Safe Method of Use 5
Personal Protective Equipment (PPE)

Purpose: This Safe Method of Use applies to **principal investigators (PIs), sector managers, designated laboratory person (DLPs)**, technical staff and students who use laboratories within the University of Auckland.

Note: the word 'must' denotes a mandatory requirement and the word 'should' denotes a recommendation.

Introduction

The Health and Safety at Work Act and the University Injury and Illness Prevention Program all require that appropriate Personal Protective Equipment is worn when handling chemicals

Personal Protective Equipment (PPE) in the laboratory comprise of combinations of the following:

1. Laboratory coat, or overalls
2. Closed footwear
3. Safety glasses or face shield
4. Gloves
5. Fume Hood

- Lab coats, safety glasses, gloves and closed shoes ***shall*** be considered mandatory minimum requirements for ***all*** personnel in the laboratory.

- The use of volatile or toxic compounds chemicals ***shall*** be restricted to fume-hoods. Refer to specific Safe Methods of Use and MSDS databases.

- All laboratories ***shall*** have access to at least one MSDS database (Gold FFX and CCOHS databases can be accessed electronically via LEARN databases)

- In the case of highly hazardous chemicals (i.e. HSNO 3.1A; 4.1A, 4.2A, 4.3A and 6.1A), a copy MSDS and the applicable Safe Method of Use ***shall*** be readily available.

1. Safety Glasses

Safety glasses ***shall*** be worn at all times in laboratories, except in the following circumstances:

a) eye protection will significantly interfere with the intended task (an example might be microscopy) <u>and a specific risk assessment has been completed</u>.
b) while in transit through the laboratory via the safest and most direct route <u>and</u> there is no imminent risk of eye injury in the immediate vicinity of the route.

While not an exhaustive list, activities that would present a higher risk of eye injury include:

- Opening centrifuge tubes
- Using syringes (particularly when forcing solutions through cartridges, or unblocking tubing or columns). ***Wherever possible, syringes fitted with Leur locks shall be used for this type of procedure.***
- Vigorous mixing/vortexing
- Pouring solutions

Please note: any system where a liquid/solvent is under any pressure presents a higher risk of eye injury

A full face shield ***shall*** be worn when handling cryogenic liquids such as liquid nitrogen where there is a significant risk of facial burn.

2. Use of Gloves

Gloves are an important method of preventing absorption of chemicals through the skin on your hands and ***shall*** be worn when handling chemicals. It is important therefore to choose gloves that are resistant to the chemical that is being handled.

Note that some of the more chemically resistant gloves have very poor dexterity and so if precise handling is required then PVC or PVA gloves may not be the most appropriate choice.

Chemical group	Latex	Nitrile	Neoprene	PVC	PVA
Solvents	×	✓	✓	×	×
Organic solvents	×	✓	✓	×	✓
Ketones	✓	×	✓	×	✓
Caustics	✓	✓	✓	✓	×
Hydrocarbons	×	✓	✓	×	✓
Acids	✓	✓	✓	✓	×
Oils	×	✓	✓	✓	✓
Fats	×	✓	✓	✓	×

Source: Ansell Protective Products Chemical Resistance Guide, 6th edition. See also Ansell Glove Chemical Resistance Guide.

Note

- The above table is quite generic and somewhat of a simplification of the matter. A more detailed chemical resistance information chart for latex, neoprene and nitrile gloves is available on the chemical safety website.
- Note in the above table that nitrile gloves are rated as being adequate for organic solvents. More detailed analysis shows that nitrile gloves have poor resistance to several common organic solvents including chloroform, and diethyl ether. Thus due caution should be used in determining the appropriate gloves to use in a given situation.
- ***Always refer to recommendations in individual MSDS for more specific guidance***

3. Fume Cupboards.

Fume cupboards ***shall***:

(i) Be used when handling volatile or toxic compounds chemicals

(ii) Be operated long enough, after the hazardous substances has been removed from the cupboard, to flush the hazardous substances substantially from the exhaust ducting.

(ii) Have a means to indicate they are operating (such as a 'tell tale'). While not mandatory, it is strongly recommended that fume cupboards intended to extract hazardous substances while unattended should have an alarm that is activated if the airflow drops by more than 20% or stops. It is also strongly recommended that the alarm is monitored.

(iii) ***Not*** be used to store closed containers of chemicals. Exception may be made for the storage of small cylinders of toxic gases (see Safe Method of Use for Gases)

4. Recirculating Fume Cupboards.

- Recirculating fume cupboards have very severe limitations especially where organic solvents and corrosive liquids are concerned. Such are these limitations that the Australian and New Zealand Standards have published statements regarding these limitations in AS/NZS 2243.9 Clause 1.3. AS/NZS 2243.9 Clause 6.1 also requires hazard identification and risk assessment prior to purchase of recirculating fume cupboards.

- Recirculating fume cupboards rely of activated carbon filter beds to absorb organic solvents. These carbon beds will absorb solvents differentially, the presence of acids will interfere with absorption and

most importantly the user is given no warning when the filter becomes saturated and there is 'breakthrough' of these solvents. In addition the phenomenon of ‘poisoning’ of the carbon filter has been noted for such hoods (i.e. the absorption of small quantities of some compounds will dramatically lower the absorption capacity.

- Once such hoods are installed, future users may not be aware of these limitations and may unwittingly use these hoods as if ducted fume hoods and end up making mistakes with potentially serious consequences. In short, recirculating fume cupboards do not provide any protection in the event of operator error and their future use.

The following will apply to all Recirculating Fume Cupboards:

- A risk assessment hazard identification and risk assessment ***shall*** be conducted prior to purchase of recirculating fume cupboards (As per AS/NZS 2243.9 clause 6.1).

- Any recirculating fume cupboards ***shall*** have a prominent notice so that all limitations are known to all users.

- A log ***shall*** be maintained of all use of each recirculating fume cupboard including the quantity of solvents and acids handled on each occasion.

- Carbon filters ***shall*** be replaced very regularly (at least annually)

- Recirculating fume cupboard ***shall*** be tested annually

- The use of recirculating fume cupboards ***shall*** be limited to chemicals, quantity of chemical and task identified in the prior risk assessment.