Building advice
Advancing building performance™

BEFORE & AFTER TESTING

INDOOR AIR QUALITY

REOPEN COMMERCIAL - MEDICAL - SCHOOLS - RETAIL - WITH CONFIDENCE

REPLACE GUESSWORK WITH DATA-DRIVEN RECOMMENDATIONS
USE STRAIGHT-FORWARD IAQ BEFORE/AFTER TESTING

MEASURES

Electronically gathers IAQ data on-site within each building zone. No lab. Confidential.

- Particle levels
- TVOCs
- Carbon Dioxide
- Carbon Monoxide
- Temperature
- Relative humidity

ANALYTICS

Instant cloud-based analysis and reports.

See valuable data about Health, Comfort, Safety, and Operating Efficiency factors.

REPORTING

Easy-to-read IAQ reports and graphs highlights observations in clear red, yellow green format.

Includes high/low limits on each graph to show concerns or areas to inspect.

SIMPLICITY

Creates recommendations to resolve common IAQ issues including:

- Ventilation
- Filtration
- Temperature/Humidity
- Purification

Email or print reports from anywhere or send them directly to your customers.

IAQ REPORTING

"According to the Occupational Safety and Health Administration, 30 percent of Americans work in buildings with air pollution, and indoor pollution is far more concentrated than outdoor air pollution."

Thomas A. Westerkamp, "The Inside Track on IAQ" Maintenance Solutions

Indoor Environmental Quality

Building advice

Executive Summary

The information in this report is designed to illustrate how the building is performing with regards to environmental parameters, to help identify issues, and offer solutions and next steps for correction. The action levels below are based on the worst case of the min/max values vs acceptable ranges.

Health & Safety

Particulates: 2 of 2 spaces measured had elevated levels of Particle Allergens.

Chemical Pollutants: 2 of 2 spaces measured had elevated levels of Chemical Pollutants.

Carbon Monoxide: 0 of 2 spaces measured had elevated levels of Carbon Monoxide.

Comfort & Energy

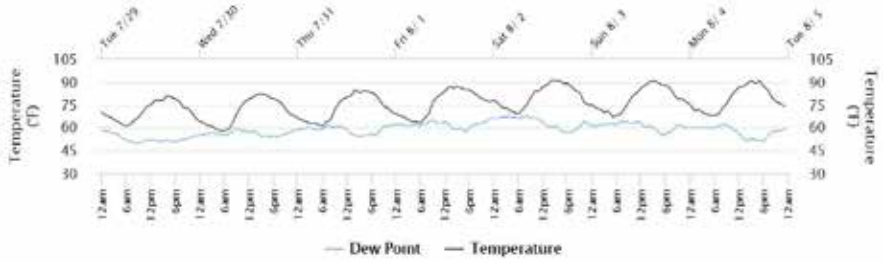
Temperature: 2 of 2 spaces were too warm at times, while 0 of 2 spaces were too cool at times.

Relative Humidity: 0 of 2 spaces had high relative humidity at times, while 2 of 2 had low relative humidity at times.

Carbon Dioxide: 1 of 2 spaces were over-ventilated and can save energy by reducing the amount of outside air.

Weather

The outdoor environment plays a key role in what happens in the indoor environment. Temperature and dew point can affect the indoor temperature and relative humidity. The outdoor data included in this report was recorded at *Madison, WI 53792.*



Outdoor Air Quality

The Air Quality Index, or AQI, is the system used to warn the public when air pollution is dangerous. The AQI tracks ozone (smog) and particle pollution (tiny particles from ash, power plants and factories, vehicle exhaust, soil dust, pollen, and other pollution), as well as four other widespread air pollutants. Keeping track of the current air quality information can help you take steps to protect yourself, children, and others from unhealthy levels of air pollution. *~American Lung Association*

Outdoor Air Quality Index for *Dane County is 160*

Unhealthy 151-200

Summary of Findings

The Executive Summary summarizes total building performance.

Aggregated data for Health/Safety and Comfort/Energy is pushed through the IAQ Analytics Engine to summarize findings in an easily understood red, yellow, green format.

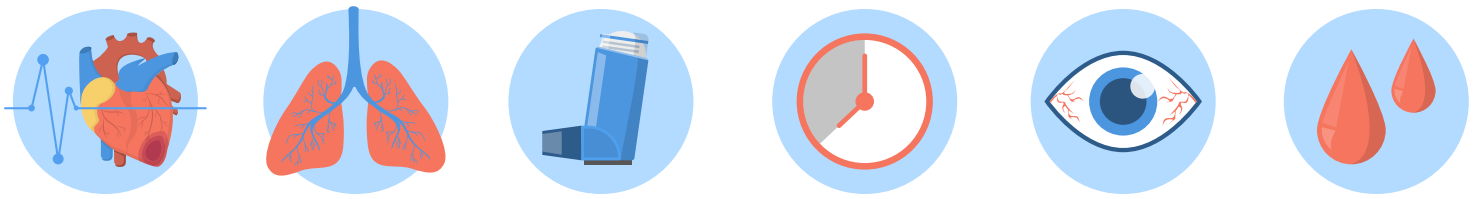
Weather

Weather data is automatically integrated during the reporting period. This helps to document whether the building was in heating or cooling mode while testing.

Outdoor Air Quality

While introduction of Outside Air (OA) has become widely recommended, knowing the quality of the OA being introduced is critical from a health perspective.

Potential Impact of Poor Air



Custom Deployment Name

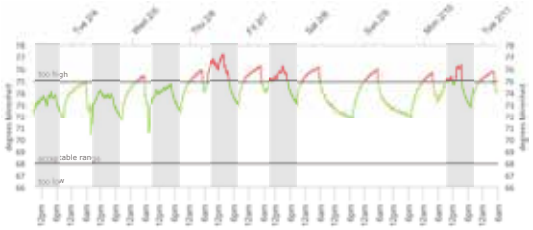
Comfort & Energy **5/11/2020 – 5/17/2020**

The graphs below show trending for Temperature, Humidity and Carbon Dioxide levels. The background transitions from white to gray to show occupied vs unoccupied time, respectively. The trend line transitions from green to red to show where levels transition from good to bad.

Temperature ●●●●

This thermal resistor (thermistor) sensor has a range of 32 to 100 degrees °F and an accuracy of ± 2 °F.

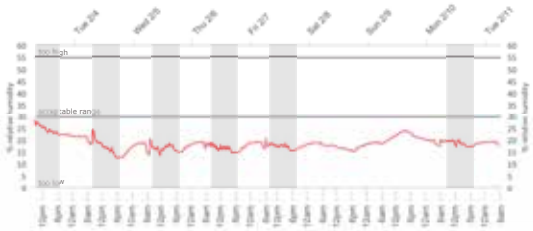
Findings
We detected several temperature control issues in this facility during the deployment.



Relative Humidity ●●●●

This capacitive sensor has a range of 10 to 90% and an accuracy of ± 5%.

Findings
The large number of Relative Humidity issues identified may cause comfort and moisture issues in your facility and is likely indicative of the amount of outside air being brought into the facility.



Carbon Dioxide ●●●●

This non-dispersive infrared (NDIR) sensor has a range of 0 to 2,000 ppm and an accuracy of ± 100 ppm.

Findings
During the monitoring of your facility we detected severe ventilation issues that need to be corrected to improve the balance between the amount of ventilation and amount of fresh air needed for your facility.

Temperature

Temperature is tracked over time evaluating the ability of the facility to maintain ASHRAE and association guidelines.

Relative Humidity

While Relative Humidity (RH) is a parameter used for measuring comfort, at high and low levels it can pose health issues. It is also a great proxy for the introduction of Outside Air. It has become an indicator for potential sources of energy waste as larger amounts of OA are introduced that must be reconditioned.

Carbon Dioxide

Carbon Dioxide (CO2) is a great proxy for OA and occupancy levels. High concentrations of CO2 (e.g. 1,000 PPM) indicate that either large concentrations of people are in the measured space or there is a too little OA being introduced. Low levels may mean too much OA is being introduced potentially increasing operating costs.

Particulates

Excessive Particulate Matter can both irritate sensitive populations and indicate poor air filtration in buildings. Higher levels of PM presence should also serve as a source of concern for virus transmission.

Chemical Pollutants

The presence of TVOCs gases can indicate poor ventilation. Again, sensitive populations can have serious allergic reactions to TVOCs. Cleaning products can be a major source of TVOCs.

Carbon Monoxide

The presence of Carbon monoxide (CO) is a serious health and safety risk. By measuring at very low levels we are able to discern early sources of potential danger and mitigate before they become serious problems.

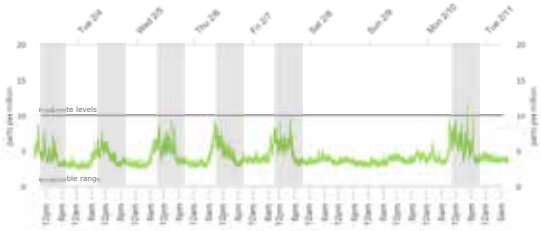
Health & Safety **5/11/2020 – 5/17/2020**

The graphs below show trending for Particulates, Chemical Pollutants and Carbon Monoxide. The background transitions from white to gray to show occupied vs unoccupied time, respectively. The trend line transitions from green to red to show where levels transition from good to bad. In some cases there is an acceptable range between the two that will be yellow or orange depending on intensity.

Particulates ●○○○

This near infrared nephelometer has a range of 0 to 50 ug/m³ in the range of 0.5 to 10 microns and an accuracy of ± 20% CV.

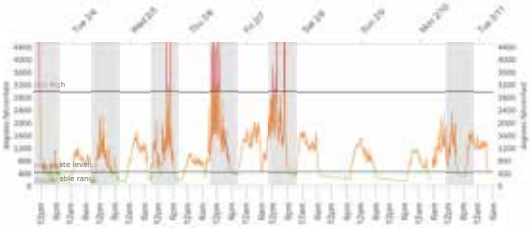
Findings
We did not detect any major issues in your facility during this deployment. This does not mean there may not still be opportunities to improve the performance of your facility, but it does highlight the need for maintaining the optimal performance.



Chemical Pollutants ●●●○

This metal oxide semi-conductor (MOS) sensor has a range of 0 – 4,000 ug/m³ and an accuracy of ± 112 ug/m³.

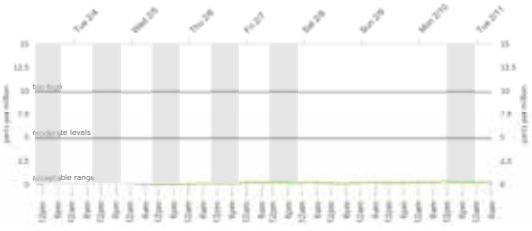
Findings
We have detected a couple locations with elevated levels of Organic Chemicals that could have long term exposure issues for sensitive individuals. There are several simple solutions we have outlined to help reduce the source of these Organic Chemicals.



Carbon Monoxide ●○○○

This electrochemical sensor has a range of 0 to 100 ppm and an accuracy of ± 3 ppm.

Findings
We did not detect any major issues in your facility during this deployment. This does not mean there may not still be opportunities to improve the performance of your facility, but it does highlight the need for maintaining the optimal performance.



Electronic IAQ Monitor

Model 5200 Sensor Array

- Particle levels
- TVOCs
- Carbon Dioxide
- Carbon Monoxide
- Temperature
- Relative humidity

SENSOR SPECIFICATIONS

Total Particulate Matter (PM)

Type: Near Infrared Nephelometer
Range: 0-50 ug/m3 in the range of 0.5-10 microns
Accuracy: ± 20% CV for 1micron Poly Styrene Latex spheres in still air @ 37ug/m3 m3, & compensated for normal indoor dust.
Theory of Operation: A light beam and a photo detector are focused at a shared point in a small chamber. A fan, mounted at the back of the monitor, pulls air through this chamber. Particulate matter suspended in this air stream scatters light from the beam, triggering the photo detector. The signal from the photo detector is monitored and an overall particulate level is calculated.

Carbon Monoxide (CO)

Type: Electrochemical
Range: 0-100 ppm
Accuracy: ± 3 ppm
Theory of Operation: Exposure of the sensor to carbon monoxide gas produces a signal that is proportional to the concentration of the gas. This signal is recorded and converted to CO in ppm.

Carbon Dioxide (CO2)

Type: Non-dispersive infrared (NDIR)
Range: 0-2000 ppm
Accuracy: ± 100 ppm
Theory of Operation: Carbon Dioxide, like most molecules, absorbs infrared light at a unique wavelength. The sensor has a lamp and infrared detector designed to work at this unique wavelength. Air with a high level (concentration) of CO2 absorbs more light at this wavelength than air with a low level of CO2. This light absorption is measured and converted into a CO2 concentration.

Total Volatile Organic Compounds (TVOCs)

Type: Metal Oxide Semi-Conductor (MOS)
Range: 0-4000 ug/m3
Accuracy: ± 112ug/m3, using isobutylene @ 22 °C, 55% RH.
Theory of Operation: Conductivity of the sensor changes in the presence of gases common to indoor environments. The sensor is calibrated using Isobutylene, a common reference gas. The sensor responds to a broad range of common indoor pollutants in the 4-12 carbon range, such as alcohols, chlorinated compounds, aldehydes, ketones, alkanes and alkenes. Some indicative specific indoor air pollutants are benzene, acetone, methyl ethyl ketone, limonene, hexane and tri-chloro ethylene.

Temperature

Type: Thermal Resistor (Thermistor).
Range: 0-4000 ug/m3
Accuracy: ± 2 deg F
Theory of Operation: Resistance of the sensor changes in proportion to changes in temperature. This resistance change if converted to temperature in Degrees F.

Relative Humidity (RH)

Type: Capacitive
Range: Range 10-90%
Accuracy: ± 5%
Theory of Operation: Moisture changes the capacitance of the sensor, which is measured and converted to relative humidity in % RH.