Occupational Health and Safety Bulletin

Indoor Air Quality (IAQ)

Workers desire healthy and comfortable working conditions. When these conditions are not met, job satisfaction, productivity and health may be compromised. Indoor Air Quality (IAQ) considers the indoor environment, including the makeup of the air and comfort factors such as temperature and relative humidity.

IAQ issues tend to be complex and should be properly assessed to identify problems and their solutions. Most often IAQ problems are the result of poor ventilation in a building. Some examples include:

- Ventilation systems not designed for the level of occupancy or work activities
- Ventilation systems that are in need of maintenance
- Buildings designed to be energy efficient, i.e., “airtight”, without enough outside air being introduced to the building

Additional causes of IAQ problems include:

- Poorly located fresh air intakes that allow vehicle exhaust or other outdoor air contaminants to enter a building
- Indoor mould growth
- Not enough local ventilation to collect contaminants from work processes, e.g., exhaust canopies or fume hoods

Alberta’s Occupational Health and Safety (OHS) legislation requires that workplaces be healthy, but does not require that workplaces be comfortable. However, there are good reasons, such as enhanced staff morale and productivity, to exceed the minimum legislated requirements.

Government of Alberta

Effects on the body

Complaints from poor IAQ may include headache, dizziness, nausea, fatigue, difficulty concentrating, sinus problems, congestion, irritation of the eyes, nose and throat and coughing. Some of these symptoms can have other causes, so initially they may not be connected with poor IAQ. The symptoms usually improve or disappear when the worker leaves the work site.

While some individuals may find odours in the workplace annoying, such as from marking pens, cleaning supplies or perfumes, others may have health-related effects because they are sensitive or allergic to some of these substances. For people who are allergic, an airborne allergen may cause watering eyes, runny nose, wheezing, shortness of breath and chest tightness or a skin reaction such as dry, red, itchy skin.

If a worker is having an adverse health effect that he or she believes is related to his/her workplace, the worker must inform his/her employer and should contact his/her personal physician.

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IAQ – a general guide

The most important factors in maintaining good IAQ are ensuring adequate ventilation, comfortable temperature, comfortable humidity and minimizing airborne contaminants. Additional factors that influence a person's perception of IAQ include lighting, noise levels, work stress and general cleanliness of the workplace.

General ventilation – carbon dioxide as an indicator

Carbon dioxide may be used as an indicator of air circulation, because its concentration relates to the number of people in a building and the building's general ventilation rate. When people breathe, oxygen from the air is inhaled and carbon dioxide is exhaled. Outdoor air contains about 330 parts per million (ppm) or about 0.033 per cent carbon dioxide. As people breathe, the carbon dioxide in a building increases above that level and peaks after several hours. If carbon dioxide concentrations get too high, the air gets stale and people will

not be comfortable. Complaints usually begin when carbon dioxide concentrations reach about 800 ppm and become more common when carbon dioxide exceeds 1000 ppm. If the level of carbon dioxide is too high, this usually means that more outside air needs to be introduced into the building.

Air temperature

Different individuals may desire different temperatures for personal comfort. Most people in offices are comfortable when the air temperature is about 22 degrees Celsius. People who are doing physical labour will usually desire a cooler temperature and lightly clothed people such as those working in aquatic or spa facilities may desire warmer temperatures.

Air temperature in an office: attempt to keep the temperature at about 22 degrees Celsius.

For information

www.employment.alberta.ca/documents/WHS/WHS-PUB_gs006.pdf
Best Practice - Working Safely in the Heat and Cold

Humidity

Comfortable relative humidity levels range from about 30 to 60 percent. When humidity is too low, people tend to get eye, nose or throat irritation, dry skin or chapped lips and static electricity becomes an annoyance. If the humidity levels get too high, condensation on surfaces may cause mould growth and unhealthy work conditions.

Relative humidity: attempt to keep the levels between 30 and 60 per cent, and avoid water condensation on cooler surfaces

Chemical (gas and particulate) contaminants

Some common indoor air contaminants include carbon monoxide, formaldehyde, motor vehicle exhaust, ozone and cigarette smoke.

Carbon monoxide can be generated from poorly maintained heating systems, can leak from gas-fired appliances or can enter a building from outside if motor vehicle exhaust is allowed to enter air intakes. This occurs more frequently where air intakes are located next to a

building's loading docks. Formaldehyde can come from the "off-gassing" of new materials such as particleboard, carpets and plastics. Ozone is produced when electric equipment such as photocopiers are used.

Dust

Dust can result from dirt being tracked into a building from people's shoes, from handling papers and from a variety of other sources. Good housekeeping practices such as wet mopping, wet wiping or vacuuming can help to control dust accumulation.

Roofing asphalt odours

Asphalt, which is commonly applied to the roofs of flat-roofed buildings as a waterproofing material, breaks down over time. New asphalt is commonly added approximately every ten to thirty years to ensure the roof remains waterproof. Roofing odours are normally generated during these projects, which can range from a few days to a couple of weeks in duration.

Sometimes building occupants or other people nearby may notice the odours and in some cases may experience short-term effects such as watery eyes, headaches or nausea. The symptoms, while unpleasant, are temporary and can be relieved by limiting further exposure and seeking fresh air. If such issues exist, the building manager should be notified.

What can a building manager do to prevent asphalt odours from entering a building?

To increase the comfort of building occupants, the building manager may opt to temporarily shut off the building's air intake during the odour generating periods of the roofing project. However, this option has the disadvantage of leading to stale air, especially if the building has many occupants. If this option is used, the air intake should be re-opened at times throughout the day when the odour generation periods stop, such as when the roofing work has ended for the day.

Also, the asphalt kettle, which is used to prepare the asphalt for application, should be kept as far away and upwind from the air intake as possible.

In situations where it is difficult to keep asphalt odours out of a building, the building manager could consider having the roofing work completed during the off hours such as evenings or weekends.

Lighting

Too much or too little lighting can affect a person's perception of IAQ and may affect their comfort.

Different tasks require different lighting levels. For example, highly detailed work such as watch repair would require more lighting than a boardroom meeting. Older workers usually require more lighting than younger workers for identical tasks.

Noise

In a typical office environment, too much background noise can affect a person's perception of IAQ and may affect their comfort.

Mould

Mould is naturally occurring in the environment and small amounts of it are usually present all around us. Normally, this is not a problem. However, too much exposure to any substance can be harmful, and mould is no exception. Excessive levels of moulds may sometimes occur when buildings are water-damaged, e.g. after flooding or sewer backup, or when there is a persistent moisture problem such as seasonal water leakage or condensation. Common indicators of a mould problem include visible evidence of building water damage, visible mould growth and/or a persistent musty odour.

For more information

www.employment.alberta.ca/documents/WHS/WHS-PUB-BH018.pdf
Do I have a Workplace Mould Problem?

Allergens

Some people may be allergic to everyday things. This can be uncomfortable for them and can create health concerns. Common substances that people might be allergic to include perfumes, animal dander and cigarette smoke. Where possible, the amount of these substances indoors should be kept to a minimum.

Employer responsibilities

Alberta's *OHS Act* requires employers to ensure the health and safety of workers at the work site. The OHS Regulation and Code under this *Act* have been established to define standards for protection from specific hazards.

In Alberta, workers must not be exposed to airborne levels of chemical contaminants above their Occupational Exposure Limit (OEL) or as low as reasonably practicable if an OEL has not been established. OELs represent minimum standards for worker protection. All reasonable and practical efforts should be taken to keep exposure levels as low as possible. OELs are reviewed and revised periodically. Please check Alberta's OHS legislation for the current requirements.

Worker responsibilities

Alberta's *OHS Act* places responsibilities on workers for health and safety at the work site. The *Act*, Regulation and Code requires workers to take reasonable care of themselves and others at the work site. This includes co-operating with the employer to protect themselves and others.

For more information

The Indoor Air Quality Tool Kit provides detailed information about maintaining a comfortable and healthy indoor work environment. IAQ guides should be interpreted and applied by competent individuals, who are trained to conduct IAQ investigations.

www.employment.alberta.ca/documents/WHS/WHS-PUB_gh015.pdf
Indoor Air Quality Tool Kit

www.assembly.ab.ca/lao/library/egovdocs/2006/alinf/160794.pdf
Alberta Infrastructure and Transportation, Mould in Indoor Environments Risk Assessment and Management Program Handbook, June 2006

www.hc-sc.gc.ca/ewh-semt/pubs/air/exposure-exposition/index-eng.php
Health Canada, Exposure Guidelines for Residential Indoor Air Quality

www.hc-sc.gc.ca/ewh-semt/pubs/air/tools_school-outils_ecoles/index-eng.php
Health Canada, Indoor Air Quality – Tools for Schools Action Kit for Canadian Schools, March 2003

www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/air/office_building-immeubles_bureaux/93ehd-dhm166_e.pdf
Health Canada: IAQ in Office Buildings: A Technical Guide

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or
- **1-800-232-7215** throughout Alberta

Website

www.worksafe.alberta.ca

Getting copies of OHS Act, Regulation & Code:

Queen's Printer

www.qp.alberta.ca

Edmonton 780-427-4952

Occupational Health and Safety

www.employment.alberta.ca/ohs-legislation

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