

PENFLEX

FLEXIBLE HELIUM TRANSFER HOSES FOR SUPER-COOLING TELESCOPES

Without the super-cooling properties of helium, astronomers wouldn't be able to see as much of the universe as clearly. The heat of their telescopes would overpower the light they're looking to capture from stars and planets lightyears away and invisible to the naked eye.

For this reason, helium gas plays a mission critical role in the operation of large telescopes around the world. The gas' ability to do its job depends on a reliable piping system to move it in and around telescope instrumentation.

HELIUM TRANSFER HOSES

Penflex designs and manufactures stainless steel hose assemblies specifically for the transfer of helium within large telescopes. Constant movement of the apparatus as it aims at different parts of the sky means hoses are subject to continuous dynamic cycling. Accordingly, our helium transfer hoses are highly flexible, requiring little force to bend and resisting deformation even after repeated cycling.

Understanding the importance of flexibility and movement, we've designed our helium transfer hoses with the following characteristics.

- **Annular hose design.** Annular hoses, where corrugations are "stacked" parallel to one another, consistently achieve longer dynamic cycling than helical hoses, where corrugations have a screw-like appearance, given bending happens between the corrugations rather than through them.
- **Thin wall.** Using thinner metal strip to make our helium transfer hoses means less force is required to bend the hose. Force to bend is a key indicator of how flexible a hose is.

At a glance

Penflex offers the widest range of metal hose and braid products in the industry.

Nominal I.D. ranges from 1/4" to 24".

Compressed pitch options for increased flexibility.

On-call engineering support for hose assembly design.

Special cleanliness requirements for helium transfer hose assemblies.

Helium mass spectrometer leak testing.

ASME IX certified welders and on-site Certified Welding Educator, Certified Welding Inspector and Non-Destructive Examiner ensures highest quality fabrication.

- **Compressed pitch.** The greater the number of corrugations, or the higher the corrugation count, the more flexible a hose will be. To give our customers a greater range of options, we offer both standard and compressed pitch.
- **Higher corrugation height.** Increasing the height of the corrugations is another way to increase the flexibility of a hose.

Getting in touch

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CLEANLINESS REQUIREMENTS

The utmost care is taken to prevent matter from settling within our helium transfer hoses during the manufacturing process.

Procedures we have developed to deliver finished hoses cleaned, charged and ready for astronomical service include plugging the hose when cutting ends to prevent chips from getting inside and using tools reserved solely for stainless steel. Beyond visual inspection, we use a borescope to identify contaminants that may have entered the hose as a final step before leak testing, removing any that may be found.

HELIUM MASS SPECTROMETER TESTING

With the ability to detect leaks as small as 10E-9 cubic centimeters per second, Penflex uses a mass spectrometer with helium tracer gas to leak test our helium transfer hoses. First used to test for leaks in uranium plants as part of the Manhattan Project during WWII, helium mass spectrometer testing is among the most accurate methods of leak detection.

ASME SECTION IX WELDERS

Penflex welders are certified to American Society of Mechanical Engineers (ASME) Section IX, the industry's highest standards. They have undergone rigorous training and years of experience to deliver the superior welds that have become a trademark of our work, meaning our helium transfer hoses are complete with top quality welds.

From design through to fabrication and welding, our helium transfer hoses are carefully crafted to move in sync with the world's largest telescopes to keep all necessary instrumentation super-cooled.

