St. Charles Parish Public Schools

Case Study: Indoor Air Quality Testing at St. Charles Parish School District

Background

The St. Charles Parish School District, in collaboration with Guth DeConzo Consulting Engineers, conducted a comprehensive study to assess the effectiveness of bi-polar ionization (BPI) technology in improving indoor air quality (IAQ) at Hahnville and Destrehan High Schools. The primary goal was to determine the validity and efficiency of AtmosAir Dielectric Barrier Discharge (DBD) Bi-polar ionization (BPI) devices installed in these schools' field house locker rooms. Given the increasing awareness of airborne transmission of pathogens, including COVID-19, this study explored how well these devices could enhance IAQ by reducing airborne particles, volatile organic compounds (VOCs), formaldehyde, and ozone levels.

Objectives

1. **Assess Ion Concentration:** Evaluate whether the AtmosAir ionization devices produce a sufficient concentration of ions (both positive and negative) to clean the air effectively.
2. **Evaluate IAQ Metrics:** Measure changes in particle count, VOC levels, formaldehyde concentration, and ozone production before and after the operation of the AtmosAir devices.
3. **Compare Technologies:** Analyze how the ionization method used by AtmosAir compares to traditional needle-point ionization methods in terms of effectiveness and safety.

Methodology

The study was conducted in two almost identical locker rooms at the respective high schools. The testing procedure involved several iterations to establish a true baseline and evaluate the AtmosAir devices' performance under various operating conditions. The testing included:

- **Baseline Measurements:** Initial readings were taken with all air purification devices turned off (True Baseline) and with alternative devices turned on, but AtmosAir devices off (Adjusted Baseline).
- **Operating Measurements:** Readings were taken after the AtmosAir devices were installed and allowed to operate, ensuring the space was fully saturated with ions.

Metrics measured included ion concentration, ozone levels, particle count, VOCs, and formaldehyde concentration.

Key Findings

1. **Ion Concentration:** The AtmosAir devices consistently met the criteria of increasing ion concentration by at least 500 ions/cm³ and achieving a minimum of 1,000 ions/cm³ during the operating trials. This indicates that the devices were functioning correctly and producing enough ions to impact IAQ positively.
2. **Impact on IAQ Metrics:** The data showed a reduction in particle count, VOCs, and formaldehyde levels when the AtmosAir devices were in operation. For instance, at Hahnville High School, particle counts for sizes ranging from 0.3 to 10.0 microns were significantly reduced during the operating trials compared to the baseline. This reduction demonstrates the effectiveness of ionization in improving air quality.
3. **Ozone Production:** The AtmosAir devices did not produce ozone levels that exceeded the safety thresholds. The increase in ozone concentration was less than 5 parts per billion (ppb) above the baseline, ensuring that the devices did not introduce harmful levels of ozone into the environment.
4. **Technology Comparison:** The study highlighted the importance of using the correct ionization technology. The AtmosAir devices, which utilize dielectric barrier discharge technology, were more effective than traditional needle-point ionization systems. The latter, used by the activTEK Eagle 5000 system, produced many more but shorter-lasting ions and was less effective in achieving the required ionization energy to properly clean

the air. This finding underscores that ion counts alone do not guarantee better IAQ unless the ions are produced using appropriate technology.

Conclusion

The St. Charles Parish School District's IAQ testing demonstrated that the AtmosAir ionization devices effectively improve indoor air quality by significantly reducing harmful airborne particles, VOCs, and formaldehyde levels without producing dangerous ozone levels. However, the study also emphasized that simply increasing ion counts does not automatically result in better IAQ; the technology used to generate these ions is crucial. The AtmosAir system's dielectric barrier discharge technology proved to be superior to traditional needle-point ionization, highlighting the importance of selecting the right equipment for effective air purification.

This case study serves as an important reference for other institutions considering the implementation of air ionization technology to improve indoor air quality, particularly in environments where airborne transmission of pathogens is a concern.

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