University of Reading

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TITLE: THE SAFE USE OF FUME CUPBOARDS

		Date
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Purpose

This document describes how to operate and use vented fume cupboards in a safe manner. Fume cupboards are fitted in laboratories for the protection of users. They are designed to control exposure to toxic substances, offensive or flammable vapours, gases and aerosols. They are not designed for use with micro-organisms, microbiological safety cabinets must be used for this latter purpose.

Scope

This document describes procedures to be followed by staff and students when using fume cupboards in laboratories at the University of Reading.

Risks

In electing to use a fume cupboard, the operator has already identified the need for protection from exposure to chemicals and fumes. Further PPE including a lab coat, gloves and safety glasses as identified in the COSHH/risk assessment must be worn.

Procedure

Before Use

- Do not attempt to use if signage indicates that the fume cupboard is out of use, if the sash is locked or if an in date E&F inspection label is not evident.
- Make pre-use checks of warning lights, air flow gauges and sash alarms where fitted. Do not use if the fume cupboard is not operating correctly. Report the problems to a Laboratory Co-ordinator contact.
- Ensure that the fume cupboard is appropriate for intended use. Perchloric acid must not be used in fume cupboards, unless fitted with wash down facility, as this presents a risk of fire - consult your Health and Safety Co-ordinator for advice.
- If off, turn on the fume cupboard fan and ensure the fume cupboard is operating satisfactorily*. If already on, ensure the fume cupboard is operational and there is adequate airflow. Listen and feel for air movement - this should be obvious with the sash in its lowest position. (Read the airflow indicator, in the absence of this indicator, a "tell-tale" ribbon attached to the bottom of the sash will provide a useful indication of airflow).

  *The airflow must be at least 0.5 m/s ±10% (0.7 m/s ±10% if working with radioactive materials)

- Check for obvious surface contamination. Should contamination/spills be found they must be removed before commencement of work. Consult a Laboratory Co-ordinator or the HSC if unsure of nature of hazard or how to deal with it.
- Ensure that you have enough space to conduct your work safely.
- Raise the sash to the maximum height level as indicated by the marker label.
- Bring all the equipment and chemicals required to the cupboard and place them in the working chamber of the fume cupboard.
- Avoid all unnecessary clutter in the fume cupboard.
- Do not block any exhaust slots or openings.
- Do not set up the apparatus/equipment close to the front edge of the fume cupboard (ensure it is set back at least 150 mm from the plane of the sash).
- Do not position the equipment so far back that it obstructs the bottom "back baffle" slot or that the operator is required to put his/her head in the working chamber to operate the equipment.
- If flammable liquids are involved, use "flame-proof" electrical equipment. Do not use multiple electric socket boards within the working chamber.

- Avoid as far as reasonably practicable naked flames (even when working with non-flammables), sources of high heat load, high-speed rotating machinery (eg centrifuges) and hot-air dryers (these items can damage fume cupboards and will disturb the air flow pattern, reducing the overall efficiency of containment of the fume cupboard). Hotplates must be kept to a minimum and be aware that they might adversely affect the airflow. If hot plates are used, these should be placed at least 10 cm from the side and back of the cupboard to avoid damage to the cupboard structure.
- Reduce the sash opening to the recommended working height for the fume cupboard (typically 500 mm and always below breathing level when working in front of the fume cupboard) and start the operation.

During Use

- Maintain the sash opening at the recommended working height for the fume cupboard
- Cease work if airflow fails and the alarm sounds. Lower the sash. If the air flow does not stabilise, seek assistance.
- Whilst the experiment is in progress minimise movement of the sash. Any movement of the sash should be carried out slowly.
- 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.
- Do not leave hazardous processes in the fume cupboard unattended
- Clean up any spillages within the fume cupboard promptly and effectively.
- When the process is complete, keep the sash at the lowest level for a further 10 minutes to ensure that all fumes and vapours have been cleared before raising the sash to its maximum position.
- Tidy up the fume cupboard. Remove all equipment that is no longer needed. Return chemicals to their proper storage place. Turn off water, gas and electricity.
- If appropriate, decontaminate and clean down the walls and worktop of the fume cupboard chamber.
- If an experiment is left running out of hours, a contact name and telephone number must be prominently displayed. Do not leave potentially hazardous work unattended.

After Use

- Chemicals must not be stored in a fume cupboard used for experimental work - they could escalate an accident.
- Dispose of laboratory waste according to the COSSH assessment.
- If appropriate, turn off the fume cupboard fan. Do not turn off if the fume cupboard is fitted with vented storage cabinets.
- Report any operational problems/defects, such as the alarm sounding or the sash sticking to a supervisor, Laboratory Co-ordinator or the HSC.

Associated documents

Safety Guide 46 Management and Use of Work Equipment Part 4 Local Exhaust Ventilation Safety Code of Practice 49 Part 1User guide to safe use of laboratory fume cupboards.

Maintenance

- Those responsible for fume cupboards must ensure that users are instructed to keep the units clean and where necessary, are responsible for organising fume cupboard housekeeping rotas.
- Should fume cupboards be deemed faulty, they must be taken out of use, either by locking and or a 'DO NOT USE' sign.

- Laboratory Co-ordinators are responsible for organising a weekly check of warning lights, air flow gauges and sash alarms where fitted. These checks must be recorded in the log book. Faults must be reported to the HSC.
- Prior to any maintenance works or insurance inspections, fume cupboards must be cleaned and vented for 12 hours. Any debris or dust must be blown free from the anemometer air flow inlet. Where vented cupboards are present, handle mechanisms must operate correctly to ensure that the doors can be closed properly. Where required, grease should be applied to the mechanism to prevent chemical corrosion.
- A permit to work is then issued by the Laboratory Co-ordinator to confirm that work can proceed.
- Laboratory Co-ordinators, working with the Operations team oversee that repairs and maintenance works are carried out and subsequently update the Fume Cupboard log book.
- Appendix 2 provides information on commonly used chemicals and their associated risk phrases as this information may be requested by the maintenance engineer.
- A test completed date is attached to the fume cupboard by FMD/Insurance Inspection staff.

Emergency Procedure

- Should a power failure occur, immediately stop working. If safe to do so, replace lids on containers and terminate any ongoing processes.
- Close the sash, warn others and leave the area. Report the incident to a supervisor and do not return to the fume cupboard until power has resumed. A supervisor or technician responsible for the area will move substances from the vented storage cupboards to safe storage until power has resumed.
- Deal with spillages immediately, using the correct absorption materials. Dispose of as hazardous waste.
- Treat fires with extreme caution. The use of high pressure CO2 may spread flames and eject items out of the fume cupboard. Only tackle fires if you have the correct fire fighting equipment and have been trained to use it. Otherwise, close the sash and if possible turn off the fume cupboard. Raise the alarm by activating the fire alarm (press red manual call point) and phone the emergency services (999). Evacuate the building.

Training

The trainee must have read and understood this SOP and any associated documents. On having observed the procedure the trainee must carry out the task whilst being assessed by the trainer. This must be repeated and assessed until competency to the satisfaction of the trainer has been achieved. Sign off of the training module can then take place.

Appendices

- Appendix 1 Log book sheets
- Appendix 2 Commonly used chemicals within laboratories (excludes Chemistry Department) and associated risk phrases

Appendix 1

Fume Cupboard Log Book

Fume Cupboard ID : _____

Fume Cupboard Location : _____

Fume Cupboard Airflow : _____

Chemicals used in this fume cupboard (that are not already listed in Appendix 2)

CHEMICAL	RISK PHRASES	CHEMICAL	RISK PHRASES

Repair and maintenance details

DATE	DETAILS	NAME	SIGNATURE	WREN NUMBER

Inspection Details (Inspection reports are held by Building Manager)

DATE OF LAST TEST	DATE OF NEXT TEST

Weekly checks of air flow, sash alarm and warning lights

DATE	FUME CUPBOARD FULLY OPERATIONAL YES/NO* IF NO, REPORT TO BUILDING MANAGER	NAME	SIGNATURE

Appendix 2 NOTE TO BE SUPERCEDED in version 2

Routinely used general chemicals and associated risk phrases

- Hydrochloric acid R20 R21 R22 R36 R37 R38
- Sodium hydroxide R35
- Ethanol R11 R20 R21 R22 R36 R37 R38 R40
- Methanol R11 R23 R24 R25 R39
- Acetic acid R10 R35.
- 2-mercaptoethanol R23 R24 R25 R37 R38 R41
- Phenol R24 R25 R34 R36 R37 R38
- Chloroform R20 R22 R38 R40 R48
- Formamide R20 R21 R22 R34 R61
- Paraformaldehyde R21 R22 R23 R34 R42 R43 R45 R46
- Hydrogen peroxide R8 R22 R34 R41
- Acetic acid R10 R35
- Butanol R10 R36 R37 R38
- Xylene R10 R20 R21 R22 R36 R37 R38
- Ethidium Bromide R20 R22 R36 R37 R38

Risk phrase summary and meanings

- R8 Contact with combustible material may cause fire
- R10 Flammable
- R11 Highly flammable
- R20 Harmful by inhalation
- R21 Harmful in contact with skin
- R22 Harmful if swallowed
- R23 Toxic by inhalation
- R24 Toxic in contact with skin
- R25 Toxic if swallowed
- R34 Causes burns
- R35 Causes severe burns
- R36 Irritating to eyes
- R37 Irritating to respiratory system
- R38 Irritating to skin
- R39 Danger of very serious irreversible effects
- R40 Limited evidence of a carcinogenic effect
- R41 Risk of serious damage to eyes
- R42 May cause sensitisation by inhalation
- R43 May cause sensitisation by skin contact
- R45 May cause cancer R46 May cause heritable genetic damage
- R48 May cause heritable genetic damage
- R61 May cause harm to the unborn child