

Work environment – **Indoor environment**

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# Air quality in air-conditioned offices >

**This information bulletin provides general information and recommendations for building owners and managers for acceptable indoor-air quality in air conditioned buildings. The thermal comfort levels used are those in which the majority of people will feel comfortable. Also included are the health aspects of a selection of atmospheric contaminants, along with typical sources and the levels of concentration below which the majority of people are unlikely to suffer adverse health effects.**

## Thermal comfort

### ***Dry Bulb Temperature: 22 - 27°c***

People used to living in hot, humid climates are comfortable at higher indoor air temperatures than people native to cold temperate climates who favour cooler indoor temperatures. Taking into account factors such as acclimatisation and the wearing of light clothing, warmer conditions would be expected to be preferred by people in the NT, especially those in the Top End.

### ***Relative Humidity: 40% - 60%***

The optimum comfort range is between 40% and 60% humidity. High humidity (greater than 60%) enhances sweating and reduces evaporation, causing discomfort and may provide an environment in which micro-organisms will flourish. Lower levels of relative humidity (less than 40%) are frequently associated with complaints of respiratory irritation, problems with contact lenses and drying of skin and nose/mouth mucous membranes.

### ***Air Movement: 0.1 - 0.2 Metres/Second***

Air movement and circulation in a room/office has an important bearing on the sensation of freshness and comfort. Insufficient air movement (below 0.1 m/sec) will give a stuffy/stale perception, whereas air movement that is too high may cause discomfort through draughts

## Health aspects

### ***Outdoor Air Supply***

For a smoke-free workplace, a minimum outdoor air supply rate of 10 litres per second (L/s) per person should be provided. (This is the level recommended in AS 1668.2).

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The build-up of indoor carbon dioxide (CO<sub>2</sub>) can be used as an indirect indicator of the amount of outdoor air that is being introduced into a building.

A flow rate of 10 L/s per person of mechanically provided outdoor air is estimated to correspond to a CO<sub>2</sub> concentration limit of 800 parts per million (ppm).

Note: The level of CO<sub>2</sub> in fresh air is approximately 360 ppm. High levels of CO<sub>2</sub> in office air can promote a feeling of lethargy and drowsiness.

## Indoor air contaminants

Some air contaminants commonly found in indoor air environments, their exposure levels and sources are:-

Type of Contaminant	Exposure Standard	Potential Source
Total dust particulates (respirable)	5mg/m <sup>3</sup> (milligram/cubic metre) averaged over an 8hr day	Dusts, fibres, pollens
Formaldehyde	1ppm (part per million) averaged over 8 hours	Particle board, plastics, tobacco smoke
Ozone	0.1ppm averaged over 8 hours	Photocopiers and laser printers
Nitrogen Dioxide	3ppm averaged over 8 hours	Gas stove combustion, tobacco smoke, vehicle exhaust
Nicotine	0.5mg/m <sup>3</sup> averaged over 8 hours	Tobacco smoke
Carbon Monoxide	30ppm averaged over 8 hours	Vehicle exhaust, combustion, tobacco smoke

## Measurement of contaminants

Measurement of concentrations of the indoor air contaminants mentioned above is a complex and specialised operation. It is unusual to find any one contaminant present in sufficient concentration to account for general occupant discomfort symptoms of eye irritation, headache, fatigue, dry throat, runny nose, sinus problems, and coughing. Rather it may be a combination of the total concentration of the contaminants that is responsible for the complaints in climate-controlled buildings. In the majority of cases levels will be adequately controlled if the proportion of outdoor air introduced is sufficient.

Microbiological contamination can also affect the quality of indoor air. A regular program of routine maintenance of air-handling and water systems specified carried out in accordance with [AS 3666](#) - Air Handling and Water System of Buildings - Microbial Control, will ensure levels are kept below those specified in the standard.

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