

Safe Method of Use 19

General Exempt Laboratory Requirements

Those using the General Safe Method of Use must have also read and comply with Safe Method of Use #2 - Laboratory Work Practices

Further information can be obtained by consulting MSDS Sheets and the Safe Methods of Use specific for each hazard class of chemical.

Note: 'Must' denotes a mandatory requirement and 'should' denotes a recommendation.

A. General Requirements for Use and Storage of Chemicals

1. General

- a. All accidents and near misses must be reported (see Section G)
- b. The requirements of Safe Method of Use for Personal Protective Equipment **must** be followed
- c. MSDS sheets **must** be consulted prior to handling any chemical whose properties the user is not familiar with.
- d. Chemicals **must** be properly segregated. Please read segregation guidelines (Section C below).
- e. Containers with chemicals **must** be clearly and legibly labelled.

Note:

Labelling means that primary containers have the following information:

- Identity of compound
- Its concentration (if applicable)
- Warning label (a UN pictogram or written warnings on the label will suffice)

And all working containers must have the following information:

- Identity of compound i.e a chemical name is preferable but a formula or chemical shorthand such as 'EtOH' or 'HCl' will suffice provided it is well accepted and understood by those persons in the laboratory
- Its concentration (if applicable)

2. Gases

- a. All gas cylinders **must** be secured.
- b. Cylinders of flammable gases **must** be used with a flashback arrestor when attached to a source of ignition.
- c. Cylinders of toxic or corrosive gases with regulators attached **must** be stored in fume hood (see SMOU 6 for Gases regarding specific requirements)

3. Flammable Solvents

- a. Flammable solvents **must** be stored in cabinets. If volumes of flammable liquids is greater than 20 litres then these cabinets must be flameproof. The 20 litre maximum is to provide guidance and the volumes of solvent stored outside flameproof cabinets in the laboratory should be kept to a minimum.
- b. No more than 100 litres of flammable solvent **must** be stored in each flameproof cabinet and no more than one 20 litre container **should** be stored in flame-proof cabinets.
- b. Flammable solvents and combustible organics **must not** be stored with oxidisers (hydrogen peroxide, sodium nitrate, hypochlorite) or any oxidising acid (concentrated nitric or perchloric acids). Please read segregation guidelines if you have any doubts.
- c. Bulk flammable solvents in the laboratory **must** be kept to a minimum – use DG stores for bulk solvent.
- d. If highly Flammable (Class 3.1A) solvents (e.g. ethers) are stored in refrigerators, these refrigerators **must** be spark-proofed (and the refrigerator labelled as such). Use of highly flammable (Class 3.1A) solvents is restricted to fume hoods.
- e. Ethers such as diethyl ether and tetrahydrofuran **must** have date of purchase clearly written on container. Once opened, ethers such as diethyl ether **must** not be kept longer than 18 months without being tested for peroxides. Subsequent testing must be performed at intervals as specified in SMOU for Higher Risk #4). If testing is not available, the ethers **must** be disposed. Testing dates and results **must** be indicated on the label. Any compound with peroxide levels greater than 100 ppm **must** be disposed.
- f. Flammable liquids **must** not to be stored or used near sources of ignition (e.g. flames, hot plates, electrical switching).

- g. Flammable liquids **must** be decanted in fume hood or well ventilated areas. The only exceptions will be Class 3.1B and C liquids that are diluted in aqueous solvents (e.g. diluted ethanol and methanol).
- h. No waste solvents are to be stored outside flameproof cabinets, unless the waste receptacles are less than or equal to 2.5 litres and are attached to analytical machines in a closed system.

4. Reactive Toxic and Corrosive Chemicals

- a. Particular care **must** be taken when storing and handling Class 4 and 5.2 Reactive Compounds (users must consult and comply with relevant SMOU and MSDS).
- b. Class 4 (reactive solids), 5.1 (oxidisers) and 5.2 (organic peroxides) compounds **must** be segregated from combustible organics and flammable liquids.
- c. Desensitised explosives such as picric acid **must** be under the supervision of a Laboratory Manager who will ensure that the levels of desensitising agent are checked every 6 months (see clause C7).
- d. Fume hoods **must** be used for handling Class 4 and toxic compounds and decanting flammables and concentrated acids.
- e. Highly toxic chemicals (Oral LD50 < 5 mg/kg) **must** be stored in a secure area or locked cupboard/refrigerator if the laboratory is not secure. A register should be kept of these toxic compounds (see SMOU for 6.1 compounds for more detail).
- f. Where liquids are stored inside cabinets there **should** be some form of secondary containment – flameproof cabinets have sumps which provide secondary containment.
- g. Individual winchesters of liquid **should** be transported in a carrier.
- h. Fume hoods **must** not be used for storage of chemicals with the exception of highly toxic gases or chemicals that leak toxic fumes.
- i. Recirculating fume hoods **must** be clearly labelled with limitations of use.

B. Requirements for Highly Hazardous Chemicals

Where chemicals have highly hazardous properties, they may require additional measures over and above general safety rules provided by the General Safe Methods of Use.

The reader is referred to specific Safe Method of Use and to the specific MSDS. In particular:

Reactive Solids	SMOU 8
Oxidisers	SMOU 9
Organic Peroxides	SMOU 10
Acutely toxic compounds	SMOU 11
Compounds with Chromic toxicity	SMOU13
Corrosives	SMOU 14

Note that for acutely toxic compounds in particular, users **must** consult MSDS sheets and ensure clear warning labels or pictograms are present on all containers.

C. Segregation and Particular Storage Requirements

1. Water sensitive compounds (hydrides, borohydrides) **must** be stored away from sources of water.
2. Acids **must** be stored away from alkalis.
3. Oxidisers (nitrates, hypochlorites, peroxides, chlorates, permanganates) **must** be stored separately from flammable or combustible organic compounds and **must** never be stored with flammable solvents.
4. Oxidising acids (concentrated nitric and perchloric) **must never** be stored with flammable solvents, organic acids (acetic or formic) **should** be kept separately from any organic compound.
5. In situations where oxidising acids (perchloric or nitric) are stored in corrosives cabinets, organic acids (formic and acetic) **should not** be stored in the same cabinet. Instead these organic acids **should** be stored in the flammables cabinets.

Note: Segregation can be achieved by distance or in some cases by enclosing small bottles of incompatible chemical in a plastic container.

6. Purchasing date of time sensitive compounds such as ethers **must** be recorded on bottle. Compound will be tested or discarded at the prescribed date (see SMOU for Peroxide –forming chemicals).
7. Desensitised explosive compounds such as picric acid **must** be checked every 6 months to ensure adequate levels of desensitising agent are present.

D. Compounds with Chronic Toxicity

Care **must** be taken to reduce exposure to any chemical (through the use of fume hoods and gloves). The adverse effects of some compounds are only evident after repeated low-level exposures (e.g. sensitising agents). Particular care **must** be taken when MSDS sheets indicate a compound is teratogenic, mutagenic or sensitising agent.

Fume hoods **must** be used when handling sensitising agents such as formaldehyde as well as many common solvents (xylene) to reduce inhalation hazard not only to the user but also to other laboratory personnel. Gloves of appropriate resistance **must** be worn when handling these compounds.

E. Disposal of Chemicals

With few exceptions all chemicals **must** be disposed by a licensed chemical waste contractor (see Chemical Safety Website for more details).

F. Work Alone or After-hours

1. Laboratory personnel working alone or after-hours **must** ensure they obtain prior permission from their supervisor.
2. Laboratory personnel working alone or after-hours **must** familiarise themselves with emergency procedures and have easy access to emergency telephone numbers.
3. It is strongly recommended that any person working after-hours notifies Unisafe (Extn 85000) when they enter the building and expected time of leaving.
4. In the case of some specific chemicals (e.g. HF) work alone or after-hours **is specifically prohibited** (these prohibitions are specific to chemical concerned and are included in the SMOU for that chemical).

F. Requirements for an Exempt Laboratory

1. Laboratory Management

- a. Every Exempt Laboratory **must** have a Laboratory Manager.
- b. 'Persons in Charge' of the Laboratory **must** be nominated in the absence of the Laboratory Manager. Otherwise (unless the building or floor has perimeter access control e.g. FMHS, SBS, Liggins Institute) the laboratory **must** be locked when Lab Manager or a 'Person in Charge' is not available.

- c. There can only be one person in charge of the Laboratory at any one time. Therefore a hierarchy **must** be established.
- d. All of the above **must** be in writing and all laboratory personnel **must** be aware of who is in charge of the laboratory at any given time.
- e. It is suggested that a list giving name of the Laboratory Manager and Persons in Charge in order of hierarchy is posted in a prominent place in the laboratory or on a website.

2. Requirements of the Lab Manager

The Laboratory Manager or "Person in Charge" **must**:

- a. Make themselves available to Emergency Services in the event of laboratory evacuation and must ensure any laboratory staff who can provide information to Emergency Services are also available.
- b. Ensure all laboratory personnel have access and follow the Safe Method of Use for every category of chemical that is present in the lab. The General Rules above are extracted from specific SMOUs and should suffice. Specific SMOUs are available on the Chemical Safety Website.
- c. Ensure lab personnel know location of spill kits and protective equipment and how to operate this equipment.
- d. Ensure lab personnel know which gloves are appropriate for the chemical they are using. Note that this information is available on the Chemical Safety Website.
- e. Ensure all laboratory personnel have access to and can extract information about any chemical in the lab from MSDS databases. Note that two MSDS databases (Chemweb Gold and CCOHS) are available within the University. Specific Safe Methods of Use should be consulted for more detail.
- f. Ensure all laboratory personnel have access to a 24 hours emergency number.
- g. Check (or arrange to have checked) all containers of chemicals to ensure they are not leaking and are properly labelled. Particular attention should be paid to labels on containers of corrosive compounds.
- h. Check to ensure chemicals are properly segregated.

- i. Check to ensure opened containers of ethers are not stored for longer than 18 months.
- j. Ensure there is adequate shelf-space assigned for chemical storage.

3. Requirements of the Lab Personnel

All laboratory personnel must:

- a. Follow Safe Method of Use on Basic Laboratory Safety.
- b. Use protective equipment as directed with particular attention to safety glasses and the use of correct type of gloves.
- c. Make themselves available to the lab manager and Emergency Services if they are able to provide information relevant to the emergency.
- d. Read and follow Safe Method of Use for the category of chemical they are using (the above general rules will cover most situations).
- e. Ensure (in writing) that the Laboratory Manager is aware of any acquisition of highly hazardous chemical for which there is no Safe Method of Use.
- f. Ensure laboratory is locked when either Lab Manager or Person-in-Charge is absent.

Note: the requirement to lock the laboratory will not necessarily apply to Liggins Institute, School of Biological Sciences and Faculty of Medical and Health Sciences where there is adequate perimeter security.

- g. Destroy any warning labels on packaging before discarding the packaging.
- h. Report any leaking container or malfunctioning equipment to the Laboratory Manager.
- j. Report container with illegible or defaced label to the Laboratory Manager.
- k. Know the location of spill kits and protective equipment.
- l. Know how to deal with spill of any chemical in the laboratory.

G. Reporting Accidents and Incidents

1. All accidents and incidents **must** be reported to Laboratory Manager.
2. All accidents and near misses **must** be reported to University Health and Safety Office **on the prescribed University Accident/Incident form**. Ensure a copy is sent to Faculty or Department Manager.
3. Accidents involving splashes to the eye may require reporting to OSH. These accidents **must** be reported as soon as possible to the University Health and Safety Office.
4. The Laboratory Manager and any person with information relevant to the emergency **must** make themselves available to the Emergency Services.