

Indoor Environmental Quality (IEQ) in WI Schools

Introduction

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- ▶ BS & MS in Occupational Safety from the University of Wisconsin-Whitewater.
- ▶ Certified Hazardous Materials Manger (CHMM)
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Introduction

▶ Patrick Finnemore

- ▶ Director of Facilities at Kenosha Unified School District
- ▶ Leads all areas of facilities and construction, as well we Food Service and Transportation for a school district with 20,000+ students and over 40 facilities.
- ▶ 30+ years of experience of directing facilities for large multi-site organizations in all phases of Facilities and Operations.
- ▶ Registered Professional Engineer in the State of Wisconsin.
- ▶ Former board member for both WASBO and WSSCA.



AGENDA

1. Potential IEQ Contaminants
2. What is Acceptable IEQ
3. Water/Mold Clean-up Guidelines and Responding to Floods
4. IEQ Complaint Response Strategies
5. Preventative Maintenance and Duct work Cleaning
6. Current Trends in IEQ
7. State Regulations impacting IEQ



Potential IEQ Contaminates

- ▶ Building Related; New Materials: Volatile Organic Compounds (VOC's), Aldehydes, Formaldehyde, etc...
- ▶ Human Related (odors, waste, etc...)
- ▶ Environmental (asbestos, radon, sewer gas etc...)
- ▶ Operations (Art, Tech Ed. Welding Fumes)
- ▶ Office Equipment (particulates, ozone)
- ▶ Bacteria and Mold
- ▶ Carbon Monoxide (CO) (incomplete combustion, boilers, water heaters, science, Tech Ed.)
- ▶ Construction Related dusts/odors



What is Acceptable IAQ?

- ▶ Fresh Air (Oxygen) Needs
 - ▶ CO₂ Levels-Follow ASHRAE 62 for Outside air requirements
 - ▶ OSHA – 5,000 ppm
 - ▶ ASHRAE – 1,000 ppm (700 ppm above background)
 - ▶ Canada had a classroom limit of 1,500 ppm, but now just use the ASHRAE standard
 - ▶ In recent years, we have significantly increased the CO₂ monitoring in our buildings, especially in large areas such as gymnasiums along with annual testing of classrooms

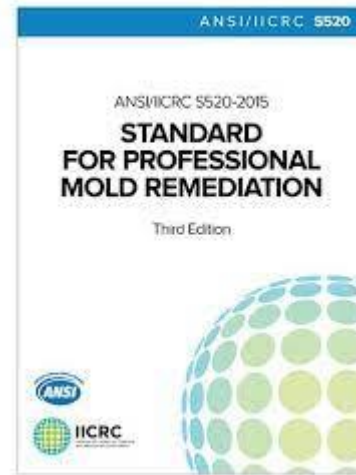
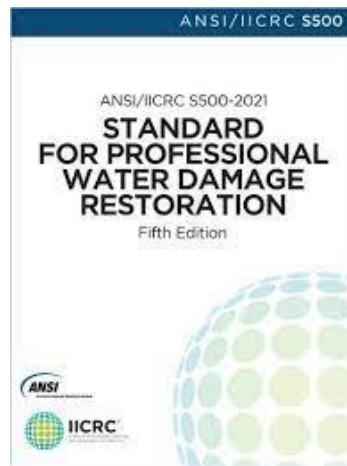
What is Acceptable IAQ?

- ▶ Increased individual sensitivities (allergies, asthma, chemical sensitivities, etc...)
- ▶ Medical Advances showing correlation of disease and health related issues to the indoor environment
- ▶ New Building Materials: more manufactured products with chemicals that off-gas and soft/porous materials that grow mold both impact the indoor environment.
 - ▶ Drywall vs. CMU (Value Engineering)

Water and Mold Clean-Up Guidelines

State of the art guidelines

- ▶ ANSI/IICRC S500 Standard and Reference Guide for Professional Water Damage Restoration
- ▶ ANSI/IICRC S520 Standard and Reference Guide for Professional Mold Remediation



Water and Mold Clean-Up Guidelines

Categories of Water Loss

- ▶ Category 1 (Clean Water)
 - ▶ Water that is clean at the releasing source and does not pose a hazard if consumed by humans. Category 1 water may become Category 2 over time or as it mixes with soils, on or within floor coverings or building assemblies, which can promote the growth and amplification of microorganisms in the water.
 - ▶ **Examples: burst water pipes, failed supply lines on appliances, broken toilet tanks, etc....**



Water and Mold Clean-Up Guidelines

Categories of Water Loss

- ▶ Category 2 (Gray Water)
 - ▶ Water that begins with some degree of contamination and could cause sickness or discomfort if consumed by humans. As with Category 1 water, Category 2 water can become Category 3 water over time and depending on other environmental conditions.
 - ▶ **Examples: Discharge or overflow of washer or dishwasher, overflow of toilet bowl, etc....**



Water and Mold Clean-Up Guidelines

Categories of Water Loss

- ▶ Category 3 (Black Water)
 - ▶ Water that is highly contaminated and could cause death or serious illness if consumed by humans.
 - ▶ **Examples: Sewage, rising flood water from rivers and streams, ground surface water flowing horizontally into buildings.**



Can I Remediate Small Amounts of Mold?



Mold Clean-Up & Responding to Floods

What if I Find Mold?

- ▶ All major guidance documents recommend timely removal of visible mold
- ▶ Identify and correct moisture source
- ▶ EPA: “Do not run the HVAC system if you know or suspect that it is contaminated with mold”
- ▶ Is there more “Hidden” Mold?
- ▶ Are building contents and possessions affected?
- ▶ Should I evacuate some or all occupants?



Mold Clean-Up & Responding to Floods

EPA Guidelines for Mold Remediation

Small

- <10 Sq. Ft. Affected
- Min. PPE – No Containment (N95 respirator)
- Need for OSHA respiratory protection program?

Medium

- 10 – 100 Sq. Ft. Affected
- Limited to full PPE – Limited Containment

Large

- 100 + Sq. Ft. Affected
- Full PPE – Full Containment, Neg pressure



IEQ Complaint Response Strategies – From a School District Perspective

Treat Every Concern Seriously

- ▶ Log all concerns, work done to correct concern and the final resolution
- ▶ Keep employee and Principal informed of progress-Communication!!
- ▶ Supplement resolution with test data if possible
- ▶ Look for both simple and systemic solutions

IEQ Concern Record-State form-Appendix A of IEQ Plan

- ▶ This form should be completed for any complaint, other than temperature related complaints.

Appendix A

Indoor Environmental Quality (IEQ) Concern Record

			Date Mo./Day/Yr.	
GENERAL INFORMATION				
Name First, Last	Email Address		Phone Area Code/No.	
Street Address		City	State	ZIP
Status in Filing Concern <i>Check One</i>				
<input type="checkbox"/> Staff <input type="checkbox"/> Student <input type="checkbox"/> Parent <input type="checkbox"/> Member of Public				
ENVIRONMENTAL QUALITY CONCERN				
District Building of Concern				
Describe IEQ Concern <i>Limit response to space provided.</i>				

IEQ COORDINATOR'S USE ONLY			
<i>Attach all other pertinent documentation.</i>			
Date Recorded Mo./Day/Yr.	Date Investigation Began Mo./Day/Yr.	Date Investigation Complete Mo./Day/Yr.	Person Assigned to Investigate
Result of Investigation			
Clean-up, Remediation, or Other Work Necessary <input type="checkbox"/> Yes <input type="checkbox"/> No		Person Assigned First & Last Name	
Date Work Began Mo./Day/Yr.	Date Work Complete Mo./Day/Yr.	Follow-Up Contact Made <input type="checkbox"/> No <input type="checkbox"/> Yes, Date of follow-up	



IEQ Complaint Response Strategies – From a Consultants Perspective

Elements of a IEQ Compliant Response – Consultants Perspective

- ▶ Document
 - IAQ complaint response form-Appendix A
- ▶ Hazard assessment & response
 - Emergency vs. Non-Emergency
 - Visual inspection of area and HVAC serving the area
 - Background information and Visual inspection will dictate need for sampling
 - In-house response/repairs
 - Outsource response/repairs
 - Inconclusive
 - Investigation by outside source
 - Complaint vs. Control
 - Medical evaluation of affected individuals

▶ COMMUNICATE!!!



Preventative Maintenance

Building design & construction

- ▶ HVAC – ASHRAE guidelines
- ▶ Air conditioning – Proper use can help control humidity
- ▶ Building materials
 - ▶ Carpet versus **hard surface**
 - ▶ *Carpet is impossible to clean*
 - ▶ Drywall use near water sources
 - ▶ Will lead to mold growth
- ▶ Building envelope issues

Preventative Maintenance

HVAC Inspections

- ▶ Mechanical rooms, penthouse, roof
- ▶ Heating & cooling coils
- ▶ Condensate drain (Drip) pans
- ▶ Source of outside air intake
- ▶ Outside air intake screen/grill
- ▶ Grills, grates & diffusers-supply and return
- ▶ Ceilings/tiles surrounding grills & diffusers

Inspection of Drain Pan - Plugged



Inspection of Duct Insulation- Mold



Inspection of O.A. Grill - Plugged



Inspection of Coils/Filters - Plugged



Do You Know What's In Your HVAC & Ducting?



Conducting a Ventilation & HVAC/Duct Cleaning Project

- ▶ Plan and budget: 5-10 year plan; then repeat.
 - ▶ Develop an HVAC/Duct cleaning bid spec. manual:
 - ▶ Insure compliance with current NADCA guidelines.
 - ▶ Insure NADCA trained/certified contractors.
 - ▶ Insure proper Insurance, equipment, experience.
 - ▶ Insure proper planning, expectations, follow-up.
 - ▶ Provide project follow-up documentation such as visual inspections, photos and samples collection with Laboratory Analytical Data.

*Consultants can assist you with all of these items.



Current Trends in IEQ

- ▶ Discussion.....
 - ▶ Considering all recommendations by CDC and ASHRAE what are you as a Facility Director/Safety Coordinator doing to improve IAQ Temperature/Humidity Controls
 - ▶ HVAC Outside air intake
 - ▶ HVAC Filtration
 - ▶ HVAC Run times
 - ▶ Building Exhaust
 - ▶ UV Lighting/Ionization
 - ▶ Local Air Scrubbers
 - ▶ HVAC and Filter Upgrades
 - ▶ HVAC Unit and Duct work cleaning
 - ▶ Public Relations-Communication
 - ▶ Relationship with IEP?
 - ▶ Vendors you trust?



Current Trends in IEQ

ASHRAE Standard 241, Control of Infectious Aerosols

- ▶ Standard 241 establishes minimum requirements to reduce the risk of airborne disease transmission, such as SARS-COV-2 virus, which causes COVID-19, the flu virus and other pathogens in buildings like single and multi-family homes, offices, schools and healthcare facilities. The standard applies to new and existing buildings and major renovations and provides requirements for many aspects of air system design, installation, operation and maintenance.

Important topics addressed in the standard:

- ▶ **Infection Risk Management Mode (IRMM)** – Establishes requirements for an infection risk management mode (IRMM), which applies during identified periods of elevated disease transmission risk. Authorities having jurisdiction can determine when the enhanced protections of Standard 241 are required. Resilience (the ability to respond to extreme circumstances outside normal conditions) in indoor air quality control design and operations is introduced.
- ▶ **Requirements for Equivalent Clean Airflow Rate** – Sets requirements for equivalent clean airflow rate target per occupant of pathogen free air flow, reducing the risk of infection.
- ▶ **Requirements for Use of Filtration and Air Cleaning Technology** – Provides extensive requirements for use of filtration and air cleaning (such as HEPA filters, air ionizers, or UV lights) to achieve equivalent clean airflow requirements and be cost effective effectively and safely.
- ▶ **Planning and Commissioning** – Provides assessment and planning requirements for being ready for the times when there is an event with increased disease-causing pathogen transmissions. The standard has a building readiness plan, that documents procedures for assessing existing or new HVAC systems to determine if they are working properly and attributing to the equivalent clean air delivered to spaces



State Regulations – IEQ in Schools

- ▶ Indoor Environmental Quality (IEQ) Management Plan required for all School Districts in Wisconsin.
- ▶ Administered by the Department of Public Instruction (DPI) as directed by 2009 Wisconsin Act 96.
- ▶ WI Stat. 118.075 (3) and (4) is the law requiring IEQ Management Plans in school districts.

State Regulations – IEQ in Schools

INDOOR ENVIRONMENTAL QUALITY
IN SCHOOLS TASK FORCE

RECOMMENDATIONS TO
STATE SUPERINTENDENT TONY EVERS
IN RESPONSE TO

2009 WISCONSIN ACT 96

SUBMITTED FEBRUARY 2011

Indoor Environmental Quality in WI Schools

- ▶ IEQ Management Plan Requirements:
 1. Mission Statement
 2. Role of the IEQ Coordinator
 3. Communication of the plan and response to complaints
 4. Reporting of IEQ Concerns
 5. Addressing IEQ Findings
 6. IEQ Policies
 7. Procedures for Maintenance and Facility Operations
 - 8. Construction and Renovation**
 9. Staff Responsibilities for Maintaining Good IEQ
 10. Prevention of IEQ Problems

Indoor Environmental Quality in WI Schools

8. Construction/Renovation

- ▶ Follow all State, Federal and Municipal building codes, guidelines and other mandates, rules, regulations when doing construction/renovation-**Pre-Renovation Survey**
- ▶ EMC recommends that all districts develop a plan to manage IEQ during construction consider:
 - ▶ Dust generation & migration (concrete, wood, etc...)
 - ▶ Odor generation & migration (VOC's, gas, etc...)
 - ▶ Noise generation & migration (equipment, people, etc...)
 - ▶ Hazardous materials disturbance & migration (asbestos, lead paint, Silica etc...)
 - ▶ HVAC modifications
 - ▶ Demolition by Haz Mat contractor under negative pressure to control all dusts



Take Away....

- ▶ IEQ Plan is a good step to get district to think & talk about various IEQ related issues as well as laying out how to respond but it is still somewhat reactive so...
- ▶ EMC is working with many Districts to do Proactive IEQ, which includes interviews, inspections of buildings and HVAC/ducting, sampling, documentation, etc...



Questions?

