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## Standard Specification

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### RECOMMENDED ENGINEERING SPECIFICATION FOR TRI-FLEX LOOP®

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Tri-Flex Loop, model TFL2 (+/-2") axial or TFL4 (+/-4" axial), which provides a flexible pipe loop that will absorb and compensate multi-plane movements (X, Y, and Z), plus rotation about those axes simultaneously as well as reduce piping stress.
- Models TFL2/4SMN (male NPT ends)
  - Models TFL2/4SMP (150# plate steel flanges)
  - Models TFL2/4SVG (groove pipe ends)
  - Models TFL2/4SWN (beveled weld ends)
  - Models TFL2/4BSW (copper female sweat end)
  - Models TFL2/4BHM (copper male NPT ends)
  - Models TFL2/4BPP (copper female press fit ends)
  - Models TFL2/4BSWRFR (UL 207 listed in sizes ¼ - 2½" copper female sweat for refrigeration)
  - Models ULTFL2/4SMN (UL536 listed in sizes 1" to 4" nominal pipe size)
  - Models ULTFL2/4SMP (UL536 listed in sizes 1" to 4" nominal pipe size)
  - Models ULTFL2/4SWN (UL536 listed in sizes 1" to 4" nominal pipe size)

##### 1.02 MANUFACTURES

- A. Tri-Flex Loop shall be manufactured by Flex Hose Co., FHC-International, Anvil-Star or pre-approved equal.

#### PART 2 PRODUCTS

##### 2.01 TRI-FLEX LOOP

- A. Construction to be 3 equal length sections of annular corrugated 321 / 304L stainless steel (bronze for models TFLBSW, TFLBHM and TFLBPP) close-pitch hose (made in USA) with stainless steel (or bronze for models TFLBSW, TFLBHM and TFLBPP) over-braid (made in USA) that will absorb or compensate for pipe movements in all 6 degrees of freedom (3 coordinate axes, plus rotation about those axes) simultaneously.
- B. The corrugated metal hose, braid(s), and a stainless steel ring-ferrule/band (material gauge not less than .048") must be integrally seal welded using a 100% circumferential, full penetration TIG welds. End fittings shall be selected per application. Fittings must be attached using a 100% circumferential TIG weld.
- C. When service is compressed or combustible gases and ID size is 1" - 4" pre-manufactured flexible loops shall have UL536 listing for compressed and combustible gases, such as: liquefied petroleum gases, and manufactured and natural fuel gases, at pressures not exceeding 175 PSI at ambient temperature.
- D. When service is high pressure refrigerant (typically in variable flow refrigerant systems) and nominal copper tube sizes ¼" through 2½", pre-manufactured flexible loops shall have a UL 207 listing for use with compatible refrigerants (not for use with ammonia refrigerants) and have a full 5:1 burst to working pressure ratio. They shall be provided cleaned and capped for use in refrigerant systems.
- E. Braided stainless steel Tri-Flex Loops must be suitable for operating temperatures up to 850 degrees F (455 degrees C). Braided bronze Tri-Flex Loops must be suitable for operating temperatures up to 400 degrees F (204 degrees C)
- F. Tri-Flex Loop must be designed for pressure testing to 1.5 times their maximum rated working pressure and a minimum 4:1 (burst to working) safety factor.
- G. Each braided Tri-Flex Loop shall be individually leak tested by the manufacturer using air-under-water and/or hydrostatic pressure.
- H. Tri-Flex Loops shall be prepared for shipment using a cut-to-length metal shipping bar, tacked securely between the elbows of the two parallel legs, to maintain the manufactured length during shipping. Shipping bar must be removed prior to system start-up.

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- I. The Flex-Hose Co. Tri-Flex hanger assembly kit shall be used to support and hang the Tri-Flex Loop. The UL Listed Seismic Wire/Cable assemblies conform to the requirements of the ASCE (American Society of Civil Engineers) guidelines for structural applications of wire rope, in that the cable is pre-stretched and the permanent end fittings maintain the break strength of the cable with a safety factor of two.
- J. The pre-manufactured flexible loop shall be installed and guided following the manufacturer's published installation instructions. The Flex-Hose Co. Tri-Flex Loop requires no pipe guides. Manufactured loops that require pipe alignment guides shall use "Spider" type with outer housing ring affixed to building structure with rigid elements. Units shall be fabricated from carbon steel. Pipe hangers and/or roller supports shall not be considered acceptable for use as guides.
- K. The pre-manufactured flexible loop design shall be tested by an independent third party to confirm simultaneous movement in X, Y, and Z planes plus rotation about those axes. Third party testing will document and confirm motion capabilities of the device. Device testing to include large and irregular movements similar to movement that may be caused by seismic movement analytically using finite element modeling and computer simulation as well as physical testing of the device. Independent third party testing data and documentation are to be furnished upon the engineers request during pre-qualification process or at the time of submission.
- L. The pre-manufactured flexible loop shall meet the requirements of the 2018 International Building Code (IBC) and the American Society of Civil Engineers code requirements for Total Maximum Displacement and accidental torsion as directed in IBC Chapter 16 and ASCE 7-16, Chapter 13.
- M. When used for potable water (in copper tubing systems) the models TFLBSW and TFLBPP shall be third party tested and, listed (by a laboratory in compliance with all applicable requirements of ISO/IEC 17025) and marked in accordance with NSF/ANSI 61-2016. *SPECIAL NOTE: Drinking water supplies that are less than pH 6.5 may require corrosion control to limit leaching of copper into the drinking water.*
- N. When used for potable water (in copper tubing systems) the model TFLBSW shall be third party tested and, listed (by a laboratory in compliance with all applicable requirements of ISO/IEC 17025) and marked in accordance with Section 1417(d) of the Safe Drinking Water Act. Must meet the lead content requirements of Section 116875 of the California Health & Safety Code, and the criteria of NSF/ANSI 372-2016 for low lead.
- O. When used for potable water (in steel piping systems) the models TFLSMP, TFLSMN and TFLSVG shall be third party tested and, listed (by a laboratory in compliance with all applicable requirements of ISO/IEC 17025) and marked in accordance with NSF/ANSI 61-2016
- P. When used for potable water (in steel piping systems) the models TFLSMP, TFLSMN and TFLSVG shall be third party tested and, listed (by a laboratory in compliance with all applicable requirements of ISO/IEC 17025) and marked in accordance with Section 1417(d) of the Safe Drinking Water Act. Must meet the lead content requirements of Section 116875 of the California Health & Safety Code, and the criteria of NSF/ANSI 372-2016 for low lead.
- Q. When used for potable water (in stainless steel piping systems) the models TFLSSMP6, TFLSSMN6 and TFLSSVG6 shall be third party tested and, listed (by a laboratory in compliance with all applicable requirements of ISO/IEC 17025) and marked in accordance with NSF/ANSI 61-2016
- R. When used for potable water (in stainless steel piping systems) the models TFLSSMP6, TFLSSMN6 and TFLSSVG6 shall be third party tested and, listed (by a laboratory in compliance with all applicable requirements of ISO/IEC 17025) and marked in accordance with Section 1417(d) of the Safe Drinking Water Act. Must meet the lead content requirements of Section 116875 of the California Health & Safety Code, and the criteria of NSF/ANSI 372-2016 for low lead.

### 2.02 WARRANTY

Tri-Flex Loop must have a 5-year full replacement warranty when installed in accordance with all specifications and installation instructions as described in the Flex-Hose Tri-Flex Loop Installation and Maintenance Instructions.

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