



Monomoy Regional Middle School Air Quality Testing Report

Reason for Testing: Staff Concerns

Date of Testing: September 19, 2023

Description: Indoor Air Quality tests (CO₂, CO, Humidity, Temperature) and surface area tests (room B136 and adjacent rooms)

Conducted By: Marina Brock, Barnstable County

Summary of Findings: No identified flowering or viable mold growth detected, concerns raised about the condition of the carpet.

District Response: Replacement of carpet.

Removal of tree/organic matter outside of room.

Operation of dehumidifier and air filter.

Cleaning and removal of clutter, debris from other classrooms.

Rick Travers, District Facilities Director
Monomoy Regional School District
450 Crowell Road,
Chatham, MA 02633

September 23, 2023

Dear Rick,

I would like to express my appreciation for the opportunity to assist your department in conducting an initial assessment of Indoor Air Quality (IAQ) at Monomoy Middle School on Tuesday, September 19th. On that day, the weather conditions were temperate and clear, with residual high humidity. The motivation behind this assessment stemmed from an employee's health concern that may be related to an IAQ issue within the facility. To gauge the internal air quality during our assessment, I utilized a TSI Q-Trac IAQ meter, which provides measurements for various parameters indicative of internal fresh air capacity:

- Carbon Dioxide (CO₂): Represented in Parts Per Million (ppm), this measurement indicates fresh air exchange efficiency.
- Carbon Monoxide (CO): Measured in Parts Per Million (ppm), CO is a hazardous byproduct of combustion.
- Relative Humidity (RH): This parameter quantifies air moisture levels.
- Temperature (T): It records the temperature within the assessed areas.

Throughout the assessment, we collected samples in all areas for all the above parameters. All the collected values fell within normal and acceptable ranges, indicating active fresh air circulation.

Our primary focus during this assessment was a middle school classroom where the instructor has reported experiencing ongoing physical/health discomfort, potentially linked to this classroom environment. Additionally, at the request of your department, we extended our investigation to encompass several other classrooms in this area that were experiencing more nebulous concerns. This expanded scope aimed to address shared concerns about possible localized environmental factors contributing to IAQ issues in this specific school building area.

In the primary area of concern, Room B136, Mr. Duggen's room, had a detectable odor on the day of the assessment. The smell was likened to mild acetic acid, and the origin could not be readily determined, but the likely cause was the classroom carpet. At the time, the classroom windows were open, and a portable fan and air filter were operating. The Q-Trac meter readings measuring fresh exchange indicated all levels to be normal, with the inside classroom levels of CO₂ at 490 ppm, only slightly higher than outside ambient CO₂ levels of 420 ppm, indicating a very high and efficient level of fresh air exchange. The classroom is clean and uncluttered. There was no detectable mildew odor (an indicator of mold growth), and we could find no visible mold on any surface.

The reason I feel the carpet is the source has several probabilities. The carpet is extremely old, and deferred maintenance has extended its life almost twice the recommended years. Although very well maintained for its age, modern floor coverings offer much greater usefulness in maintaining lower maintenance requirements/resources and ensuring a healthier internal environment. Another issue is the carpet is on a concrete slab on grade. Significant problems can arise with these conditions, especially in a building with no means of centralizing efficient seasonal dehumidification. Carpets on a slab can cause problematic seasonal condensation and moisture issues with climate and relative humidity changes, causing moisture drop on the carpet surface and the development of ambient microorganism growth, including various bacteria and mold.

Acetic acid smells like vinegar. It has a sour odor and is a common ingredient in many food, drinks, and industrial products. However, I believe the odor of acetic acid is probably produced through the fermentation of material dropped, spilled, or deposited on the carpet over time through either bacterial or chemical reactions. These types of odors are also maddening as they “come and go” dependent on higher relative humidity and temperatures, often “blossoming” seasonally in summer or fall and “disappearing in colder, drier months.

Temporary Recommendations provided and initiated at the time of the assessment:

- Run an appropriately sized dehumidification unit continually in the classroom to reduce humidity, keeping windows closed for a week or more. See if the odor becomes less pronounced.
- Run the classroom air filtering unit on the “Allergen” cycle concurrently and continually.
- Assess the success or failure of this approach through symptom reduction or odor mitigation or elimination.

Additional Recommendations

- Long-term recommendation- remove carpet and replace with resilient and environmentally friendly floor covering.
- Ryanna and the facilities department suggested reducing/ eliminating the vegetation within the interior enclosed courtyard where the all the classroom univents (including Mr. Duggan’s) intakes are located, to encourage greater and more efficient air circulation and air flow. I agree.
- If health symptoms or issues persist, please see suggested protocol below.

Other Assessed classroom Areas

We walked through several adjoining classroom areas (See attached photos), and I could not detect the similar acetic acid odor found in Mr. Duggan's room. Qtrac air samples were taken in all these areas, revealing excellent fresh air exchange as most windows were open, and the classroom's active mechanical exchange system was operating. In several rooms, the amount of classroom materials was problematic and created issues surrounding the accumulation of dust and other airborne debris while also making reasonable cleaning of surfaces for allergens impossible.

In one classroom, the emergency response safety shower was so inaccessible with clutter that it would be unusable in an emergency, a significant compliance and safety liability to the school district. Chemicals were also improperly stored and/or stored in an unsafe manner in several areas. Mismanagement of chemicals can potentiate spills, exposure risks, and other possible accidents. Aside from being an IAQ issue, this mismanagement potentiates safety and health compliance issues.

Finally, in other assessed classrooms, several tape samples were taken of debris located on several suspect classroom surfaces and one from the ceiling-mounted return air vent faceplate. These were all analyzed microscopically and contained typically circulating indoor debris, including skin cells, dust mite pieces, fibers, mineral debris, and circulation mold spores, but NO flowering or viable mold growth.

Conclusions

Assessing individual health concerns within this context is a challenging task. Currently, there are no notable health issues or significant problems for the general population in this area. However, it is essential to recognize that environmental allergens and irritants are dynamic and subject to seasonal and situational variations. These factors can potentially induce allergy symptoms and severe health issues in susceptible individuals at any given time. Allergies may develop in anyone at any time due to many reasons. These can include genetic predisposition, age, sex, exposure, susceptibility, and many other factors and co-factors.

Additionally, Indoor Air Quality (IAQ) is not a static parameter, but a variable influenced by numerous external and internal environmental factors. External factors include seasonal fluctuations in pollen, mold spores, and any number of additional environmental allergens. Further, as mentioned above, weather conditions like high humidity, moisture, temperature, solar gain/loss, and wind velocity and direction can also trigger periodic IAQ issues. Indoor factors encompass the functionality of mechanical air handling systems, work materials and processes, levels of airborne particulates, occupants, odors, vapors, gases, dander, mists, dust, aerosols, and fragrances. Moreover, the complex interplay of many factors can further influence IAQ. Individual tolerances and susceptibilities add yet another layer of complexity, with varying individual responses to exposure levels.

Regarding these allergy-related concerns, it's important to note that reactions can differ significantly among individuals. While some may remain asymptomatic even with substantial exposure, others may experience severe health problems with minimal exchange or exposure. Collaborative efforts are necessary to address these concerns effectively to establish a baseline IAQ and an "allergy-friendly" environment.

To be of greater assistance in making specific and useful recommendations, a more comprehensive allergy and medical assessment is recommended for this or any employee experiencing significant and continued health issues necessitating accommodation. This assessment should be conducted to identify and evaluate specific environmental allergens or triggers. It is advisable for the employee to consult with an allergist (as opposed to a Doctor of General practice) to be allergy tested to identify specific common, local, or regional allergens possibly triggering individual reactions. These results should also be characterized based on the severity of the response (e.g., "significant," "moderate," or "minor").

This information will enable us to pinpoint the primary triggering sources of concern and tailor mitigation or control actions, accordingly, working with the Administration, the employees, Human Resources, and Facilities. In some organizations, the school Nurse has also been involved. The flow of this system should be assessed and developed congruently with your organizational resources, policies, and procedures.

Without this specific data, any actions taken for employee accommodation would be speculative and may be ineffective. Proceeding without a definitive health and environmental focus may inadvertently exacerbate the issue. Once the comprehensive medical assessment is complete, I can provide more precise recommendations, once again ensuring alignment with your Human Resources (HR) Policy. In addressing IAQ concerns, reduction, elimination, and prevention of source exposure remain fundamental strategies to mitigate symptoms effectively.

In addition, a wealth of information regarding many aspects of IAQ can also be found on the Environmental Protection Agency website at <http://www.epa.gov/> and the publication Tools for Schools at <https://www.epa.gov/iaq-schools/indoor-air-quality-tools-schools-action-kit> which affords an excellent program designed for schools to assist in developing a system to improve environmental air quality.

Please don't hesitate to call if you have any questions or concerns or if I can assist during or after the evaluation.

Respectfully submitted.

Marina Brock

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Photos From Assessed Areas





