

# THERMAL / SEISMIC SOLUTIONS

## V CONNECTORS, U LOOPS, AND DOG LEGS

Since 1977, TCH has served as a leading industry for seismic and thermal movement solutions. Our product line of V and U flex connectors provide superior protection against any unpredictable seismic motion or thermal pipe expansion or compression movement. These flex connectors are durably constructed to maintain flexibility under pressure without compromising strength. In contrast to traditional metal bellows, our V and U connectors impose NO pressure thrust load on the piping system. This eliminates the need for expensive thrust blocks or heavy-duty anchors.

### ADVANTAGES

- No pressure thrust loads
- Nominal spring rates
- Minimal anchor loads needed
- Unconstrained system or minimal guiding needed
- Motion absorbed on the X, Y, and Z axis
- Meets the Buy American Act and a complete domestic product is available
- Cost Savings - reduced anchor cost, guiding cost and construction material cost



IT IS SIMPLY ONE OF THE MOST EFFECTIVE WAYS TO COMPENSATE FOR PIPING SYSTEM MOVEMENT

### APPLICATIONS

- Steam Lines
- Chemical Products
- Petroleum Products
- Hot or Chilled Water
- Natural and Medical Gas



APPROXIMATE SPRING FORCES FOR THE V AND U CONNECTORS ARE AS FOLLOWS:

1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"
35 lbs.	41 lbs.	46 lbs.	65 lbs.	68 lbs.	82 lbs.	87 lbs.	93 lbs.	127 lbs.	214 lbs.	228 lbs.	312 lbs.	345 lbs.	399 lbs.

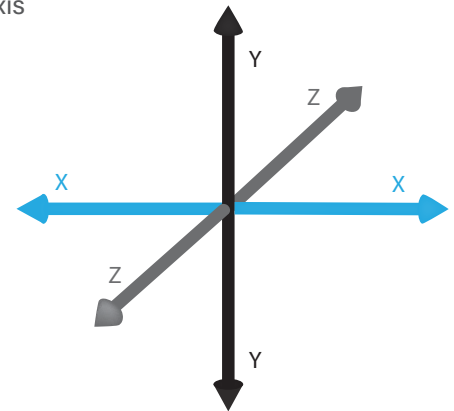
The figures above reflect the total force required to deflect the V and U connector its full rate movement, pressurized to 150 PSIG for 1/2" through 10" and 100 PSIG for 12"

### V AND U CONNECTOR MOVEMENT & FLEXIBILITY:

#### More flexibility than standard metal and rubber expansion joints:

For all movements, each hose leg of the V and U connector moves in lateral directions, minimizing weld attachment stresses. The configuration of the V and U shaped connectors also reduces pipe intrusion into adjacent spaces.

- Allow movement along the X, Y, and Z axis



- Standard 2", 3", 4" movement, larger movement needs can be designed and fabricated upon request

Movements are primarily in lateral directions minimizing weld attachment stresses. Weld attachment stresses are a high cause of failure on deflected braided metal hose connectors. The V and U shaped connector configuration reduces pipe intrusion into adjacent spaces. Minimizing weld attachment stresses.

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## V CONNECTORS

### CONSTRUCTION & ATTRIBUTES:

The V connector consists of two flexible sections of hose and braid, two 45 degree elbows and one 90 degree elbow for a total of 180 degrees in pipe change.

### Nesting Configurations:

The design of the V allows for easy configuration. The V can be nested within additional V's, taking up less valuable space and does not require additional pipe extensions. Nesting V configurations do not require any special order components. Ordering in stock connectors saves you both time and money.



## U LOOPS

### CONSTRUCTION & ATTRIBUTES:

The U Loop consists of two flexible sections of hose and braid, two 90 degree elbows, and a 180 degree return equaling a 360 degree pipe change.

### Nesting Configurations:

The U Loop has a larger nesting footprint than that of the V connector. Nested U Loops can be used in parallel pipe runs to keep all the expansion devices at one location and to save space. They can also be nested in any number of sequences and with any number of pipes. Just specify pipe diameter sequence and the corresponding distance between pipe center lines when ordering.



## L DOG LEG

IN STEAM APPLICATIONS, HORIZONTAL INSTALLATION IS RECOMMENDED TO AVOID CONDENSATE BUILDUP

### CONSTRUCTION & ATTRIBUTES:

The L Dog Leg consists of two flexible sections of hose and braid and one 90 degree elbow for a total of 90 degrees in pipe change.

### Nesting Configurations:

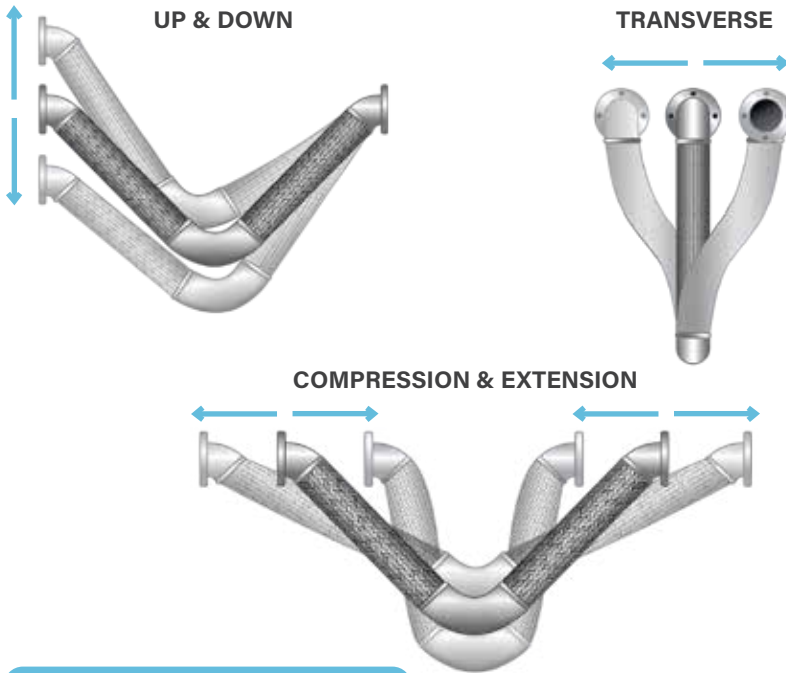
The L Dog Leg has the ability to nest within itself, taking up less valuable space, and is also an excellent alternative to a hard pipe 90 degree change within piping system. The design of the L allows for easy configuration and requires no additional pipe extensions. Ordering in stock connectors saves you both time and money!



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## MOVEMENT



## V, U, L MATERIALS

### Hose, Braid & Collar:

- Stainless Steel
- Bronze

## SIZES

- Sizes: ½" I.D. - 24" I.D.

### Movements:

- Standard 2", 3", 4" motion
- \* Custom motions available

## END FITTINGS

- Stainless steel, Carbon Steel, and Copper



\* Custom end fittings are available

### Pressure Ratings: depending on ID - WRK PSI 110 - 3,255

- Single braid - standard pressure
- Double braid - higher pressures

## V AND U OPTIONS

### Drain Ports:

- Required for steam systems

### Hanger:

- On 90 degree or 45 degree elbow for piping system support in horizontal or vertical installations

### Stainless Steel Liner

### Sewage:

- Clean access out at 90 degrees on the V or 180 degree return on U



ELBOW WITH DRAIN AND HANGER



### Fire SafeFlex™ :

- For fire suppression systems
- NFPA 13



### Lead-Free Flex™ :

- NSF 61 and 372 lead free systems

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## INSTALLATION:

- The standard position of the V or U is with the 90 or 180 degree elbow hanging down.
- Horizontal and vertical mounting yields the same allowance for motion as long as the 90 or 180 degree elbow is properly supported with a hanger to avoid sagging or torquing
- V/U/L connectors must be supported if installed in any other position than the standard position. Supporting cable or pipe hanger rod should be attached to a hanger located at the bottom of the 90 or 180 degree elbow.

## REMEMBER, it is recommended that seismic connectors be replaced after any seismic activity

In expansion compensation situations, the V and U connector can be installed pre-compressed or pre-extended, only if the full range of motion will be encountered in only one direction. Consultation with TCH is a **must** if it is pre-compressed situation.

Larger connectors are supplied with shipping bars attached. These bars are tack welded on to maintain proper designed length. The shipping bars need to be removed from the V or U after installation.

For steam applications, a drain port and a plug is to be specified and factory installed into the bottom of the 90 or 180 degree elbow to allow condensate to be drained. An alternative position for steam service, is with the 90 or 180 degree elbow pointing upward. Installing the V or U connector in this way will allow natural drainage into the surrounding piping.

## REMEMBER: For steam applications, horizontal installation is recommended to avoid condensate buildup

Anchors are required on either side of the V or U connector to react to the spring forces of the connector. Pressure thrust loads are not a consideration because the V or U connector will not impose pressure thrust onto the system. 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.

## PIPE GUIDES & SLIDES

### Pipe guides are always recommended in applications involving thermal movement:

- Pipe guides are needed to facilitate the thermal expansion of a pipeline so that the movement is properly directed to the expansion joint
- Pipe guides are designed to prevent buckling or squirming of the pipe
- Proper guiding and anchoring are essential to the correct installation of expansion joints
- Axial movement 4", 6" and 8"
- Pre-insulated guides are available
- Available in 1/2" through 24" I.D. pipe diameters
- \* **Custom sizes available**
- Provides protection for expansion joints, piping system and vital equipment from shearing and lateral forces.



SPIDER GUIDE