

1. PURPOSE

This procedure has been prepared to provide information about the safe use of fume cupboards at the University of Melbourne.

2. APPLICATION

The information contained in this sheet concerns the use of ducted fume cupboards. While much of it will be relevant to the use of recirculating laminar flow or Biohazard cupboards, specialist advice should be sought for their use.

3. LEGISLATION

None.

4. REFERENCES

Australian Standard 2243 Safety in Laboratories Part 8 Fume cupboards
Fume Cupboard Clearance for Inspection , Maintenance and Repairs Form
Fume Cupboard Clearance Contacts

5. RESPONSIBILITIES

5.1 Laboratory, managers, department managers and supervisors

Ensure that all staff who use ducted fume cupboards receive training and information on safe use.

Ensure that the procedures and guidelines are followed when staff or students use ducted fume cupboards.

Ensure that fume cupboards that do not meet the required airflow requirements are removed from service i.e. tagged out.

A copy of the Fume Cupboard Clearance for Inspection , Maintenance and Repairs Form is attached to this procedure. This must be filled out before any maintenance work on a fume cupboard commences. Departments should notify the Environment Health and Safety Unit of any changes to the Departments Authorised Persons list.

Departments should control the use of fume cupboards to ensure that the exhaust fume discharges do not contain contaminants in excess of the level specified by the appropriate regulatory authority. It is recommended the discharge level be set below the recommended occupational exposure standard level.

5.2 Property and Campus Services

Ensure that all ducted fume cupboards are tested according to AS 2243.8 twice every 12 months.

Ensure that test results are forwarded to the responsible person in each department as soon as possible.

Ensure that the test result for each cupboard is recorded on the fume cupboard as soon as possible after testing, where it can be read by users.

5.3 All Employees

Ensure that all procedures and guidelines are followed when using ducted fume cupboards.

Before using a fume cupboard for the first time:

- check that the flow reading on the test certificate meets or exceeds the flow rate requirement.
- locate where the fan failure warning alarm is and what it will sound like.
- locate the fire damper or emergency stop (if fitted) for use in the event of a fire.
- locate the nearest phone, fire extinguisher/blanket, shower or eyewash station and know who and where the qualified first aid providers are.

Regularly maintain the fume cupboard by

- removing the contents of the cupboard and washing the walls and work bench.
- keeping sinks and drains clear of refuse and checking them regularly.
- labelling all containers in the fume hood appropriately.
- ensuring waste bottles in the fume hood are capped when not in use and are disposed of regularly.

6. PROCEDURE AND GUIDELINES

6.1 Fume Cupboard Function and Usage

A fume cupboard is essentially a ventilated box with one side being moveable to provide an adjustable opening. It provides air extraction to remove any fumes produced within the box. It is designed to have laminar flow through the front opening, i.e. the flow is to be even and non-turbulent through the open face of the cupboard.

To obtain even flow through the face of the fume cupboards baffles are generally installed at the back of the cupboard. These baffles are set to extract the air from two or more locations across the back of the fume cupboard. If the openings provided by the baffles are blocked by items stored in the cupboard then the air flow through the face of the cupboard can become uneven.

Whenever anything is placed within the fume cupboard it introduces turbulence into the cupboard which may affect the containment and extraction of fumes. If a fume cupboard is not set up and used appropriately, fumes may escape out of the sash opening of the fume cupboard towards the user, especially with heavier vapours such as formaldehyde or chlorinated solvents.

Fume cupboards draw air out of the rooms they are installed in. There needs to be an adequate volume of air available or the fume cupboard will not be able to draw a sufficient volume of air to function properly.

Where the room is small or there are a large number of fume cupboards an additional supply of air, other than the normal room ventilation, may be required. This additional air is known as the make-up air.

If the make-up air supply is not adequate or the make-up air is switched off then the fume cupboards may not be able to achieve the required face velocity. Alternatively if there is no make-up air and the room ventilation is switched off, there may be insufficient air volumes for the fume cupboards to achieve the required face velocity.

The incoming air can be deflected off an item placed in this zone at enough speed to escape from the cupboard. This

can cause fumes to escape in to the lab. This is of particular concern when fumes are generated within this zone as they may be captured by the deflected air. A person standing in front of the cupboard increases the probability of fume entering the lab.

The base of the fume cupboard area that must be kept clear to allow effective ventilation of the work area.

The use of the screen will result in turbulence directly behind the screen. If the area behind the work area is not kept clear there is a high potential for a 'dead spot' to be created which will increase the potential for fume escape.

6.2 Safe Work Procedures

Do not work within ten centimetres of the leading edge. The larger the item, the further back it needs to be within the fume cupboard to overcome the turbulence created.

Do not place storage items behind the area you are work rig in. This is particularly important where a perspex screen or lead bricks are used for radioisotope work.

Minimise the amount of items stored within the fume cupboard.

Do not put large equipment, such as ovens in the fume cupboard, as they block the baffles and produce regions of zero or low flow in the work space.

Minimise traffic past the front of the fume cupboard as this can cause turbulence which may result in fume escape.

Do not use fume cupboards with a porous bench surface (e.g. terracotta tiles) for work with radioactive material.

Do not open windows which may create draughts in the vicinity of the fume cupboard.

If doors are within 1 metre of fume cupboards they should be kept closed during the use of fume cupboard.

The make-up air supply and room ventilation should be on whenever the fume cupboard is in use.

6.3 Fume Cupboard Performance

Fume cupboards are required to be constructed and maintained in accordance with Australian Standard AS2243.8 Safety in Laboratories - Fume Cupboards. This standard prescribes an adequate face velocity of 0.5 cubic metres per second for the containment of fumes and a methodology for testing. There are 2 types of test to be carried out: face velocity and smoke testing at an interval of 6 months.

Face velocity is the flow of air measure at 5 or more points at the sash opening with the sash opened fully. The flow is measured in cubic metres per second (cm/s). An adequate face velocity is defined as being an average of greater than 0.5 cm/s across the face, with individual readings being within +/- 10% of the average. The Australian Standard requires fume cupboard testing be done with a anometer (air flow meter). A hot wire anometer should not be used where flammable liquids are present.

Smoke testing is checking for eddys, irregular flow patterns or currents that could have fumes flowing out into the laboratory.