A New and Better Tool for Measuring Indoor Air Quality

For most of us a glass thermometer is the device we first think of when asked how to measure temperature. The glass thermometer is an excellent tool for some temperature measurements, such as your child's fever. It is certainly not the only way to measure temperature and in many applications it is not the best.
To measure the high temperatures of molten metals it is better to use a thermocouple. To measure a few l/ l00ths of a degree temperature change in a chemical reaction a thermistor is a better choice.
These devices are all useful tools. All have applications in which they are the best choice and all of them work poorly or not at all in other applications.
When we set out to measure other parameters such as air quality we again use tools. The particular tool is not important. It is only important that it is readily available, affordable and provides reproducible results.

Why is CO2 monitoring often specified?
When building tenants and owners first decided to monitor indoor air quality a suitable tool was required. One approach was to assume that the deterioration of indoor air quality was directly attributable to human occupancy. One measure of human occupancy is carbon dioxide, because we all exhale carbon dioxide. Since CO2 detectors originally developed for greenhouses were available, almost affordable and reproducible at the time, standards were developed based on parts per million of carbon dioxide.
CO2 served as a convenient tool for predicting human comfort. However like the expansion of mercury in a glass thermometer CO2 has little direct effect on human comfort.
CO2 is not harmful to people in the concentrations normally encountered in buildings. It tracks the occupancy level of a space but fails completely to respond to other contaminants that can be much more serious. These other contaminants include, formaldehyde from new carpets and construction materials, CO from incomplete combustion and solvents from paint and art supplies.

The new tool

Full spectrum sensors, sometimes called VOC sensors because they measure “Volatile Organic Compounds” sense ketones in human respiration. They also sense chemicals which have been associated with health problems such as formaldehyde given off by chip board and carpets.. Potentially, they offer the promise of improved air quality monitoring since they measure both human occupancy and environmental chemicals. Until now instruments using these sensors could lack the sensitivity to accurately measure the very low levels of VOC’s associated with human occupancy. They also were affected by changes in temperature and humidity. The new electronics in our AQT-2000 have overcome these limitations. Our 15 bit A/D convertor technology is 32 to 128 times more precise than older instruments. The on-board temperature and humidity sensors eliminate errors. Our smart micro-processor algorithm has been developed through four years of field experience. The AQT-2000 is comparable to CO2 monitors in accuracy of monitoring human occupancy. It has the significant advantage that it also detects harmful and dangerous chemicals in the occupied space. It is also lower in cost than CO2 monitors.
Because the AQT-2000 is much newer than CO2 monitors there will be a time delay before standards groups write it into there specifications. Until that time the hand held module incorporates a convenient and inexpensive data logger which can be left attached to the monitor to log air quality for periods from a day to 2 weeks. The data can be easily transferred to a desktop computer and graphed to demonstrate to potential clients that it is working well.

Which choice?

Why choose the AQT-2000 over CO2 monitors?
1. It does more. It senses and can exhaust harmful chemicals that may be present in buildings. As well, it can provide fresh air in proportion to demand from occupancy.
2. It costs less. Typically the air quality monitor will cost less than half as much as a CO2 monitor.