	Min. Bend Rad. Static (Inches)	Min. Bend Rad. Dynamic (Inches)	Max. Perm. Offset - MMT (Inches)	Max Perm. Offset - XL (Inches)	Approx Weight (Lbs)
1/2	6-1/2	10	990	911	1.75	7	0.38	2.0	0.4
3/4	7	11	750	690	2.5	9.5	0.38	2.0	0.5
1	8	12	605	557	3	11	0.38	2.0	0.8
1-1/4	8-1/2	13	570	524	4	12	0.38	2.0	1.0
1-1/2	9	14	410	377	5.5	13	0.38	2.0	1.3
2	10-1/2	15	455	419	7	16	0.38	2.0	2.0
2-1/2	12	N/A	345	317	8	18	0.38	N/A	5.0
3	14	N/A	290	267	10	22	0.38	N/A	8.0
4	16	N/A	250	230	13	26	0.38	N/A	13.0

UPCS-FLG & UPCS-XL-FLG FLANGED CONNECTORS



Hose & Braid: 300 Series Stainless Steel
Ends: Painted Carbon Steel 150# Plate Flanges

Size (Inches)	MMT OAL (Inches)	XL OAL (Inches)	WP @ 70° F (PSI)	WP @ 250° F (PSI)	Min. Bend Rad. Static (Inches)	Min. Bend Rad. Dynamic (Inches)	Max. Perm. Offset (Inches)	Max Perm. Offset - XL (Inches)	Approx Weight (Lbs)
1-1/2	9	N/A	410	377	5.5	13	0.38	N/A	10.0
2	9	N/A	455	419	7	16	0.38	N/A	12.0
2-1/2	9	12	345	317	8	18	0.38	2.0	13.5
3	9	13	290	267	10	22	0.38	2.0	15.0
4	9	14	250	230	13	26	0.38	2.0	21.0
5	11	15	200	184	17	34	0.38	2.0	29.0
6	11	16	210	193	19	41	0.38	2.0	33.0
8	12	18	190	175	23	50	0.38	2.0	60.0
10	13	22	150	138	29	67	0.38	2.0	81.0
12	14	N/A	140	129	34	70	0.38	N/A	108.0
14	14	N/A	150	138	42	79	0.38	N/A	118.0

Note: Sizes 8" and larger are constructed with braided-braid reinforcing.

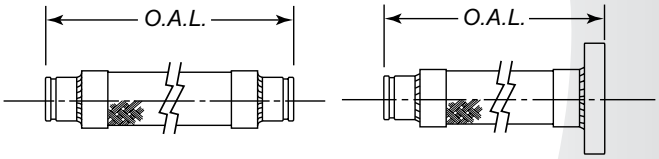
Stainless Steel Braided

UPCS-GG/GF & CRPCS Series Pump Connectors

Unisource maintains a large inventory of flexible stainless steel connectors in groove x groove, groove x flange, and reducing styles, all in standard industry lengths.

UPCS-GG GROOVE X GROOVE & UPCS-GF GROOVE X FLANGE CONNECTORS

Hose & Braid: 300 Series Stainless Steel
Ends: Painted Carbon Steel 150# Plate Flanges & Grooved Ends

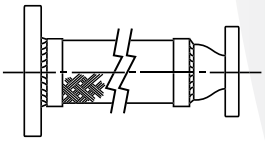


Size (Inches)	OAL-GG (Inches)	OAL-GF (Inches)	WP @ 70° F (PSI)	WP @ 250° F (PSI)	Min. Bend Rad. Static (Inches)	Min. Bend Rad. Dynamic (Inches)	Max. Perm. Offset (Inches)	Approx Weight GG (Lbs)	Approx Weight GF (Lbs)
2	12	12	455	419	7	16	0.38	2.8	8.7
2-1/2	14	12	345	317	8	18	0.38	4.0	9.5
3	14	13	290	267	10	22	0.38	5.0	11.0
4	15	13	250	230	13	26	0.38	6.5	13.0
5	16	14	200	184	17	34	0.38	12.0	18.5
6	16	14	210	193	19	41	0.38	13.0	21.7
8	17	15	190	175	23	50	0.38	22.0	39.5
10	18	16	150	138	29	67	0.38	36.0	58.0
12	19	17	140	129	34	70	0.38	45.0	77.0

CRPCS FLANGED REDUCING CONNECTORS

Unisource CRPCS connectors are a material and labor saving device designed to provide vibration and noise isolation when connected between piping and vibrating equipment. These special connectors are intended to facilitate a reduction in pipe size when connecting to mechanical equipment. They are normally installed on the discharge side of HVAC pumps. Since **CRPCS** connectors incorporate a reduced size flange on one side, it eliminates having to install both a straight flex connector and a pipe reducer. **CRPCS** connectors utilize Superflex series 300 stainless steel hose and braid, carbon steel flanges, and carbon steel bell reducers. Longer length connectors are available on request to provide additional lateral deflection and increased vibration control efficiency.

Hose & Braid: 300 Series Stainless Steel
Ends: Painted Carbon Steel 150# Plate Flanges & Bell Reducer



Sizes (Inches)	Part #	OAL (Inches)	Hose Size (Inches)	Live Length (Inches)	Static Bend Radius (Inches)	# of Braids	Working Pressure (PSIG)	Burst Pressure (PSIG)	Approx Weight (Lbs)
2-1/2 x 2	CRPCS-2520-FLG	13	2-1/2	6.25	6.5	1	395	1580	8.0
3 x 2	CRPCS-3020-FLG	13	3	6.25	8.5	1	385	1540	8.5
3 x 2-1/2	CRPCS-3025-FLG	13	3	5.75	8.5	1	385	1540	9.0
4 x 2	CRPCS-4020-FLG	13	4	5.75	11.0	1	270	1080	17.0
4 x 2-1/2	CRPCS-4025-FLG	13	4	5.75	11.0	1	270	1080	19.0
4 x 3	CRPCS-4030-FLG	13	4	5.75	11.0	1	270	1080	22.0
5 x 2-1/2	CRPCS-5025-FLG	16	5	7.63	14.0	1	225	900	26.0
5 x 3	CRPCS-5030-FLG	16	5	7.63	14.0	1	225	900	27.0
5 x 4	CRPCS-5040-FLG	16	5	7.63	14.0	1	225	900	29.0
6 x 3	CRPCS-6030-FLG	17	6	8.38	16.0	1	170	680	33.0
6 x 4	CRPCS-6040-FLG	17	6	8.38	16.0	1	170	680	35.0
6 x 5	CRPCS-6050-FLG	17	6	8.00	16.0	1	170	680	39.0
8 x 4	CRPCS-8040-FLG	18	8	8.38	19.0	1	235	940	49.0
8 x 5	CRPCS-8050-FLG	18	8	8.25	19.0	1	235	940	55.0
8 x 6	CRPCS-8060-FLG	18	8	8.25	19.0	1	235	940	64.0
10 x 6	CRPCS-1060-FLG	18	10	7.25	24.0	1	260	1040	84.0
10 x 8	CRPCS-1080-FLG	18	10	7.25	24.0	1	260	1040	89.0
12 X 10	CRPCS-1210-FLG	20	12	8.00	28.0	1	160	640	128.0

Stainless Steel Braided

Special "Superflex" Connectors

Special Configuration SF21 Superflex Assemblies

Unisource Superflex stainless steel braided hose is available in a variety of special styles.

Superflex options:

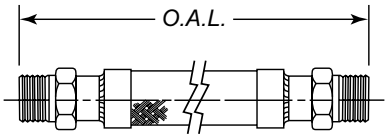
- Choose your overall length
- Select either single braid or double braid
- Fitting material can be carbon steel, stainless steel, or copper
- End fitting styles
    - o Sch 40 or Sch 80 pipe threads
    - o Hex wrenching surface
    - o Beveled weld ends
    - o Plate, raised-face, and weld neck flanges
    - o Floating flanges
    - o 150#, 300#, or 600# drill patterns
    - o 150# or 3000# unions
    - o JIC
    - o Grooved
    - o Copper sweat (tube) or copper hex male NPT

SF21CSA Straight CSA Rated Connectors For Natural Gas

SF21CSA connectors are specifically designed for use as a flexible pipe connector in medium pressure natural gas applications. These heavy-duty connectors are CSA certified and can be fabricated with any of four different end configurations:

- Style 49 - 150# carbon steel weld neck flanges
- Style 58 - 300# carbon steel raised-face flanges
- Style 50 - Sch 80 male NPT hex ends
- Style 52 - Sch 80 beveled weld ends

Each assembly is factory pressure-tested and is rated to 350 PSIG working pressure. Safety factors range from a minimum of 4:1 in 4" size to greater than 15:1 in size 1/2". Finished assemblies are labeled with manufacturer, part number, maximum working pressure, certification report number, serial number and CSA logo. **SF21CSA** connectors are intended to provide vibration isolation and accommodate offset pipe motion. Unisource recommends a minimum 24" overall length, but the user may specify other overall lengths in keeping with the hose ratings for static and dynamic bend radius.



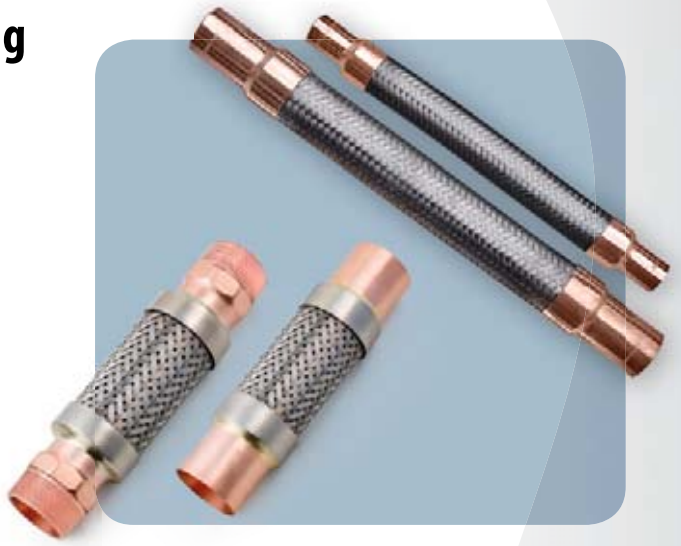
SF21CSA STRAIGHT CSA RATED CONNECTORS

Hose & Braid: 300 Series Stainless Steel
Ends: Painted Carbon Steel — See Styles Noted Above

Size (Inches)	# of Braids	Part Number	WP @ 70° F	Burst @ 70° F	Min. Bend Rad. Static	Min. Bend Rad. Dynamic
1/2	1	SF21CSA-050-FF-FF-XX"	350	5340	1.50	6.0
3/4	1	SF21CSA-075-FF-FF-XX"	350	4540	2.13	8.0
1	1	SF21CSA-100-FF-FF-XX"	350	3180	2.75	10.0
1-1/4	1	SF21CSA-125-FF-FF-XX"	350	2440	3.50	13.0
1-1/2	1	SF21CSA-150-FF-FF-XX"	350	2120	4.50	14.0
2	1	SF21CSA-200-FF-FF-XX"	350	2140	6.00	16.0
2-1/2	1	SF21CSA-250-FF-FF-XX"	350	1580	6.50	15.0
3	2	SF22CSA-300-FF-FF-XX"	350	1820	8.50	18.0
4	2	SF22CSA-400-FF-FF-XX"	335	1340	11.00	22.0

Copper/Bronze Braided

UPCB & VIB Connectors For Copper Piping

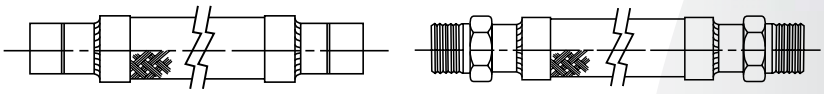


Style UPCB connectors are the standard of the industry in braided connectors for copper piping. This style connector is constructed with stainless steel corrugated hose & braid for high-pressure ratings. The traditional overall lengths of **UPCB** connectors are designed to isolate equipment vibration and minimum permanent offset. Longer length bronze braided connectors can be fabricated upon request that will accommodate greater lateral pipe motions.

Style UPCB-BRSW is offered with standard copper sweat/tube ends. **Style UPCB-BRMP** is built with copper hex male NPT ends. These connectors are typically in stock in sizes ranging from 1/2" to 3" diameter.

UPCB-BRSW SWEAT & UPCB-BRMP THREADED CONNECTORS

Hose & Braid: Series 300 Stainless Steel
Ends: Copper Sweat or Hex Male NPT

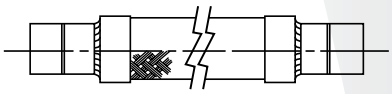


Size (Inches)	MMT OAL (Inches)	WP @ 70° F (PSI)	WP @ 250° F (PSI)	Min. Bend Rad. Static (Inches)	Min. Bend Rad. Dynamic (Inches)	BRSW Approx Weight (Lbs)	BRMP Approx Weight (Lbs)
1/2	6-1/2	642	552	1.5	7.0	0.3	0.4
3/4	7	524	451	2.3	8.0	0.4	0.6
1	8	428	368	3.0	10.0	0.8	1.0
1-1/4	8-1/2	328	282	3.5	12.0	1.3	1.6
1-1/2	9	299	257	4.0	13.5	1.5	2.2
2	10-1/2	288	248	5.0	17.0	2.5	3.4
2-1/2	12	244	210	8.0	22.0	3.0	4.1
3	14	176	151	12.0	24.0	4.1	5.6

Unisource Style VIB-SS connectors are ideal for use as either a U.L. rated vibration eliminator in refrigeration applications or as an extended length HVAC connector for copper pipe. **Style VIB-SS** connectors combine the exceptional physical properties of stainless steel hose and braid with copper tube end connections. Our advanced attachment process ensures a positive, corrosion-free end fitting at an economical cost. The end result is high working pressures, high temperature ratings, corrosion resistance, and longer product life. **U.L. recognized.**

VIB-SS VIBRATION ELIMINATORS - U.L. RECOGNIZED

Hose & Braid: Series 300 Stainless Steel
Ends: Copper Sweat Female Coupling



Size (Inches)	Nom. Hose I.D. (Inches)	To Fit Copper Tube (Inches)		Overall Length (Inches)	Length of Female Copper Tube End (Inches)	Maximum W.P. @ 70° F. (PSIG)	Approx. Weight (Lbs)
		Nom. Size	Actual O.D.				
VIB-2-SS	1/4	1/4	1/8	7-1/2	0.750	500	0.19
VIB-3-SS	3/8	3/8	1/4	8-1/4	0.750	500	0.25
VIB-4-SS	3/8	1/2	3/8	9	0.875	500	0.31
VIB-5-SS	1/2	5/8	1/2	9-3/4	0.938	500	0.44
VIB-6-SS	1/2	3/4	5/8	10	1.250	500	0.50
VIB-7-SS	3/4	3/4	5/8	11-1/4	1.250	500	1.00
VIB-8-SS	3/4	7/8	3/4	11-1/2	1.380	500	1.06
VIB-9-SS	1	1-1/8	1	13	1.750	500	1.50
VIB-10-SS	1-1/4	1-3/8	1-1/4	14-3/4	2.063	500	2.12
VIB-11-SS	1-1/2	1-5/8	1-1/2	17	2.250	500	3.41
VIB-12-SS	2	2-1/8	2	20	2.688	390	5.53
VIB-13-SS	2-1/2	2-5/8	2-1/2	24	3.063	340	8.50

Fan Coil / Water Hoses

Style "H-P Flex" Connectors

Unisource "H-P Flex" hose assemblies are specifically designed for connecting to H.V.A.C. water equipment. These economically priced assemblies are ideal for heat pump/fan coil applications and are equal to or surpass specifications for most competitive hose assemblies built for similar applications. In addition, **"H-P Flex"** conforms to Modified ASTM E 84-01 for fire rating and is backed by a 36-month warranty*.

"H-P Flex" is constructed using an EPDM rubber inner core, stainless steel exterior braid, 304L stainless steel crimp ferrules, and either brass or bichromate steel threaded ends. End connections are male solid NPT one end and a swivel adapter producing male swivel NPT on the other end. **"H-P Flex"** will handle hot water applications up to 230° F. Operating pressure ratings are calculated at an average of 4:1 safety factor. Available sizes are 1/2" I.D. through 2" I.D. and lengths from 12" overall to 36" overall.

"H-P Flex" is extremely easy to install in comparison to rigid pipe or tubing connections, allowing time saving during the design stage and installation. In addition, there is no waste, and no pipe to cut, assemble, or braze.
** Contact Unisource for details of warranty.*

STYLE "H-P FLEX" FAN COIL / WATER HOSE

Hose & Braid: EPDM Rubber Inner Core, 300 Series Stainless Steel Braid
Ends: 300 Stainless Steel Crimp Ferrules, Machined Brass/Nickel Plated Brass Threaded Ends. Male NPT Solid One End, Male NPT Swivel Other End.

Size (Inches)	Operating Pressure (PSIG)	Min. Burst (PSIG)	Minimum Bend Radius (Inches)	Approx. O.D. (Inches)	Temperature Range*	Swivel End Type
1/2	375	1500	1.50	0.71	+5° F to +230° F	1
3/4	300	1200	2.25	1.10	+5° F to +230° F	1
1	225	900	2.75	1.38	+5° F to +230° F	1
1-1/4	200	800	4.00	1.69	+5° F to +230° F	2
1-1/2	175	600	5.50	2.09	+5° F to +230° F	2
2	150	500	8.50	2.64	+5° F to +230° F	2

* Note: Temperature range is less than 41° F. with Glycol additive.

Swivel End Types:

1. Female swivel cone seat-NPSM thread brass with (RUMS) adapter male cone NPSM to male NPT brass.
2. Female swivel flat seat-NPSM steel with fiber washer and (RUMP) adapter NPSM male to NPT male steel. Steel is bichromate finish.

Size x OAL	Part #	Ends
1/2" x 12"	HP-050-S-12.0"	Brass - Type 1
1/2" x 18"	HP-050-S-18.0"	Brass - Type 1
1/2" x 24"	HP-050-S-24.0"	Brass - Type 1
1/2" x 36"	HP-050-S-36.0"	Brass - Type 1
3/4" x 12"	HP-075-S-12.0"	Brass - Type 1
3/4" x 18"	HP-075-S-18.0"	Brass - Type 1
3/4" x 24"	HP-075-S-24.0"	Brass - Type 1
3/4" x 36"	HP-075-S-36.0"	Brass - Type 1
1" x 12"	HP-100-S-12.0"	Brass - Type 1
1" x 18"	HP-100-S-18.0"	Brass - Type 1
1" x 24"	HP-100-S-24.0"	Brass - Type 1
1" x 36"	HP-100-S-36.0"	Brass - Type 1
1-1/4" x 18"	HP-125-S-18.0"	Steel - Type 2
1-1/4" x 24"	HP-125-S-24.0"	Steel - Type 2
1-1/4" x 36"	HP-125-S-36.0"	Steel - Type 2
1-1/2" x 18"	HP-150-S-18.0"	Steel - Type 2
1-1/2" x 24"	HP-150-S-24.0"	Steel - Type 2
1-1/2" x 36"	HP-150-S-36.0"	Steel - Type 2
2" x 24"	HP-200-S-24.0"	Steel - Type 2
2" x 36"	HP-200-S-36.0"	Steel - Type 2

Special Connectors

Series EC Expansion Compensators

For the compensation of thermal growth in small diameter piping systems, **Unisource Series EC Expansion Compensators** are the ideal choice. These economical expansion components utilize the design theory behind externally pressurized expansion joints that are used in large diameter steam piping and apply these designs to smaller size, lower temperature piping systems.

Series EC Expansion Compensators are often used in HVAC systems such as hot water lines and steam condensate to absorb the effects of thermal pipe growth. Like externally pressurized expansion joints, **Series EC** expansion compensators are a packless, maintenance-free joint that incorporates an all stainless steel multi-ply flexible bellows, a steel enclosure, with an external and internal guide ring/sleeve to maintain proper alignment of the inner pipe. The sleeve isolates the bellows from media, eliminating flow turbulence. External pressure is applied to the bellows via a gap between the internal flange and the housing. Bellows squirm is eliminated by means of an internal flange, and also guides the bellows along the longitudinal center-line. The external pressure keeps the bellows stable. *For proper operation, expansion compensators must be adequately anchored and guided.*

Choose from either Style **EC-MMT** with carbon steel male NPT threaded ends or Style **EC-FFS** with copper tube ends. Carbon steel beveled weld ends or flanged ends can be attached upon request. Most styles are available in sizes from 3/4" through 4". All sizes and styles are rated for 2" of axial travel. *Caution: manufacturing process utilizes silver brazing. Do not exceed 1000° F during installation.*

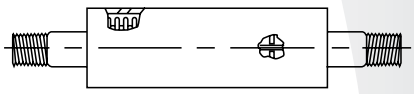
SERIES EC-FFS EXPANSION COMPENSATOR W/COPPER TUBE ENDS

Bellows & Shroud: 304 Series Stainless Steel, 2-Ply Bellows; 304 S/S Shroud
Ends: Female Copper Sweat

Size (Inches)	Model #	Axial Comp. (Inches)	Axial Ext. (Inches)	Max. W.P. (PSIG)	Overall Length (Inches)	Outside Dimension (Inches)	Effective Area (In^2)	Axial Sp. Rt. (Per Inch)	Weight (Lbs)
3/4	EC-075-FFS	1.75	0.25	200	12-3/4	2.38	2.2	122	2.2
1	EC-100-FFS	1.75	0.25	200	12-3/4	2.38	2.2	122	2.4
1-1/4	EC-125-FFS	1.75	0.25	200	13-5/8	2.75	3.5	160	3.1
1-1/2	EC-150-FFS	1.75	0.25	200	14-3/8	2.75	3.5	160	3.3
2	EC-200-FFS	1.75	0.25	200	14-1/2	3.75	6.5	269	5.5
2-1/2	EC-250-FFS	1.75	0.25	200	15	4.38	9.6	348	7.5
3	EC-300-FFS	1.75	0.25	200	15	5.00	12.9	398	10.0

Maximum operating temperature: 400°

SERIES EC-MMT EXPANSION COMPENSATOR W/MALE NPT THEADED ENDS



Bellows & Shroud: 304 Series Stainless Steel Bellows; C/S Shroud
Ends: Carbon Steel Male NPT

Size (Inches)	Model #	Axial Comp. (Inches)	Axial Ext. (Inches)	Max. W.P. (PSIG)	Overall Length (Inches)	Outside Dimension (Inches)	Effective Area (In^2)	Axial Sp. Rt. (Per Inch)	Weight (Lbs)
3/4	EC-075-MMT	1.75	0.25	200	12-1/8	3.00	2.2	112	5.5
1	EC-100-MMT	1.75	0.25	200	12-1/8	3.50	3.5	148	7.0
1-1/4	EC-125-MMT	1.75	0.25	200	14-1/8	4.00	4.8	165	10.2
1-1/2	EC-150-MMT	1.75	0.25	200	14-1/8	4.50	6.5	259	12.3
2	EC-200-MMT	1.75	0.25	200	14-1/8	4.50	7.6	266	13.2
2-1/2	EC-250-MMT	1.75	0.25	200	15-1/2	5.50	12.9	358	19.6
3	EC-300-MMT	1.75	0.25	200	15-3/16	6.50	16.1	409	24.4
4	EC-400-MMT	1.75	0.25	200	15-3/16	7.09	24.2	494	27.5

Maximum operating temperature: 750°

Special Connectors

Series BPC & BPC-R Bellows Pump Connectors

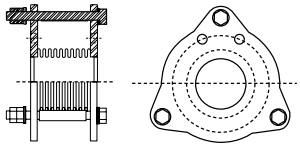
Series BPC and Series BPC-R Bellows Pump Connectors are an ideal solution when a flexible pipe connector is required in severe service applications.

Often, an application will require a connector to isolate noise and vibration, relieve stresses on equipment, and handle both high-temperatures and axial motion. Rubber connectors will have relatively low pressure ratings at high temperatures. Braided connectors can offer high pressure/high temperature capabilities, but do not offer any axial movement capabilities. Pressure ratings of bellows pump connectors are virtually unaffected by high system temperatures and these special connectors are able to absorb limited amounts of axial travel and lateral offset.

The special design of Unisource **Series BPC** and **Series BPC-R** connectors includes multi-ply stainless steel bellows to provide long life and isolation in high-frequency applications. Three built-on tie rods prevent over-extension in high-pressures and eliminate jobsite installation of rod assemblies. Special rubber grommets are installed on each end of rods so that noise and vibration is not transmitted across the steel rods.

Series BPC bellows pump connectors are our standard overall length connector designed to provide 1/2" compression and 1/8" lateral motion, plus pump vibration. **Series BPC-R** connectors are constructed in overall lengths to match standard single rubber connectors. **BPC-R** connectors will provide about 1" compression, 3/8" extension and from 1/8" to 5/16" lateral motion, plus pump vibration. Sizes larger than 12" upon request.

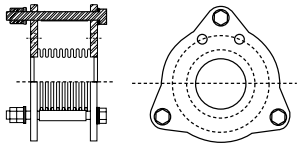
SERIES BPC BELLOWS PUMP CONNECTORS



Bellows: 2-Ply A240-304 Stainless Steel
Tie Rods: Carbon Steel-Three Rods w/Rubber Grommets
Flanges: Tie Rod Flanges, 150# ASA Drilled, Carbon Steel

Part #	Size (Inches)	OAL (Inches)	Live Length (Inches)	Effective Area (Inches²)	Approx. Weight (Lbs)	Rated Comp. (Inches)	Rated Ext. (Inches)	Rated Offset (Inches)	Working Pressure (PSIG)	
									@ 70° F	@ 360° F
BPC-200-FLG	2	4-3/8	3-1/8	6.9	10.5	0.50	0.125	0.125	225	210
BPC-250-FLG	2-1/2	4-3/8	3-1/8	6.9	14.5	0.50	0.125	0.125	225	210
BPC-300-FLG	3	4-3/8	3-1/8	8.8	16.5	0.50	0.125	0.125	225	210
BPC-400-FLG	4	4-5/8	3-1/8	15.1	26.0	0.50	0.125	0.125	225	210
BPC-500-FLG	5	4-7/8	3-3/8	23.5	32.0	0.50	0.125	0.125	225	210
BPC-600-FLG	6	5	3-1/2	33.2	37.0	0.50	0.125	0.125	225	210
BPC-800-FLG	8	5-7/8	3-7/8	59.3	65.0	0.50	0.125	0.125	225	210
BPC-1000-FLG	10	6-1/4	4-1/4	93.5	86.0	0.50	0.125	0.125	225	210
BPC-1200-FLG	12	6-5/8	4-5/8	134.0	112.0	0.50	0.125	0.125	225	210

SERIES BPC-R BELLOWS PUMP CONNECTORS



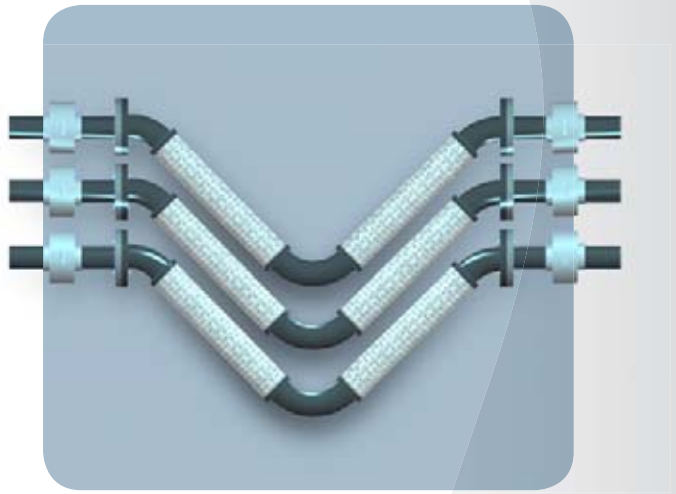
Bellows: 2-Ply A240-304 Stainless Steel
Tie Rods: Carbon Steel-Three Rods w/Rubber Grommets
Flanges: Tie Rod Flanges, 150# ASA Drilled, Carbon Steel

Part #	Size (Inches)	OAL (Inches)	Live Length (Inches)	Effective Area (Inches²)	Approx. Weight (Lbs)	Rated Comp. (Inches)	Rated Ext. (Inches)	Rated Offset (Inches)	Working Pressure (PSIG)	
									@ 70° F	@ 360° F
BPC-R-200-FLG	2	6	4-3/4	6.9	20.5	0.94	0.31	0.38	225	210
BPC-R-250-FLG	2-1/2	6	4-3/4	6.9	24.0	0.94	0.31	0.31	225	210
BPC-R-300-FLG	3	6	4-3/4	8.8	25.0	0.94	0.31	0.25	225	210
BPC-R-400-FLG	4	6	4-1/2	15.1	35.0	0.94	0.31	0.19	225	210
BPC-R-500-FLG	5	6	4-1/2	33.2	38.0	0.94	0.31	0.19	225	210
BPC-R-600-FLG	6	6	4-1/2	33.2	41.5	0.94	0.31	0.13	225	210
BPC-R-800-FLG	8	6	4	59.3	68.0	0.75	0.25	0.09	225	210
BPC-R-1000-FLG	10	8	6	93.5	118.0	1.25	0.38	0.13	225	210
BPC-R-1200-FLG	12	8	6	134.0	147.0	1.25	0.38	0.09	225	210

Note: Both Series BPC & BPC-R have a full vacuum rating. Larger sizes available upon request.

Seismic Flex Loops

Unisource "Uni-Loops" For Seismic & Thermal Pipe Motion



Specified by consulting engineers and building owners and installed by contractors throughout the world for many years, **Unisource Uni-Loops** solve the problems of pipe motion caused by thermal pipe growth and the unpredictable movements associated with seismic activity. **Uni-Loops** can perform the functions of large pipe loops or expansion joints, and in addition, can provide protection and flexibility in multiple planes during potentially catastrophic earthquakes.

Unlike large pipe loops, **Uni-Loops** take up a minimum of space, providing pipe motion accommodation solutions in limited space situations such as indoor piping. The small configuration of the **Uni-Loops** are also far less susceptible to the heat loss tat must be dealt with in the case of large pipe loops.

Whereas metal bellows or rubber expansion joints will impose substantial anchor loads due to the effects of static pressure thrust, **Uni-Loops will not introduce any thrust loads on the piping system**. The unique construction of the braided V-shaped loop creates a flexible product that does not expand when pressurized. A welded-on braid acts as a restraining device, even at extended pressures, yet allows tremendous flexibility. Anchor loads in regard to the **Uni-Loops** are confined to the relatively small spring forces required to deflect the flexible legs within the loop. Unlike expansion joints, a minimum of pipe guiding is required.

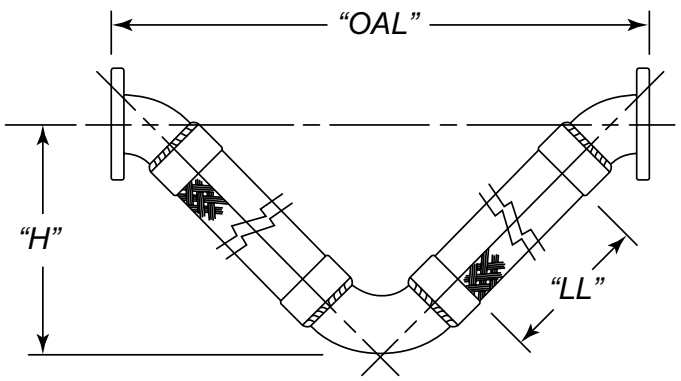
Uni-Loops are extremely easy to design in nested configurations. Due to the inherent V-design, standard **Uni-Loops** can simply be nested within each other with relatively tight centering. A substantial amount of space can be saved, and since no additional pipe extensions need to be installed in the **Uni-Loops**, standard models can be used, saving cost and reducing delivery time.

The standard position for the **Uni-Loop** is in a horizontal pipe run, with the elbow pointing straight down. Positioning is versatile, however, and the loops can be installed in many other positions such as laying the loop horizontal, positioning the elbow straight up, or positioning for vertical pipe run. In installations other than the standard position, Unisource can provide a support eyelet to allow a cable or rod to support the weight of the loop and its contents.

Uni-Loops can be used for a variety of fluids and gases. Loops can be constructed using stainless steel hose and braid with carbon steel end fittings and elbows, or with bronze hose and braid with copper end fittings and elbows. End fitting options include flanges, male threads, beveled weld ends, grooved ends, and copper sweat. Use **Uni-Loops** for applications such as heating and cooling water in HVAC systems; moderate velocity steam; natural gas; medical gases; fire sprinkler piping; and selected process applications. Drain ports can be added where required. For higher pressure applications, **Uni-Loops** can be constructed using double braided hose legs. Consult Unisource for specific pressure ratings.

Standard **Uni-Loops** are offered for either 2", 3" or 4" of motion from center-line in axial and offset planes. Loops for even greater motions can be constructed upon request.

All **Uni-Loops** are shipped complete with installation instructions wire tagged to each product. Unisource offers loops for applications under the auspices of the CSA/AGA, NFPA, and U.L.



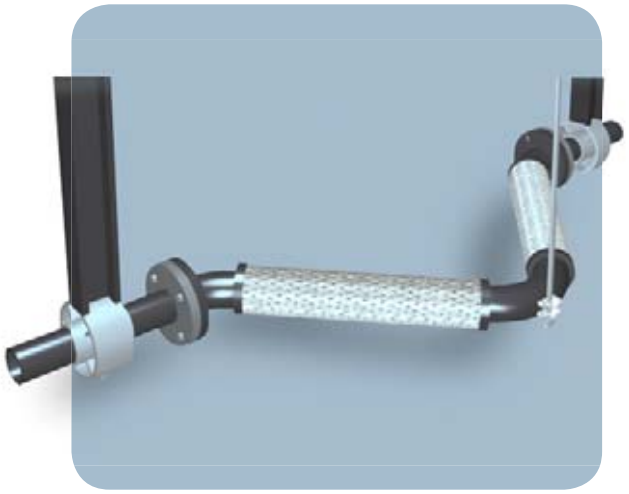
Select the problem solving UNI-LOOPS for your next project!

A complete assortment of UNI-LOOP products….

- V-SF21-47-47 Flanged
- V-SF21-40-40 Male NPT
- V-SF21-55-55 Grooved
- V-SF21-42-42 Beveled Weld Ends
- V-BF11-12-12 Copper Sweat
- V-SF21AGA Natural Gas
- V-BF11MED Medical Gases

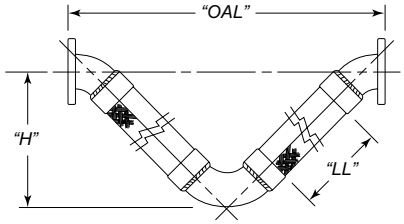
Seismic Flex Loops

Unisource V-SF21-47-47 Flanged "Uni-Loop"



Style **V-SF21-47-47** is a flanged end loop with carbon steel Class 150 plate flanges as standard ends. Raised face flanges (**Style V-SF21-48-48**) or virtually any other flange configuration can also be ordered. Schedule 40 carbon steel elbows are also standard, but can be specified in other materials.

As in other configurations of **"Uni-Loops"**, choose from either 2", 3" or 4" of motion from center-line. For steam service, Unisource recommends placing the loops in either an inverted or horizontal installation when conveying steam. A drain port should also be specified for steam service. Unisource can also add an eyelet at the 90 degree elbow to accommodate a support rod or cable.



STYLE V-SF21-47-47, FLANGED "UNI-LOOP"

Hose: Type 321 S/S
Braid: Type 304 S/S
Elbows: Carbon Steel, Sch 40
Flanges: Plate Flanges (standard), 150# ASA Drilled, Carbon Steel

Size (Inches)	Part #	Overall Length OAL (Inches)	Live Length LL (Inches)	Height H (Inches)	Approx. Spring Force* (Lbs)	Pressure Ratings (PSIG) W.P.	Pressure Ratings (PSIG) Max. Test	Allowable Motions X, Y, or Z
1-1/2	V-SF21-150-47-47-12.5"LL	28	12-1/2	12-3/4	75	530	795	2"
2	V-SF21-200-47-47-14.0"LL	32	14	14-1/2	82	516	774	
2-1/2	V-SF21-250-47-47-14.5"LL	35	14-1/2	15-1/2	86	395	593	
3	V-SF21-300-47-47-16.5"LL	39-3/4	16-1/2	17-3/4	93	385	578	
4	V-SF21-400-47-47-18.0"LL	45-3/4	18	20-1/4	127	270	405	
5	V-SF21-500-47-47-20.0"LL	53	20	23	214	225	337	
6	V-SF21-600-47-47-21.5"LL	59-1/4	21-1/2	25-3/4	228	170	255	
8	V-SF21-800-47-47-24.0"LL	71-1/4	24	30-1/2	312	235	353	
10	V-SF21-1000-47-47-27.0"LL	84	27	35-1/2	345	260	390	
12	V-SF21-1200-47-47-28.5"LL	94-3/4	28-1/2	39-1/2	399	160	240	
1-1/2	V-SF21-150-47-47-15.5"LL	32-1/4	15-1/2	14-3/4	75	530	795	3"
2	V-SF21-200-47-47-17.0"LL	36-1/4	17	16-1/2	82	516	774	
2-1/2	V-SF21-250-47-47-18.0"LL	40	18	18	86	395	593	
3	V-SF21-300-47-47-21.75"LL	44-3/4	21-3/4	21-1/2	93	385	578	
4	V-SF21-400-47-47-22.0"LL	51-1/2	22	23	127	270	405	
5	V-SF21-500-47-47-24.5"LL	59-1/2	24-1/2	26-1/4	214	225	337	
6	V-SF21-600-47-47-26.5"LL	66-1/4	26-1/2	29-1/4	228	170	255	
8	V-SF21-800-47-47-29.5"LL	79	29-1/2	34-1/4	312	235	353	
10	V-SF21-1000-47-47-33.5"LL	93-1/4	33-1/2	40	345	260	390	
12	V-SF21-1200-47-47-35.5"LL	104-3/4	35-1/2	44-1/2	399	160	240	
1-1/2	V-SF21-150-47-47-18.0"LL	35-3/4	18	16-1/2	75	530	795	4"
2	V-SF21-200-47-47-20.0"LL	40-1/2	20	18-3/4	82	516	774	
2-1/2	V-SF21-250-47-47-20.5"LL	43-1/2	20-1/2	19-3/4	86	395	593	
3	V-SF21-300-47-47-23.5"LL	49-3/4	23-1/2	22-3/4	93	385	578	
4	V-SF21-400-47-47-25.5"LL	56-1/2	25-1/2	25-1/2	127	270	405	
5	V-SF21-500-47-47-28.5"LL	65	28-1/2	29	214	225	337	
6	V-SF21-600-47-47-30.5"LL	72	30-1/2	32	228	170	255	
8	V-SF21-800-47-47-34.0"LL	85-1/2	34	37-1/2	312	235	353	
10	V-SF21-1000-47-47-38.5"LL	100-1/4	38-1/2	43-3/4	345	260	390	
12	V-SF21-1200-47-47-41.0"LL	112-1/4	41	48-1/2	399	160	240	

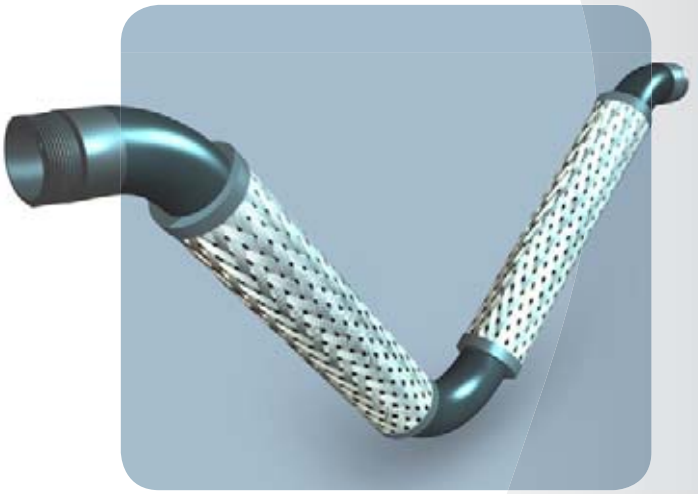
* Total force necessary to accommodate full motion, calculated @ 150 PSIG.
Note: 1) Maximum operating temperature: 800° F. 2) Other style flanges available.

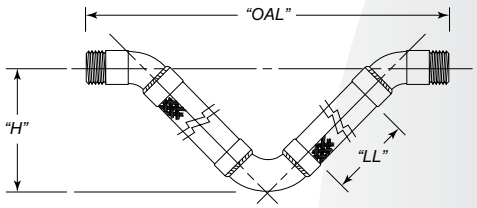
Seismic Flex Loops

Unisource V-SF21-40-40 Threaded "Uni-Loop"

Style **V-SF21-40-40** is a loop with carbon steel male NPT threaded ends as standard. Female union ends can also be specified (**Style V-SF21-43-43**).

As in other configurations of **"Uni-Loops"**, choose from either 2", 3" or 4" of motion from center-line. For steam service, Unisource recommends placing the loops in either an inverted or horizontal installation when conveying steam. A drain port should also be specified for steam service. Unisource can also add an eyelet at the 90 degree elbow to accommodate a support rod or cable.





STYLE V-SF21-40-40, THREADED "UNI-LOOP"

Hose: Type 321 S/S
Braid: Type 304 S/S
Elbows: Carbon Steel, Sch 40
Ends: Carbon Steel Sch 40, Male NPT

Size (Inches)	Part #	Overall Length OAL (Inches)	Live Length LL (Inches)	Height H (Inches)	Approx. Spring Force* (Lbs)	Pressure Ratings (PSIG) W.P.	Pressure Ratings (PSIG) Max. Test	Allowable Motions X, Y, or Z
1/2	V-SF21-050-40-40-9.0"LL	22-1/4	9	9-1/4	35	1335	2003	2"
3/4	V-SF21-075-40-40-10.0"LL	23-3/4	10	9-3/4	41	1135	1703	
1	V-SF21-100-40-40-11.0"LL	27-1/2	11	10-3/4	45	795	1193	
1-1/4	V-SF21-125-40-40-12.0"LL	29-3/4	12	12	64	610	915	
1-1/2	V-SF21-150-40-40-12.5"LL	31-1/2	12-1/2	12-1/2	68	530	795	
2	V-SF21-200-40-40-14.0"LL	35-1/2	14	14-1/2	82	516	774	
2-1/2	V-SF21-250-40-40-14.5"LL	39-1/2	14-1/2	15-1/2	86	395	593	
3	V-SF21-300-40-40-16.5"LL	45-1/4	16-1/2	17-3/4	93	385	578	
4	V-SF21-400-40-40-18.0"LL	53-1/4	18	20	127	270	405	
1/2	V-SF21-050-40-40-11.5"LL	25-3/4	11-1/2	11	35	1335	2003	3"
3/4	V-SF21-075-40-40-12.5"LL	27-1/4	12-1/2	11-1/2	41	1135	1703	
1	V-SF21-100-40-40-13.5"LL	31	13-1/2	12-3/4	45	795	1193	
1-1/4	V-SF21-125-40-40-14.5"LL	33-1/2	14-1/2	13-3/4	64	610	915	
1-1/2	V-SF21-150-40-40-15.5"LL	35-3/4	15-1/2	14-3/4	68	530	795	
2	V-SF21-200-40-40-17.0"LL	39-3/4	17	16-1/2	82	516	774	
2-1/2	V-SF21-250-40-40-18.0"LL	44-1/2	18	18	86	395	593	
3	V-SF21-300-40-40-20.0"LL	50-1/4	20	20-1/4	93	385	578	
4	V-SF21-400-40-40-22.0"LL	59	22	23	127	270	405	
1/2	V-SF21-050-40-40-13.5"LL	28-1/2	13-1/2	12-1/4	35	1335	2003	4"
3/4	V-SF21-075-40-40-15.0"LL	30-3/4	15	13-1/4	41	1135	1703	
1	V-SF21-100-40-40-16.0"LL	34-1/2	16	14-1/2	45	795	1193	
1-1/4	V-SF21-125-40-40-17.0"LL	37	17	15-1/2	64	610	915	
1-1/2	V-SF21-150-40-40-18.0"LL	39-1/4	18	16-1/2	68	530	795	
2	V-SF21-200-40-40-20.0"LL	44	20	18-1/2	82	516	774	
2-1/2	V-SF21-250-40-40-20.5"LL	48	20-1/2	22-3/4	86	395	593	
3	V-SF21-300-40-40-23.5"LL	55-1/4	23-1/2	25-1/2	93	385	578	
4	V-SF21-400-40-40-25.5"LL	64	25-1/2	25-1/2	127	270	405	

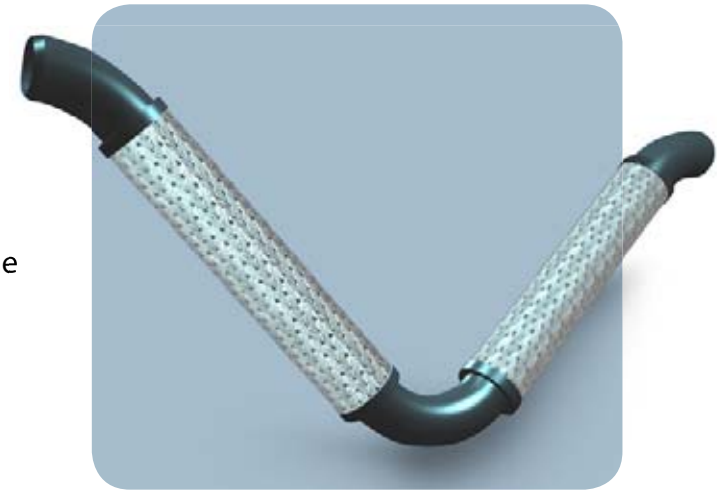
* Total force necessary to accommodate full motion, calculated @ 150 PSIG. Note: 1) Maximum operating temperature: 800°

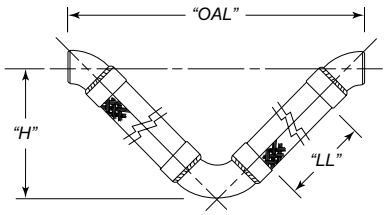
Seismic Flex Loops

Unisource V-SF21-42-42 Beveled Weld End "Uni-Loop"

Style V-SF21-42-42 loops are configured with carbon steel schedule 40 beveled weld ends as standard.

As in other configurations of **"Uni-Loops"**, choose from either 2", 3" or 4" of motion from center-line. For steam service, Unisource recommends placing the loops in either an inverted or horizontal installation when conveying steam. A drain port should also be specified for steam service. Unisource can also add an eyelet at the 90 degree elbow to accommodate a support rod or cable.





STYLE V-SF21-42-42, WELD-END "UNI-LOOP"

Hose: Type 321 S/S
Braid: Type 304 S/S
Elbows: Carbon Steel, Sch 40
Ends: Carbon Steel Sch 40 Beveled Weld End

Size (Inches)	Part #	Overall Length OAL (Inches)	Live Length LL (Inches)	Height H (Inches)	Approx. Spring Force* (Lbs)	Pressure Ratings (PSIG) W.P.	Pressure Ratings (PSIG) Max. Test	Allowable Motions X, Y, or Z
2	V-SF21-200-42-42-14.0"LL	31-1/2	14	14-1/2	82	516	774	2"
2-1/2	V-SF21-250-42-42-14.5"LL	34-3/4	14-1/2	16	86	395	593	
3	V-SF21-300-42-42-16.5"LL	39-1/2	16-1/2	18	93	385	578	
4	V-SF21-400-42-42-18.0"LL	45-1/2	18	20-1/2	127	270	405	
5	V-SF21-500-42-42-20.0"LL	52-1/2	20	23-1/2	214	225	337	
6	V-SF21-600-42-42-21.5"LL	58-3/4	21-1/2	26	228	170	255	
8	V-SF21-800-42-42-24.0"LL	71	24	30-1/2	312	235	353	
10	V-SF21-1000-42-42-27.0"LL	83-1/2	27	36	345	260	390	
12	V-SF21-1200-42-42-28.5"LL	94	28-1/2	40	399	160	240	
2	V-SF21-200-42-42-17.0"LL	36	17	17	82	516	774	3"
2-1/2	V-SF21-250-42-42-18.0"LL	39-1/2	18	18-1/2	86	395	593	
3	V-SF21-300-42-42-21.75"LL	44-1/2	20	20-1/2	93	385	578	
4	V-SF21-400-42-42-22.0"LL	51	22	23-1/2	127	270	405	
5	V-SF21-500-42-42-24.5"LL	58-3/4	24-1/2	26-1/2	214	225	337	
6	V-SF21-600-42-42-26.5"LL	66	26-1/2	29-1/2	228	170	255	
8	V-SF21-800-42-42-29.5"LL	78-3/4	29-1/2	34-1/2	312	235	353	
10	V-SF21-1000-42-42-33.5"LL	92-3/4	33-1/2	40-1/2	345	260	390	
12	V-SF21-1200-42-42-35.5"LL	104	35-1/2	45	399	160	240	
2	V-SF21-200-42-42-20.0"LL	40	20	19	82	516	774	4"
2-1/2	V-SF21-250-42-42-20.5"LL	43	20-1/2	20	86	395	593	
3	V-SF21-300-42-42-23.5"LL	49-1/4	23-1/2	23	93	385	578	
4	V-SF21-400-42-42-25.5"LL	56	25-1/2	26	127	270	405	
5	V-SF21-500-42-42-28.5"LL	64-1/2	28-1/2	29-1/2	214	225	337	
6	V-SF21-600-42-42-30.5"LL	71-1/2	30-1/2	32-1/2	228	170	255	
8	V-SF21-800-42-42-34.0"LL	85	34	38	312	235	353	
10	V-SF21-1000-42-42-38.5"LL	100	38-1/2	44	345	260	390	
12	V-SF21-1200-42-42-41.0"LL	112	41	49	399	160	240	

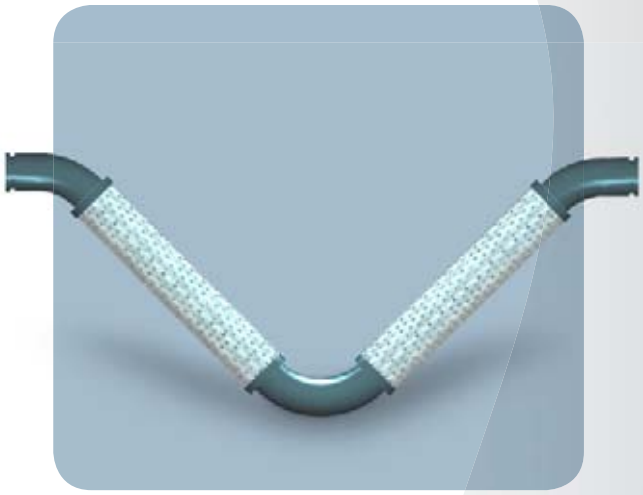
* Total force necessary to accommodate full motion, calculated @ 150 PSIG. Note: 1) Maximum operating temperature: 800°

Seismic Flex Loops

Unisource V-SF21-55-55 Grooved End "Uni-Loop"

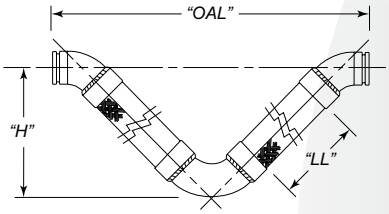
Style **V-SF21-55-55** loops are constructed with carbon steel standard grooved ends for easy installation.

As in other configurations of **"Uni-Loops"**, choose from either 2", 3" or 4" of motion from center-line. Unisource can also add an eyelet at the 90 degree elbow to accommodate a support rod or cable.



STYLE V-SF21-55-55, GROOVED-END "UNI-LOOP"

Hose: Type 321 S/S
Braid: Type 304 S/S
Elbows: Carbon Steel, Sch 40
Ends: Carbon Steel Grooved



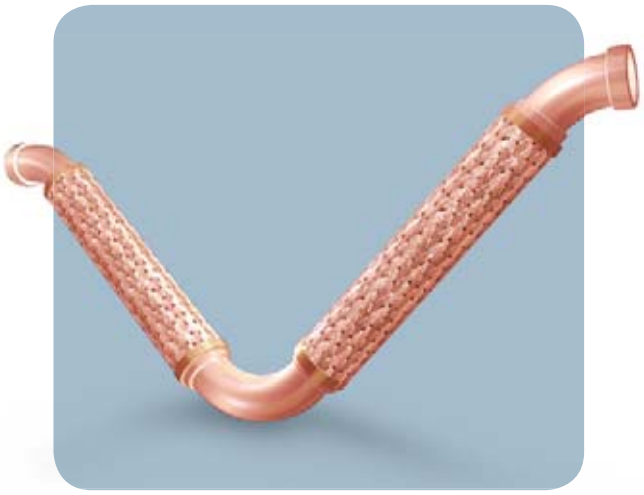
Size (Inches)	Part #	Overall Length OAL (Inches)	Live Length LL (Inches)	Height H (Inches)	Approx. Spring Force* (Lbs)	Pressure Ratings (PSIG) W.P.	Pressure Ratings (PSIG) Max. Test	Allowable Motions X, Y, or Z
2	V-SF21-200-55-55-14.0"LL	38	14	14-1/2	82	516	774	2"
2-1/2	V-SF21-250-55-55-14.5"LL	41-1/8	14-1/2	16	86	395	593	
3	V-SF21-300-55-55-16.5"LL	45-7/8	16-1/2	18	93	385	578	
4	V-SF21-400-55-55-18.0"LL	51-7/8	18	18	127	270	405	
5	V-SF21-500-55-55-20.0"LL	58-7/8	20	23-1/2	214	225	337	
6	V-SF21-600-55-55-21.5"LL	65-1/4	21-1/2	26	228	170	255	
8	V-SF21-800-55-55-24.0"LL	77-3/8	24	30-1/2	312	235	353	
10	V-SF21-1000-55-55-27.0"LL	90	27	36	345	260	390	
12	V-SF21-1200-55-55-28.5"LL	100-3/4	28-1/2	40	399	160	240	
2	V-SF21-200-55-55-17.0"LL	42-3/8	17	17	82	516	774	3"
2-1/2	V-SF21-250-55-55-18.0"LL	46	18	18-1/2	86	395	593	
3	V-SF21-300-55-55-21.75"LL	50-3/4	20	20-1/2	93	385	578	
4	V-SF21-400-55-55-22.0"LL	57-1/2	22	23-1/2	127	270	405	
5	V-SF21-500-55-55-24.5"LL	65-1/4	24-1/2	26-1/2	214	225	337	
6	V-SF21-600-55-55-26.5"LL	72-3/8	26-1/2	29-1/2	228	170	255	
8	V-SF21-800-55-55-29.5"LL	85-1/8	29-1/2	34-1/2	312	235	353	
10	V-SF21-1000-55-55-33.5"LL	99-1/4	33-1/2	40-1/2	345	260	390	
12	V-SF21-1200-55-55-35.5"LL	110-5/8	35-1/2	45	399	160	240	
2	V-SF21-200-55-55-20.0"LL	46-1/2	20	19	82	516	774	4"
2-1/2	V-SF21-250-55-55-20.5"LL	49-5/8	20-1/2	20	86	395	593	
3	V-SF21-300-55-55-23.5"LL	55-3/4	23-1/2	23	93	385	578	
4	V-SF21-400-55-55-25.5"LL	62-3/8	25-1/2	26	127	270	405	
5	V-SF21-500-55-55-28.5"LL	70-7/8	28-1/2	29-1/2	214	225	337	
6	V-SF21-600-55-55-30.5"LL	78	30-1/2	32-1/2	228	170	255	
8	V-SF21-800-55-55-34.0"LL	91-1/2	34	38	312	235	353	
10	V-SF21-1000-55-55-38.5"LL	106-3/8	38-1/2	44	345	260	390	
12	V-SF21-1200-55-55-41.0"LL	118-3/8	41	49	399	160	240	

* Total force necessary to accommodate full motion, calculated @ 150 PSIG.

Seismic Flex Loops

Unisource V-BF11-12-12 Copper Sweat "Uni-Loop"

Styles **V-BF11-12-12** and **V-SF21-12-12** loops are designed specifically for copper piping systems. They are constructed with copper female sweat ends and copper elbows and either stainless steel braided hose or bronze braided hose, depending on size. Those loops using stainless steel braided hose will also utilize stainless steel 90-degree return elbows.

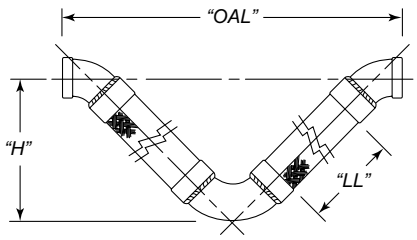


As in other configurations of **"Uni-Loops"**, choose from either 2", 3" or 4" of motion from center-line. Unisource can also add an eyelet at the 90 degree elbow to accommodate a support rod or cable.

STYLE V-BF11-12-12, BRONZE/COPPER "UNI-LOOP"

Hose: Bronze
Braid: Bronze
Elbows: Copper
Ends: Female Copper Sweat

Note: Sizes 2-1/2", 3", and 4" are constructed with stainless steel hose and braid, stainless steel 90-degree Sch 10 bottom elbow and copper sweat end connections.



Size (Inches)	Part #	Overall Length OAL (Inches)	Live Length LL (Inches)	Height H (Inches)	Approx. Spring Force* (Lbs)	Pressure Ratings (PSIG) W.P.	Pressure Ratings (PSIG) Max. Test	Allowable Motions X, Y, or Z
1/2	V-BF11-050-12-12-9.5"LL	20-1/4	9-1/2	9-1/4	34	642	963	2"
3/4	V-BF11-075-12-12-10.0"LL	22-3/4	10	10-1/4	40	524	786	
1	V-BF11-100-12-12-10.5"LL	24-1/2	10-1/2	11	44	428	642	
1-1/4	V-BF11-125-12-12-11.5"LL	27-1/2	11-1/2	12	65	328	492	
1-1/2	V-BF11-150-12-12-12.0"LL	29	12	12-3/4	70	299	449	
2	V-BF11-200-12-12-13.0"LL	32-1/2	13	14	80	432	413	
2-1/2	V-SF21-250-12-12-14.5"LL	36-3/4	15-1/2	17	86	395	593	
3	V-SF21-300-12-12-16.5"LL	41-1/2	17	19	93	385	578	
4	V-SF21-400-12-12-18.0"LL	48	18	21	127	270	405	
1/2	V-BF11-050-12-12-12.0"LL	23-3/4	12	11-1/2	34	642	963	3"
3/4	V-BF11-075-12-12-12.5"LL	26-1/4	12-1/2	12-1/2	40	524	786	
1	V-BF11-100-12-12-13.0"LL	28	13	13	44	428	642	
1-1/4	V-BF11-125-12-12-14.0"LL	31	14	14	65	328	492	
1-1/2	V-BF11-150-12-12-14.5"LL	32-1/2	14-1/2	15	70	299	449	
2	V-BF11-200-12-12-16.0"LL	36-3/4	16	16-1/2	80	432	413	
2-1/2	V-SF21-250-12-12-18.0"LL	41-3/4	18	19	86	395	593	
3	V-SF21-300-12-12-20.0"LL	46-1/2	20	21	93	385	578	
4	V-SF21-400-12-12-22.0"LL	53-1/2	22	24	127	270	405	
1/2	V-BF11-050-12-12-14.0"LL	26-1/2	14	12-1/2	34	642	963	4"
3/4	V-BF11-075-12-12-15.0"LL	30	15	14	40	524	786	
1	V-BF11-100-12-12-15.5"LL	31-3/4	15	14	44	428	642	
1-1/4	V-BF11-125-12-12-16.5"LL	34-1/2	16-1/2	16	65	328	492	
1-1/2	V-BF11-150-12-12-17.0"LL	36	17	16-1/2	70	299	449	
2	V-BF11-200-12-12-18.5"LL	40-1/4	18-1/2	18-1/2	80	432	413	
2-1/2	V-SF21-250-12-12-20.5"LL	45-1/4	20-1/2	20-1/4	86	395	593	
3	V-SF21-300-12-12-23.5"LL	51-1/2	23-1/2	23-1/2	93	385	578	
4	V-SF21-400-12-12-25.5"LL	58-1/2	25-1/2	26-1/2	127	270	405	

* Total force necessary to accommodate full motion, calculated @ 150 PSIG.

CSA Seismic Loops

Unisource V-SF21CSA Threaded & Weld End "Uni-Loop" For Natural Gas

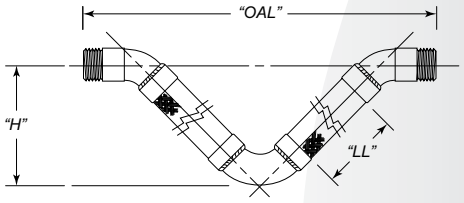
Unisource **V-SF21CSA** threaded and weld-end **Uni-Loops** are designed specifically for natural gas piping and are certified by CSA International for gas piping applications (Certification Report No. 190623-1131571).

V-SF21CSA gas loops are constructed with stainless steel hose and braid, carbon steel Sch 40 elbows and either male NPT ends (**Style 40-40**) or beveled weld ends (**Style 42-42**). Unisource gas loops are rated for minimum working pressures of 150 PSIG, with extremely high burst to working pressure ratios.

V-SF21CSA Uni-Loops are rated for 4" of motion from center-line. Size range is from 1/2" through 4".

STYLE V-SF21CSA-40-40, THREADED UNI-LOOP

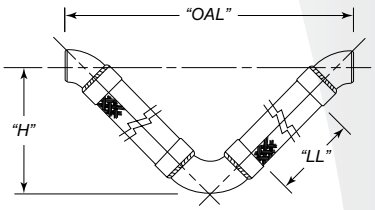
Hose: Stainless Steel
Braid: Stainless Steel
Elbows: Sch 40 Carbon Steel
Ends: Male NPT



Size (Inches)	Part #	Overall Length OAL (Inches)	Live Length LL (Inches)	Height H (Inches)	Approx. Spring Force* (Lbs)	Pressure Ratings (PSIG) W.P.	Pressure Ratings (PSIG) Max. Test	Allowable Motions X, Y, or Z
1/2	V-SF21AGA-050-40-40-16.0"LL	32	16	14	35	150	5340	4"
3/4	V-SF21AGA-075-40-40-17.0"LL	33-1/2	17	14-3/4	41	150	4540	
1	V-SF21AGA-100-40-40-18.0"LL	37-1/2	18	15-3/4	45	150	3180	
1-1/4	V-SF21AGA-125-40-40-23.0"LL	45-1/2	23	19-3/4	64	150	2240	
1-1/2	V-SF21AGA-150-40-40-24.0"LL	47-3/4	24	20-3/4	68	150	2120	
2	V-SF21AGA-200-40-40-25.0"LL	51	25	22-3/4	82	150	2140	
2-1/2	V-SF21AGA-250-40-40-29.0"LL	60	29	25-3/4	86	150	2140	
3	V-SF21AGA-300-40-40-30.0"LL	63-1/2	30	27-1/4	93	150	1540	
4	V-SF21AGA-400-40-40-32.0"LL	70	32	30	127	150	1080	

STYLE V-SF21CSA-42-42, WELD-END UNI-LOOP

Hose: Stainless Steel
Braid: Stainless Steel
Elbows: Sch 40 Carbon Steel
Ends: Sch 40 Beveled Weld End



Size (Inches)	Part #	Overall Length OAL (Inches)	Live Length LL (Inches)	Height H (Inches)	Approx. Spring Force* (Lbs)	Pressure Ratings (PSIG) W.P.	Pressure Ratings (PSIG) Max. Test	Allowable Motions X, Y, or Z
1/2	V-SF21AGA-050-42-42-16.0"LL	29	16	14	35	150	5340	4"
3/4	V-SF21AGA-075-42-42-17.0"LL	30-1/2	17	14-3/4	41	150	4540	
1	V-SF21AGA-100-42-42-18.0"LL	33-1/2	18	15-3/4	45	150	3180	
1-1/4	V-SF21AGA-125-42-42-23.0"LL	41-1/2	23	19-3/4	64	150	2240	
1-1/2	V-SF21AGA-150-42-42-24.0"LL	43-3/4	24	20-3/4	68	150	2120	
2	V-SF21AGA-200-42-42-25.0"LL	47	25	22-3/4	82	150	2140	
2-1/2	V-SF21AGA-250-42-42-29.0"LL	55	29	25-3/4	86	150	2140	
3	V-SF21AGA-300-42-42-30.0"LL	57-1/2	30	27-1/4	93	150	1540	
4	V-SF21AGA-400-42-42-32.0"LL	62	32	30	127	150	1080	

* Total force necessary to accommodate full motion, calculated @ 150 PSIG.

Seismic Flex Loops

Unisource V-SF21MED "MedFlex" "Uni-Loop" For Medical Gas Systems

MedFlex V-BF11MED loops are produced specifically for medical gas applications and are documented, purged, and brazed to NFPA (National Fire Protection Association) standards. In addition, **"MedFlex"** loops are cleaned, capped, and bagged in accordance with CGA (Compressed Gas Association) G-4.1.

"MedFlex" loops are constructed with bronze hose and braid, copper return elbow, and copper sweat end connections. Sizes 2-1/2" through 4" utilize stainless steel hose and braid, stainless steel return elbow, and copper sweat end fittings silver brazed to the assembly.

Unisource **Uni-Loops** can be included into specific seismic bracing designs for submission to the California Office of Statewide Health Planning and Development (OSHPD) for use in health care facilities.

Like other **Uni-Loop** products, **"MedFlex"** loops are capable of motion in all directions. Due to the unique design, **"MedFlex"** loops can be installed anywhere that building motion or pipe movement may be experienced—seismic applications, thermal pipe growth, or building settling. The **"MedFlex"** loop is versatile. It may be installed in a variety of configurations and can even be nested to save space.

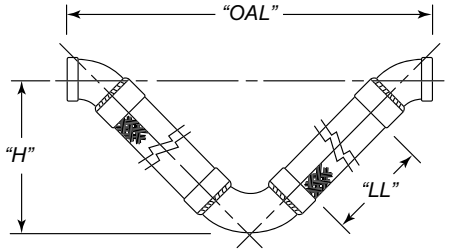
Whereas metal bellows or rubber expansion joints will impose substantial anchor loads due to the effects of static pressure thrust, **Uni-Loops will not introduce any thrust loads on the piping system**. The unique construction of the braided V-shaped loop creates a flexible product that does not expand when pressurized. A welded-on braid acts as a restraining device, even at extended pressures, yet allows tremendous flexibility. Anchor loads in regard to the Uni-Loops are confined to the relatively small spring forces required to deflect the flexible legs within the loop. Unlike expansion joints, a minimum of pipe guiding is required.

Uni-Loops are extremely easy to design in nested configurations. Due to the inherent V-design, standard **Uni-Loops** can simply be nested within each other with relatively tight centering. A substantial amount of space can be saved, and since no additional pipe extensions need to be installed in the **Uni-Loops**, standard models can be used, saving cost and reducing delivery time.

The standard position for the **Uni-Loop** is in a horizontal pipe run, with the elbow pointing straight down. Positioning is versatile, however, and the loops can be installed in many other positions such as laying the loop horizontal, positioning the elbow straight up, or positioning for vertical pipe run. In installations other than the standard position, Unisource can provide a support eyelet to allow a cable or rod to support the weight of the loop and its contents.

STYLE V-BF11MED, MEDFLEX "UNI-LOOP"

Hose: Bronze
Braid: Bronze
Elbows: Copper
Ends: Copper Female Sweat
Note: Sizes 2-1/2", 3", and 4" are constructed with stainless steel hose and braid, stainless steel 90-degree Sch 10 bottom elbow and copper sweat end connections.



Size (Inches)	Part #	Overall Length OAL (Inches)	Live Length LL (Inches)	Height H (Inches)	Approx. Spring Force* (Lbs)	Pressure Ratings (PSIG) W.P.	Pressure Ratings (PSIG) Max. Test	Allowable Motions X, Y, or Z
1/2	V-BF11MED-050-12-12-14.0"LL	26-1/2	14	12-1/2	34	642	963	4"
3/4	V-BF11MED-075-12-12-15.0"LL	30	15	14	40	524	786	
1	V-BF11MED-100-12-12-15.5"LL	31-3/4	15	14	44	428	642	
1-1/4	V-BF11MED-125-12-12-16.5"LL	34-1/2	16-1/2	16	65	328	492	
1-1/2	V-BF11MED-150-12-12-17.0"LL	36	17	16-1/2	70	299	449	
2	V-BF11MED-200-12-12-18.5"LL	40-1/4	18-1/2	18-1/2	80	432	413	
2-1/2	V-SF21MED-250-12-12-20.5"LL	45-1/4	20-1/2	20-1/4	86	395	593	
3	V-SF21MED-300-12-12-23.5"LL	51-1/2	23-1/2	23-1/2	93	385	578	
4	V-SF21MED-400-12-12-25.5"LL	58-1/2	25-1/2	26-1/2	127	270	405	

* Total force necessary to accommodate full motion, calculated @ 150 PSIG.

Pipe Alignment Guides

Series PG Standard Spider Type Pipe Alignment Guides

Series **PG Pipe Alignment Guides** should always be used in conjunction with expansion joints. Pipe alignment guides help to control the motion of pipe and expansion joints, ensuring that the joint is subject only to the deflection for which it was designed. Unguided piping, under pressure will tend to buckle, sometimes severely. This buckling would deter the expansion joints from working properly. Guides permit unobstructed axial movement of the pipe while restricting lateral, angular, or buckling movements.

Standard spider guides are manufactured to accommodate specific amounts of movement and insulation. A pipe guide assembly consists of an anchored housing and a sliding spider that is attached to the pipe. The spider moves through the housing as the pipe expands and contracts. Guides are carbon steel painted for rust protection. Additional items in this series include pre-insulated guides, pipe slides and bases, anchor clamps, baseboard fin-tube guides, baseboard anchors, and hinged series.

It is recommended that an expansion joint be located as near to an anchor as possible. The first guide* should be located within 4 pipe diameters of the expansion joint (see Figure 1). The second guide should be located within 14 pipe diameters of the expansion joint. The remaining guides are placed at the appropriate distance shown in the Intermediate Guide Spacing Chart (see Figure 2).

* Note: when using pipe alignment guides in conjunction with Unisource Series EP Externally Pressurized expansion joints, the first guide can be eliminated due to the internal guides in the Series EP expansion joints.

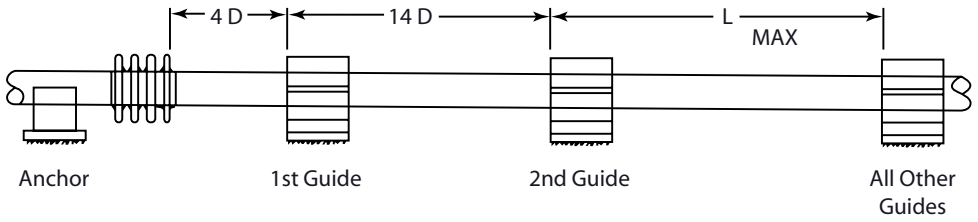


Figure 1
Typical layout with expansion joints and proper guide spacing.

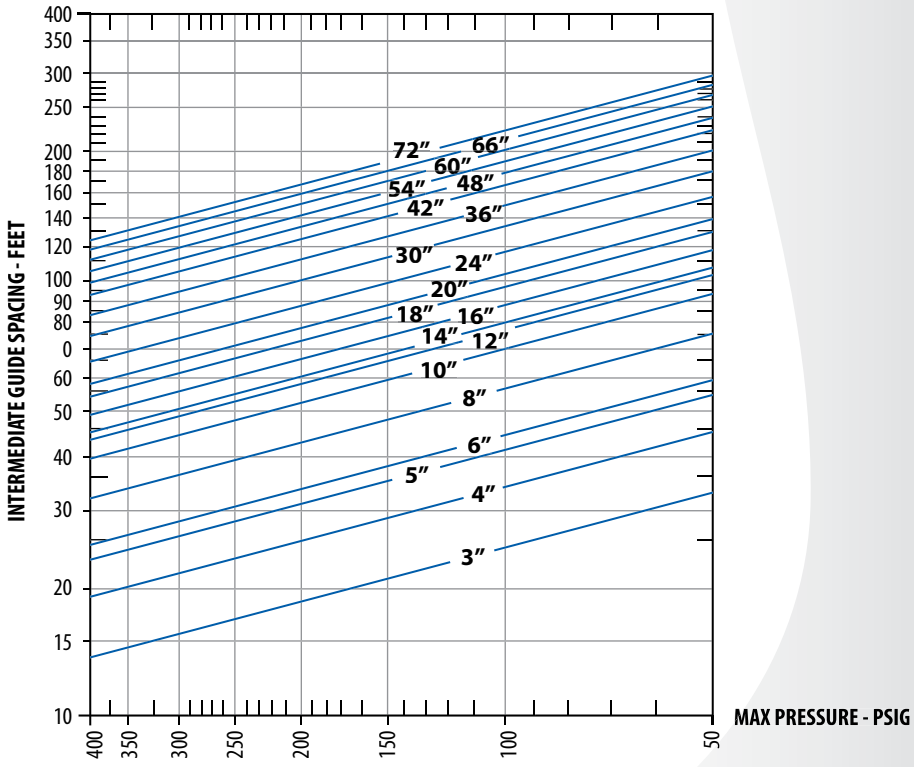


Figure 2
Recommended maximum spacing of intermediate pipe guides for applications involving axial movement only. (Values based on standard weight carbon steel pipe.)

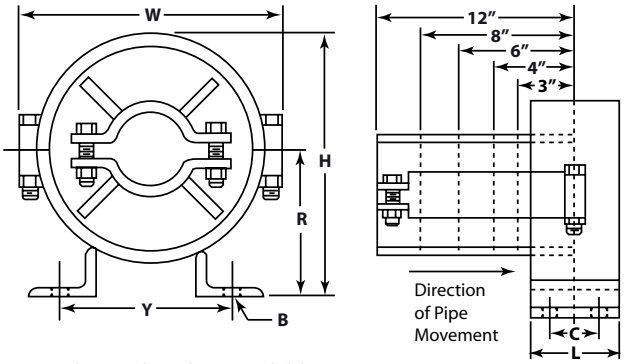
Pipe Alignment Guides

Series PG Standard Spider Type Pipe Alignment Guides

Carbon Steel – Painted for Rust Protection
Note: Body size 14" & larger supplied with 4 bolts.

1. To use the chart below, you must know the pipe size, required insulation thickness, and axial movement. Locate the pipe size from the left column and the corresponding insulation thickness to find the correct part number. The last digit(s) indicate(s) the axial movement required.

Example: the correct part number for a 2" pipe with 3" of insulation and a required axial movement of 8" is PG-020-3**10**-8.
Consult submittal sheets for pipe guide dimensions.



2. Explanation of part number:

PG-XXX -	X**XX** -	X(X)
Pipe Size	Body No. (Bold)	Axial Movement

3. Special pipe guides not listed are available upon request.

4. Use the 1" thickness column when no insulation in required.

5. Copper tube guides require dialectric spacers.

Size (Inches)	Insulation Thickness						
	1"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"
1/2	PG-004-1**04**-3 -8 -12	PG-004-1**04**-3 -8 -12	PG-004-2**05**-3 -8 -12	PG-004-2**06**-3 -8 -12	PG-004-3**08**-3 -8 -12	PG-004-3**08**-3 -8 -12	PG-004-4**10**-4 -8 -12
3/4	PG-006-1**04**-3 -8 -12	PG-006-6**05**-3 -8 -12	PG-006-2**06**-3 -8 -12	PG-006-3**08**-3 -8 -12	PG-006-3**08**-3 -8 -12	PG-006-4**10**-4 -8 -12	PG-006-4**10**-4 -8 -12
1	PG-010-1**04**-3 -8 -12	PG-010-6**05**-3 -8 -12	PG-010-2**06**-3 -8 -12	PG-010-3**08**-3 -8 -12	PG-010-3**08**-3 -8 -12	PG-010-4**10**-4 -8 -12	PG-010-4**10**-4 -8 -12
1-1/4	PG-012-1**04**-3 -8 -12	PG-012-1**04**-3 -8 -12	PG-012-2**06**-3 -8 -12	PG-012-3**08**-3 -8 -12	PG-012-3**08**-3 -8 -12	PG-012-4**10**-4 -8 -12	PG-012-4**10**-4 -8 -12
1-1/2	PG-014-1**05**-3 -8 -12	PG-014-1**05**-3 -8 -12	PG-014-2**06**-3 -8 -12	PG-014-3**08**-3 -8 -12	PG-014-3**08**-3 -8 -12	PG-014-4**10**-4 -8 -12	PG-014-4**10**-4 -8 -12
2	PG-020-1**05**-3 -8 -12	PG-020-6**06**-3 -8 -12	PG-020-2**08**-3 -8 -12	PG-020-2**08**-3 -8 -12	PG-020-3**10**-4 -8 -12	PG-020-3**10**-4 -8 -12	PG-020-4**12**-4 -8 -12
2-1/2	PG-024-1**06**-3 -8 -12	PG-024-1**06**-3 -8 -12	PG-024-2**08**-3 -8 -12	PG-024-2**08**-3 -8 -12	PG-024-3**10**-4 -8 -12	PG-024-3**10**-4 -8 -12	PG-024-4**12**-4 -8 -12
3	PG-030-1**06**-3 -8 -12	PG-030-2**08**-3 -8 -12	PG-030-2**08**-3 -8 -12	PG-030-3**10**-4 -8 -12	PG-030-3**10**-4 -8 -12	PG-030-4**12**-4 -8 -12	PG-030-4**12**-4 -8 -12
4	PG-040-1**08**-3 -8 -12	PG-040-1**08**-3 -8 -12	PG-040-2**10**-4 -8 -12	PG-040-2**10**-4 -8 -12	PG-040-3**12**-4 -8 -12	PG-040-3**12**-4 -8 -12	PG-040-4**14**-6 -8 -12
5	PG-050-1**10**-4 -8 -12	PG-050-1**10**-4 -8 -12	PG-050-2**10**-4 -8 -12	PG-050-3**12**-4 -8 -12	PG-050-3**12**-4 -8 -12	PG-050-3**14**-6 -8 -12	PG-050-4**16**-6 -8 -12
6	PG-060-1**10**-4 -8 -12	PG-060-1**10**-4 -8 -12	PG-060-2**12**-4 -8 -12	PG-060-2**12**-4 -8 -12	PG-060-3**14**-6 -8 -12	PG-060-4**16**-6 -8 -12	PG-060-4**16**-6 -8 -12
8	PG-080-1**12**-4 -8 -12	PG-080-1**12**-4 -8 -12	PG-080-2**14**-6 -8 -12	PG-080-3**16**-6 -8 -12	PG-080-3**16**-6 -8 -12	PG-080-4**18**-6 -8 -12	PG-080-4**18**-6 -8 -12
10	PG-100-2**16**-6 -8 -12	PG-100-2**16**-6 -8 -12	PG-100-2**16**-6 -8 -12	PG-100-3**18**-6 -8 -12	PG-100-3**18**-6 -8 -12	PG-100-4**20**-6 -8 -12	PG-100-4**20**-6 -8 -12
12	PG-120-2**18**-8 -12	PG-120-2**18**-6 -8 -12	PG-120-2**18**-6 -8 -12	PG-120-3**20**-6 -8 -12	PG-120-3**20**-6 -8 -12	PG-120-4**22**-8 -12	PG-120-4**22**-8 -12
14	PG-140-2**20**-8 -12	PG-140-2**20**-8 -12	PG-140-2**20**-8 -12	PG-140-2**20**-8 -12	PG-140-3**22**-8 -12	PG-140-3**22**-8 -12	PG-140-4**24**-8 -12

Note: Larger sizes of pipe guides are also available. Other movement ratings available upon request. Pre-insulated guides also available.

Expansion Joints

Series EP Externally Pressurized Expansion Joints – 150# & 300# Styles

Series **EP Externally Pressurized Expansion Joints** are used in straight runs of pipe to accommodate large amounts of thermal expansion. Typical applications would include steam systems, where extreme temperature differentials would cause thermal growth of the piping system. **Series EP** expansion joints are a packless, maintenance-free joint that incorporates an all stainless steel flexible bellows, a steel enclosure, with external and internal guide ring/sleeve to maintain alignment of the inner pipe. The sleeve isolates the bellows from media, eliminating flow turbulence. External pressure is applied to the bellows via a gap between the internal flange and housing. Movement limitation is accomplished by means of an internal flange, and also guides the bellows along the longitudinal centerline. The external pressure keeps the bellows stable.

Externally pressurized expansion joints have significant advantages over pipe loops because they are able to absorb very large axial movements and take up far less space than pipe loops. Typically these applications are indoors, in utility tunnels, or buried where extra space is not available. **Series EP** joints also are frequently specified instead of slip joints that are also engineered for large movements because of several factors. Slip joints are a packed product that required periodic inspection and maintenance. Access vaults are always required for packed joints. **Series EP** externally pressurized joints are of a packless, all-welded construction that does not require inspection and can be installed in remote locations or even directly buried. Unisource **Series EP** externally pressurized expansion joints are a long-life quality piping product that carries a ***Five-Year Limited Leak-Free/Maintenance-Free Warranty***. *Contact Unisource for details.*

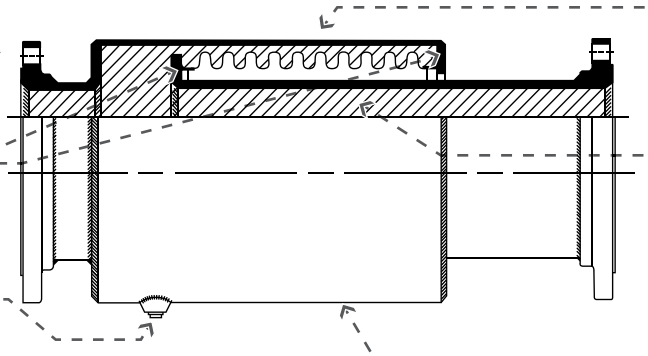
Select either 150 PSIG or 300 PSIG bellows construction. Single bellows styles are available for 4", 6", or 8" of axial travel. Dual styles can accommodate either 8", 12", or 16" of travel. Flanges or weld end are additional options. Meets MIL-E-17813F Type II Class 4. Standard bellows are constructed of single ply or multi-ply Type 304 stainless steel and are suitable for most chloride free applications such as steam, condensate, oil, and chilled water. Where chlorides may be present, Inconel 600 bellows should be specified. Special bellows material would include 316SS, 321SS, Inc 600, and Inc 625. Other bellows alloys are available upon request. Pipe and end connections are plain steel.

Series EP Externally Pressurized Expansion Joint - Construction

FLANGES
Raised face forged flanges or beveled weld ends are standard.

INTERNAL & EXTERNAL GUIDES
Ensure proper guiding of pipe inside joint.

DRAIN
For draining liquids or location for installing a steam trap.



BELLOWS - Single or multi-ply. 304SS is standard.

INTERNAL LINER - Carbon steel pipe liner prevents turbulence.

COVER - Excellent protection and is designed for full line pressure.

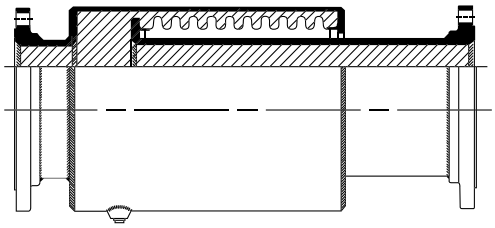
Available Styles and Options:

- Single or dual bellows
- 150# or 300# pressure ratings (with appropriate 150# or 300# drilled flanges)
- Standard T-304 SS bellows or specify 316SS, 321SS, Inco 600, or Inco 625.
- Anchor base is standard on dual units and optional on single units.
- Ends can be flange x flange, weld x weld, or flange x weld.

Expansion Joints

Series EP Externally Pressurized Expansion Joints – 150# Single Bellows Style

Bellows: Single Ply or Multi-Ply 304SS
Ends: Flanges – 150# ANSI B 16.5 RFSO C/S, ASTM 105 Forged
Weld Ends – Sch 40 C/S Beveled
Pipe/Shell: Carbon Steel Sch Standard
Drain Port: Carbon Steel w/Tapered Plug
Anchor Base: None. Can be ordered
Lifting Lugs: Carbon Steel. Used on all units.



4" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
S15150EP-4.0-XX-XX-OAL	1-1/2	22-3/4	21	6	4.0	0.75	85	150	26	20
S2150EP-4.0-XX-XX-OAL	2	25-1/2	23-1/4	12	4.0	0.75	194	150	44	33
S25150EP-4.0-XX-XX-OAL	2-1/2	25-1/2	23-1/4	12	4.0	0.75	194	150	51	35
S3150EP-4.0-XX-XX-OAL	3	24-1/2	22-1/4	16	4.0	0.75	252	150	63	46
S4150EP-4.0-XX-XX-OAL	4	25-3/4	22-3/4	30	4.0	0.75	425	150	99	72
S5150EP-4.0-XX-XX-OAL	5	24	21-1/2	42	4.0	0.75	501	150	128	95
S6150EP-4.0-XX-XX-OAL	6	24	21-1/2	53	4.0	0.75	570	150	144	102
S8150EP-4.0-XX-XX-OAL	8	25-1/4	22-1/2	83	4.0	0.75	1212	150	228	161
S10150EP-4.0-XX-XX-OAL	10	26-3/4	23-3/4	135	4.0	1.0	1065	150	306	209
S12150EP-4.0-XX-XX-OAL	12	28	24-1/2	182	4.0	1.0	1217	150	400	257
S14150EP-4.0-XX-XX-OAL	14	28-1/4	24-1/2	212	4.0	1.0	1328	150	491	293

6" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
S15150EP-6.0-XX-XX-OAL	1-1/2	30-3/4	28-3/4	6	6.0	1.12	57	150	35	29
S2150EP-6.0-XX-XX-OAL	2	34-1/2	32	12	6.0	1.12	130	150	56	46
S25150EP-6.0-XX-XX-OAL	2-1/2	34-1/2	32	12	6.0	1.12	130	150	65	50
S3150EP-6.0-XX-XX-OAL	3	31	28-1/2	16	6.0	1.12	190	150	74	57
S4150EP-6.0-XX-XX-OAL	4	32-1/2	29-1/2	30	6.0	1.12	283	150	117	89
S5150EP-6.0-XX-XX-OAL	5	30	27-1/2	42	6.0	1.12	334	150	149	116
S6150EP-6.0-XX-XX-OAL	6	30-1/4	27-1/2	53	6.0	1.12	380	150	167	125
S8150EP-6.0-XX-XX-OAL	8	32	29	83	6.0	1.12	808	150	265	198
S10150EP-6.0-XX-XX-OAL	10	34	30-3/4	135	6.0	1.50	710	150	358	261
S12150EP-6.0-XX-XX-OAL	12	35-3/4	32	182	6.0	1.50	811	150	467	324
S14150EP-6.0-XX-XX-OAL	14	36	32	212	6.0	1.50	885	150	565	367

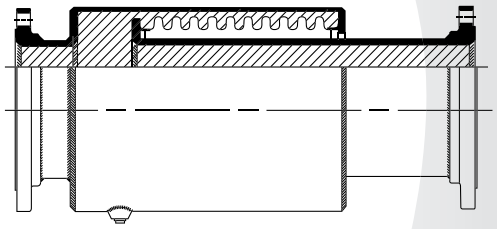
8" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
S15150EP-8.0-XX-XX-OAL	1-1/2	36-3/4	35	6	8.0	1.50	43	150	39	33
S2150EP-8.0-XX-XX-OAL	2	41-1/2	39-1/4	12	8.0	1.50	97	150	65	55
S25150EP-8.0-XX-XX-OAL	2-1/2	41-1/2	39-1/4	12	8.0	1.50	97	150	75	60
S3150EP-8.0-XX-XX-OAL	3	39-1/2	37-1/4	16	8.0	1.50	126	150	91	74
S4150EP-8.0-XX-XX-OAL	4	41-1/4	38-1/2	30	8.0	1.50	212	150	144	116
S5150EP-8.0-XX-XX-OAL	5	36-1/4	33-3/4	42	8.0	1.50	251	150	171	138
S6150EP-8.0-XX-XX-OAL	6	36-1/4	33-3/4	53	8.0	1.50	285	150	191	149
S8150EP-8.0-XX-XX-OAL	8	38-1/2	35-3/4	83	8.0	1.50	606	150	302	236
S10150EP-8.0-XX-XX-OAL	10	43-1/4	40	135	8.0	2.00	533	150	434	337
S12150EP-8.0-XX-XX-OAL	12	45-1/4	41-3/4	182	8.0	2.00	609	150	562	419
S14150EP-8.0-XX-XX-OAL	14	45-1/2	41-3/4	212	8.0	2.00	1053	150	671	473

XX-XX: 48-48 = 150# C/S RFSO Flanges, 42-42 = Sch 40 C/S Beveled Weld Ends
Note: (1) Sizes larger than 14" available upon request. (2) If installed vertically, position with traveling end up to avoid trapping media.

Expansion Joints

Series EP Externally Pressurized Expansion Joints – 300# Single Bellows Style

Bellows: Multi-Ply 304SS
Ends: Flanges – 300# ANSI B 16.5 RFSO C/S, ASTM 105 Forged
Weld Ends – Sch 40 C/S Beveled
Pipe/Shell: Carbon Steel Sch Standard
Drain Port: Carbon Steel w/Tapered Plug
Anchor Base: None. Can be ordered
Lifting Lugs: Carbon Steel. Used on all units.



4" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
S15300EP-4.0-XX-XX-OAL	1-1/2	23-1/4	21	6	4.0	0.75	170	300	31	22
S2300EP-4.0-XX-XX-OAL	2	25-3/4	23-1/4	12	4.0	0.75	388	300	49	35
S25300EP-4.0-XX-XX-OAL	2-1/2	25-3/4	23-1/4	12	4.0	0.75	388	300	56	36
S3300EP-4.0-XX-XX-OAL	3	24-3/4	22-1/4	16	4.0	0.75	504	300	75	47
S4300EP-4.0-XX-XX-OAL	4	25-3/4	22-3/4	30	4.0	0.75	850	300	121	74
S5300EP-4.0-XX-XX-OAL	5	24-1/2	21-1/2	42	4.0	0.75	1002	300	158	97
S6300EP-4.0-XX-XX-OAL	6	25-1/4	21-1/2	53	4.0	0.75	1140	300	190	106
S8300EP-4.0-XX-XX-OAL	8	26-3/4	22-1/2	83	4.0	0.75	2424	300	295	168
S10300EP-4.0-XX-XX-OAL	10	28-1/2	23-3/4	135	4.0	1.0	3266	300	396	216
S12300EP-4.0-XX-XX-OAL	12	30-1/2	25	182	4.0	1.0	3491	300	540	285
S14300EP-4.0-XX-XX-OAL	14	30-3/4	25	212	4.0	1.0	2656	300	732	373

6" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
S15300EP-6.0-XX-XX-OAL	1-1/2	31-1/4	28-3/4	6	6.0	1.12	114	300	41	30
S2300EP-6.0-XX-XX-OAL	2	34-3/4	32	12	6.0	1.12	260	300	63	48
S25300EP-6.0-XX-XX-OAL	2-1/2	34-3/4	32	12	6.0	1.12	260	300	73	52
S3300EP-6.0-XX-XX-OAL	3	31-1/4	28-1/2	16	6.0	1.12	380	300	87	59
S4300EP-6.0-XX-XX-OAL	4	32-1/2	29-1/2	30	6.0	1.12	566	300	141	94
S5300EP-6.0-XX-XX-OAL	5	30-3/4	27-1/2	42	6.0	1.12	668	300	181	120
S6300EP-6.0-XX-XX-OAL	6	31-1/4	27-1/2	53	6.0	1.12	760	300	214	130
S8300EP-6.0-XX-XX-OAL	8	33-1/2	29	83	6.0	1.12	1616	300	336	209
S10300EP-6.0-XX-XX-OAL	10	35-3/4	30-3/4	135	6.0	1.50	2177	300	452	272
S12300EP-6.0-XX-XX-OAL	12	38-1/4	32-1/2	182	6.0	1.50	2327	300	610	355
S14300EP-6.0-XX-XX-OAL	14	38-1/2	32-1/2	212	6.0	1.50	1770	300	828	468

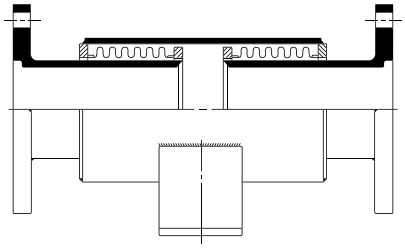
8" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
S15300EP-8.0-XX-XX-OAL	1-1/2	37-1/4	35	6	8.0	1.50	86	300	48	35
S2300EP-8.0-XX-XX-OAL	2	41-3/4	39-1/4	12	8.0	1.50	194	300	72	58
S25300EP-8.0-XX-XX-OAL	2-1/2	41-3/4	39-1/4	12	8.0	1.50	194	300	84	63
S3300EP-8.0-XX-XX-OAL	3	39-3/4	37-1/4	16	8.0	1.50	252	300	106	78
S4300EP-8.0-XX-XX-OAL	4	41-1/4	38-1/2	30	8.0	1.50	424	300	170	124
S5300EP-8.0-XX-XX-OAL	5	36-3/4	33-3/4	42	8.0	1.50	501	300	203	143
S6300EP-8.0-XX-XX-OAL	6	37-1/2	33-3/4	53	8.0	1.50	570	300	239	155
S8300EP-8.0-XX-XX-OAL	8	40	35-3/4	83	8.0	1.50	1212	300	377	250
S10300EP-8.0-XX-XX-OAL	10	44-3/4	40	135	8.0	2.00	1633	300	534	354
S12300EP-8.0-XX-XX-OAL	12	47-3/4	42-1/4	182	8.0	2.00	1745	300	712	457
S14300EP-8.0-XX-XX-OAL	14	48	42-1/4	212	8.0	2.00	1328	300	966	607

XX-XX: 58-58 = 300# C/S RFSO Flanges, 42-42 = Sch 40 C/S Beveled Weld Ends
Note: (1) Sizes larger than 14" available upon request. (2) If installed vertically, position with traveling end up to avoid trapping media.

Expansion Joints

Series EP Externally Pressurized Expansion Joints – 150# Dual Bellows Style

Bellows: Single Ply or Multi-Ply 304SS
Ends: Flanges – 150# ANSI B 16.5 RFSO C/S, ASTM 105 Forged
Weld Ends – Sch 40 C/S Beveled
Pipe/Shell: Carbon Steel Sch Standard
Drain Port: Carbon Steel w/Tapered Plug
Anchor Base: Carbon Steel Intermediate Anchor Base
Lifting Lugs: Carbon Steel. Used on all units.



8" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)*	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
D15150EP-8.0-XX-XX-OAL	1-1/2	38	35-1/4	6	8.0	1.5	85	150	52	47
D2150EP-8.0-XX-XX-OAL	2	43-1/4	39-1/2	12	8.0	1.5	194	150	56	50
D25150EP-8.0-XX-XX-OAL	2-1/2	43-1/4	39-1/2	12	8.0	1.5	194	150	77	65
D3150EP-8.0-XX-XX-OAL	3	41-1/4	37-1/2	16	8.0	1.5	252	150	105	90
D4150EP-8.0-XX-XX-OAL	4	42-1/2	38-3/4	30	8.0	1.5	425	150	150	134
D5150EP-8.0-XX-XX-OAL	5	40-1/4	36	42	8.0	1.5	501	150	160	140
D6150EP-8.0-XX-XX-OAL	6	40-1/4	36-1/4	53	8.0	1.5	570	150	250	210
D8150EP-8.0-XX-XX-OAL	8	42-1/2	38-1/4	83	8.0	1.5	1212	150	325	275
D10150EP-8.0-XX-XX-OAL	10	45-1/4	40-1/2	135	8.0	2.0	1065	150	450	380
D12150EP-8.0-XX-XX-OAL	12	47-1/4	42-1/4	182	8.0	2.0	1217	150	590	490
D14150EP-8.0-XX-XX-OAL	14	47-1/2	42-1/4	212	8.0	2.0	1328	150	700	560

* Per bellows

12" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)*	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
D15150EP-12.0-XX-XX-OAL	1-1/2	54	51	6	12.0	2.25	57	150	73	63
D2150EP-12.0-XX-XX-OAL	2	61-1/4	57-1/4	12	12.0	2.25	130	150	75	65
D25150EP-12.0-XX-XX-OAL	2-1/2	61-1/4	57-1/4	12	12.0	2.25	130	150	100	92
D3150EP-12.0-XX-XX-OAL	3	54-1/4	50-1/4	16	12.0	2.25	190	150	140	124
D4150EP-12.0-XX-XX-OAL	4	56	52	30	12.0	2.25	283	150	200	180
D5150EP-12.0-XX-XX-OAL	5	52-1/2	48	42	12.0	2.25	334	150	210	190
D6150EP-12.0-XX-XX-OAL	6	52-1/2	48-1/4	53	12.0	2.25	380	150	310	280
D8150EP-12.0-XX-XX-OAL	8	55-3/4	51-1/4	83	12.0	2.25	808	150	425	375
D10150EP-12.0-XX-XX-OAL	10	59-1/2	54-3/4	135	12.0	3.0	710	150	580	516
D12150EP-12.0-XX-XX-OAL	12	62-1/2	57-1/4	182	12.0	3.0	811	150	750	660
D14150EP-12.0-XX-XX-OAL	14	62-3/4	57-1/4	212	12.0	3.0	885	150	875	730

* Per bellows

16" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)*	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
D15150EP-16.0-XX-XX-OAL	1-1/2	66	63-1/4	6	16.0	3.0	43	150	85	77
D2150EP-16.0-XX-XX-OAL	2	75-1/4	71-1/2	12	16.0	3.0	97	150	88	80
D25150EP-16.0-XX-XX-OAL	2-1/2	75-1/4	71-1/2	12	16.0	3.0	97	150	120	110
D3150EP-16.0-XX-XX-OAL	3	71-1/4	67-1/2	16	16.0	3.0	126	150	160	145
D4150EP-16.0-XX-XX-OAL	4	75-3/4	70	30	16.0	3.0	212	150	235	212
D5150EP-16.0-XX-XX-OAL	5	64-3/4	60-1/2	42	16.0	3.0	251	150	250	230
D6150EP-16.0-XX-XX-OAL	6	64-3/4	60-3/4	53	16.0	3.0	285	150	370	330
D8150EP-16.0-XX-XX-OAL	8	69	64-3/4	83	16.0	3.0	606	150	500	445
D10150EP-16.0-XX-XX-OAL	10	78	73-1/4	135	16.0	4.0	533	150	665	600
D12150EP-16.0-XX-XX-OAL	12	81-3/4	76-3/4	182	16.0	4.0	609	150	850	760
D14150EP-16.0-XX-XX-OAL	14	82	76-3/4	212	16.0	4.0	1053	150	1010	870

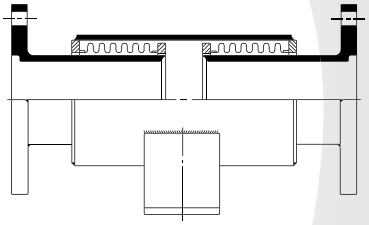
* Per bellows

XX-XX: 48-48 = 150# C/S RFSO Flanges, 42-42 = Sch 40 C/S Beveled Weld Ends
Note: (1) Sizes larger than 14" available upon request. (2) If installed vertically, position with traveling end up to avoid trapping media.
(3) Anchor base is standard on dual units, and acts as an intermediate anchor.

Expansion Joints

Series EP Externally Pressurized Expansion Joints – 300# Dual Bellows Style

Bellows: Multi-Ply 304SS
Ends: Flanges – 300# ANSI B 16.5 RFSO C/S, ASTM 105 Forged
Weld Ends – Sch 40 C/S Beveled
Pipe/Shell: Carbon Steel Sch Standard
Drain Port: Carbon Steel w/Tapered Plug
Anchor Base: Carbon Steel Intermediate Anchor Base
Lifting Lugs: Carbon Steel. Used on all units.



8" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)*	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
D15300EP-8.0-XX-XX-OAL	1-1/2	39-1/4	35-1/4	6	8.0	1.5	170	300	49	37
D2300EP-8.0-XX-XX-OAL	2	43-1/2	39-1/2	12	8.0	1.5	388	300	76	62
D25300EP-8.0-XX-XX-OAL	2-1/2	43-1/2	39-1/2	12	8.0	1.5	388	300	87	67
D3300EP-8.0-XX-XX-OAL	3	41-3/4	37-1/2	16	8.0	1.5	504	300	110	82
D4300EP-8.0-XX-XX-OAL	4	43-1/4	38-3/4	30	8.0	1.5	850	300	177	133
D5300EP-8.0-XX-XX-OAL	5	40-3/4	36	42	8.0	1.5	1002	300	230	174
D6300EP-8.0-XX-XX-OAL	6	41-1/2	36-1/4	53	8.0	1.5	1140	300	270	192
D8300EP-8.0-XX-XX-OAL	8	44	38-1/4	83	8.0	1.5	2424	300	416	294
D10300EP-8.0-XX-XX-OAL	10	46-3/4	40-1/2	135	8.0	2.0	3266	300	540	678
D12300EP-8.0-XX-XX-OAL	12	49-3/4	42-1/4	182	8.0	2.0	3491	300	741	511
D14300EP-8.0-XX-XX-OAL	14	50	42-1/4	212	8.0	2.0	2656	300	1003	673

* Per bellows

12" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)*	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
D15150EP-12.0-XX-XX-OAL	1-1/2	55-1/4	51	6	12.0	2.25	114	300	66	54
D2150EP-12.0-XX-XX-OAL	2	61-1/2	57-1/4	12	12.0	2.25	260	300	103	89
D25150EP-12.0-XX-XX-OAL	2-1/2	61-1/2	57-1/4	12	12.0	2.25	260	300	117	97
D3150EP-12.0-XX-XX-OAL	3	54-3/4	50-1/4	16	12.0	2.25	380	300	134	106
D4150EP-12.0-XX-XX-OAL	4	56-3/4	52	30	12.0	2.25	566	300	215	171
D5150EP-12.0-XX-XX-OAL	5	53	48	42	12.0	2.25	668	300	276	220
D6150EP-12.0-XX-XX-OAL	6	53-3/4	48-1/4	53	12.0	2.25	760	300	318	240
D8150EP-12.0-XX-XX-OAL	8	57-1/4	51-1/4	83	12.0	2.25	1616	300	492	376
D10150EP-12.0-XX-XX-OAL	10	61-1/4	54-3/4	135	12.0	3.0	2177	300	651	489
D12150EP-12.0-XX-XX-OAL	12	65	57-1/4	182	12.0	3.0	2327	300	881	651
D14150EP-12.0-XX-XX-OAL	14	65-1/4	57-1/4	212	12.0	3.0	1770	300	1193	863

* Per bellows

16" Travel Part #	Size (Inches)	OAL Flanged (Inches)	OAL Weld End (Inches)	Effective Area (Inches²)	Rated Compression (Inches)	Rated Extension (Inches)	Axial Spring Rate (Lbs/Inch)*	Max. Oper. Pressure @ 650 ° F	Weight Flanged (Lbs)	Weight Weld Ends (Lbs)
D15150EP-16.0-XX-XX-OAL	1-1/2	67-1/4	63-1/4	6	16.0	3.0	86	300	77	65
D2150EP-16.0-XX-XX-OAL	2	75-1/2	71-1/2	12	16.0	3.0	194	300	123	109
D25150EP-16.0-XX-XX-OAL	2-1/2	75-1/2	71-1/2	12	16.0	3.0	194	300	138	118
D3150EP-16.0-XX-XX-OAL	3	71-3/4	67-1/2	16	16.0	3.0	252	300	172	146
D4150EP-16.0-XX-XX-OAL	4	74-1/2	70	30	16.0	3.0	424	300	275	231
D5150EP-16.0-XX-XX-OAL	5	65-1/4	60-1/2	42	16.0	3.0	501	300	322	266
D6150EP-16.0-XX-XX-OAL	6	66	60-3/4	53	16.0	3.0	570	300	368	290
D8150EP-16.0-XX-XX-OAL	8	70-1/2	64-3/4	83	16.0	3.0	1212	300	574	458
D10150EP-16.0-XX-XX-OAL	10	79-1/2	73-1/4	135	16.0	4.0	1633	300	816	654
D12150EP-16.0-XX-XX-OAL	12	84-1/4	76-3/4	182	16.0	4.0	1745	300	1085	855
D14150EP-16.0-XX-XX-OAL	14	84-1/2	76-3/4	212	16.0	4.0	1328	300	1471	1141

* Per bellows

XX-XX: 58-58 = 150# C/S RFSO Flanges, 42-42 = Sch 40 C/S Beveled Weld Ends
Note: (1) Sizes larger than 14" available upon request. (2) If installed vertically, position with traveling end up to avoid trapping media.
(3) Anchor base is standard on dual units, and acts as an intermediate anchor.

PTFE Bellows

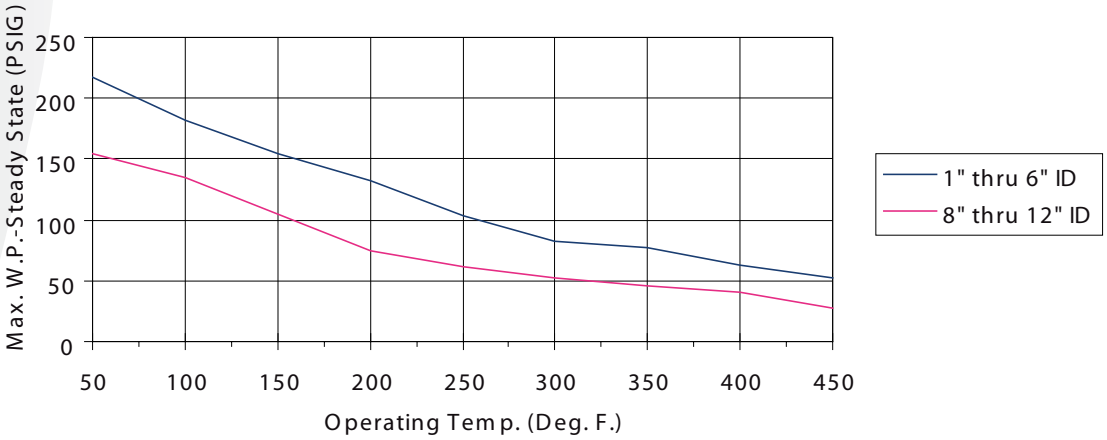
Style 112A 2-Convolute & 113A 3-Convolute Molded PTFE Bellows

Tef-Flex Style 112A and 113A Convoluted PTFE Bellows Expansion Joints and Flexible Couplings offer the best combination of low spring-rate flexibility, temperature resistance, and the chemical inert properties of PTFE material. The **"Tef-Flex"** Style **112A 2-Convolute Flexible Coupling**, and Style **113A 3-Convolute Expansion Joint** were designed to meet the needs of the HVAC, high-technology, and chemical/petrochemical industries. The **"Tef-Flex"** bellows connectors are versatile and will 1) absorb pipe movements and stress; 2) isolate mechanical vibration; 3) reduce system noise; 4) protect against surge forces. **"Tef-Flex"** connectors are suitable for connection to metallic piping or plastic lined metallic piping.

The construction of the **"Tef-Flex"** connector utilizes 2, 3, or even 5 molded convolutions of white PTFE. These convolutions are reinforced with metallic rings between the bellows for pressure rating and stability. Standard galvanized ductile iron backing flanges are protected by the lip of the PTFE bellows, so that all wetted surfaces are PTFE. Steel limit rods are factory installed. Additional convolutions provide greater movement capability. **Style 112(316)A** and **113(316)A** include Type 316 stainless steel backing flanges and hardware. Options include high purity cleaning and packaging. **"Tef-Flex"** expansion joints can also be manufactured in machined, accordion style.

TEF-FLEX TEFLON CONNECTORS — PRESSURE vs. TEMPERATURE

The graph below indicates that **Style #113A** expansion joints, like other expansion joints, and **Style #112A** flexible couplings drop in pressure rating as the temperature increases. It is important to note however, that burst pressure of **Style #113A** joints (or that pressure at which bellows failure normally occurs) is approximately three times that of their working pressure. Please consult our staff for modifications if pressure and temperatures in your application exceed those shown below.



"Tef-Flex connectors are highly flexible, dependable, and versatile"

Vacuum Service - Style #112A or #113A

Maximum Temperature For Full Vacuum

Style 112-A	
Up to 6"	350° F
8"	250° F
10"	200° F
12"	N/A

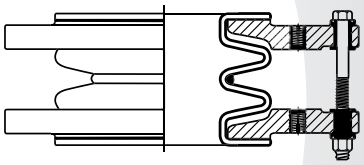
Style 113-A	
Up to 6"	175° F
8"	125° F
10"	100° F
12"	N/A

PTFE Bellows

Style 112A 2-Convolute & 113A 3-Convolute Molded PTFE Bellows

STYLE 112A 2-CONVOLUTE PTFE FLEXIBLE COUPLING

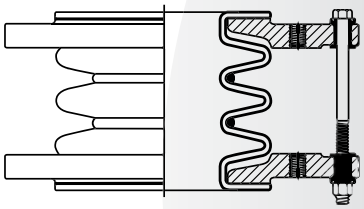
Bellows: Molded White PTFE
Tie Rods: Plated Carbon Steel w/PTFE Grommets
Flanges: Galvanized Ductile Iron
Reinforcing Rings: Series 300 Stainless Steel



Part #	Size (Inches)	Neutral Length (Inches)	Max. Travel (Inches)	Angular Misalign (Degrees)	Max. Misalign (Inches)	Working Pressure (PSIG) at Temp.			Full Vac. Up to Deg. F.	Weight (Lbs)
						@ 70° F	@ 180° F	@ 300° F		
112A-100	1	1.375	0.25	10	0.126	190	146	88	350	4.0
112A-150	1-1/2	1.375	0.25	10	0.126	190	146	88	350	5.0
112A-200	2	1.625	0.25	10	0.126	190	146	88	350	8.0
112A-300	3	2.250	0.38	15	0.250	190	146	88	350	12.0
112A-400	4	2.625	0.50	15	0.250	190	146	88	350	18.0
112A-500	5	3.250	0.50	15	0.250	190	146	88	350	27.0
112A-600	6	3.750	0.50	12.5	0.250	190	146	88	350	31.0
112A-800	8	4.000	0.50	12.5	0.250	160	93	60	250	51.0
112A-1000	10	5.250	0.50	10	0.250	150	85	52	200	63.0
112A-1200	12	6.000	0.50	12.5	0.250	150	85	52	N/A	88.0

STYLE 113A 3-CONVOLUTE PTFE EXPANSION JOINT

Bellows: Molded White PTFE
Tie Rods: Plated Carbon Steel w/PTFE Grommets
Flanges: Galvanized Ductile Iron
Reinforcing Rings: Series 300 Stainless Steel



Part #	Size (Inches)	Neutral Length (Inches)	Max. Travel (Inches)	Angular Misalign (Degrees)	Max. Misalign (Inches)	Working Pressure (PSIG) at Temp.			Full Vac. Up to Deg. F.	Weight (Lbs)
						@ 70° F	@ 180° F	@ 300° F		
113A-100	1	1.75	0.50	12.5	0.250	190	146	88	175	4.0
113A-150	1-1/2	2.00	0.50	15	0.250	190	146	88	175	5.0
113A-200	2	2.75	0.50	20	0.374	190	146	88	175	8.0
113A-300	3	3.625	0.75	25	0.500	190	146	88	175	12.0
113A-400	4	3.625	1.00	25	0.500	190	146	88	175	19.0
113A-500	5	4.00	1.00	25	0.500	190	146	88	175	28.0
113A-600	6	4.00	1.00	20	0.625	190	146	88	175	32.0
113A-800	8	6.00	1.125	20	0.625	160	93	60	125	53.0
113A-1000	10	7.00	1.125	15	0.625	150	85	52	100	65.0
113A-1200	12	7.875	1.125	10	0.625	150	85	52	N/A	90.0

Tef-Flex Connector — Dimensions

Size (Inches)	ANSI Standard Holes			Flange O.D. (Inches)	Flange Thickness (Inches)	Approx. Weight	
	# of Holes	Thread (Inches)	Bolt Circle (Inches)			112A (Lbs)	113A (Lbs)
1	4	1/2-13	3-1/8	4-1/4	5/16	4	4
1-1/2	4	1/2-13	3-7/8	5	3/8	5	5
2	4	5/8-11	4-3/4	6	7/16	8	8
2-1/2	4	5/8-11	5-1/2	7	1/2	10	11
3	4	5/8-11	6	7-1/2	5/8	12	12
4	8	5/8-11	7-1/2	9	5/8	18	19
5	8	3/4-10	8-1/2	10	3/4	27	28
6	8	3/4-10	9-1/2	11	3/4	31	32
8	8	3/4-10	11-3/4	13-1/2	7/8	51	53
10	12	7/8-9	14-1/4	16	1	63	65
12	12	7/8-9	17	19	1	88	90

Notes

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