

## A Hermeticity

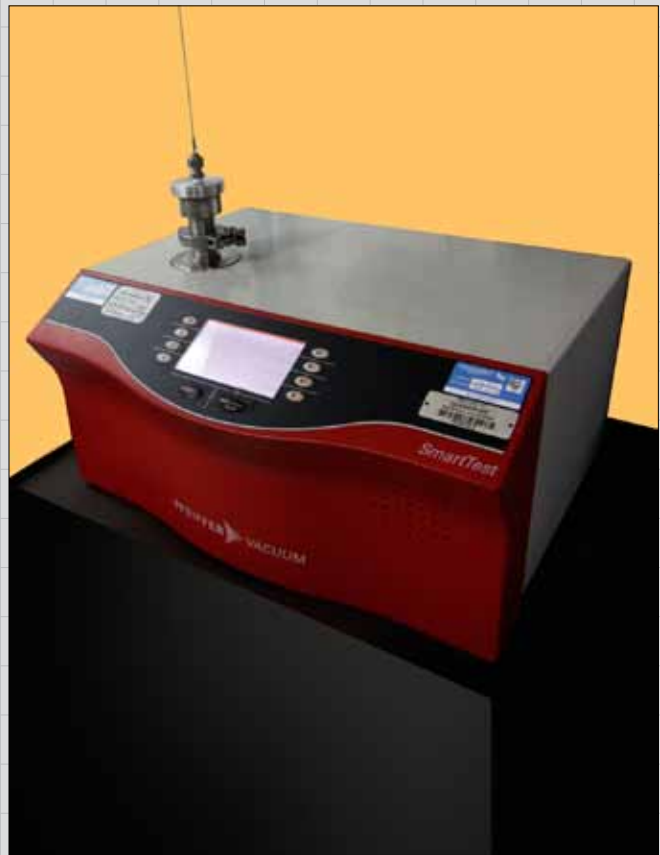
Hermeticity is defined as "the state or condition of being airtight". Sophisticated military electronics enclosures can experience electrical failure from ingress of moisture. System engineers can design the enclosure to withstand exposure to moisture and condensation by using "moisture-hardened" components and conformal coatings, but often the most practical approach is to install hermetically sealed electrical I/O connectors. Glass-to-metal seals provide assurance that, over the life of the enclosure, the accumulated amount of water vapor inside the box will not exceed the amount necessary to form condensation. Other applications for Micro-D hermetic connectors include vacuum chambers, cryogenics, and enclosures filled with inert gas.

### Hermetic Testing

All hermetic connectors are 100% tested prior to shipment. A helium leak test is performed to certify the hermetic seal. This test is conducted by inducing a 1 ATM vacuum on one side of the connector. Helium gas is released on the other side, and a mass spectrometer "counts" the number of helium molecules that penetrate the connector seal. Helium leak testing takes advantage of the small size of a helium molecule compared to air or water vapor. Helium is inert, rare in our atmosphere, and is easy to detect with a mass spectrometer.

### Helium Leak Rates

Std cc/sec Approximate	Approximate Bubble Equivalent
$1 \times 10^{-1}$	1 cc/10 sec
$1 \times 10^{-2}$	1 cc/100 sec
$1 \times 10^{-3}$	1 cc/hour
$1 \times 10^{-4}$	1 cc/3 hours
$1 \times 10^{-5}$	1 cc/24 hours
$1 \times 10^{-6}$	1 cc/2 weeks
$1 \times 10^{-7}$	3 cc/year
$1 \times 10^{-8}$	1 cc/3 year
$1 \times 10^{-9}$	1 cc/30 years
$1 \times 10^{-11}$	1 cc/3000 years



Close up of gas tube assembly undergoing helium leak test at the Glenair Factory in Glendale, CA