

Indoor Air/Indoor Environmental Quality

It is generally recognized that Australians spend 90% or more of their time indoors either relaxing or working. Until recently relatively little research has been done on the quality of air in our homes, offices, schools, recreational buildings, restaurants, public buildings or even inside cars.

Less than acceptable indoor air quality can result in significant adverse impacts on our health and environment. Furthermore these impacts carry significant cost burdens to the economy. The C.S.I.R.O. estimates that the cost of less than acceptable indoor air quality in Australia may be as high as \$12 billion per year. In recent years comparative risk studies performed by the US EPA and its Science Advisory Board have consistently ranked indoor air pollution among the top five environmental risks to public health.

Definition of Indoor Air

The National Health and Medical Research Council (NHMRC) define indoor air as;

“Air within a building occupied for at least one hour by people of varying states of health”

This can include the office, classroom, transport facility, shopping centre, hospital and home. Indoor air quality can be defined as the totality of attributes of indoor air that affect a person's health and well being.

As commercial buildings and dwellings have become better sealed from the external environment, pollutants being released from indoor sources are being found at higher concentrations.

Indoor air quality can be adversely affected by other pollutants such as fungi, microbial contamination, house dust mites, particulates and air toxics such as formaldehyde and other volatile organic compounds.

Resolving indoor air quality problems

Investigating and resolving indoor air quality problems can be complex.

However identifying the likely cause and controlling it should minimise health and comfort concerns and maintain or increase productivity. The Building Manager may choose to employ a Mechanical Services contractor who has an in-house specialist in this field or an Occupational Hygienist to conduct the indoor air quality investigation. The person investigating will need information on:

- The building occupants and their locations, movements, tasks, and any symptoms.
- The building's air conditioning and ventilation systems.
- Possible contaminants and how people could be exposed.

A proper investigation of indoor air quality generally involves:

- A walkthrough inspection to gather information on the issues detailed above.
- Inspection of possible problem areas and consultation with building owners.
- Review of any documentation available on the above issues.
- Consultation with the person managing the maintenance strategies and control of the H.V.A.C. systems.
- Taking measurements of air movement, temperature, humidity and carbon dioxide.

Monitoring for specific airborne contaminants is not usually helpful as they are commonly present at levels below workplace exposure standards. Health or comfort symptoms are more likely to be caused by a combination of contaminants than from a high level of one specific contaminant.

Carbon dioxide is the exception as it is an indicator of the adequacy of ventilation for the number of occupants in a building.

Following the investigation, the investigator may form a theory or hypothesis about the cause of the problems. This should be tested and verified by implementing corrective action procedures and then carrying out further inspections and consultation to see whether the problem has been resolved. If the investigator has not been able to identify a possible cause of the problem a more detailed inspection of the building and its air handling systems may be required.

Possible corrective actions may include:

- Increasing ventilation rates or the proportion of fresh air circulated by the ventilation system.
- Ensuring the air conditioning, heating and ventilation system is being operated and maintained in accordance with the manufacturer's specifications and as far as practicable in accordance with *AS/NZS 1668.1&2 The Use of Ventilation and Air Conditioning in Buildings* and *AS/NZS 3666.1&2 Air-handling and water systems of buildings*.
- The systems should be regularly cleaned, and records of such maintenance should be kept. Providing local exhaust ventilation where there is an ongoing source of contaminants as part of a work process such as a printing or photocopying area containing ozone.
- Removing pollutants such as mould-affected panels or carpets and other contaminants from the ventilation or H.V.A.C. system and substituting hazardous cleaning chemicals with less hazardous chemicals where practicable. A carpet cleaning regime to remove dust mites and restricting smoking around air intake points.
- Increasing ventilation temporarily where new floor coverings, paint or furniture have been installed or pesticides used inside a building.