Easyflex™ Seismic "V" Connector

VibraSystems

Applications

Kanwal's Easyflex Series Seismic "EFSVC" Connectors are one of the most effective ways to compensate for thermal expansion or the unpredictable pipe movements encountered during seismic activity. Series "EFSVC" Flexible Connectors are seismic connectors engineered to absorb movement **in all directions**. The unique "EFSVC" design places the flexible leg at 45 degree angles to the pipe run, even allowing up and down movements.

As opposed to bellows expansion joints, Kanwal's Easyflex Series Flexible "EFSVC" Connectors impose no pressure thrust load on the piping system, eliminating the need for thrust anchoring around the connector. Simply use pipe alignment guides in conjunction with the seismic "EFSVC" connectors to direct any motion into the connector.

Why the "EFSVC" Connector and not a "Loop"? The "SVC" Connector uses (2) 45 Degree elbows and (1) 90 Degree elbow for a total of 180 degree in pipe change, where as the "Loop" is based on 360 Degree pipe direction change. For all motions, each hose leg of the "EFSVC" Connector moves in angular directions, minimizing weld attachment stresses. Weld attachment stresses are a high cause of failure on deflected braided metal hose connectors. The "EFSVC" Connector configuration also minimizes intrusion to adjacent spaces, minimizing pressure drop with one 180 Degree change of direction, compared to the 360 Degree change of direction with the "Loop" and allows nesting without adding pipe or flexible connectors.

"EFSVC" Connectors can be constructed to accommodate 2", 3", 4" or greater movement in all planes. The flexible legs are calculated to provide at least 2000 cycles, far beyond the life of all previous seismic connectors available on the market. Normally, the "EFSVC" Connector is installed with the 90 degree return elbow hanging down, but can be installed in other positions as long as the elbow is supported. Also, "EFSVC" Connectors can typically be nested without alteration of the loop. In tight centering situations, V-Loops can be nested by using progressively longer pipe extensions at the base of the connector.

Ordering Options

SIZES	Standard sizes from 1/2" through 10".
PRESSURE RATINGS	Single braid for standard pressures. Double braid for higher pressure.
MATERIAL	Standard connectors in SS 321 or SS 304/SS 316 also available. End connections of carbon steel, stainless steel.
MOVEMENTS	Specify 2", 3", or 4" in all planes.
HANGER	Available upon request.
END CONFIGURATIONS	Weld ends, fixed flanges, threaded.

- Due to policy of continual improvement, the specifications are subject to change without prior notice.
- Measurements are subject to 5% tolerance.
- To achieve good results do not over load fitting more than designed parameters as per drawing / catalogue.

Position & Support

Kanwal's Easyflex "EFSVC" Connector can be installed in a variety of positions.

- The standard position is with the V and 90 degree elbow hanging down.
- Horizontal and vertical mounting yields the same allowance for motion provided the 90 degree elbow is supported properly to avoid sagging or torquing.
- "EFSVC" Connectors larger than 1-1/2" diameter must be supported if installed in any other position than the standard position. Supporting cable or rod should be attached to an eyelet located at the bottom of the 90-degree elbow which can be provided by the factory. Flexible cable or pipe hanger rods can also be used.
- Horizontal Run – "EFSVC" Connector Hanging Straight Down (as illustrated):
  Loop hangs straight down, without restriction, and free to flex. Support of the bottom elbow is not required. Pipe alignment guides are required to direct axial motion.
- Horizontal Run – "EFSVC" Connector Straight Up:
  Support must be provided at the 90 degree elbow to prevent the loop from leaning. Pipe hanger rod or cable must be loose enough to allow the 90 degree elbow to move up or down ¼" as the connector flexes.
  Spring isolated rod is ideal for this application.
- Horizontal Run – "EFSVC"Connector Horizontal:
  Support must be provided at the 90 degree elbow to prevent the flex hose from drooping or torquing the hose or pipe. Pipe hanger rod or cable must be loose enough to allow the 90 degree elbow to move horizontally back and forth ¼" as the connector flexes. Spring isolated rod is preferred for this application.
- Vertical Run – V Connector Horizontal:
  Support must be provided at the 90 degree elbow to prevent the flexible hose from drooping or torquing hose or pipe. Pipe hanger rod or cable must be loose enough to allow the 90 degree elbow to move horizontally back and forth ¼" as the connector flexes. Spring isolation rod is preferred for this application.

Nested

- Due to the inherent design of the "EFSVC" Connector, they may be nested in most cases without having to alter the standard construction. In tight centering situations where loop flanges would interfere with each other, it add a center spool piece at the bottom of each connector. Please may be necessary for the factory to specify sequence of pipe diameters and corresponding distances between pipe center lines.

Advantages

- Anchor forces are minimized because the pressure thrust is reacted by the wire braid.
- Anchor forces are minimized because of the inherent high flexibility of the metal hose.
- The "V" configuration allows adjacent piping to be nested to save space.
- V-Flex connectors can absorb in-plane extension and compression, or out of plane lateral offset.

Installation

In expansion compensation situations, the "EFSVC" Connector can be installed pre-compressed or pre-extended only if the full range of motion will be encountered in one direction.
If shipping bars are attached to the connector, they should not be removed until after installation. These bars are lightly tack welded to the loop to maintain the proper length until installation and will break-away in case of seismic activity. If the "EFSVC" Connector(s) are designed and installed to compensate strictly for expansion, then the shipping rods should be removed after installation.
For steam applications, a drain port and plug shall be specified and factory installed into the bottom of the 90 degree elbow to allow condensate to be drained. An alternative position for steam service is with the loop inverted, with the 90 degree elbow pointing upward. In this way, the "EFSVC" Connector will drain naturally into the surrounding piping. See the "Position & Support" section "Horizontal – V Straight Down".

Anchoring Considerations

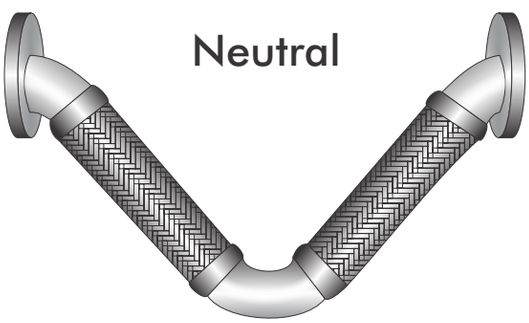
Anchors are required on either side of the "EFSVC" Connector to react to the spring forces of the loop. Pressure thrust loads are not a consideration because the "EFSVC" Connector will not impose pressure thrust due to the welded on braid. Anchors should be of sufficient strength to withstand the spring forces of the loops and the frictional forces of the pipe sliding through any pipe alignment guides. Approximate spring forces for the "EFSVC" Connectors are as follows:

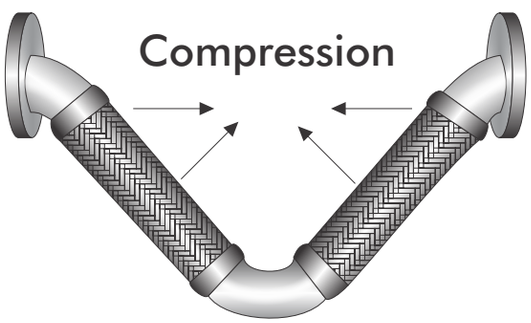
½"	¾"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	5"	6"	8"	10"	12"
35.2 lbs	39.6 lbs	44 lbs	63.8 lbs	68.2 lbs	81.4 lbs	85.8 lbs	92.4 lbs	57 Kg	125.4 lbs	226.6 lbs	310.2 lbs	343.2 lbs	396 lbs

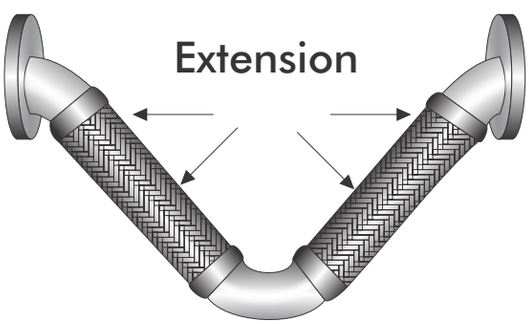
Note: The figures above reflect the total force required to deflect the "EFSVC" Connector its full rated movement, pressurized to 10 Kg/cm^2 for **½"** through 8" and 5 Kg/cm^2 upto 12".

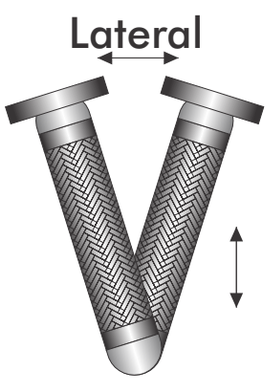
Easyflex "EFSVC" Connector Six Independent Planes of Movement

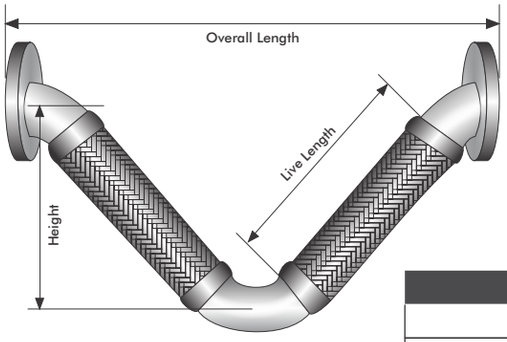
⇒ Movement is primarily in angular directions minimizing weld attachment stresses.
⇒ "EFSVC" Connectors do not induce pressure thrust force onto the piping system, therefore reducing piping forces.
⇒ "EFSVC" Connectors also allow rotation along the 6 planes of the X, Y and Z axis.
⇒ "EFSVC" Connectors can be constructed to accommodate 2", 3" 4" or greater movement on all planes. The flexible legs are calculated to provide at least 2000 cycles, far beyond the life of all previous seismic connectors available on the market.











EFSVC Seismic Flange Connector	
CONSTRUCTION MATERIALS	
HOSE	SS 321 STAINLESS STEEL
BRAID	1 LAYER 304
FITTINGS	CARBON STEEL
ELBOWS	SCH. 40 CARBON STEEL
FLANGE	CARBON STEEL

Size Nominal Bore	Live Length	Overall Length	Height	WRK SIG @ 70°C	Motion X, Y, Z
EFSVC FOR 2" MOVEMENT					
2"	14″	32″	14″	25	2"
2.5"	16″	38″	17″	25	2"
3"	18″	42″	19″	25	2"
4"	19″	47″	21″	20	2"
5"	20″	52″	23″	15	2"
6"	22″	64″	28″	15	2"
8"	23″	73″	30.71″	15	2"
10"	26″	83″	35″	10	2"
12"	28″	94″	38.58″	10	2"
EFSVC FOR 3" MOVEMENT					
2"	17.32″	36.02″	16.34″	25	3"
2.5"	19.69″	43.31″	19.29″	25	3"
3"	21.65″	47.24″	21.26″	25	3"
4"	22.64″	51.97″	23.23″	20	3"
5"	23.62″	58.07″	25.59″	15	3"
6"	28.15″	68.50″	30.31″	15	3"
8"	29.92″	79.92″	34.65″	15	3"
10"	30.51″	88.58″	37.99″	10	3"
12"	33.07″	100.98″	42.72″	10	3"
EFSVC FOR 4" MOVEMENT					
2"	20.08″	39.96″	18.31″	25	4"
2.5"	23.03″	46.85″	21.46″	25	4"
3"	25.00″	51.97″	23.62″	25	4"
4"	25.98″	57.09″	25.79″	20	4"
5"	27.17″	62.99″	28.15″	15	4"
6"	32.28″	74.41″	33.27″	15	4"
8"	34.65″	86.61″	37.99″	15	4"
10"	35.04″	95.47″	41.14″	10	4"
12"	38.19″	108.46″	46.65″	10	4"