Case Study: Bi-Polar Ionization and Indoor Air Quality Testing in the City School District of New Rochelle

Introduction

In response to the COVID-19 pandemic, the City School District of New Rochelle undertook an initiative to improve indoor air quality (IAQ) across its schools by installing AtmosAir's Dielectric Barrier Discharge (DBD) Bi-Polar Ionization (BPI) devices. The goal was to create a safer environment for students and staff as they returned to in-person learning. Guth DeConzo Consulting Engineers, in collaboration with Smart Air Defense, was commissioned to conduct a comprehensive evaluation of the installed BPI devices to assess their effectiveness in enhancing IAQ

Project Overview

The project involved testing BPI devices installed in ten schools within the district. The schools included:

- George M. Davis Elementary School
- Trinity Elementary School
- Jefferson Elementary School
- Columbus Elementary School
- Henry Barnard Elementary School
- Daniel Webster Elementary School
- William B. Ward Elementary School
- Isaac E. Young Middle School
- Albert Leonard Middle School
- New Rochelle High School

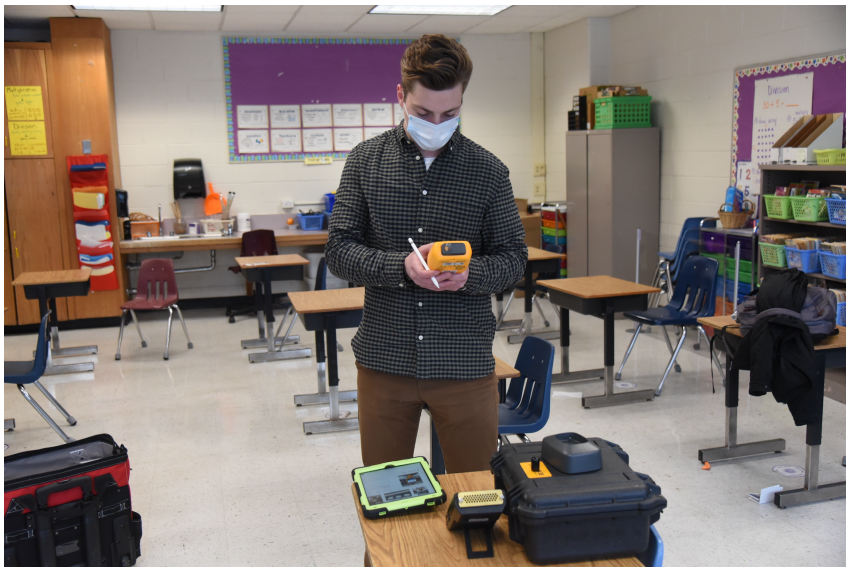
The evaluation focused on verifying the proper installation and operation of the BPI devices and measuring their impact on various IAQ metrics, including ion concentration, ozone levels, particle count, volatile organic compounds (VOCs), and formaldehyde levels.

Testing Methodology

Guth DeConzo engineers conducted tests on 10% of the installed BPI devices at each school. The testing procedure involved baseline measurements and measurements taken with the operating BPI devices. The IAQ metrics were recorded using specialized equipment placed at breathing height in the center of each room. Each trial lasted 15 minutes, and the data collected included:

- Ion concentration (ions per cubic centimeter)
- Ozone concentration (parts per billion)
- Particle count (ranging from 0.3 to 10.0 microns)
- VOC concentration (parts per million)
- Formaldehyde concentration (parts per million)

The devices were assessed on their ability to increase ion concentration by at least 500 ions/cm^3 above baseline levels and maintain an ozone concentration increase of no more than 5 parts per billion.



Results

The testing results showed that all BPI devices across the ten schools passed the validation procedure. Key findings include:

- A significant increase in ion concentration in all tested spaces, with the average concentration exceeding the target minimum of 1,500 ions/cm³.
- Ozone levels remained within safe limits, with no device contributing to an increase of more than 5 parts per billion above baseline levels.
- Particle counts decreased, particularly for smaller particles (0.3 to 1.0 microns), indicating the effectiveness of ionization in promoting particle agglomeration and subsequent filtration.
- VOC and formaldehyde concentrations were reduced, demonstrating the BPI devices' capability to neutralize harmful gases.

Conclusion

Implementing BPI devices in the City School District of New Rochelle enhanced indoor air quality by increasing ion concentrations, reducing particulate matter, and neutralizing harmful gases without producing hazardous ozone levels. This case study highlights the effectiveness of BPI technology as a viable solution for improving IAQ in educational settings, especially in the context of pandemic-related safety concerns.

Recommendations

To sustain the improvements in IAQ, it is recommended that the district continue monitoring the performance of the BPI devices using the installed IAQ sensors. Regular maintenance and periodic testing should also be conducted to ensure the long-term efficacy of the devices. Additionally, the district could consider expanding the use of BPI technology to other facilities within the community

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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