

VTech MasSpec Case Study:

Automatic Helium Leak Detection at Kaori Heat Treatment

Kaori Heat treatment Co. Ltd. of Ningbo, China, is a producer of brazed plate heat exchangers, which are composed of multiple, thin, slightly-separated plates that have very large surface areas and allow the transfer of heat between two liquids.



Fundamental to the correct operation of brazed plate heat exchangers is that they must be leak proof, thus not allowing seepage of liquid to the outside (external leakage) as well as preventing internal mixing of the two liquids (internal circuit leakage).

In the past, leak testing of brazed plate heat exchangers involved pressurization with dry air and dipping the unit underwater to inspect for the presence of air bubbles. Using this method, external leaks could be determined very easily. However, the minimum detectable leak was well above the 1g of R134a/year required by Kaori. In fact, this sensitivity would require a testing time of 7 hours and it was almost impossible to detect internal circuit leaks. Furthermore, underwater bubble testing is highly subjective and operators had to be well trained to be able to detect smaller leaks.

When Kaori submitted to us the problem of testing their brazed plate heat exchangers, we identified the internal circuit testing as the key point of the test. By implementing existing methods for this test we could not reach the sensitivity required by Kaori, unless we increased the testing time.



VTech MasSpec

We designed a customized version of conducted the first trials with our VTech MasSpec. This is an automatic helium leak detector, based on outside-in technology. The unit under test is evacuated and exposed to a helium mass spectrometer in a containment chamber filled with a small percentage of helium (between 10 and 20%).



Docking Connectors



Kaori is currently using the VTech MasSpec for the integral leak detection of their brazed plate heat exchangers. The quality of the leak testing is certified by a calibrated leak and the testing results are recorded to a database for data mining and/or print out of testing certificates.

The VTech MasSpec is included in the June 2007 issue of *Appliance Magazine* in their feature on innovations in testing equipment.

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The VTech (Alpharetta, Georgia, U.S.) MasSpec is an automatic helium leak detector for testing refrigeration components and complete refrigeration units, even in the presence of polyurethane foam. It detects helium leaks as small as 0.1 oz of R-134a per year. It requires just 10% helium concen-