Caution! Caution!

Leak detectors are becoming more and more important, and so is proper use of such equipment. Here are one contractor's thoughts.

By Craig Barnett

Those of us in the hvacr industry are aware of the upper atmosphere ozone depletion that has been linked to the release of CFC and to a lesser extent HCFC refrigerants. Furthermore, most of us are personally committed to reducing environmental pollution by recovering and recycling refrigerants, and by detecting and repairing leaks in refrigeration systems. Leak detection is a combination of art and science that can be psychologically as well as financially rewarding if a few precautions are followed.

The most commonly used leak detection techniques in systems are soap bubble solutions and electronic halogen detectors.

Soap bubble solutions have two obvious advantages. They are relatively inexpensive and they allow the technician to visually locate small to medium size leaks. In most instances, commercially available bubble solutions contain sodium lauryl sulfate (a detergent) as their number two ingredient (after water). Sodium lauryl sulfate is a molecule that is easily ionized (given an electrical charge). This chemical property can make the subsequent use of an electronic leak detector a frustrating experience.

Electronic halogen leak detectors use a high voltage DC electric field to ionize airborne atoms or molecules that enter the sensing tip. Some molecules, such as refrigerants, are easily ionized and will conduct a weak current. Non-ionizable gasses, which include the principal components of refrigerant-free air—molecules of nitrogen, oxygen, carbon dioxide, water vapor, and atoms of argon—do not conduct current easily. The passage of ionizable contaminants across the tip produces current which is translated electronically into a signal that is different from the steady background beeping, ticking, or flashing light that occurs when the instrument is first turned on. An increase in the frequency of beeping, ticking, or flashing indicates the increased concentration of contaminants being sensed.

If a leak is first searched inconclusively with soap bubbles and an electronic detector is used soon afterward, it is possible that aerosols of sodium lauryl sulfate will give false positive indications where no leaks exist. It is a good idea to spray fresh water onto positively pressurized tubing systems after using soap solutions and before using electronic detectors.

Be aware that some pipe dope compounds contain components that are volatile and ionizable and therefore produce false positives with electronic detectors. Additionally, common fuel gasses such as methane, propane, and butane, are ionizable and will cause electronic detectors to register in proportion to their atmospheric concentrations.

One further caution: Even though your electronic halogen leak detector is capable of finding fuel gas leaks, do not use it in this manner. Fuel gas plus oxygen plus a high voltage spark may equal an explosion.

Be aware of electronic detectors that squeal, buzz, or scream in an uncontaminated environment. This "runaway" condition will have you chasing ghost leaks unproductively for hours. Your detector should produce a steady background noise for its lifetime when "sniffing" uncontaminated air.

If you have been plagued by an unreliable electronic detector, contact your local wholesaler or the factory and arrange for a repair/recalibration check-up. You also may want to ask about the sensitivity of your instrument in regard to detection of the new generation of refrigerants.

Optimization of your refrigerant leak testing equipment will increase your personal productivity and will have a profound effect on the protection of the ozone layer.

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