By Paul Appler

[Editor’s Note: This feature has been left in first person to maintain the author’s personal experience.]

By this time, on your career path as refrigeration and air-conditioning technicians, you should already be aware of all the methods used to find leaks. The choice of tool, whether a straightforward visual inspection, soap bubbles, electronic sensors, ultrasonic detectors, refrigerant dyes, a combination of two, three or all of them, is totally up to you.

The question I am asked is: “which one is the best?” My answer is that there is no best. This is not about being absolute, comparing one to another, using one only because it is the latest and greatest method. The question asked should instead be: “which tool or tools should I use to be the most effective in my particular situation?”

The tool bag
You always have the first tool with you—your eyes—unless you are blind, then you will need a co-worker that has eyesight. Either way, by all means, put them to use. If you can gain access to piping and components to look for those obvious oil stains, then do it. Oil residue can point out where a system may have leaked or is currently leaking. In the same scenario, regarding the ability to get up close, you can use the soap bubble method. This is an extremely effective method for continuous leakage. Keep in mind, it helps to use the more complex specialty formulations that offer high-sensitivity bubble development instead of your dish soap. But if that is all you have, do not hesitate.

Electronic detectors are precise instruments, as long as your sensors are replaced at their recommended usage period and the wind is not blowing. One of the many observations that I have deduced from these past 13 years of studying refrigerant leaks, their disorder, and numerous exit paths, is that it is easy to understand why it could turn into an extremely frustrating task.

I have found that the best way to improve efficiency, when using sniffers, is to visualize a plane of leakage anywhere along the radius of a semispherical dome. Move the electronic sensor
When using sniffers, visualizing a plane of leakage anywhere along the radius of a semispherical dome can be more effective when finding leaks.

in a pattern that would reflect this half-ball model by using a circling motion covering the points of radius as you move along the pipe surface. This method allows you to detect those leaks that are not exiting in what we like to imagine as a 45° vertical plane from the pipes horizontal surface.

Ultrasonic detectors are ideal for targeting leak sites because they are not affected by air currents. But remember, when used in commercial and industrial settings they lose their edge. This is because of the multitude of other frequencies being generated by compressed air, steam movement through pipes, in addition to leakage.

Ultraviolet dyes are excellent for reporting intermittent leakage—just do not overdose the system because you are in a hurry to find the leak. Putting ultraviolet dyes in the system as an early detection method avoids this situation. Too much dye will affect performance output of a unit along with making it very messy when you attach or disconnect manifold gauge sets and auxiliary equipment. A case-in-point is that most dyes will react to internal moisture. They will crystallize and lose their ability to be carried by the refrigerant and oil. Look for UV dyes that offer moisture-resistance capabilities, fast-acting injection, and low product volume to system oil ratio.

**Define the leak**

So, which is the best tool for the application? Let us first define the two types of leaks: intermittent and continuous.

Intermittent leakage is due to free-flowing internal particulates providing temporary sealing, operation vibrations, varying temperature swings and load-change conditions.

Continual leakage is always a factor because everything leaks. It could be in one year, or it could be in 20 years. Just as we are, that is to say human, far from perfect and in constant decline, it comes as no surprise as to why we cannot design and build a perfectly tight system. Darn that entropy.

But do not let that stop you. Keep searching for leaks as you would for buried treasure. Use these methods in the same way that our country’s military force combines Air Force, Navy and Army to get the job done.

If you are looking to be competitive, efficient, and economical make sure to keep your business growing and your customers happy. After all, why would you settle with just one method?

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