Pure Air 3000 study
Pure Air 1250 study
Weitzman

Objectives:

An on-site real-time evaluation in an occupied commercial building of one Pure Air 3000 unit in a food Cafe and two (2) Pure Air 1250 units in an active conference room to review the overall impact on indoor air quality.

Location:
Weitzman
3102 Maple Ave. Suite 500, Dallas Pa.
Project term: 8/23/21 – 8/27/21
Conducted by: Weitzman
Supervised by: Keith Roe CIE/CMC
Advanced IAQ Solutions, Inc

Testing Environment:

A cafe setting with a food service area of 950 sq.ft / approx. 11,560 cu.ft. with 3 HVAC systems servicing that area and a conference room of 1600 sq.ft./ 14,400 cu.ft. with 4 HVAC systems servicing that area. The conference room can be divided into equal sides by a partition and was divided for part of the study as was needed for meetings.

Location of the Pure Air units:

A single Pure Air 3000 was installed in the café 90 on a countertop. There are 3 forced air systems servicing this area. Two Pure Air 1250 units was installed in Texas One Conference room and in Texas Two Conference room one on each side at ceiling height. There are 4 HVAC systems servicing that combined Conference room area. . The Greentech units were left in a continuously operating mode during the study.

Definitions of Technology:

The portable units contain ARC (Active Radiant Catalysis) which is the GTE proprietary form of UVC-PCO. That is the use of a broad-spectrum UV lamp that is encased in a quad-metallic catalyst containing 15x the exposure surface than similar UVC devices. This produces continuous air/ surface disinfectant with purifying hydroxyl emissions through a continuous AOP (advanced oxidation process). Combined with BPI technology, negative ions are also produced in a continuous streaming process into the indoor environment. This also creates an electrostatic charge to the harmful particulates, causing them to drop out of the breathing space. The Pure Air 3000 unit contains an activated oxygen feature that is adjustable and a 5-speed fan setting to better service the amount of square footage being serviced. The Pure Air 3000 was set on the 1000 sq.ft. setting and on the highest fan speed.

Sampling/Monitoring Protocols Used:

Note: Readings were taken each day at approximately the same time in each of the 3 areas and an outside control reading as well. Mold Spore sampling was done on days 1,3 and 5.

1. **TVOC and HCHO monitoring**

   Using a newly calibrated TemTop model LKC-1000 a laser multi-functional detector with a high precision electrochemical sensor that can transform the concentration of pollutants in the air into visual data, readings were taken daily during the project. The TVOC reading that this unit provides is representative of multiple airborne compounds that were present simultaneously and are reported in mg/m3 allowing low levels to be detected and reported.
   HCHO (formaldehyde), a common indoor contaminant used in many products and disinfectants, was also monitored daily and the readings are part of the integrated results and are reported separately but part of the TVOC component reported by the TemTop Meter. These total results were reported in mg/m3. (Milligram per cubic meter) providing very low detection levels.

2. **PM2.5, PM10.0**
   These are inhalable particle matter (PM) not a single pollutant, but a mixture of many chemical species. It is a complex mixture of solids and aerosols comprised of small droplets of liquid, dry solid fragments, and solid cores with liquid coatings. Those with a diameter of 10 microns or less (PM10) are inhalable into the lungs and can induce adverse Health effects. *Fine* particle matter is defined as particles that are 2.5 microns or less in diameter and comprises a portion of the PM10. These levels are regulated by an OSHO standard of exposure in the workplace. These were measured daily using a calibrated TemTop model LKC-1000 laser detector with a high precision electrochemical sensor.

3. **Respirable (dust) Particle Counts:**
   Airborne particle sizes are measured in microns. Usually, particle size is designated as the average diameter in microns. Particles less than 10 microns in diameter can get deep into your lungs and some may even pass into your bloodstream. Smaller particles (1-3 microns) diffuse deeply into your lungs tissue, depositing in the alveoli by a number of mechanisms including diffusion, sedimentation and electrostatic effects. These levels of submicron particles are frequently most elevated in an urban setting. Common airborne particles in this size range are auto emissions, combustion smoke, cement dust, silicates, legionella, tobacco smoke, carbon dust, some bacterias, lead dust, welding fumes and milled flour.

   Using a recently calibrated Extech VPC300 Video Particle Counter, particle sizes 0.3, 0.5, 1.0,2.5, 5.0 and 10.0 microns were measured daily during the project.

4. **Activated Oxygen (O3)**
   Using a Forensic Detector portable ozone monitor, the ozone levels were monitored daily and were able to be reported at levels from 1 to 100 ppb. The current TLV TWA is .1 ppm.

5. **RH% and temperature**

   These environmental factors were monitored to determine if it had any discernable effect on the results.

6. **Mold spore levels**

   150 liter air samples were taken in each area initially before the units were operating and on days 3 and 5 as well as an outside control sample. These samples were analyzed by AEML labs for total spore count identified by each separate mold genus (family).

Findings:

1. **TVOC reading results:**

It is typical the indoor TVOC levels would be greater indoors than outdoors, and they were. The TVOC levels recorded in each area were initially *low and remained low,* between .15 mg/m3 and .32 mg/m3 in the conference room and .19 and .44 mg/m3 in the Café 90. *These TVOC levels would be below any exposure concern levels and would not constitute an IAQ concern level.*

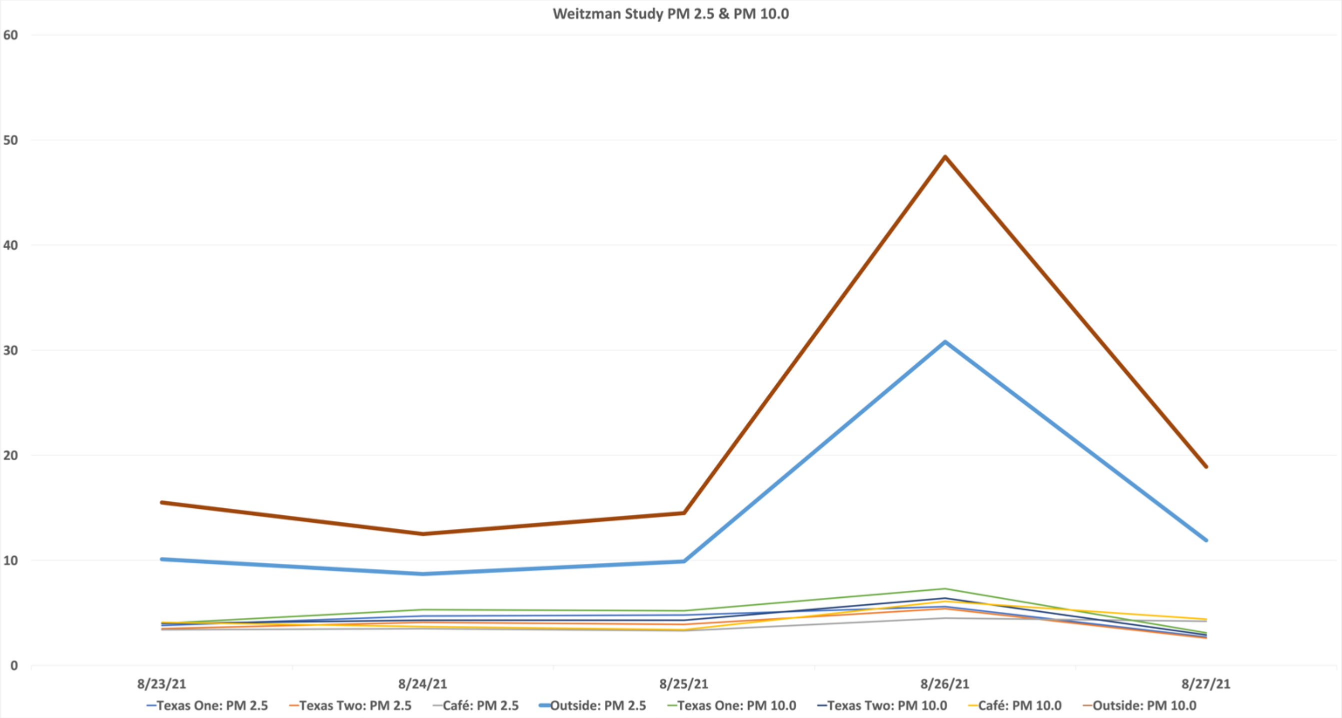
CH2O (formaldehyde) levels were also low, only slightly higher than the outdoor control levels for the 5-day period ranging between .03 mg/m3 - .07 mg/m3 in the conference room and fluctuated with the outdoor levels.

The CAFÉ 90 levels were reported between .19 mg/m3 and .44 mg/m3 being the highest on the final day as ambient levels also increased.

These levels were far below the NIOSH level of exposure at 1 ppm/1.23 mg/m3. The OSHA PEL is 0.75 ppm/.92 mg/m3. This level would not constitute an IAQ concern level.

2. PM 2.5/10,0

It is quite typical that the indoor levels will exceed the outdoor levels unless the building is in a more polluted outdoor setting. The combined PM levels on all 5 days were *far less* than the outdoor levels and *far below* the established level of concern as set by OSHA. The CAFÉ 90 PM levels were the lowest *ranging between 3.4 and 4.1 microns to 4.5 and 6.1 microns respectively. On days 4 and 5 the indoor levels in each area decreased even further compared to the outside levels which had increased significantly.*

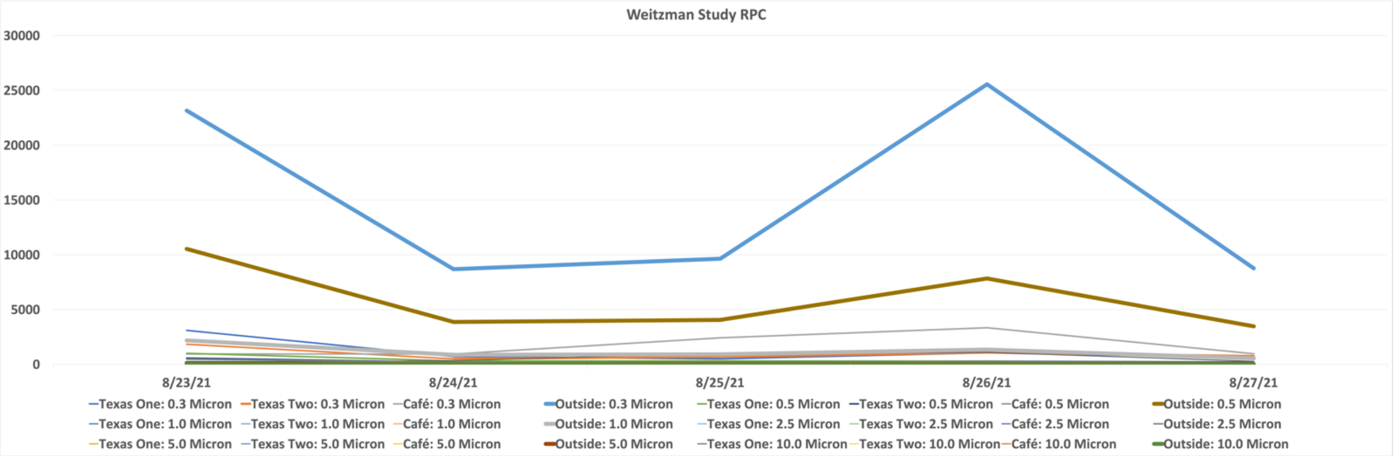


3. RPC Counts

It would be expected that the indoor levels would be greater than the outdoor levels. However, on each of the 5 days the indoor levels were *less than* the outdoor levels in each area.

Over the 5 day period the combined particle count levels in the Conference room were decreasing and by day 5 the combined total counts had decreased by approx. 71% from the initial levels and at 93% of the outside level.

In Café 90, the RPC count levels were consistently less than outside each day and fluctuated with the outdoor ambient levels



4. Activated Oxygen

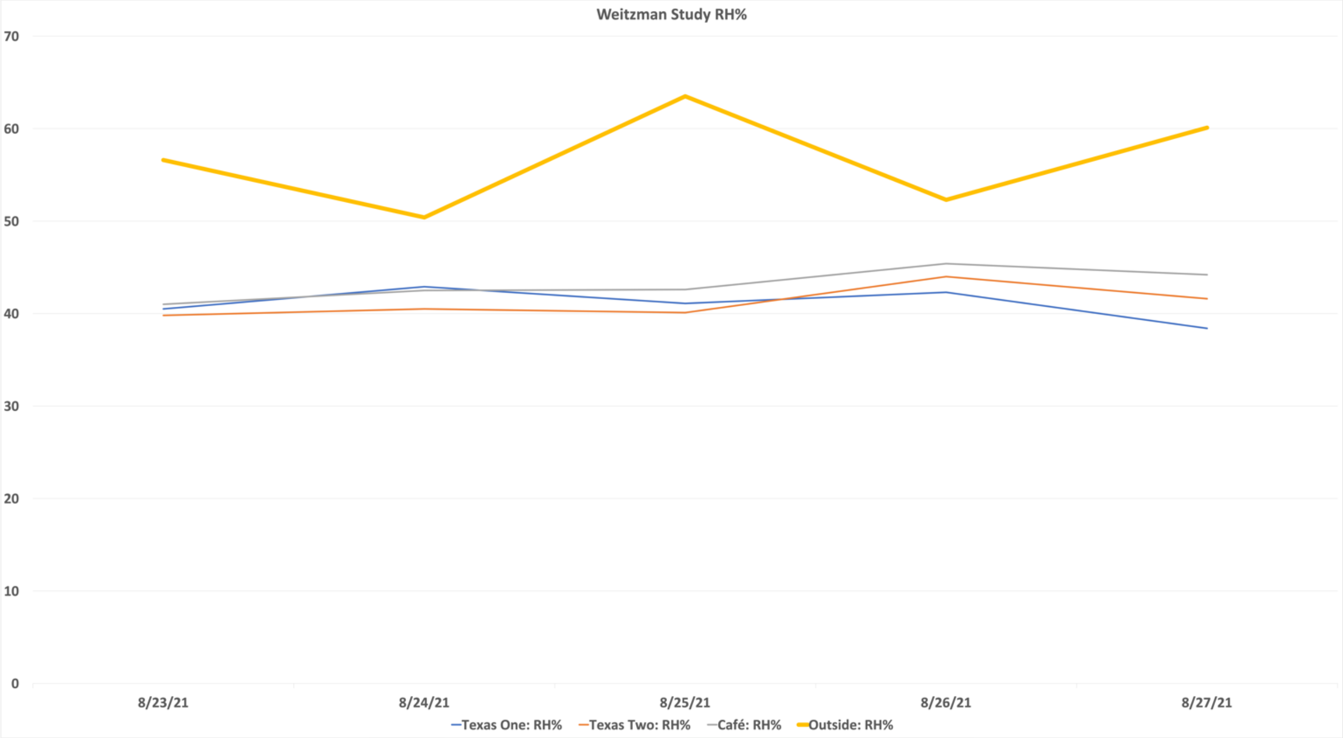
There were no detectable ozone levels in any of the areas.

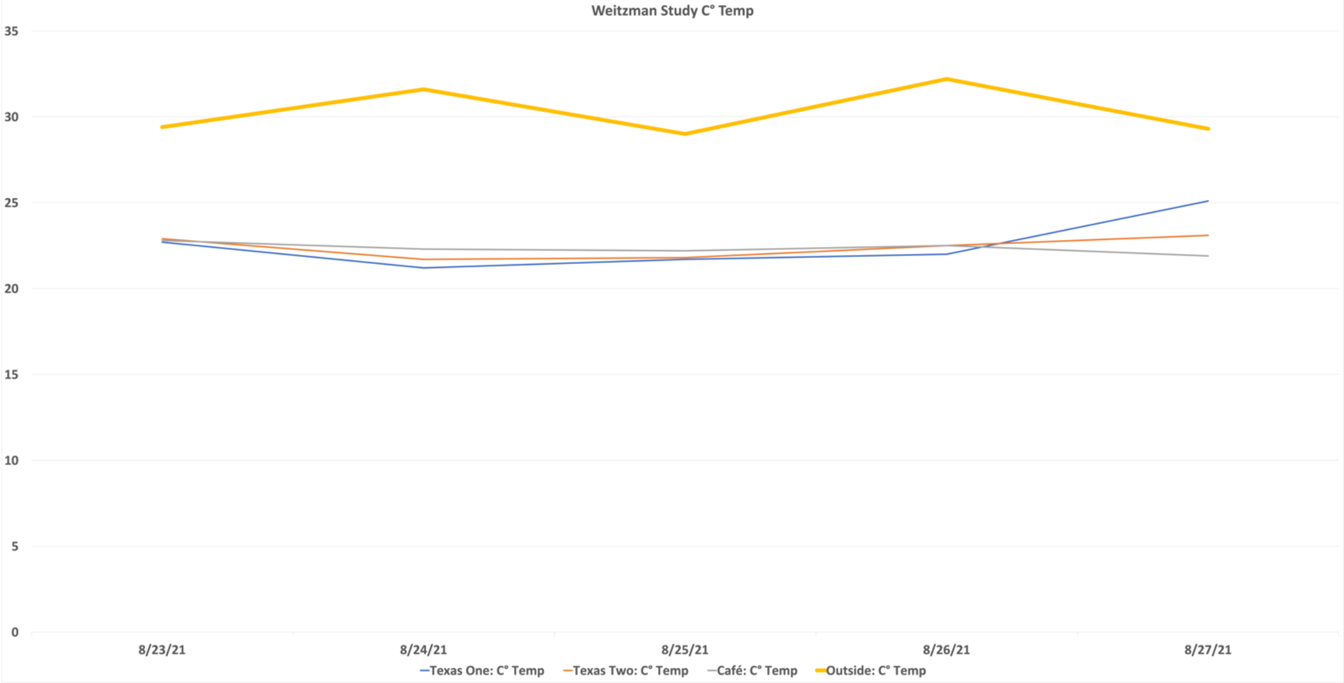
5. RH% and Temperature.

During the 5-day period in the test room, the RH% inside ranged between 38.4% and 45.4%. Outdoor levels between 50.4 % and 63.5% This would be considered typical and within the ASHRAE guidelines of 35 to 55%.

The temperature levels inside were between 70.6 to 77.8 degrees F vs outside between 84.2 and 88.9 degrees F.

There appeared to be no discernable impact on the indoor results.





6. Mold Spore levels

Reference: AEML report # 336407

The inside mold spore levels inside both the test areas were initially very low and remained very low during the test period as compared to the outside baseline.

In CAFÉ 90, by day 3, the total spore count had been reduced by 79% to the initial levels and on day 5 was reported at 40% less than the initial levels.

Initial spore count- 33 s/m3
Day 3 - 7 s/m3
Day 5- 20 s/m3

Summary of Findings and Observations:

The areas tested within this commercial building were found to have a very acceptable Indoor air quality as compared to most testing projects performed.
However, it was my findings, that the Respirable Particle Counts, PM2.5/10.0 and mold spores were significantly reduced even further in the highlighted areas. It would be my considered opinion that this additional reduction would not be expected or typical without the use of the Greentech Technology.

Reported By:

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Date submitted: 8/30/21

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