

Guideline: The safe use of a fume cupboard

Purpose

To set out the guidelines for the safe use of fume cupboards at the University.

Guideline

1. The fume cupboard is a major means of controlling exposure to chemicals and other airborne hazardous materials.

Operation

2. A fume cupboard is a ventilated box with an adjustable work opening (sash). A moving curtain of air (at 0.5 ± 0.1 m/s) being drawn past the operator, through the opening, over the work, then up the exhaust stack reduces your exposure. A fume cupboard used properly provides adequate protection. However with incorrect use, a fume cupboard may result in dangerous material escaping from the cupboard.

3. A fume cupboard is designed to have a smooth airflow through the front opening.

4. The fume cupboard draws air out of the laboratory. Therefore at least an equal amount of air must be brought into the room to replace it. Ensure that there is an adequate amount of make-up or supply air into the room before using an exhaust system.

5. Baffles or slots at the back of cupboard achieve an even airflow through the face of the cupboard. If the baffles or slots are blocked or restricted, then the air distribution can become uneven or unsafe. Avoid blocking or placing large items near the baffles.

6. Items placed in or in front of the fume cupboard create air turbulence. This may affect the capture of contaminants, and in some instances contaminants may escape from the cupboard towards the user. To limit this, ensure that work is conducted in the middle of the bench space, avoiding work and items within 10–15 cm of the front edge or at the back of cupboard obstructing the baffles.

Experiment design

7. Laboratory personnel are required to design and construct their experiments to minimise hazardous emissions. Fume exhaust emissions (measured at the stack) should be sufficiently diluted or scrubbed to prevent the emission posing a risk to health, safety or the environment. Emissions must be below the mass emissions of the air pollution regulations or the concentration given in occupational exposure standards, or if these do not exist, these emissions should be kept to a practical minimum. With flammable vapours and gases the emissions should be below 10% of their lower explosive limit. Additional information on the use of chemicals is available. Refer to the [Chemical Management Policy](#).

Operation

Before use

8. Ensure that the fume cupboard is appropriate for the task. The use of certain biological materials, perchloric acid and perchlorates, large volumes of acids etc. require special features or scrubbing. Refer to Classification of fume exhaust systems in [Managing fume exhaust system procedure](#).

9. Ensure the fume cupboard is operational and there is an airflow. Listen and feel for air movement – this should be obvious with the sash in its lowest position.

Note: The fan switch for the fume cupboard turns the fan on immediately. However, a fume cupboard goes through a pre-use purge of up to 5 minutes (varies with make and model) before switching on the power to the electrical sockets and gas. Do not start work until this pre-use cycle is complete.

10. Check for obvious surface contamination. Clean if necessary, to avoid adverse reactions with the chemicals in use.

11. Ensure that there is enough space to conduct work safely.

12. Position equipment, apparatus, and materials in the centre and back of the cupboard to minimise disturbance to airflow. Where practical, place required item within the cupboard before starting operations.

13. The WHS legislative framework requires the control of risks and exposure as far as is reasonably practicable. The following should be considered:

- reducing the quantities of the substances used;
- reducing the amount of substance released into the airflow e.g. use a condenser, watch glass cover bubblers etc.; and

- using a slower reaction rate.

During use

14. Avoid sudden rapid movements in front of the cupboard. These can cause turbulence that may draw the airborne hazardous material out of the cupboard.
15. Position the sash position to the operators advantage:
 - fully open to provide access for setting up equipment.
 - Partially open to a comfortable work height when handling the material inside the cupboard.
 - Lowered as far as is practicable, when the process is in operation and intervention is no longer required.
16. Any accidental spill of chemicals should be cleaned up as soon as soon it is safe to do so.
17. If hot plates are used, these should be placed at least 10 cm from the side of the cupboard to avoid damage to the cupboard structure.

After use

18. Dispose of laboratory waste as per the ANU guidelines.
19. Clean and decontaminate the fume cupboard, if necessary.
20. Lower the sash to minimise the waste of tempered air. A fume cupboard should remain on for at least 20 minutes after the process/activity has finished and hot plates have cooled. This is to ensure that all airborne contaminants have been exhausted. Some cupboards may need to be left on, but at their optimal setting. Note: Modern fume cupboards have a post-use purge cycle, so that once the fan is switched off, the electricity to the sockets and gases are switched off, but the fan continues to run (for up to 20 minutes – varies with make and model).
21. Note any maintenance and unusual situations within the fume cupboard log book and discuss with the appropriate person.

Fume cupboard performance

22. To achieve optimum performance from the fume cupboard ensure:
 - that work is conducted in the middle of the bench space;
 - minimise the number of items in the fume cupboard;
 - minimise traffic passing in front of the fume cupboard by maintaining a 1m zone in front of the fume cupboard for only the fume cupboard user;

- avoid open doors in the vicinity of the fume cupboard;
- ensure adequate make-up air into the room;
- larger items should be placed further back from the front edge;
- larger items should be raised to allow for airflow beneath, to prevent eddies;
- do not place storage items between the work area and the baffle, as this effects air flow; and
- If using a radiation shield or blast shield, there is a potential for an air current dead spot to be created. This can be minimised by limiting items to the side of the shield.

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