Title: PROCEDURES - AIR EXTRACTION

Purpose
The purpose of this document is to ensure that:
1. The correct Air Extraction unit is selected based on the required application.
2. The Air extraction unit meets all relevant standards.
3. Staff and students can feel confident that the Air Extraction units conform to relevant safety standards.

Organisational Scope
These procedures apply to all persons whose activities require them to use air extractors.

Content
The primary reason for having Air extraction is to provide safe working conditions for users and other personnel in laboratories and workshops. The Air Extraction unit is a mechanical means of capturing and exhausting all air in the working area, especially air that may contain hazardous or noxious fumes. Any Air Extraction unit that is installed should be suitable for the purpose it is intended to be used for and meet any relevant Australian or international Standard.

TYPES OF AIR EXTRACTION UNITS

- Ducted over sink, equipment
- Ceiling Mounted (Exhaust Fan type)
- Wall Mounted
- Point Extraction

All Air Extraction units should be either wired in to operate when the Air Conditioning unit for the area operates and/or have a manual operation override switch to allow for operation of the unit.

ATMOSPHERIC CONTAMINANTS

An Atmospheric Contaminant is:

- A hazardous substance that occurs in the form of a fume, mist, gas, dust or vapour, or
- An asphyxiant (something that chokes you), or
- A nuisance dust, to which persons may be exposed in the working environment.

Inspirable dust means those airborne particles of dust that can be breathed in through the nose or mouth.
SIMPLE ASPHYXIANTS

Simple asphyxiants are gases which, when present in an atmosphere in high concentrations, lead to a reduction of oxygen concentration. Unconsciousness and death can rapidly ensue in an environment that is deficient in oxygen.

It is inappropriate to recommend an exposure standard for each simple asphyxiant, rather it should be required that sufficient oxygen concentration be maintained. Atmospheres with not enough oxygen do not provide adequate warning of danger and most simple asphyxiants are odourless (you can't smell them).

Many simple asphyxiants can also present an explosion hazard and this should be taken into account in limiting the concentration of the asphyxiant. The most common asphyxiant is carbon dioxide. It gives no warning of its presence.

AIRBORNE PARTICULATES

Airborne particulates are contaminants that can be inhaled directly into the lungs such as gases, vapours or particulate matter (small particles). They consist of tiny particles and may also exist as dust, fumes, smoke or mist depending on the nature of the particle and its size.

The terms 'dust' and 'particulates' are often used interchangeably. There are four factors that determine the degree of hazard associated with a specific airborne particulate:

- The type of particulate involved and its biological effect;
- The concentration of airborne particulates in the breathing zone of the worker;
- The size of particles present in the breathing zone; and
- The duration of the exposure (possibly in years).

EXPOSURE / STANDARDS DURATION

An employer must ensure that no person at a place of work is exposed to an airborne concentration of an atmospheric contaminant that exceeds or breaches a standard referred to in or determined under clause 51, subclause (2) of the OHS regulation 2001.

Exposure Standards exist that provide the level that an employee can be exposed to during an 8 hour working day, 5 day working week. Except for short-term exposure limits, or where a peak limitation value has been assigned, the exposure standards for airborne contaminants are expressed as a time-weighted average (TWA) concentration of that substance over an eight-hour working day, for a five-day working week.

It is not acceptable to expose workers to concentrations significantly higher than the exposure standard solely because the exposure is for less than an eight-hour day or because the exposure occurs only occasionally. Where workers have a working day longer than eight hours or unusual shift rosters then, the TWA exposure standard may need to be adjusted to ensure adequate worker protection.

Where no exposure standard is listed the manufacturer's advice should be followed. It is good general policy to keep exposure to any substance as low as possible, irrespective of whether present information indicates it is hazardous or not.

Some substances previously thought to have been comparatively safe have subsequently been found to pose serious long-term health risks.

AUSTRALIAN STANDARDS

The following guidance material is available from the National Occupational Health and Safety Commission: For atmospheric contaminants:
ODOUR (SMELL) THRESHOLDS

Many chemical substances have a distinctive odour, which indicates the presence of the substance in the working environment. While this odour perception serves as a useful warning signal, in most instances this perception may convey little information about the potential hazard associated with the atmospheric contaminant.

While a large number of odour thresholds have been determined, there are a number of problems associated with their use. These problems include:

- The threshold of odour perception varies by magnitude between individuals and among different substances;
- The presence or absence of an odour may bear no relationship to the harmful biological effects of the substance;
- There may be interference from other substances; and
- A strongly pronounced odour, which is observed on initial contact with the substance, may completely disappear on repeated or continued exposure or fluctuation of the concentration (that is, a person may get 'used' to it).

For these reasons odour thresholds should be treated with caution. The absence of an odour may not indicate a 'safe' environment; conversely, the presence of an odour may not indicate a hazard to health. Odour perception may be useful as a warning signal, however its use is limited and should not replace the objective measurement of the airborne concentration of the particular substance through workplace monitoring.

HEALTH EFFECTS

For most substances in the workplace the main route of entry into the body is through inhalation (breathing it in).

Certain chemical substances such as aniline, nitrobenzene, phenols and certain pesticides can readily penetrate intact skin and become absorbed into the body. Frequently, there will be no accompanying skin damage.

Skin absorption can result from local contamination, for example, from a splash onto the skin or clothing, or, in some rare cases, from exposure to very high concentrations of vapour in the air.

Skin absorption can pose a far greater danger than inhalation (breathing in) exposure. Some substances, such as solvents, can speed up or alter the rate of skin absorption. Serious effects can result with little or no warning and it is necessary to take special precautions to prevent skin contact when handling these substances.

Carbon dioxide can have toxic effects at concentrations, which do not cause choking.

MINIMISING HAZARDS

The best way of controlling airborne contaminants is by eliminating them from the workplace. Where practicable, chemicals, materials, machines or processes that emit toxic fumes should be eliminated or replaced with safe alternatives.
If this is not possible, airborne contaminants should be removed, preferably by extracting them at the source by use of a fume cupboard.

It is the employer's responsibility to maintain a workplace free of hazards, and to provide personal protection where necessary. The employer must be aware of any airborne contaminants that may be produced by chemicals, materials, machines or processes used in the workplace.

Where a hazard is likely to exist, the employer is responsible for monitoring and controlling the hazard. Upon request, employers must also supply employees with copies of Material Safety Data Sheets for any hazardous substance used in the workplace.

**MAINTENANCE OF AIR EXTRACTION UNITS**

All air extraction units should be inspected and serviced on regular basis by an appropriate and reputable provider. The units are not to be used as a storage facility and it is expected that the regular users of these units keep them clean and tidy in to facilitate efficient air extraction. In addition, it is the responsibility of the users to immediately report any problems with the unit that they encounter to their supervisor.

5. **References**

6. **Contact Information**

**Contact Person:** Mrs Doreen Mackie, Chair - Faculty of Health, Engineering and Science Work, Health and Safety Committee

**Telephone:** 5556  
**Facsimile:** 5717  
**Email:** d.mackie@ecu.edu.au