



INDOOR ENVIRONMENTAL QUALITY FACTSHEET

Indoor environmental quality (IEQ) refers to the quality of the indoor environment in a particular building. Indoor air quality (IAQ) is one cause of IEQ complaints. Other issues such as comfort, noise, lighting, ergonomic stressors such as poorly designed workstations and tasks, and psychological stressors such as poor management practices can individually and in combination lead to symptoms of ill health.

Health effects associated with IEQ

There are occurrences when building occupants suffer a variety of symptoms and there is no specific medical diagnosis. For instance, headaches and fatigue are very common as are dry or irritated eyes, skin irritation, sinus infections, or nasal congestion, nausea, respiratory irritation, and allergies. Individual sensitivities may play a role.

In other cases there is a specific chemical or biological agent that is causing an illness such, as legionella that causes Legionnaire's Disease.

A workplace connection can be established by surveys of affected workers, investigation of the ventilation system, identifying other workplace factors such as air contaminants, or by medical diagnosis. Workers with symptoms should always visit a medical provider and describe the symptoms caused by the workplace. If allergies are suspected, testing to determine which allergens are causing the symptoms is the most useful means of identifying the problem.

The mission of New York's network of occupational health clinics is to diagnose and prevent work related health problems; your local clinic may be contacted for assistance with IEQ problems.

What are the causes of IEQ problems?

IEQ problems can be caused by ventilation system deficiencies and overcrowding. Some common indoor air contaminants include tobacco smoke, microbiological contamination, which is usually due to water or moisture intrusion, outside air pollutants such as exhaust fumes, off gassing of materials in the office, and improper use of pesticides. Symptoms, such as headaches and fatigue, may also be caused by uncomfortable conditions such as improper temperature and relative humidity, poor lighting, high noise levels, as well as poor ergonomic conditions or psychological stressors. In most cases, complaints are not caused by one major problem, but by a combination of smaller ones.

Specific chemical contaminants are rarely the single cause of IEQ complaints by themselves. Local exhaust systems should be used to control and remove chemical contaminants from individual sources such as large copiers or other places where

chemicals are used. An inventory of chemical use in the building can help pinpoint potential sources of contamination.

Insufficient fresh air is often a primary cause of IEQ health concerns. The American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) "Standard 62-2016: Ventilation for Acceptable Indoor Air Quality." recommends the following:

- Delivering and evenly distributing seventeen cubic feet per minute (17 cfm) per person of outdoor air to office space.
- Maintaining carbon dioxide (CO₂) levels below 700parts per million plus outside levels in normal office space (ex. If outside levels were 300ppm + 700ppm, then recommended level indoors should be no higher than 1000pm). CO₂ is a waste product of breathing. Therefore, CO₂ levels are used to help assess whether a building is properly ventilated. It is used to help determine if other contaminants are being removed and diluted properly.
- Maintaining relative humidity in occupied spaces at less than 65% to reduce likelihood of conditions that can lead to microbial growth.

Air filtration and the removal of fine particles that can cause irritation and other symptoms is also frequently deficient. Filters should fit tightly, be replaced regularly, and have as high efficiency as possible, or at least 25-30%.

Poor temperature control, especially overheated spaces, is often the cause of IEQ symptoms. Fatigue, headaches, and a stuffy feeling can all be caused when the temperature is elevated, even if the air is fresh. ASHRAE “-Standard 55-2013 Thermal Environmental Conditions for Human Occupancy,” set temperature guidelines, assuming that seasonal clothing will be worn, recommending 68 to 76 degrees during the winter and 72.5 to 80 degrees in the summer depending on relative humidity levels. The recommended temperature ranges are comfortable for at least 80% of individuals provided they are wearing seasonal appropriate clothing. Temperature settings should be discussed among work groups and settings adjusted to satisfy the maximum number of affected workers, with the understanding that individual comfort levels vary widely.

Water damage and moisture problems are the major source of fungal growth in buildings. Roof, wall and plumbing leaks, condensation, spills and over watering of plants, and any other water source can be the cause of microbiological growth. All leaks must be repaired as soon as possible and water damaged materials dried, cleaned, or replaced.

Dehumidifiers and fans can reduce moisture levels after leaks, but response should be immediate to prevent widespread fungal growth and avoid more significant cleanups. Individuals with allergies may be particularly sensitive. General custodial care, cleanliness, and adequacy of air filtration and supply also affect bioaerosol levels.

Addressing IEQ problems

Local health and safety committees, in collaboration with building operators, should take the lead in addressing IEQ issues. A starting point is to gain an understanding of the design of the unique ventilation system in your location, and how it is monitored and operated, and maintained. For instance, committee members should learn where the fresh

air enters the ventilation system, how often filters are changed, and the efficiency level of those filters. Protecting the quality of entering air is paramount to insure that exhaust, dust, and other contaminants cannot enter. Systems should be established for “maintaining good IEQ” and for “responding to IEQ complaints.” Committees may survey members to determine if there are patterns of symptoms and problems in certain work areas.

Temperature control problems should be reported to a responsible person who can make repairs or adjustments as needed. In some cases, committees may use a log to monitor temperatures over a period of time to assist facility personnel in assessing these problems.

Other indoor factors should also be considered. For example, if lighting is excessive and causing headaches, then it should be modified.

PEF conducts regular training for members in IEQ basics and a great deal of information is available on the web. If local efforts cannot solve the problems, the PEF Health and Safety Department should be contacted

Sources of IEQ information

The web has a wealth of information about IEQ issues and pollutants. All the sites listed below link to other sites.

PEF Health and Safety Website- www.pef.org

National Institute for Occupational Safety and Health- www.cdc.gov/niosh

Environmental Protection Administration- www.epa.gov/iaq

American Lung Association- www.lungusa.org

New York State Department of Health Division of Environmental Health-
<http://www.health.state.ny.us/nysdoh/consumer/environ/homeenvi.htm>

NYS Occupational Health Clinic Network

The New York State Occupational Health Clinic Network (OHCN) is the nation's only state-based occupational health clinic network and is located throughout the State, including a clinic specializing in farm worker health and safety. The network offers specialized medical diagnoses, high-quality care and support services. Each year, thousands of workers in New York get sick or are injured on the job. The OHCN assists New Yorkers by helping them to return to work quickly and safely and by preventing disease and injuries.

<http://www.health.ny.gov/environmental/workplace/clinic.htm>

Upon request, PEF Occupational Safety & Health will provide other factsheets, standards, regulations, and other resources. Contact us at healthandsafety@pef.org or 518-785-1900, ext. 254 or 1-800-342-4306, ext. 254.

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