

Safe Use of Ducted Fume Cupboards

Information Sheet 01-2023

SCOPE

This sheet provides information and advice about the safe use of ducted fume cupboards at Curtin University.

Note: *While much of the information here is also relevant to the use of recirculating fume cupboards, specialist advice should be sought for their use.*

Introduction

Curtin University has over 170 ducted fume cupboards across Bentley, Technology Park and Kalgoorlie campuses. Of these, some are fitted with scrubber units and are therefore designated for the use of perchloric acid or hydrofluoric acid.

Adequate ventilation is one of the most important engineering controls in the workplace to minimize exposure to hazardous substances. It is therefore vital that all fume cupboards are maintained to the highest possible standard. Staff must be trained in all aspects of fume cupboard operation and relevant maintenance procedures.

Definitions

Scrubber	A scrubber (fume scrubber) is a device fitted to the fume cupboard exhaust duct designed to wash contaminants from the effluent fume, usually with water or aqueous solution.
Wash-down	The wash-down irrigates all concealed surfaces below the fume scrubber, such as the rear baffles and ducting above the work area.

HOUSEKEEPING

In addition to the requirements of the standard fume cupboards must be subject to periodic inspections and cleaning.

1. Remove any unnecessary chemicals, glassware and equipment. The standard states that “a fume cupboard shall not be used for the storage of chemicals”.
2. Regularly check and clean sinks and drains.
3. Regularly empty fume cupboard and wash down baffles, walls, work area, sinks and drains.
4. Ensure all containers are labelled appropriately and remove any incompatible chemicals.
5. Ensure the routine operational checks of scrubber units and wash down facilities are performed and this requirement forms part of fume cupboard safe working procedures.

SCRUBBERS

While the standard specifies that the scrubber units and wash down facilities are checked twice a year this does not provide sufficient maintenance for routine use.

It is the responsibility of the area to ensure that these units are working efficiently and that any required routine maintenance is clearly outlined in safe working procedures and associated risk assessments:

1. For perchloric acid and hydrofluoric acid operations, ensure that the fume cupboard controller is set so that the scrubber runs continuously during fume cupboard operation including the post purge period.
2. Ensure that the wash down facility runs for a minimum of 15 minutes on completion of operations and that the work area is completely washed down.
3. Ensure that the scrubber unit is checked prior to operation:
 - a. Check the water level in the sump via the sight glass.
 - b. Depending on the frequency of operations dump the content and flush the sump prior to use or at regular intervals. In heavy use areas it may be necessary to regularly monitor the PH in the sump.
 - c. Observe the operation of the scrubber via the sight glass to ensure that spray nozzles are operating correctly.
 - d. A log of routine checks should be kept.

HYDROFLUORIC ACID OPERATIONS IN FUME CUPBOARDS

Refer to the *Hydrofluoric Acid, Information Sheet* available from Curtin's Health and Safety website.

PERCHLORIC ACID OPERATIONS IN FUME CUPBOARDS

Operations that involve heating perchloric acid such as acid digestions must only be done in a designated fume cupboard. That is a fume cupboard fitted with a wash down facility and a scrubber unit. The construction of the fume cupboard must also conform to the requirements of AS/NZS 2243.8

1. Fume cupboards that are designated suitable for perchloric acid work are normally reserved for operations that are chemically compatible so as to minimise the risk of formation of metal perchlorates or organic perchlorates which in certain circumstances may explode.
2. Fume cupboards that are designated for perchloric acid use must be clearly labelled as such.
3. Prior to the use of perchlorates or perchloric acid a risk assessment must be performed and the work cleared by your Academic Supervisor.
4. Use of a designated perchloric acid fume cupboard for other incompatible chemistry should be avoided as it requires total decontamination of the fume cupboard system including the cupboard, ductwork, fan and housing. Risk assessment and clearance by your Academic Supervisor is required.

Note: *Scrubber units must run continuously during perchloric acid operations. On completion the wash down facility must be run for at least 15 minutes and the work area flushed with water to ensure complete decontamination.*

GENERAL OPERATIONS IN CUPBOARDS

Fume cupboards are designed and tested to provide so that air flow across that face of the cupboard (required ventilation) meets the requirements of the standard. Care needs to be taken so that operations within the cupboard do not adversely affect the fume cupboard efficiency:

1. A fume cupboard shall not be used for the storage of chemicals. Refer to the appropriate Australian Standard for the requirements for storage of chemicals.
2. The maximum allowable quantity of chemicals is to be determined by risk assessment. A label indicating this quantity must be displayed.
3. Ensure that the fume cupboard is fit for the intended purpose and is clean and free from contaminants.
4. Sash position should allow for optimal air flow.
5. Working at the front face of the cupboard can cause turbulence within the unit. Avoid working within 10 cm of the front of the cupboard.
6. Keep the area clear behind the desired work area.
7. Avoid having large equipment in the cupboard as this can cause low or variable flow across the work area.
8. Make sure the make-up air is as per fume cupboard design and is not affected by air-conditioning, open windows or doors.

MAINTENANCE

According to AS/NZ 2243.8, Fume Cupboards must have a six and twelve monthly maintenance and testing schedule. At Curtin University, maintenance is undertaken by approved contractors through Operations and Maintenance.

ROLES AND RESPONSIBILITIES

Prerequisites

Only personnel who are deemed competent may carry out this task.

Role	Responsibilities
Persons in charge of the laboratory and Technical Staff	<ul style="list-style-type: none">• Risk assess all intended work prior to operation.• Ensure that all staff and students receive training and information on the safe use of fume cupboards. Training records to be kept. Ensure that safe working procedures are followed when staff and students use fume cupboards.

Persons in charge of the laboratory and Technical Staff (continued)	<ul style="list-style-type: none"> • Ensure that all fume cupboards are completely operational. Fume cupboards with faults are to be tagged out of operation. Report all faults to Facilities Management. • Liaise with Facilities Management personnel regarding routine twice yearly maintenance operations. Fume cupboards without current test certificates are to be tagged out of service. • Provide a contamination free work area for contractors and maintenance personnel. • Control the use of fume cupboards so that discharge does not exceed the level set by the regulatory authority
Operations and Maintenance	<ul style="list-style-type: none"> • Ensure that all ducted fume cupboards are tested and maintained according to <i>AS/NZS 2243.8:2014</i>. Routine test results to be made available to Laboratory Managers and Technical Staff on request. • Ensure that Laboratory Managers and Technical Staff are fully informed regarding fume cupboard maintenance issues. Laboratory Managers must be informed prior to work being carried out on a fume cupboard so as to allow for work planning and work area decontamination. • On completion of new fume cupboard installations, ensure that the supplier provides training to Laboratory Managers, Technical and Research Staff on the operations of new ducted fume cupboards.
Academic Supervisors	<ul style="list-style-type: none"> • Ensure all student risk assessment are reviewed and approved prior to commencement of work • Ensure that all faults are reported directly to the Laboratory Manager and/or Technical Staff • Tag out any faulty equipment • Ensure all fume cupboards are left in a tidy manner following students use • Ensure student are using the correct fume cupboard for their processes • Provide feedback to Laboratory Manager and/or Technical Staff if alternate types of fume cupboards are required
Teaching and Research Students or Staff	<ul style="list-style-type: none"> • In consultation with your supervisor complete a risk assessment for the proposed operations and have it signed off by your supervisor. • Ensure that safe working procedures are available and followed when using ducted fume cupboards. • Check that the test certificate is in date and that the fume cupboard is fully operational. • Ensure that all faults are reported directly to the Laboratory Manager and/or Technical Staff. • Perform regular housekeeping.
References	
[1]	<i>AS/NZ 2243.8 Safety in Laboratories – Fume Cupboards</i>
[2]	<i>Hydrofluoric Acid Information Sheet</i>