

## Leak Detection through Pressure Decay The Differential Advantage

There are many products today that must be tested for leaks to ensure the highest quality. Products such as valves, containers, storage tanks, radiators and drums are some examples. There are also processes such as welding, bonding or gasketing that require leak testing. Pressure decay is one of the most common methods for detecting leaks. While helium and ion leak detection methods are effective, they are more time consuming and require expensive equipment. Pressure decay utilizing a pressure sensor works well because of its simplicity. By pressurizing the test piece and then isolating it from the pressure source, any subsequent loss of pressure can most likely be attributed to a leak in the product.

There are two methods that can be used to measure pressure decay.

### Method 1:

Diagram 1 shows a plastic container being tested utilizing a gage type transducer. If the container is pressurized to 100 psi and then the valve is closed, the transducer will sense a leak/decay in pressure in the container, if given enough time.

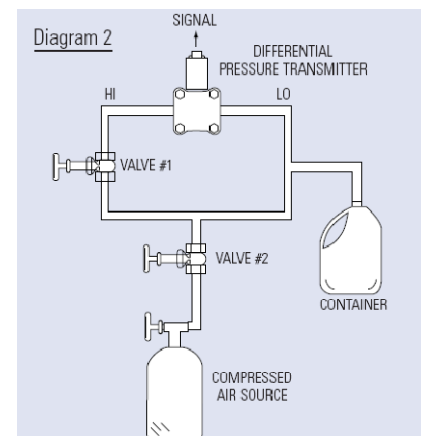
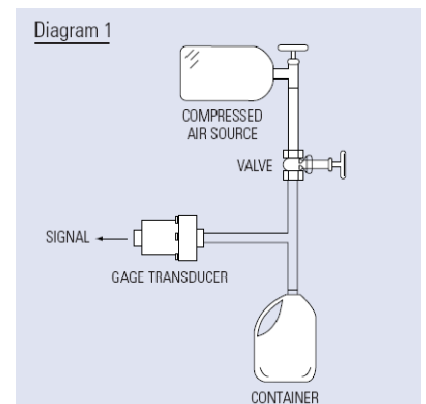
Small leaks can be detected in this manner, although the process can be time consuming. If the transducer's total error band due to nonlinearity, hysteresis, repeatability, etc. is 1%, then a leak cannot be accurately detected until the pressure drops to less than 99 PSI (100 PSI – 1% TTL Error band). Very small leaks could take several minutes to detect.

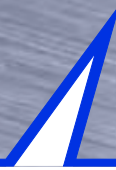
### Method 2:

Using a differential pressure transmitter allows for a more sensitive leak detector. At the start of this test (Diagram 2), valves #1 and #2 are open. The supply pressure is applied to the test system, both sides of the transmitter and the container are pressurized to 100 PSI. Valve #2 is then closed. The output from the transmitter is zero because the line pressure is at 100 PSI on both sides of the sensor. Valve #1 is then closed.

If a leak is present in the container, the low side of the transmitter will begin to lose pressure. If a 0-5" WC transmitter is used, and we assume a 1% total error band, a leak will be detected when the pressure decays a minimum of 1% of 5" WC. This amounts to a drop of 0.05" WC.

As you can see in the first example you have to wait until the pressure decays 1 PSI or 27.68" W.C. Using the differential system produces faster results, at least 500 times faster, decreasing the total test time required.





Not every leak test application requires the rapid response time or sensitivity a differential transmitter can offer. Viatran offers a solution for whatever your need. Contact a Viatran Applications Engineer for more information or assistance with your application.

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