Sentinel 3520 Application Note

Leak test of radiator assembly

Industrial AC manufacturer challenged to meet EPA leak standard in available cycle time.

A manufacturer of industrial air conditioning units had to meet a specific EPA-mandated leak rate and was having issues getting the repeatability and accuracy required in their leak test within the available cycle time.

They had four different models that were being tested at the station. Their current leading brand leak testers required five minutes to do the test to find the leaks at the targeted 10% gauge R&R. Two minutes—120 seconds—were all that were allocated.

The manufacturer wanted an alternative for leak testing the radiator unit.

Solution

A study was undertaken using the Sentinel 3520 leak test instrument, controlled by a Sciemetric sigPOD running advanced PSV software to determine whether the desired gage R&R could be delivered within the two-minute cycle time. The vacuum decay test used air and a test pressure of 10 psiv.

The 3520 module was connected via Ethernet cable to the sigPOD to enable the tester to be close to the part under test, reducing hose length to minimize system volume, and placing the controller in a convenient position for the operator.

A vacuum pump and 50L tank were connected to the supply port of the 3520, providing 13.5 psiv supply pressure. The 3520's fast and accurate electronic pressure control regulation resulted in quick evacuation of the part to the 10 psiv test pressure in 4 seconds. The resulting evacuated test pressure variation test to test was only 0.000004 psi. All waveforms, including pressure, flow, supply pressure, pilot pressure, PID controls, and part and ambient temperatures were collected and stored to a data record on the test computer and to a Sciemetric QualityWorX database for analysis.

Results

The solution delivered **2% gage R&R**, better than the target, within a **cycle time of 115 seconds**. Using the data collected from the test the repeatability was easy to see and led the project lead to state "You have clearly exceeded our expectations".

"You have clearly exceeded our expections"

- From 5 minutes to 115 seconds
- 2% gauge R&R with faster cycle time
- In-depth analysis of data

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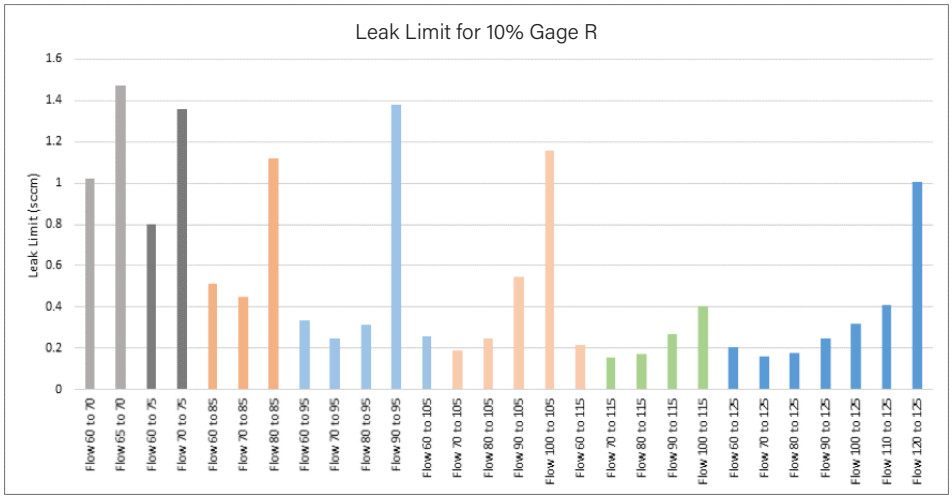

This graph, produced using Sciemetric's QualityWorX data analysis tools, shows a comparison of leak rate vs. gage R with gage R constant at 10%. This data enabled the manufacturer to clearly see the impact of shortening cycle time and how it would affect the leak rate and the gage R.

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