Indoor Air Quality

The Centers for Disease Control and Prevention (CDC) estimates the majority of Americans spend approximately 90 percent of their time indoors. On average, office workers spend 40 hours a week in office buildings. In fact, most workers eat, drink and in certain work settings, sleep in enclosed environments where "make-up air" (fresh air added to recirculated air) may be compromised if not properly maintained.

Indoor air quality (IAQ) refers to the air quality within and around buildings and structures as it relates to the health and comfort of building occupants. Health effects from indoor air pollutants may be experienced soon after exposure or in some cases, years later. This fact sheet addresses practical recommendations that will help prevent or minimize IAQ problems within commercial and institutional building environments.

Effects

Health effects may be present shortly after an exposure or repeated exposures to a pollutant. Symptoms vary and may include eye, nose and throat irritation, headaches, dizziness and fatigue. Effects are typically short-term and treatable by simply eliminating the person's exposure to the source, if it can be identified. These symptoms can easily be mistaken for other illnesses such as allergies, stress, colds and influenza. The indicator is that occupants feel ill while inside the building and the symptoms go away shortly after leaving the building (weekends or on vacation). To access the health symptom survey, go to:
https://www.osha.gov/Publications/3430indoor-air-quality-sm.pdf (Appendix D)

Failure to respond in a timely and effective manner can lead to adverse health consequences. Diseases linked to poor IAQ include asthma and hypersensitivity pneumonitis. Long term effects due to indoor air pollutants may include respiratory diseases, heart disease and cancer.

Sources

Indoor pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems. Inadequate ventilation, building design, high temperature and humidity levels can increase concentrations of indoor pollutant levels. Sources of pollution include:

- Location of building
  - near highways or busy thoroughfares
  - land where prior industrial use or chemical pollutants
  - proximity to industrial or chemical plant
- Building materials and furnishings
  - asbestos-containing insulation,
  - newly installed flooring, upholstery or carpet,
  - cabinetry or furniture made of certain pressed wood products

- Building Maintenance
  - cleaning products
  - personal care products
  - chemically cleaned carpets left to dry without active ventilation
- Building system design and maintenance
  - improperly functioning HVAC;
  - infiltration of outdoor pollutants-vehicle exhaust, humid air, parking garage contaminants, etc;)
  - renovations where HVAC system was not updated to accommodate changes in use or occupancy
- Building Design
  - Poor foundations, roofs, facades and window/door openings
  - Outside air intakes near sources of pollutants
  - Building with multiple tenants (emissions from one tenant may adversely affect another)
- Excess moisture (mold)
- Fuel-burning combustion appliances
- Outdoor sources such as radon, pesticides, outdoor air pollution

Improving Indoor Air Quality

A systematic approach should be used when addressing air quality in the workplace. Management commitment, training, employee involvement, hazard identification, and control and program audit are key components of an IAQ management plan to address, prevent and resolve problems in their specific buildings.

The Environmental Protection Agency (EPA) recently updated their Building Air Quality (BAQ) guidance with I-BEAM (**I**ndoor **B**uilding **E**ducation and **A**ssessment **M**odel). I-BEAM is designed to be more comprehensive for managing IAQ in commercial buildings.

There are three basic control methods for lowering concentrations of indoor air pollutants:

1. **Source Control** – removal, substitution and enclosure of sources
2. **Engineering Controls** – *Local Exhaust* to remove point sources of pollutants; *Dilution Ventilation* (control normal amounts of air pollutants); *Air Cleaning* – removal of particles from the air as it passes through the HVAC equipment.
3. **Administrative Controls** –
   Work Schedule
   - Scheduling maintenance or cleaning when other building occupants are not present
   - Reduce amount of chemicals being used
   - Control location of chemical use (maintenance work on movable equipment in maintenance shop)

   Educate building occupants.

   Housekeeping practices that include preventing dirt from entering the environment, storing food properly, selecting cleaning products/methods that minimize pollutants in the building.

For more information on the I-BEAM Fundamentals of IAQ in buildings, HVAC systems, Maintenance and Housekeeping, Energy Efficiency, Diagnosing and Solving Problems, Renovation and New Construction, Budgets and Accounts visit: https://www.epa.gov/indoor-air-quality-iaq/indoor-air-quality-building-education-and-assessment-model

Resources

- Preventing Mold Related Problems in the Indoor Workplace
  https://www.osha.gov/Publications/preventing_mold.pdf
- Indoor Air Quality in Commercial and Institutional Buildings
  https://www.osha.gov/Publications/3430indoor-air-quality-sm.pdf
- Building Air quality: A Guide for Building Owners and Facility Managers
  https://www.epa.gov/sites/production/files/2014-08/documents/iaq.pdf
- Environmental Protection Agency – Indoor Air Quality Building Education Assessment Model
  https://www.epa.gov/indoor-air-quality-iaq/indoor-air-quality-building-education-and-assessment-model

This Alliant Risk Control Consulting fact sheet is not intended to be exhaustive. The discussion and best practices suggested herein should not be regarded as legal advice. Readers should pursue legal counsel or contact their insurance providers to gain more exhaustive advice.