

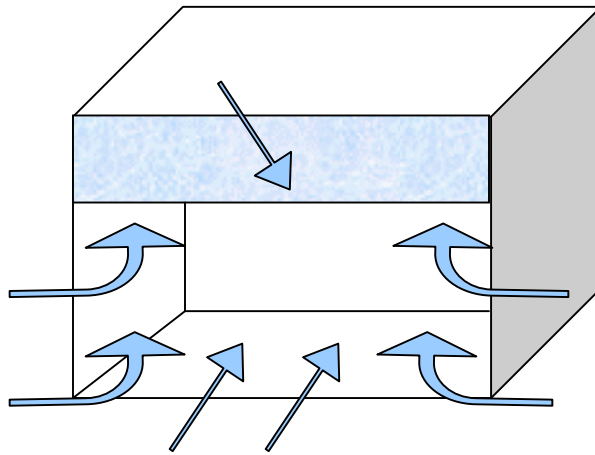
GUIDELINES ON THE SAFE USE OF A FUME CUPBOARD

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

Operation -

A fume cupboard is basically 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, incorrect use a fume cupboard may result in dangerous material escaping from the cupboard.

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

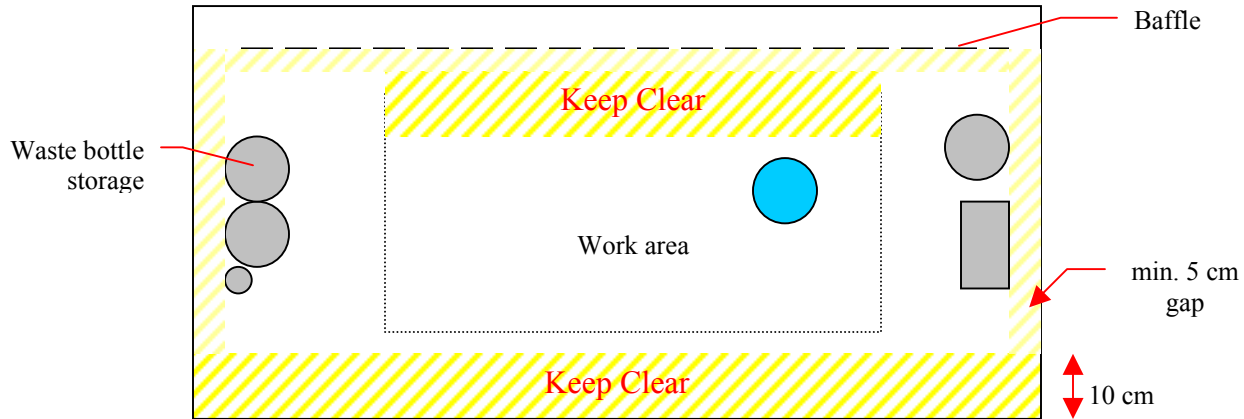


Normal airflow into a fume cupboard

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. Please ensure that there is an adequate amount of make-up or supply air into the room before using an exhaust system.

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.

Items placed in or in front of the fume cupboard creates air turbulence. This may affect the capture of contaminants, and in some instances vapours 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 cm of the front edge or at the back of cupboard obstructing the baffles.



Fume cupboard bench layout

Hints -

To achieve optimum performance from your fume cupboard ensure:

- That work is conducted in the middle of the bench space.
- Minimise the amount of items in the fume cupboard.
- Minimise traffic passing in front of the fume cupboard.
- Avoid open doors or opens in the vicinity of the fume cupboard.
- Ensure adequate make-up air into the room.
- Larger items may need to be placed further back from the front edge.
- Do not place storage items behind where you are working, as this effects air flow.
- If you are using a radiation shield or blast shield, there is a potential for a dead spot to be created. Try to minimise this by limiting items to the side and behind the shield.

Experiment design –

Laboratory personnel are required to design and construct their experiments to ensure that hazardous emissions are minimised and released in a controlled manner. Fume exhaust emissions (measured at the stack) should be sufficiently diluted or scrubbed to prevent the emission posing a risk to health and 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, they emissions should be kept to a practical minimum, with flammable vapours and gases below 10 % of their lower explosive limit.

Additional information on the use of chemicals is available at –

http://info.anu.edu.au/policies/procedures/human_resources/chemical_hazard_procedures.asp,
http://info.anu.edu.au/policies/procedures/human_resources/risk_management_for_chemicals.asp

, and

http://info.anu.edu.au/policies/procedures/human_resources/chemical_risk_management.asp.

Operation -

Here are some pointers in the correct use of a fume cupboard.

BEFORE USE

1. Ensure that the fume cupboard you are using is appropriate. The use of certain biological materials, perchloric acid and perchlorates, large volumes of acids etc. require special features or scrubbing.
2. 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, the 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.

3. Check for obvious surface contamination. Clean if necessary, to avoid adverse reactions with the chemicals in use.
4. Ensure that you have enough space to conduct your work safely.
5. Position equipment, apparatus, and materials in the centre and back of the cupboard to minimise disturbance to airflow. Where practical, place everything within the cupboard before starting operations.

Note: Remember that the OHS Regulations require you to reduce risks and exposure as much as possible. Is it practical to -

- Reducing the quantities of the substances used?
- Reducing the amount of substance released into the airflow? eg. use a condenser, watch glass cover etc.
- Use a slower reaction rate?

DURING USE

6. Try to avoid sudden rapid movements in front of the cupboard. These can cause turbulence that may draw the airborne hazardous material out of the cupboard.
7. Use the sash position to your 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 your intervention is no longer required.
8. Any accidental spill of chemicals should be cleaned up immediately (i.e. as soon as it is safe to do so).
9. 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

10. Dispose of laboratory waste as per the ANU guidelines.

- 11.** Clean and decontaminate the fume cupboard.
- 12.** 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.

Note: Modern fume cupboards have a post-use purge cycle, so that once you switch off the fan, 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).

Know what happens when you switch on or off your fume cupboard, and its effect on the power and gases. Ensure that your actions do not adversely effect your experiment or safety.

Remember to note maintenance and unusual situations within your fume cupboard log book.