Service Information

Container Products

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Testing of NEW R134a refrigerant supply

This bulletin is intended as a further update to the industry to describe available options and devices for testing the quality of refrigerant in **new** R134a refrigerant gas cylinders.

Consideration was given to devices that would identify contaminated refrigerant comprised of varying blends of R12, R22, R40 and R134a. Three different device types have been identified that can be used to test gas phase refrigerant from new R134a refrigerant cylinders. Each device has limitations and concerns as shown in the table below, but each has the ability to detect contaminated refrigerant. None of these devices can directly confirm the presence of R40, which may have played a role in recent compressor ruptures.

Carrier does not endorse or recommend any specific device, method of testing or particular supplier, but is providing the basic information on each device type to enable users to make a decision on what is best for their operations based on their own evaluation.

THE INFORMATION BELOW IS APPLICABLE ONLY FOR TESTING NEW R134a REFRIGERANT GAS CYLINDERS.

Device	Identifies Refrigerant	Ease of use	Refrigerant release	Sensitivity	Concerns
Electronic Refrigerant Analyzer[1,2]	R22, R134a, R12 and Hydrocarbons	Simple	De minimis	10%	Low sensitivity
Portable VOC[3] device[4]	Read out ppm of VOC's which include R40	Complex	Uncontrolled	1ppm	Over sensitive and may give false positive. F-gas regulation
Halide Leak detector[5]	Qualitative detection of Chlorine compounds (CFC, HCFC, R40)	Simple	Uncontrolled	300-600ppm	Combustion gas concern F-gas regulation

1. Devices are available from a number of suppliers including:
   a. Neutronics – Ultima ID (Model #'s RI-2004HV and RI-2004HVP)
   b. Bacharach – PurChek (Model #'s 2100-8001 and 2100-8002)
2. The Neutronics Mini ID R134a, Neutronics Ultima ID Pro and Bacharach PurChek Pro are not suitable for this use.
3. VOC, Volatile Organic Compounds
4. Devices are available from a number suppliers, including the MiniRAE with 11.7eV lamp from RAE systems
5. The US EPA does not advocate the testing of refrigerant leaks using halide leak detectors

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Electronic Refrigerant Analyzer

These devices use Infra Red (NDIR) technology to identify the gases present. They can be connected directly to a refrigerant cylinder and the device controls the flow of required refrigerant which is considered a de minimis release.

Operation and training are straight forward and users are guided by on-screen instructions. The commercially available devices can identify R134a, R12, R22 and Hydrocarbons. When testing, the only acceptable reading is R134a 100%, and all other readings **must be 0%**. Any reading greater than 0% for R12, R22, HC or AIR is an indication of contaminated refrigerant. If results show DET #1, #2, etc, then the purity of the refrigerant in the cylinder is less than 90% and refrigerant contamination is indicated.

The major limitation is the need to interpret the results as shown above, particularly when dealing with small amounts of R40 in R134a.

Portable VOC (Volatile Organic Compounds) device

This device uses Photo Ionization Detector (PID) technology and is specifically designed to detect only VOC's. This means that the device will respond to hydrocarbons (like propane) and R40, but will not respond at all to HFC's (R134a), HCFC's (R22) or CFC's (R12).

When testing for R40, the 11.7eV lamp must be utilized. This lamp has a limited operating life and must be replaced periodically. As these devices cannot withstand pressure, connection directly to a refrigerant cylinder is not advisable. The refrigerant must be bled direct from the cylinder valve or through a gauge set with the detection tube placed at the outlet. The response time is instant, and the device will indicate a contaminant level in ppm if VOC's are present. Any reading **above 0ppm** is an indication of contaminated refrigerant.

The major limitation of these devices is their high sensitivity, as they were designed primarily for personnel protection and respond to very low levels of any VOC.

Halide Leak Detector

These have been around for many years and predate the use of electronic analyzers and current fluorocarbon refrigerants. Halide leak detectors are only able to identify chlorine, meaning they will respond to CFC's (R12), HCFC's (R22) and chlorinated hydrocarbons (R40).

As with the VOC detectors, they cannot work under pressure. If the sample tube is placed too close to the sample outlet, the flame can be 'blown out'. In use, the detector flame is lit and adjusted and the initial flame color noted as transparent blue. The free end of the sample tube is then passed over the area to be tested and a sample is drawn up the sample tube by venturi action. If chlorine is present in the sample, the flame turns vivid green, which is an indication of contaminated refrigerant.

The major limitation of this device is related to safety. The detector flame should be kept away from the sample cylinder since the sample may be flammable. Also, combustion products of the flame test may be toxic.

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