Protect your building from critical seismic movement with the Tri-Flex Loop

Isolating Building Joints

Tri-Flex Loop meets the stringent requirements of the International Building Code and ASCE Standards for seismic applications.

Find out how the IBC & ASCE seismic regulations will impact your next building.

www.flexhose.com • Toll Free 1.877.TRI-FLEX
Isolate Building Joints

The Tri-Flex Loop® Seismic Connection System
meet the requirements of Chapter 17.1.1 of ASCE Standard 7-16 code for total displacement.

From coast to coast, the 2018 International Building Code (IBC) & ASCE Standard 7-16 are requiring architects, engineers and building owners to adapt to new building requirements related to seismic regulations. Flex-Hose Company’s Tri-Flex Loop design meets the displacement requirements as defined by Chapter 17.1.1 of the ASCE 7-16 code. It's three flexible sections allow it to compensate movement in six degrees of freedom (three coordinates axes, plus rotation about those axes simultaneously from random seismic shifts).

2018 International Building Code (IBC) Section 1613-Earthquake Loads 1613.1 Scope. Every structure and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable. The seismic design category for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

ASCE Standard 7-16

- Chapter 17 - Seismic Design Requirements for Seismically Isolated Structures

17.1. General
Every seismically isolated structure and every portion thereof shall be designed and constructed in accordance with the requirements of this section and the applicable requirements of this standard.

17.1.1 Definitions
Maximum Displacement
The maximum lateral displacement, excluding additional displacement caused by actual and accidental torsion, required for design of the isolation system. The maximum displacement is to be computed separately using upper bound and lower bound properties.

Total Maximum Displacement
The total maximum displacement, including additional displacement caused by the actual and accidental torsion, required for verification of the stability of the isolation system or elements thereof, design of structure separations, and vertical load testing of isolator unit prototypes. The total maximum displacement is to be computed separately using upper bound and lower bound properties.

ASCE Standard 7-16 Chapter 11

11.1.2 Scope. Every structure and portion thereof, including nonstructural components, shall be designed and constructed to resist the effects of earthquake motions as prescribed by the seismic requirements of this standard. Certain nonbuilding structures as described in Chapter 15, are also within the scope and shall be designed and constructed in accordance with the requirements of chapter 15. Requirements concerning altensions, additions and change of use are set forth in Appendix 11B. Existing structures and alterations to existing structures need only comply with the seismic requirements of this standard where required by Appendix 11B.

17.2.6.2 Components Crossing the Isolation Interface. Elements of seismically isolated structures and nonstructural components, or portions thereof, that cross the isolation interface, shall be designed to withstand the total maximum displacement and to accommodate on a long term basis any permanent residual displacement.

Tri-Flex Loop Specifications:
The Tri-Flex Loop patented design meets the displacement requirements as defined Chapter 17 of ASCE Standard 7-16. Its three flexible sections allow it to compensate movement in six degrees of freedom (three coordinates axes, plus rotation about those axes simultaneously from random seismic movements and displacements).

The New York State Center for Advanced Technology (CAT) at Rensselaer Polytechnic Institute, Troy, NY Tri-Flex Loop Flexible Coupling for Seismic Applications Testing Project No. A70614, October 1998

The focus of the Flexible Coupling Evaluation is to study the motion capabilities of the Flex-Hose Tri-Flex loop. The product is designed to withstand large and irregular movements such as might be caused by seismic activities. Testing was conducted by (1) analytically using finite element modeling and computer simulation and (2) using physical testing.

The experimental results, in which the Flex-Hose Tri-Flex loop exhibited significantly superior ability to withstand repeated cyclic loading in three dimensions. Based on the testing conducted on the Tri-Flex Loop, it is likely that the Flex-Hose Tri-Flex Loop will withstand limited application of displacements in excess of those published by the manufacturer without failure.

The New York State Center for Advanced Technology (CAT) concluded the Flex-Hose Tri-Flex Loop is found to be more likely to survive a seismic event where large, three dimensional relative displacements of the ends of the coupling are allowed.

Tri-Flex Loop’s superior capabilities were proven in computer-controlled, rigorous robotic testing at the New York State Center for Advanced Technology (CAT) at Rensselaer Polytechnic Institute and are available on a video.

For your complimentary copy of the testing CD call us toll free 1-877-TRI-FLEX.
Tri-Flex Loop® Factory Cable Hanger Support Systems meet the requirements of the ASCE Standard 7-16 Chapter 13.6.4, 13.6.4.1, 13.6.7 for piping systems and component supports.

ASCE Standard 7-16

- Chapter 13 - Structural Design Requirements for Non-Structural Components

13.6.4 Component Supports. Mechanical and Electrical component supports (including those with Ip=1.0) and the means by which they are attached to the component shall be designed for the forces and displacements determined in Sections 13.3.1 and 13.3.2. Such supports include structural members, braces, frames, skirts, legs, saddles, pedestals, cables, guys, stays, snubbers, tethers and elements forged or cast as part of the mechanical or electrical component.

13.6.4.1 Design Basis. If standard supports, for example, ASME B31, NFPA 13, or MSS SP-58, or proprietary supports are used, they shall be designed by either load rating (i.e., testing) or for the calculated seismic forces. In addition, the stiffness of the support, where appropriate, shall be designed such that the seismic load path for the component performs its intended function.

13.6.7 Distribution Systems: Piping and Tubing Systems. Unless otherwise noted in this section, piping and tubing systems shall be designed for the seismic forces and seismic relative displacements of Section 13.3. ASME pressure piping systems shall satisfy the requirements of section 13.6.7.1. Fire protection sprinkler piping shall satisfy the requirements of section 13.6.7.2. Elevator system piping shall satisfy the requirements of section 13.6.11.

13.6.7.1 ASME Pressure Piping Systems. Pressure piping systems, including their supports, designed and constructed in accordance with ASME B31 shall be deemed to meet the force, displacement, and other requirements of this section. In lieu of specific force and displacement requirements provided in ASME B31, the force and displacement requirements of Section 13.3 shall be used.

13.6.7.2 Fire Protection Sprinkler Systems. Fire protection sprinkler piping, pipe hanger, and bracing designed and constructed in accordance with NFPA 13 shall be deemed to meet the force and displacement requirements of this section.

Compliant Tri-Flex Loop® Cable Hanger Assembly Kits meet the requirements of the ASCE 7-16 Chapters 13.6.4, 13.6.4.1 and 13.6.7 for component supports in that they are designed for load rating and third party tested. The UL Listed Seismic Wire Rope/Cable used in our hanger assemblies conforms to the requirement of ASCE (American Society of Civil Engineers) guidelines for structural application of wire rope in that the cable is prestretched and permanent end fittings maintain the breakstrength of the cable with a safety factor of two.

Simple and Reliable

- Use RED CABLE kit for installing all Tri-Flex Loops up to 8” in diameter.
- Use BLUE CABLE kit for installing all Tri-Flex Loops of 10” or larger in diameter.

Contents of kits:
- 2 URC (universal restraint) clips for attaching to structure
- 4 zinc-plated copper oval sleeves
- 2 red or blue cables, 13 ft. long
**PROGRAM FEATURES**

- Building seismic joints
- Automatically selects UL® Listed hanger assemblies
- Calculates nest of expansion seismic loops
- Calculates spring rates of expansion seismic loops
- Creates detailed schedule or submittals
- Allows saving of projects, opening new projects, and editing of projects
- Industry terminology
- Application examples
- Specifications

**Seismic Loop Sizing Program**

**It’s FREE!**

**Auto CAD Compatible**

**LISTED**

- Tri-Flex Loop® for compressed and combustible gases 33NB
- CSA standard B51 certified. Inspected and tested by the Technical Standards and Safety Authority of Canada.
- FM APPROVED For Fire Protection Systems

**FLEX-HOSE WARRANTY**

- 5-YEAR WARRANTY
- PRO PRODUCT REPLACEMENT WARRANTY
- EXCEEDS INDUSTRY STANDARD

**-cycle tested for 20,000 cycles**

**The complete seismic system solution.**

**Tri-Flex Loop® Hanger Assembly Kit and Accessories**

The UL Listed Seismic Wire Rope/Cable™ used in our hanger 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 breakstrength of the cable with a safety factor of two.

**Tri-Flex Loop® Factory Cable Anchor Kit**

It’s simple, reliable & it reduces pipe anchoring costs!

The Tri-Flex Loop Factory Cable Anchor Kit saves valuable time on Tri-Flex Loop installation, making it easy to anchor the piping system when using the revolutionary Tri-Flex Loop.

The UL Listed Seismic Wire Rope/Cable™ used in our hanger 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 prestretched and the permanent end fittings maintain the breakstrength of the cable with a safety factor of two.

**The Tri-Flex Loop meets the most stringent requirements of the ASCE and the International Building Code!**

**Save Labor Costs with these Tri-Flex Loop Accessories!**

- Color coded, factory cable cutter & crimper to meet cable specifications
- Color coded for Tri-Flex Loop installations of 10" and larger in diameter
- Color coded for Tri-Flex Loop installations of up to 8" diameter

**Listed • Color Coded • Pre-stretched • Breakstrength Certified**

**UL Listed Hanger Lug**

**UL Listed Seismic Wire Rope/Cable**

**UL Listed Hanging Lug**

**UL Listed Factory Cable Anchor Kit**

**UL Listed URC for attaching to structure**

**Oval Sleeve**

**UL Listed Seismic Cable Rope/Cable**

**UL Listed Hanging Lug**

**Tri-Flex Loop® Factory Cable Anchor Kit**

**Listed • Factory Assembled • Simply install over pipe & fasten to above structure**

- Color Coded • Pre-stretched • Breakstrength Certified

* UL EK268P5 Vibration & Seismic Technologies

**TRI-FLEX LOOP® FACTORY CABLE ANCHOR KIT**

**UL Listed**

**Broken Strength Certified**

**Listed • Pre-stretched**

**Color Coded**

**Tri-Flex Loop® meets the most stringent requirements of ASCE Standards and the International Building Code.**
Tri-Flex Loop®
A World of Difference...
IN CRITICAL PIPING CONNECTIONS SINCE 1968

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Expanded Design & Manufacturing • 6809 Crossbow Drive, East Syracuse, NY 13057 • 315.701.0001 • Fax 315.701.0012
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LISTED
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UL
ASME
FM
CSA standard 851 certified, inspected and tested by the Technical Standards and Safety Authority of Canada.