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Mass Spectrometer – Helium Leak Test

Helium leak mass spectrometer test is a way to detect very small leaks across a pressure boundary.

THE Applus+ SOLUTION

The helium leak test is conducted with the use of a mass spectrometer, which is calibrated to detect the presence of helium molecules. Helium molecules are very small, so using helium as a tracer gas will find very small leaks that other leak tests may not find.

This can be conducted in one of 3 ways: Detector-probe technique, Tracer-probe technique, or Hood technique.

The detector-probe helium leak test is conducted by pressurising a component with helium gas, and then scanning the component by "sniffing" for the presence of helium with the detector probe. The mass spectrometer is monitored to verify the presence of helium leakage.

The tracer-probe test is conducted by placing the component under a vacuum and connecting it to the mass spectrometer. The tracer probe is then used to "spray" helium around the component under test. If a leak is present, the helium will be drawn into the part due to the differential pressure. The mass spectrometer is monitored to verify the presence of helium leakage.

The Hood test is conducted by placing the component under a vacuum and connected to the mass spectrometer. A "hood" or "envelope" is then established around a portion of the component under test, such as the tube-sheet bundle of a heat exchanger. The hood, which is normally made of a plastic material or bag, is then filled with helium to

test a large area at one time. If a leak is present, the helium will be drawn into the part due to the differential pressure. The mass spectrometer is monitored to verify the presence of helium leakage.

The helium leak tests and mass spectrometer testing at Applus+ are delivered by certified technicians and equipment to perform to all methods in accordance with various codes and customer requirements.

Target customers

Helium leak tests and mass spectrometer testing is performed on many components in the nuclear, chemical and aerospace industries, among others. It is imperative to ensure a component passes a helium leak test to ensure it is leak tight.

Some components, such as heat exchangers, must be tested to ensure that the gases and/or liquids are not mixing due to a leak, which could be extremely detrimental to operations.

Other components need helium leak tests to ensure that they are vacuum tight. If a leak was present and air or other gases/liquids were drawn into the system, system performance could be drastically impacted in a negative way.

Key customer benefits

The advantage of performing helium leak tests is the ability to find very small leaks in components. The presence of leaks in certain systems could be extremely hazardous both to personnel and to the environment.