CASE STUDY: DUNCAN AVIATION ENJOYS DRAMATIC VISIBILITY IMPROVEMENT, ENERGY SAVINGS WITH DIALIGHT LED UPGRADE

January 2018

Electrical Products & Solutions™

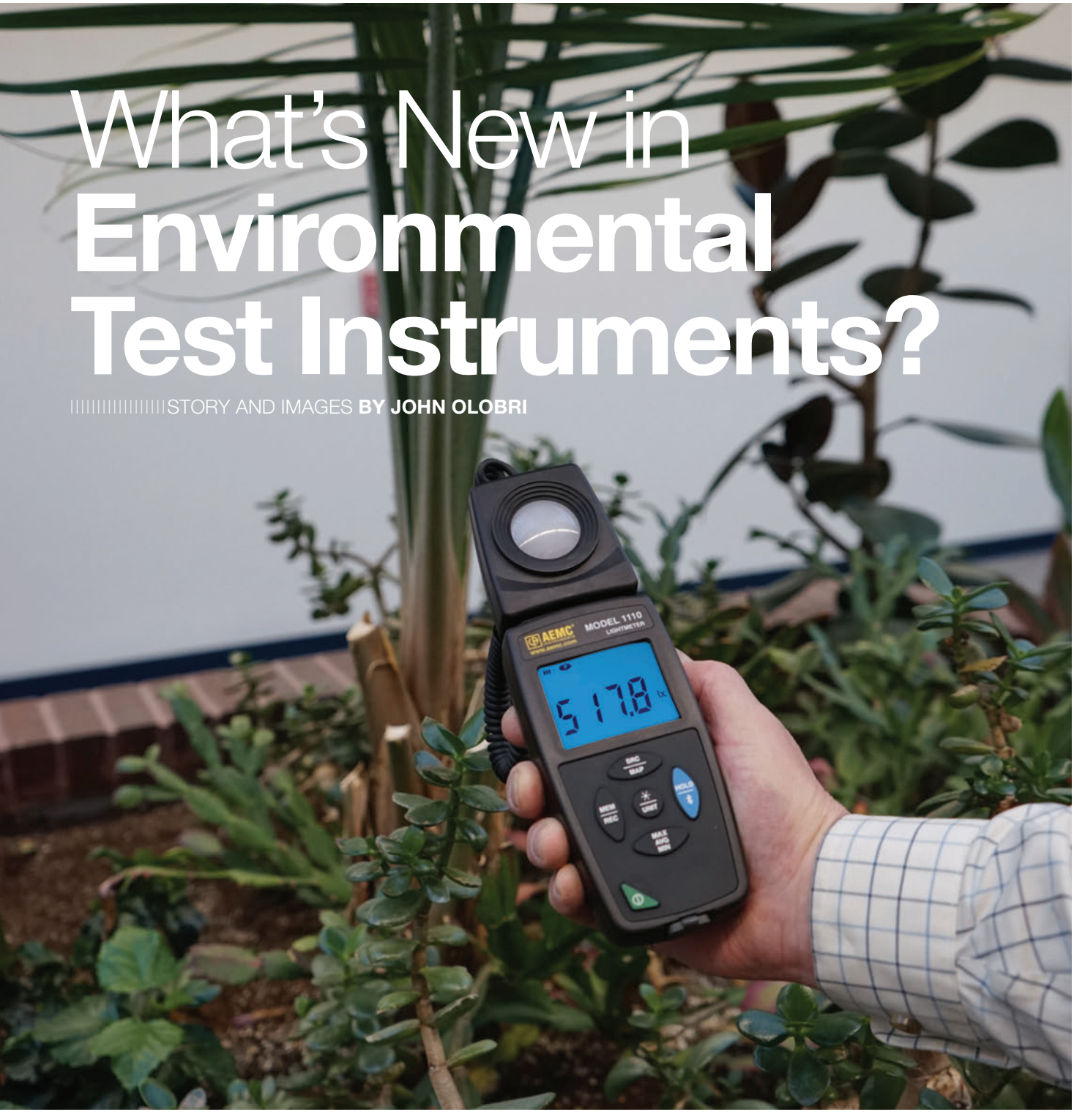
The Purchasing Guide for Electrical Contractors

www.epsmag.net

What's new in environmental test instruments?

What's New in Environmental Test Instruments?

STORY AND IMAGES **BY JOHN OLOBRI**



THERE ARE A VARIETY of environmental parameters that are checked when considering the overall health and operation of a typical office building or industrial facility where people spend a large part of their day. Keeping these parameters in a safe range not only provides for the health of the worker but also the efficiency and cost of running the operation.

The amount of energy consumed in a building is greatly influenced by the indoor environmental conditions. Temperature, ventilation and the lighting environment are key

Continued on page 8

AEMC® Instruments Continued from page 6

parameters effecting health, productivity and the comfort of the occupants. Studies have proven that the financial impact of a poor indoor environment for the employer, the building proprietor and for occupants, are frequently substantially higher than the cost of the energy used to run the building. It has also been proven that proper indoor ecological quality can improve overall work performance as well as reducing absenteeism.

As just stated, good environmental parameters contribute to lower energy costs. There are several standards employed for checking these parameters such as OSHA 1910. Important parameters to monitor are temperature, humidity, air flow, carbon dioxide (CO_2) and lighting levels.

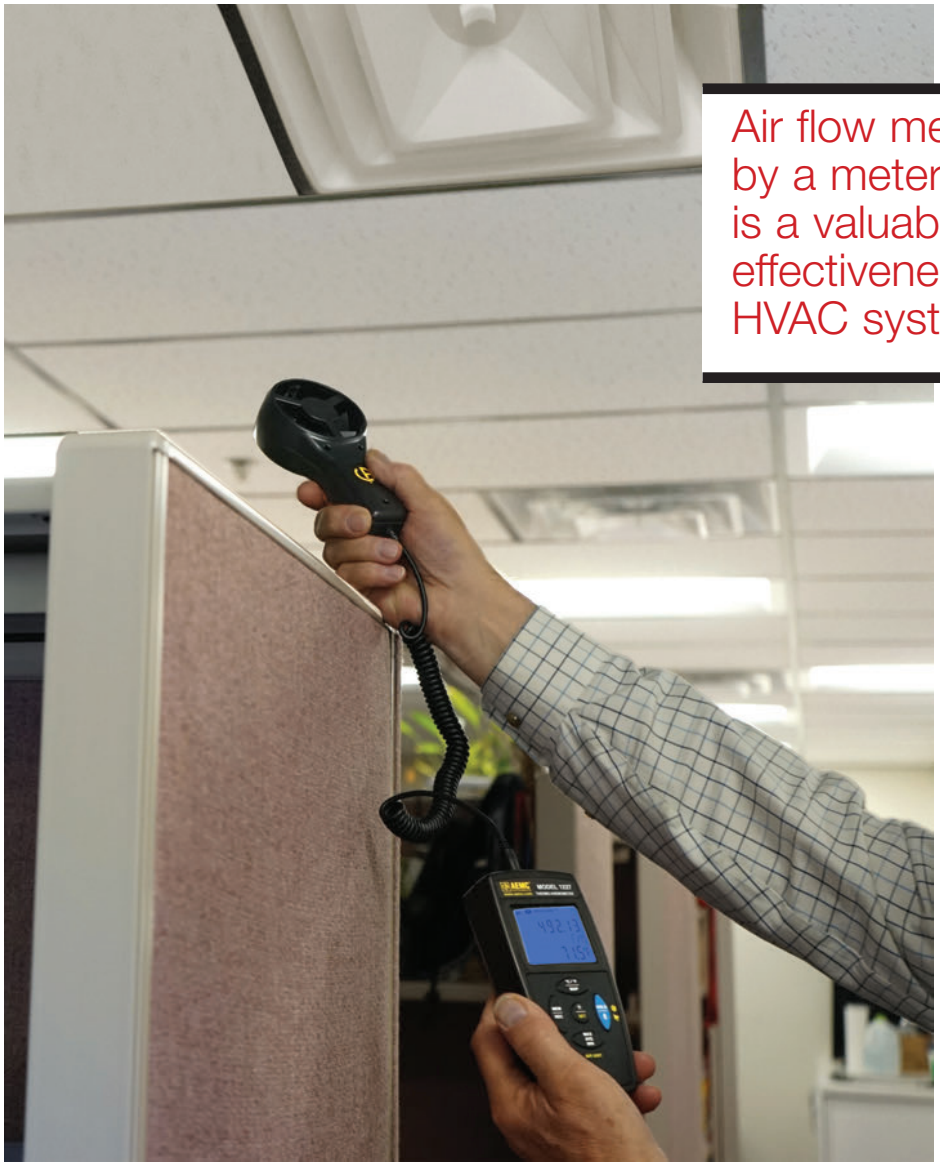
The ability to monitor and now record these parameters has improved significantly over the years. Also the monitoring requirements have changed. For example, in the past monitoring natural, incandescent and florescent lighting was required but today we also need to monitor LED lighting. Today's light meters offer the capability to select the type of lighting you are monitoring as well as, whether to display the measurement in Lux or Foot Candles.

Basically, one foot candle is the measurement of light one foot away from a one candle source for a one square foot area yielding a measurement of 1 Lumen/foot^2. Lux is the measurement of light one meter from the one candle source for one square meter providing a measurement of 1 Lumen/meter^2. As a rough comparison a lux measurement will yield a numeric value ten times that of a foot candle numeric value.

Another valuable measurement tool is to track the min, max and average lighting of a given area. This feature is available in many light meters. If you are going to track these parameters over a period of time, a normal work day for example, a data logging light meter works best as it not only tracks these measurements but it also provides a plot over time using the software provided with the meter. Most meters offer fixed and removable light sensors to assist in the proper location for monitoring.

Temperature and Humidity are two very common measurements taken in a normal work environment. Typically, these two parameters are found together in most meters formally called Thermo-Hygrometers. Most instruments available today offer the ability to select the temperature display between Fahrenheit and Centigrade and measure relative humidity displayed as a percentage between 0 and 100%. Some also offer the added capability to display dew point as a temperature measurement. Meters with this capability offer multiple line displays showing all three measurements or the ability to scroll through them. As with the light meters described above, the ability to track min, max and average values, as well as record them is a very helpful feature and available on several product offerings. Typically the Continued on page 12

AEMC® Instruments Continued from page 8



Air flow measurement provided by a meter called an Anemometer is a valuable tool to monitor the effectiveness of the building's HVAC system.

most comfortable and efficient ranges for temperature and humidity in an office environment is between 68 and 77 °F and 40 to 60% RH.

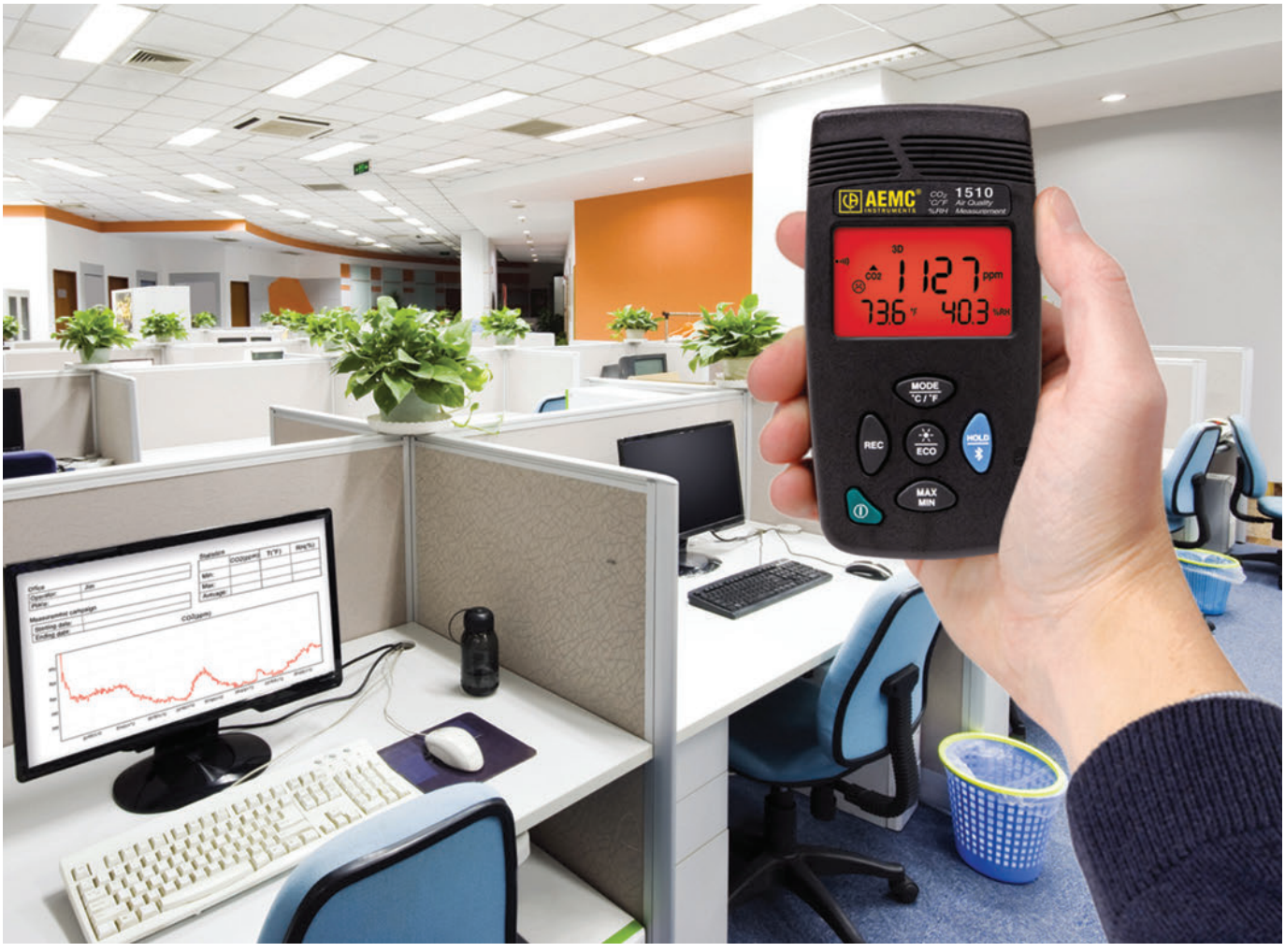
Air flow measurement provided by a meter called an Anemometer is a valuable tool to monitor the effectiveness of the building's HVAC system. Most anemometers also incorporate temperature measurement. Instruments today allow the user to select between measuring air flow in units, such as cubic feet per minute and wind speed in units, such as miles per hour, as well as measuring temperature in Fahrenheit or Centigrade. To accurately measure the air flow from a typical HVAC register, an accessory to the anemometer called an air flow hood which controls the measurement area for the anemometer is often used. They are available from a number of suppliers including the meter manufacturer. Usually both intake and output air flow measurements are taken at all the registers in the area of concern, to profile both the flow and the balance of the system. As much as 70% of the problems associated with HVAC efficiency is due to improper air flow. An important tool found in good anemometers today is a feature referred to as mapping. This feature allows the operator to take measurements at each register and stores the min, max and average readings at the press of a button for that register. The operator then moves to the next register and repeats the process. At the completion of the measurement process this information can be downloaded and a "map" of the system is graphically presented. This is a great tool to assist the technician in properly balancing the system.

One final measurement to consider is that the quality of air inside a building depends on the concentrations of contaminants – such as gases and particles – and how much fresh air is brought in through its ventilation system to dilute and remove them. An important gas to monitor is Carbon Dioxide (CO_2). It is produced when people breathe. Each exhaled breath by an average adult contains 35,000 or more parts per million (ppm) of CO_2 – 100 times higher than is typically found in outside air. The CO_2 levels in the air outside a building are usually 380 ppm. The CO_2 concentration in an occupied indoor area indicates if the building's air handling and balance is appropriate – that is, if the optimal amount of outside air is being mixed with air that has been circulating in the building.

Current recommendations, such as those from the American Society of Heating Refrigerating, and Air Conditioning Engineers (ASHRAE) recommend that indoor CO_2 levels not exceed the local outdoor concentration by more than about 650 ppm. Good practice indicates that the ASHRAE Standard 62.1 target for CO_2 level in indoor air is about 1,000 ppm.

Several cost effective CO_2 meter/loggers are now available to monitor this gas along with temperature and humidity. Additional capability found in some meters is the ability to set alarm levels to warn occupants when CO_2 levels exceed safe levels. One such meter, the Continued on page 14

AEMC® Instruments Continued from page 12



In summary, there are a variety of instruments available today with both monitoring and recording capability that are battery and/or USB powered and offer wireless communication with useful user selectable options and include easy to use application software to effectively monitor the health of the building.

AEMC model 1510 not only provides for alarm settings but also changes the display to a red background to provide a very identifiable visual alarm indication along with an audible tone to the occupants. Additionally, as it is also a data logger it offers an economy mode where a window of time (typically set to working hours) when the meter is active and then goes to sleep mode conserving power during non-working hours.This saves battery life and allows longer recording periods.

In summary, there are a variety of instruments available today with both monitoring and recording capability that are battery and/or USB powered and offer wireless communication with useful user selectable options and include easy to use application software to effectively monitor the health of the building. And the best thing is they are reasonably priced. These instruments more than pay for themselves in energy cost savings, especially when problem areas are detected and corrected. ❑

John Olobri holds degrees in both Electrical and Industrial Engineering and has worked in the design and marketing of instrumentation for over 35 years. For the past twenty years, John has been the Director of Sales and Marketing for AEMC® Instruments where he has been actively involved in the areas of Insulation Resistance, Ground Resistance testing, Power Quality Testing, Data Logging and Environmental Testing. He also conducts accredited seminars on ground resistance testing in various cities around the country.