MATANUSKA-SUSITNA
BOROUGH SCHOOL DISTRICT

Indoor Air Quality Program

Updated: November 2021

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INTRODUCTION

A. Summary

The Matanuska-Susitna Borough School District (District) is committed to providing a safe environment for all employees, students, and visitors. In pursuit of this goal, an Indoor Air Quality (IAQ) Program has been developed to document the standards for indoor air quality throughout all District or Matanuska-Susitna Borough owned facilities.

B. Scope

The air quality within and around buildings and structures can affect a person's health, comfort, and ability to work or learn effectively. Environmental factors which can impact the quality of air include temperature; humidity; ventilation; airborne particulates; and other contaminants such as volatile organic compounds and allergens.

Some contaminants, such as radon, are inherently present and cannot be completely removed from the environment. As such, indoor air quality is considered acceptable when the level of contamination is at or below the established regulatory limits or best practice guidelines. This program establishes standard procedures for the management of IAQ concerns through:

1. Goals and objectives
2. Key drivers
3. Technical solutions
4. Reporting procedures and
5. Investigation

C. Regulations and Standards

The Indoor Air Quality Tools for Schools Action Kit (Attachment A), which was developed by the Environmental Protection Agency (EPA), was used as a guide to develop this plan.

PROGRAM RESPONSIBILITIES

A. Administration

The following individuals are responsible for administering the District's IAQ program:

Program Oversight
Daniel Belanger, Compliance Program Coordinator
Matanuska-Susitna Borough School District
3901 E. Bogard Road
Wasilla, AK 99654
P: 907-864-2024; F: 907-864-2081

Program Review and Support
Nicole Lundstrom, Risk Manager
Matanuska-Susitna Borough School District
501 North Gulkana Street
Palmer, AK 99645
P: 907-746-9213; F: 907-761-4091

B. Program Coordinators

The District's Program Coordinators are responsible for building inspections, IAQ testing, mitigation, and communicating relevant IAQ information to the Compliance Program Coordinator.

David Larson, Central Region Foreman
Matanuska-Susitna Borough School District
3901 E. Bogard Road
Wasilla, AK 99654
P: 907-864-2004; F: 907-864-2081

Stephen Murray, Eastern Region Foreman
Matanuska-Susitna Borough School District
3901 E. Bogard Road
Wasilla, AK 99654
P: 907-864-2005; F: 907-864-2081

Steven "Rusty" Belanger, Western Region Foreman
Matanuska-Susitna Borough School District
3901 E. Bogard Road
Wasilla, AK 99654
P: 907-864-2006; F: 907-864-2081

C. Employees

All District employees play an important role in maintaining air quality. For example, placing objects in front of unit ventilators, modifying thermostat adjustments, or turning off noisy ventilators may cause the quality of air within a room or structure to deteriorate.

Employees are responsible for:

1. Complying with this program.
2. Reporting IAQ concerns to their supervisor; and
3. Working with the Program Coordinator to identify elevated levels of air contaminants, upon request.

PROGRAM COMPONENTS

A. Goals and Objectives

1. Reduce the likelihood that building occupants will experience work-related illnesses or the exacerbation of symptoms of health conditions such as asthma and allergies by providing quality indoor air, monitoring air contaminants, and taking action to mitigate pollution as necessary.
2. Control temperature, humidity, and ventilation, which will foster students' comfort and learning, and provide a high-quality environment for employees and the general public.
3. Maintain low levels of indoor air pollution through preventative measures such as routine maintenance activities and periodic building evaluations and inspections.
4. Provide adequate air exchanges and maintaining ventilation standards.
5. Respond to, and thoroughly investigate, IAQ-related concerns.

B. Key Drivers

There are six key drivers which are essential, and work together, to deliver an effective school air quality management program (Attachment B).

1. Organize
    a. The District IAQ team includes Program Coordinators who report to the Compliance Program Coordinator, who is responsible for program oversight.
    b. The District will create and maintain policies, programs, and procure equipment or services as necessary to assist the Program Coordinators.
2. Communicate
    a. Be transparent and inclusive.
    b. When concerns have been identified, communicate results of investigations.
3. Assess
    a. Walk school grounds and establish a baseline.
    b. Identify and prevent risks.
    c. Listen to building occupants who report concerns. Provide concerned building occupants with the Indoor Air Quality Report of Concern Form (Attachment C).
4. Plan
    a. Prioritize actions and work in stages.
    b. Plan for future needs, when applicable.
5. Act
    a. The Compliance Program Coordinator, who may consult with other qualified professionals, is responsible for establishing the frequency of testing for Indoor Air Pollutants (IAP) and other identified contaminants.
    b. If an elevated level of IAP is identified, develop a plan to reduce contaminants to recommended levels.
6. Evaluate
    a. Solicit feedback.
    b. Determine the most effective strategies for mitigation when IAP or contaminants are detected above recommended levels.

C. Technical Solutions

There are seven technical solutions to effectively manage IAQ risks (Attachment D). When addressed systematically, the IAQ program focuses on these solutions to ensure that a healthy environment is maintained.

1. Quality HVAC:
    a. Inspect HVAC systems regularly.
    b. Establish a maintenance plan.
    c. Change filters regularly.
    d. Provide air ventilation according to the American Society of Heating, Refrigerating and Air-Conditional Engineers (ASHRAE) Standards or local code.
    e. Clean air supply diffusers, return registers, and outside air intakes.
    f. Keep unit ventilators clear of books, papers, and other items.
2. Control of Moisture/Mold:
    a. Conduct routine moisture inspections.
    b. Establish a mold prevention and remediation plan.
    c. Monitor indoor humidity levels.
    d. Address moisture problems promptly.
    e. Within 24-48 hours, dry any areas that have become wet.
3. Integrated Pest Management:
    a. Inspect and monitor for pests.
    b. Use spot treatments and baits.
    c. Communicate with occupants prior to pesticide use.
    d. Mark indoor and outdoor areas treated with pesticides with signage.
4. Effective Cleaning and Maintenance:
    a. Conduct routine inspections of school environment.
    b. Follow preventative maintenance plan.
    c. Train custodial/maintenance staff on protocols.
    d. Ensure safety data sheets (SDS) for materials are available through MSDSOnline.
    e. Clean and remove dust with damp cloth.
    f. Use high efficiency filters on vacuums.
5. Smart Materials Selection:
    a. Maintain products inventory.
    b. Purchase low-chemical emitting products when possible.
    c. Use low-toxicity and low-chemical emitting paint.
    d. Use least toxic cleansers possible (only those approved by the District).
6. Source Control:
    a. Conduct annual building walkthrough inspections.
    b. Develop a plan to reduce IAPs if found above recommended levels.
    c. Utilize the District's Hazardous Material Communication Plan (HAZCOM) when needed.
    d. Use walk-off mats at building entrances when possible.

7. Integrated Energy Management Solutions:
    a. Evaluate IAQ during energy efficiency upgrades and building renovations.
    b. Conduct regular HVAC maintenance and tune-ups.
    c. Use programmable thermostats where available.
    d. Consider post-construction commissioning for HVAC systems.
    e. Control amount of moisture in building assemblies, mechanical systems, and occupied spaces.

D. Typical Indoor Air Pollutants

Within the Indoor Air Quality Tools for Schools Reference Guide, the EPA has identified several indoor air pollutants (IAP's) which are common in schools. These pollutants, along with the sources, potential health effects, and general control strategies for mitigation, are presented in Attachment E. The common pollutants are:

1. Biological contaminants (mold, dust mites, pet dander, pollen, etc.)
2. Carbon Dioxide (CO_2)
3. Carbon Monoxide (CO)
4. Dust
5. Environmental tobacco smoke (ETS) or secondhand smoke
6. Fine Particulate Matter (PM)
7. Lead (Pb)
8. Nitrogen Oxides (NO, NO_2)
9. Pesticides
10. Radon (Rn)
    a. Radon is a colorless, odorless, and tasteless radioactive gas produced during the process of normal radioactive decay of uranium, radium, and thorium. These elements are naturally present in soil, rocks, and water. It impossible to not be exposed to Radon. The National Institute for Occupational Safety and Health (NIOSH), which is part of the Centers for Disease Control and Prevention (CDC), is the federal agency responsible for conducting research and making recommendations for the prevention of work-related injury and illness. Radon has been identified by NIOSH as a potential occupational carcinogen.
11. Other Volatile Organic Compounds (VOCs) (formaldehyde, solvents, cleansing agents)

Each pollutant is described or analyzed across five categories:

1. Description
2. Sources
3. Standards and guidelines for indoor air quality
4. Health effects
5. Control measures

E. Reporting Procedures

When an employee has an IAQ concern, it should be reported to their building supervisor through a completed Indoor Air Quality Report of Concern Form (Attachment C). The building supervisor and the Program Coordinator will investigate the concern.

F. Investigation

Program Coordinators are responsible for responding to IAQ concerns within the buildings in their assigned region. When addressing a concern, the Program Coordinator will investigate the potential cause, as well as the severity of the concern. If an IAP is discovered, the Program Coordinator will develop a plan in consultation with other qualified professionals as necessary, to mitigate or reduce the pollutant to recommended levels.

ATTACHMENTS

A. EPA Indoor Air Quality Tools for Schools Reference Guide

B. EPA Key Drivers

C. Indoor Air Quality Report of Concern

D. EPA Technical Solutions

E. EPA Typical Indoor Air Pollutants

EPA Indoor Air Quality Tools for Schools Reference Guide (Full PDF Link)

EPA

Indoor Air Quality Tools for Schools

REFERENCE GUIDE

aft

ASBO International

nea National Education Association
Great Public Schools for Every Child

National PTA
everychild. onevoice.

American Lung Association.

Indoor Air Quality (IAQ)

The Framework for Effective School IAQ Management:
Six Key Drivers

ORGANIZE
- Develop Systematic Approach
- Identify Existing Assets
- Design Standard Operating Procedures
- Empower an IAQ Leader
- Build an Effective Team
- Create Champions
- Secure Senior Buy-In

COMMUNICATE
- Share Your Goals
- Make IAQ Meaningful
- Be Transparent and Inclusive
- Communicate Results (Return on Investment)

EVALUATE
- Solicit Feedback
- Capture Return on Investment
- Measure, Assess and Track Program Implementation
- Document Accomplishments
- Determine the Most Effective Strategies for Continuous Improvement

ASSESS
- Walk the Grounds
- Listen to Occupants
- Use Technology
- Determine a Baseline
- Keep Customers Satisfied
- Identify and Prevent Risks

ACT
- Educate Staff About IAQ to Change Behavior
- Train Occupants to Address IAQ Risks
- Address the Source of Problems

PLAN
- Prioritize Actions
- Put Goals in Writing
- Start Small
- Work in Stages
- Plan for the Future

INDOOR AIR QUALITY REPORT OF CONCERN

Facilities
Mat-Su Borough School District
3901 E. Bogard Road
Wasilla, AK 99654
P: (907) 864-2001 || F: (907) 864-2081

If you believe there is an IAQ problem in your workplace, please notify your supervisor and complete this form. Your supervisor will work with the Program Coordinator assigned to your location to investigate your concern.

Name:	Position:
School/Facility:	Date/Time:
Supervisor:	Phone:
Program Coordinator:	Phone:

Details of Concern

What kind of symptoms or discomfort are you experiencing?

Are there other staff members experiencing similar symptoms?

When do symptoms begin?

When are they the worst?

Do they go away? If so, when?

Where do you spend most of your time in the school/facility?

Where are you when you experience the symptoms?

Your school's Program Coordinator will review the details of this concern and may contact you for more information if needed.

The Framework for Effective School IAQ Management: **Seven Technical Solutions**

Quality HVAC
- Inspect HVAC systems regularly
- Establish a maintenance plan
- Change filters regularly and ensure condensate pans are draining
- Provide outdoor air ventilation according to ASHRAE Standards or local code
- Clean air supply diffusers, return registers and outside air intakes
- Keep unit ventilators clear of books, papers and other items

Control of Moisture/Mold
- Conduct routine moisture inspections
- Establish a mold prevention and remediation plan
- Maintain indoor humidity levels between 30% and 60%
- Address moisture problems promptly
- Dry wet areas within 24–48 hours

Strong Integrated Pest Management (IPM)
- Inspect and monitor for pests
- Establish an IPM plan
- Use spot treatments and baits
- Communicate with occupants prior to pesticide use
- Mark indoor and outdoor areas treated with pesticides

Effective Cleaning and Maintenance
- Conduct routine inspections of school environment
- Develop a preventive maintenance plan
- Train cleaning/maintenance staff on protocols
- Ensure material safety data sheets (MSDS) are available to staff
- Clean and remove dust with damp cloth
- Vacuum using high-efficiency filters

Smart Materials Selection
- Maintain products inventory
- Develop low-emitting products purchasing and use policies
- Use only formaldehyde-free materials
- Use only low-toxicity and low-emitting paint
- Select products based on product rating systems
- Use least toxic cleaners possible (only those approved by the district)

Aggressive Source Control
- Conduct regular building walkthrough inspections
- Test for radon; mitigate if necessary
- Implement a hazardous materials plan (use, label, storage and disposal)
- Establish a school chemical management and inventory plan
- Implement smoke-free policies
- Establish an anti-idling school bus policy
- Use walk-off mats at building entrances
- Conduct pollutant-releasing activities when school is unoccupied

Integrated Energy Management Solutions
- Protect IAQ during energy efficiency upgrades and building renovations
- Conduct regular HVAC maintenance and tune-ups
- Install programmable thermostats
- Consider performing post-construction commissioning for HVAC systems
- Control moisture in building assemblies, mechanical systems and occupied spaces

ACTION KIT
- HVAC
- Moisture/Mold
- IPM
- Cleaning & Maintenance
- Materials Selection
- Source Control
- Energy Efficiency

Typical Indoor Air Pollutants

The following four pages present information about several indoor air pollutants common to schools, in a format that allows for easy comparison. The pollutants presented include:

- Biological contaminants (mold, dust mites, pet dander, pollen, etc.)
- Carbon dioxide (CO_2)
- Carbon monoxide (CO)
- Dust
- Environmental tobacco smoke (ETS) or secondhand smoke
- Fine particulate matter (PM)
- Lead (Pb)
- Nitrogen oxides (NO, NO_2)
- Pesticides
- Radon (Rn)
- Other volatile organic compounds (VOCs) (formaldehyde, solvents, cleaning agents)

Each pollutant is described or analyzed across five categories:

- Description
- Sources
- Standards and guidelines for indoor air quality
- Health effects
- Control measures

Indoor Air Pollutant	Description	Sources
Biological contaminants	Common biological contaminants include mold, dust mites, pet dander (skin flakes), droppings and body parts from cockroaches, rodents and other pests or insects, viruses, and bacteria. Many of these biological contaminants are small enough to be inhaled.	Biological contaminants are, or are produced by, living things. Biological contaminants are often found in areas that provide food and moisture. Damp or wet areas such as cooling coils, humidifiers, condensate pans, or unvented bathrooms can be moldy. Draperies, bedding, carpet, and other areas where dust collects may accumulate biological contaminants.
Carbon dioxide (CO_2)	Carbon dioxide (CO_2) is a colorless, odorless product of carbon combustion.	Human metabolic processes and all combustion processes of carbon fuels, like those in cars, buses, trucks, etc., are sources of CO_2. Exhaled air is usually the largest source of CO_2 in classrooms.
Carbon monoxide (CO)	Carbon monoxide (CO) is a colorless, odorless gas. It results from incomplete oxidation of carbon in combustion processes.	Common sources of CO in schools are improperly vented furnaces, malfunctioning gas ranges, or exhaust fumes that have been drawn back into the building. Worn or poorly adjusted and maintained combustion devices (e.g., boilers, furnaces), or a flue that is improperly sized, blocked, disconnected, or leaking, can be significant sources. Auto, truck, or bus exhaust from attached garages, nearby roads, or idling vehicles in parking areas can also be sources.
Dust	Dust is made up of particles in the air that settle on surfaces. Large particles settle quickly and can be eliminated or greatly reduced by the body's natural defense mechanisms. Small particles are more likely to be airborne and are capable of passing through the body's defenses and entering the lungs.	Many sources can produce dust including: soil, fleecy surfaces, pollen, lead-based paint, and burning of wood, oil, or coal.
Environmental tobacco smoke (ETS), or secondhand smoke	Tobacco smoke consists of solid particles, liquid droplets, vapors, and gases resulting from tobacco combustion. Over 4,000 specific chemicals have been identified in the particulate and associated gases.	Tobacco product combustion

Standards or Guidelines	Health Effects	Control Measures
There are currently no Federal government standards for biologicals in school indoor air environments.	Mold, dust mites, pet dander, and pest droppings or body parts can trigger asthma. Biological contaminants, including molds and pollens can cause allergic reactions for a significant portion of the population. Tuberculosis, measles, *Staphylococcus* infections, *Legionella* and influenza are known to be transmitted by air.	General good housekeeping and maintenance of heating and air conditioning equipment are very important. Adequate ventilation and good air distribution also help. The key to mold control is moisture control. If mold is a problem, get rid of excess water or moisture and clean up the mold. Maintaining the relative humidity between 30 and 60 percent will help control mold, dust mites, and cockroaches. Employ integrated pest management (IPM) to control insect and animal allergens. Cooling tower treatment procedures exist to reduce levels of *Legionella* and other organisms.
ASHRAE Standard 62-2001 recommends 700 ppm above the outdoor concentration as the upper limit for occupied classrooms (usually around 1,000 ppm).	CO_2 is an asphyxiate. At concentrations above 1.5 percent (15,000 ppm) some loss of mental acuity has been noted. (The recommended ASHRAE standard of 700 ppm above the outdoor concentration is to prevent body odor levels from being offensive.)	Ventilation with sufficient outdoor air controls CO_2 levels. Reduce vehicle and lawn and garden equipment idling and/or usage.
The OSHA standard for workers is no more than 50 ppm for 1 hour of exposure. NIOSH recommends no more than 35 ppm for 1 hour. The U.S. National Ambient Air Quality Standards for CO are 9 ppm for 8 hours and 35 ppm for 1 hour. The Consumer Product Safety Commission recommends levels not to exceed 15 ppm for 1 hour or 25 ppm for 8 hours.	CO is an asphyxiate. An accumulation of this gas may result in a variety of symptoms deriving from the compound's affinity for and combination with hemoglobin, forming carboxyhemoglobin (COHb) and disrupting oxygen transport. Tissues with the highest oxygen needs—myocardium, brain, and exercising muscle—are the first affected. Symptoms may mimic influenza and include fatigue, headache, dizziness, nausea and vomiting, cognitive impairment, and tachycardia. At high concentrations CO exposure can be FATAL.	Combustion equipment must be maintained to assure that there are no blockages and air and fuel mixtures must be properly adjusted to ensure more complete combustion. Vehicular use should be carefully managed adjacent to buildings and in vocational programs. Additional ventilation can be used as a temporary measure when high levels of CO are expected for short periods of time.
The EPA Ambient Air Quality standard for particles less than 10 microns is 50 $\mu g/m^3$ per hour for an annual average and 150 $\mu g/m^3$ for a 24-hour average.	Health effects vary depending upon the characteristics of the dust and any associated toxic materials. Dust particles may contain lead, pesticide residues, radon, or other toxic materials. Other particles may be irritants or carcinogens (e.g., asbestos).	Keep dust to a minimum with good housekeeping. Consider damp dusting and high-efficiency vacuum cleaners. Upgrade filters in ventilation systems to medium efficiency when possible and change frequently. Exhaust combustion appliances to the outside and clean and maintain flues and chimneys. When construction or remodeling is underway, special precautions should be used to separate work areas from occupied areas.
Many office buildings and areas of public assembly have banned smoking indoors or required specially designated smoking areas with dedicated ventilation systems be available. The "Pro-Children Act of 1994" prohibits smoking in Head Start facilities and in kindergarten, elementary, and secondary schools that receive Federal funding from the Department of Education, the Department of Agriculture, or the Department of Health and Human Services (except Medicare or Medicaid).	The effects of tobacco smoke on smokers include rhinitis/pharyngitis, nasal congestion, persistent cough, conjunctival irritation, headache, wheezing, and exacerbation of chronic respiratory conditions. Secondhand smoke has been classified as a "Group A" carcinogen by EPA and has multiple health effects on children. It has also been associated with the onset of asthma, increased severity of or difficulty in controlling asthma, frequent upper respiratory infections, persistent middle-ear effusion, snoring, repeated pneumonia, and bronchitis.	Smoke outside away from air intakes. Smoke only in rooms that are properly ventilated and exhausted to the outdoors.

Indoor Air Pollutant	Description	Sources
Fine Particulate Matter ($PM_{2.5}$)	Fine particulate matter ($PM_{2.5}$), or soot, is a component of diesel exhaust, and is less than 2.5 microns in diameter; in comparison, the average human hair is about 100 microns thick. It may consist as a tiny solid or liquid droplet containing a variety of compounds.	The main source of $PM_{2.5}$ is diesel engines in trucks, buses, and nonroad vehicles (e.g., marine, construction, agricultural, and locomotive). Diesel engines emit large quantities of harmful pollutants annually.
Lead (Pb)	Lead is a highly toxic metal.	Sources of lead include drinking water, food, contaminated soil and dust, and air. Lead-based paint is a common source of lead dust.
Nitrogen oxides (NO, NO_2)	The two most prevalent oxides of nitrogen are nitrogen dioxide (NO_2) and nitric oxide (NO). Both are toxic gases, and NO_2 is a highly reactive oxidant and corrosive.	The primary sources indoors are combustion processes, such as unvented combustion appliances (e.g., gas stoves, vented appliances with defective installations, welding, and tobacco smoke). Outdoor sources, such as vehicles and lawn and garden equipment, also contribute to nitrogen oxide levels.

Standards or Guidelines	Health Effects	Control Measures
There are currently no Federal government standards for $PM_{2.5}$ in school indoor air environments. EPA's National Ambient Air Quality Standards list 15 $\mu g/m^3$ as the annual limit and 65 $\mu g/m^3$ as the 24-hour limit for $PM_{2.5}$ in outdoor air.	Particulate matter is associated with a variety of serious health effects, including lung disease, asthma, and other respiratory problems. In general, children are especially sensitive to air pollution because they breathe 50 percent more air per pound of body weight than adults. Fine particulate matter, or $PM_{2.5}$, poses the greatest health risk, because it can pass through the nose and throat and become lodged in the lungs. These particles can aggravate existing respiratory conditions, such as asthma and bronchitis, and they have been directly associated with increased hospital admissions and emergency room visits for heart and lung disease, decreased lung function, and premature death. Short-term exposure may cause shortness of breath, eye and lung irritation, nausea, light-headedness, and possible allergy aggravations.	Effective technologies to reduce $PM_{2.5}$ include particulate filters and catalysts that can be installed on buses. An easy, no-cost, and effective way to control fine particulate matter is to minimize idling by buses, trucks, and other vehicles.
In 1978, the Consumer Product Safety Commission banned lead in paint.	Lead can cause serious damage to the brain, kidneys, nervous system, and red blood cells. Children are particularly vulnerable. Lead exposure in children can result in delays in physical development, lower IQ levels, shorter attention spans, and an increase in behavioral problems.	Preventive measures to reduce lead exposure in buildings painted before 1978 include: Cleaning play areas; frequently mopping floors and wiping window ledges and other smooth flat areas with damp cloths; keeping children away from areas where paint is chipped, peeling, or chalking; preventing children from chewing on window sills and other painted areas; and ensuring that toys are cleaned frequently and hands are washed before meals.
No standards have been agreed upon for nitrogen oxides in indoor air. ASHRAE and the U.S. EPA National Ambient Air Quality Standards list 0.053 ppm as the average 24-hour limit for NO_2 in outdoor air.	NO_2 acts mainly as an irritant affecting the mucosa of the eyes, nose, throat, and respiratory tract. Extremely high-dose exposure (as in a building fire) to NO_2 may result in pulmonary edema and diffuse lung injury. Continued exposure to high NO_2 levels can contribute to the development of acute or chronic bronchitis. Low-level NO_2 exposure may cause increased bronchial reactivity in some asthmatics, decreased lung function in patients with chronic obstructive pulmonary disease, and increased risk of respiratory infections, especially in young children.	Venting the NO_2 sources to the outdoors and assuring that combustion appliances are correctly installed, used, and maintained are the most effective measures to reduce exposures. Develop anti-idling procedures for all vehicles and nonroad engines (cars, buses, trucks, lawn and garden equipment, etc.).