

4.23 Feedthrough for Severe Environments and Temperatures

Statement: Affordable hermetic seal for feedthrough of wires, tubes, or fibers.

Problem: Needed solution for the hermetically sealed feedthrough of wires, tubes, or fibers from one process side to another process side.

Solution and technology description: The feedthrough is a fully reconfigurable design; however, it can also be produced as a permanent device. Packing material disks used in the construction of the device can be replaced as needed for rebuilding a given feedthrough for another job or a different set of feeds if potting is not used for the original feedthrough build. (Potting on one or both sides of the sleeve provides double or triple leak sealing protection). Variable Compression Ratio connectors were adapted for the pressure seal on the feedthrough; however, any commercial connector can be similarly adapted. The design can easily be scaled up to larger (50 mm diameter) and even very large (300 mm or more) sizes.

Benefits: The technology offers multiple advantages, including:

- Leak proof - leak testing of feedthrough under extreme cryogenic and vacuum conditions resulted in no leakage.
- Reconfigurable - when constructed without potting, feedthroughs can be disassembled, reconfigured, and reused for a different application.
- Adaptable - can be used with capillary tubing, fiber optics, wiring, and many other types of applications. The number of feeds can be as many as the overall diameter permits. Any type of commercial connector can be adapted for the pressure seal.
- Scalable - feedthrough design can be scaled up for larger (50 mm diameter) or even very large (300 mm or more) sizes.
- Affordable - feedthrough is constructed using commercial off-the-shelf components and is simple to assemble with no special tooling.
- Versatile - either side of the feedthrough can be a high pressure or a high vacuum environment. Either side can also be either full cryogenic (-269°C) or elevated (152°C) temperature. Handles thermal cycling, pressure cycling, corrosive, and severe transient conditions with no performance degradation.

Areas of application: This technology could be efficiently used in:

- Manufacturing.
- Transportation.
- Electrical Power Generation.