

# Metal Hose from Penflex Delivers Leak-Free Cryogenic Transfer Solutions

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As metal hose is the sole means of transferring cryogenic media with minimal evaporation and without significant changes in temperature or pressure, Penflex has consistently refined its manufacturing and leak testing processes to best serve the cryogenic market.

From cryogenic hose assemblies and bulk hose used in cryogenic applications to metal expansion joints and bellows, our products are leak-tested to the highest industry standards using a mass spectrometer. Such a device is capable of detecting leaks as small as  $10E-9$  cubic centimeters per second—whereby it would take a year and a half for one bubble to escape under water—establishing mass spectrometer tests that use helium tracer gas as the most accurate means of leak detection.

Mass spectrometers were first developed as part of the Manhattan Project during World War II, using electrostatic or magnetic sectors, or a combination of the two, to analyze particle mass.

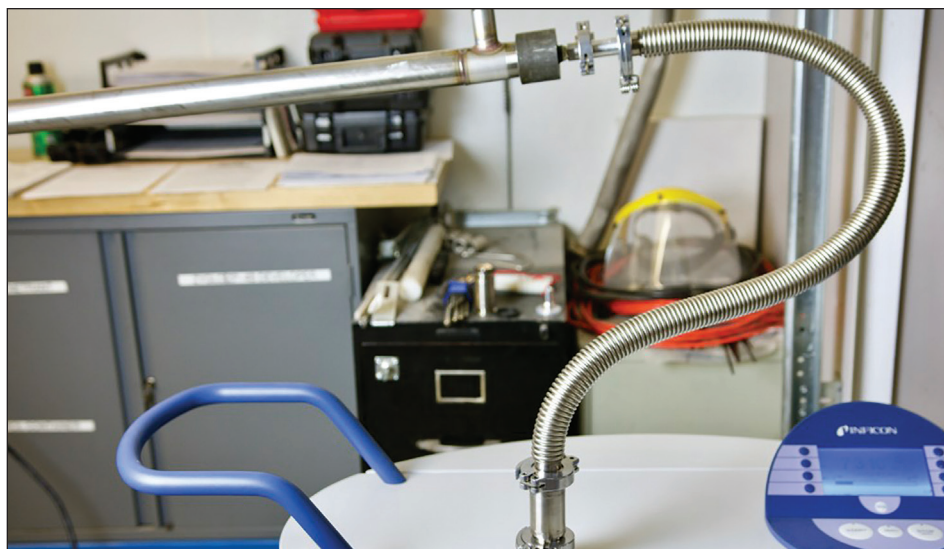
Testing with current mass spectrometers requires a vacuum-sealed chamber that is filled with helium. Helium acts as a tracer gas because its atoms are among the smallest and can thus penetrate small leaks quickly. As the gas escapes from the chamber, the machine measures the rate of leakage.

Such tests are carried out in our non-destructive testing lab, itself compliant with the American National Standards Institute. Whether the hoses will be used to transfer LNG from carrier to storage tank, as part of an oxygen transfilling system in an individual's home, or for something in between, they have all received the same rigorous testing in an environment that prides itself on cleanliness and safety.

Beyond leak testing, our mechanical forming process, whereby we make flexible



*Hose assemblies made from P3 hose series with interlocked guards and armored ends. Image: Penflex*



*Mass spectrometer machine pulling vacuum on chamber containing hose assembly. Image: Penflex*

hose from metal tube, provides additional advantages for hose and hose assemblies used in cryogenic applications.

We use an “outside-in” method to create corrugations, meaning the inside of the hose remains untouched, offering an additional level of security against unwanted contaminants. This method also enables us

to make hose from thicker walled materials which demonstrate greater resistance to corrosion and longer hose life than thinner walled counterparts.

Together, Penflex's manufacturing and leak-testing processes mean more efficient transfer of cryogenic media with hoses that are built to last. [www.penflex.com](http://www.penflex.com) ■