

VTech e-news

Tracer Gas Leak Detection

#16

Automating the Sniffing Process

Up until now, tracer gas leak detection involved a tradeoff between automation and manual operation, with the former unable to detect leak location and the latter being dependent on a human operator.

VTech's latest innovative technology **Punto.Leak** solves this problem, automating the sniffing process by incorporating gas traps, integrated with commercially available leak detectors, all in one compact, portable unit.

Up to 8 gas traps can be affixed to individual leak test points on the unit under test. The **VTech Punto.Leak** begins by checking the overall leakage and if this limit is surpassed, continues to check each gas trap one by one until each leaking point is determined. This leak detection method incorporates operator-independent automation with pinpointing leak location. Watch the video at left for a brief demonstration.

The **VTech Punto.Leak** is available for use with any commercial leak detectors including Helium, Hydrogen/Nitrogen mix and our Refrigerant leak detector, based on infrared technology. [Click here](#) for more information on the **VTech Punto.Leak** or contact Gordon Purkis at (404) 432-1629 or g.purkis@vtechonline.com



**VTech MasSpec Outside-In
Helium Leak Detection System**

Background: Tracer Gas Leak Detection

The term "tracer gas leak testing" describes a group of test methods intended to detect and measure the flow of a tracer gas through a leak. Examples of tracer gases include halogen (refrigerants), helium and hydrogen 5%/nitrogen 95% mix. These techniques differ depending on the tracer gas used and the equipment design.

The most commonly used tracer gas, other than halogen refrigerants, is helium. Helium has been used successfully as a tracer gas for long time due to its physical properties. It is neither toxic nor flammable, is inert and does not react with other compounds. Helium has low viscosity and relative molecular mass, so it easily passes through porosities. In the same environmental conditions, it flows through orifices 2.7 times faster than air. Since its concentration in air is low (5 ppm), it is easy to detect an increment of helium concentration. However, there are some shortcomings. Helium disperses slowly

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Product Spotlight

Other Automatic Tracer Gas Systems

In addition to the VTech Punto.Leak, VTech offers two additional automatic tracer gas leak detection systems, the [VTech VacuTester](#) inside-out "vacuum chamber" system and the [VTech MasSpec](#) "outside-in" system. Both systems use helium as a tracer gas, provide a pass/fail result, but there are fundamental differences in the two machines. To follow is a comparison between the two:

VacuTester

Inside-out helium leak detectors, also called vacuum chamber systems, check for leaks by evacuating the chamber and charging the component or system under test with helium. Any helium that leaks from the inside-out is pumped toward the mass spectrometer and detected.

Advantages of this method include the greater differential pressure between the vacuum of the chamber and the positive pressure of the part being tested. Along that same line, the parts are tested at a positive pressure in keeping with their design, rather than at a vacuum with an outside-in type system. Inside-out systems can detect a leak in the range of 1×10^{-7} mbar * l/s.

VTech's **VacuTester** (shown below) can incorporate a pressure decay test as well as a manual sniffer for locating leaks.

MasSpec

Outside-in leak detectors operate in the opposite manner as inside-out systems. The component or system under test is evacuated and the containment hood filled with helium, which enters the component through any leaks and is detected by the mass spectrometer.

An Outside-in system uses helium's natural tendency to "stick", similar to that of helium "spraying". One advantage is that there is no need to create a vacuum in the containment hood, which is kept at atmosphere, thereby not requiring roots pumps or a vacuum chamber. An outside machine is intrinsically simpler and a lower cost alternative to an inside-out system.

The leak test resolution is in the range of 1.8×10^{-6} mbar * l/s.

VTech's **MasSpec**, shown at right, is an outside-in system. The containment hood is custom-designed to your specifications to reduce helium consumption.



VTech MasSpec



VTech VacuTester

See page 3 for links to videos on these leak detection systems



Customer Highlight

Tracer Gas Leak Detection Systems continued from page 1

into the atmosphere, so, in case of big leaks, its high concentration will contaminate the area for a long time, even hours. Also, Helium is relatively expensive when compared to other industrial gases, so wasting it in the case of a big leak is very costly. A helium mass-spectrometer is the instrument best suited for detecting it (i.e. mass 4).

It is important to remember that background concentration in air is a limiting factor for any tracer gas detector. There are two ways to carry out leak testing with helium tracer gas: external detection of tracer gas escaping from leaks of a filled unit (inside-out method), and internal detection of tracer gas entering from leaks (outside-in method). For each of these two methods there are two realization techniques. The inside-out methods can be executed with atmospheric sniffing or with vacuum chamber detection, while the outside-in method is generally implemented by putting the unit to be tested in an enclosed space containing the tracer gas or, very rarely, spraying the tracer gas on the unit surface.

To read a paper on the two automatic methods of helium sniffing, outside-in and inside out, please [click here](#).

Video Links:



VTech Punto.Leak



VTech MasSpec



VTech VacuTester

About VTech

VTech combines over 50 years of experience in equipment design and process engineering of HVAC&R assembly lines. Our equipment range includes Leak Detection, Refrigerant Charging and Recovery, Pre-Evacuation, and Electrical Safety/Performance Test. Our Process Software provides an integrated solution for data management and process control. Please visit our website at www.vtechonline.com to browse our catalog and of course, feel free to contact us with any questions.

For Questions and Comments please contact Gordon Purkis at (404) 432-1629 or g.purkis@vtechonline.com