



Penn Hills School District

Case Study: Enhancing Indoor Air Quality at Penn Hills School District

Background

The Penn Hills School District, located in Penn Hills, PA, initiated a project to improve indoor air quality (IAQ) by installing AtmosAir bi-polar ionization (BPI) devices across various school facilities. Guth DeConzo Consulting Engineers, in collaboration with Smart Air Defense, conducted an extensive evaluation of these devices' effectiveness, aiming to ensure the health and safety of students and staff in the district. The study focused on the ability of these ionizers to reduce airborne contaminants, including particulate matter, volatile organic compounds (VOCs), formaldehyde, and ozone.

Objectives

The primary objectives of this study were:

1. **Verify the proper installation and operation** of the AtmosAir BPI devices.
2. **Assess the effectiveness** of these devices in improving IAQ by measuring specific air quality parameters.
3. **Ensure compliance** with OSHA and other relevant standards regarding ozone production and ion concentration.

Methodology

The evaluation process involved a two-phase testing procedure:

- **Baseline Testing:** Initial measurements were taken with the ionizers turned off to establish baseline IAQ metrics.
- **Operating Testing:** After installing and operating the ionizers overnight, measurements were repeated to assess the change in IAQ metrics.

Metrics monitored during the tests included:

- **Ion Concentration:** Measured in ions per cubic centimeter (ions/cm³).
- **Ozone Levels:** Recorded in parts per billion (ppb).
- **Particulate Matter Counts:** Tracked for particle sizes ranging from 0.3 to 10 microns.
- **VOC and Formaldehyde Concentrations:** Monitored in parts per million (ppm).

The testing adhered to strict criteria to determine a PASS/FAIL outcome, particularly focusing on achieving a minimum increase of 500 ions/cm³ from baseline and ensuring ozone levels did not exceed a 5 ppb increase.



Findings

The results from the testing revealed that the AtmosAir BPI devices were effective in significantly improving the indoor air quality across the tested rooms. Key findings included:

- **Ion Concentration:** All spaces tested met or exceeded the desired ion concentration, showing increases well above the 500 ions/cm³ threshold, indicating effective air ionization and the potential for substantial air cleaning.
- **Particulate Matter:** There was a noticeable reduction in smaller particles (less than 2 microns), which are particularly concerning for viral transmission, such as SARS-CoV-2.
- **VOC Levels:** VOC concentrations decreased across all tested spaces, showcasing the ionizers' capability to oxidize and neutralize harmful gases.
- **Formaldehyde Concentrations:** Results varied, with some rooms showing a decrease and others a slight increase, although all levels remained well within OSHA safety limits.
- **Ozone Production:** The devices maintained ozone levels well within the permissible exposure limits, ensuring no adverse effects from ozone emissions.

Conclusions

Implementing AtmosAir BPI devices in Penn Hills School District has proven a successful initiative for enhancing indoor air quality. The devices effectively increased ion concentrations, reduced airborne particles, and decreased VOC levels while maintaining safe ozone levels. This case study demonstrates the viability of using bi-polar ionization technology in educational settings to promote a healthier environment for both students and staff.

Recommendations

Based on the positive outcomes of this study, it is recommended that Penn Hills School District continues to monitor IAQ and consider expanding the use of bi-polar ionization devices to additional spaces within the district. Continuous testing and validation should be performed to ensure ongoing compliance with IAQ standards and to maintain a safe and healthy indoor environment.

This case study provides a detailed overview of the BPI testing conducted in the City School District of New Rochelle, summarizing the methodology, results, and overall impact of the project.

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