# How Important is a Micron Gauge to the ACR Service Professional? Or, What is an "Adequate" Vacuum, and How Do I Measure It?

Today's service techs are facing many challenges with increasing competition, rising refrigerant costs, new synthetic oils, changing legislation, economic factors along with more knowledgeable customers having greater expectations from their service technicians and reliability from their equipment.

All this and more combines to squeeze your profits. It's not enough to simply work harder; it's a matter of working smarter and taking advantage of every available advantage and service technique available so you can be at the top of your game. To stay in business, you have to keep your customers satisfied and their equipment performing the way it was designed to.

Today's higher efficiency equipment is more sensitive to damage from contaminates, and just a small drop of moisture can create problems within a system and negatively affect the systems operation, performance and your profits—and even your reputation.

If during installation or service (a non-condensable) air enters and remains in the system, it will collect on the high side reducing system efficiency causing head pressure to rise. The discharge valve can get hotter than under normal operating conditions and organic solids can form and compressor failure can result.


The YELLOW JACKET 69075 LCD vacuum gauge combines thermocouple sensor technology with advanced electronics for precise readings and repeatability not found with thermistor sensors or analog meters for accurate readings from atmosphere to 1 micron without recalibration.

Moisture in a system can form ice crystals that can close off openings in expansion valves and capillary tubes, resulting in inadequate refrigerant distribution and cooling. Ultimately moisture can contribute to the formation of acids and sludge that can damage the system from within and result in a compressor and component failure.

In the AC/R industry, a practical definition of vacuum is a space from which air and other gases have been reduced. A high vacuum (sometimes referred to as a deep vacuum) means the atmosphere inside a closed system has been reduced to a level where gases and moisture have been removed.

As air is pulled out of the system by the vacuum pump, the pressure inside falls below the outside atmospheric pressure; as the internal pressure lowers, the temperature at which moisture will boil inside the system also falls. For example, at an internal pressure of 29.87 inches, water boils at just 6 degrees F.

At this depth of vacuum, any moisture present in the system (part of the systems dirt) boils off into a vapor, which is drawn out of the system by the vacuum pump. The higher (or deeper) the vacuum and the longer the time in which the system remains at a deep level of vacuum, the more moisture and non-condensable gases will be pulled out of the system.

Given that non-condensable gases are removed at negative pressures of –5,000 microns, it is not practical to use a standard manifold; however, you can accurately monitor the level of vacuum in a system by incorporating a simple economy vacuum gauge, which displays vacuum on a LED readout from atmosphere to 50 microns. You can connect it in-line through the system—this is the preferred method—or at the vacuum pump.

The best place to measure vacuum is at the system, not at the pump. With a combination Vacuum/Charging Valve #18975, you can attach the gauge directly at the system and isolate it from the pump, hoses and manifold for a true indication of the vacuum in the system.

John O'Rourke, service tech from GT Air Systems in Kingston, Ontario services a rooftop unit.

Using a full scale, digital electronic vacuum gauge like the Yellow Jacket model #69075 provide for greater accuracy in registering readings greater than 50 microns. It's also worth noting that digital electronic vacuum gauges incorporating thermocouple sensor technology with advanced electronics provide greater precision and repeatability not found with thermistor sensors and analog meters. Pulling a proper vacuum is an important and necessary procedure to ensure the proper and efficient operation of your customer's A/C & Refrigeration equipment.

ASHRAE recommends evacuation to below 1,000 microns, and after isolation, a system must not rise above 2,500 microns within several hours. Some equipment manufacturers specify deeper vacuum to ensure that harmful water vapor is removed from the system.

1,000 microns equal only .039 inches of mercury, a measurement that cannot be made with a mechanical gauge, or determined by evacuation time, or the sound of the pump. The only tool that can measure vacuum at these levels is an electronic vacuum gauge.

For more tools and tips for faster and better evacuation, either request a copy of our booklet "Profits in a Vacuum," ask your wholesaler or contact B. J. Williams & Associates at 1-613-389-2879 (www.bjw4cold.com & www.yellowjacket.com).

***Editor's note:*** *Bernie Williams is President B. J. Williams & Associates Inc. representing Ritchie Engineering Yellow Jacket A/C & Refrigeration service tools. Email: bernie@bjw4cold.com*