Department of Chemical Engineering

Laboratory Safety Handbook

Revision 1

Contents

Introduction

Safety within the Department of Chemical Engineering is vital to ensure the health and well-being of all our staff and students. Both State and Federal legislation dictate laboratory safety. The notes in this handbook are not intended to be a comprehensive compilation of safety practices and techniques, but rather as a guide to assist you in establishing your laboratory practices. This handbook also details specific requirements for using the Chemical Engineering laboratories in Buildings 001, 205, 220A, 305, 500, and 601.

All staff, students and visitors of the Department of Chemical Engineering are to:

- Adhere to the safety regulations and University policies outlined in this booklet. Anyone performing experiments involving chemicals gases and/or instrumentation must read the handbook and sign the safety declaration attached.

- Familiarise themselves with the location and operation of safety devices (fire extinguishers, safety showers, first aid equipment and emergency exits) within the area in which they work.

These regulations are in place to protect all staff, students and visitors in the Department.

It must be recognised, that at any time a staff member or a student feels that the work activity they are undertaking or being requested to undertake is unsafe, they are entitled to refuse to do the activity until it is made safe.

Contact the Department of Chemical Engineering Senior Technical Officers or Technical staff for all laboratory enquiries and concerns.

Important Contact Numbers

Emergency Contact Numbers

For life threatening emergencies contact the Emergency Services	
From a Curtin Phone	**0 000**
From a mobile or external phone	**000**

For all other assistance contact Curtin Security

From a Curtin Phone	4444
From a mobile or external phone	9266 4444 and 1300 004 444

Staff Contact Numbers

Name	Position	☎
Araya Abera	Senior Technical Officer (B001 and B205 laboratories)	9709 / 0401 172 627 (mobile)
Jason Wright	Senior Technical Officer (B220A, B305, B500, and B601 laboratories)	3046 / 0449 855 574 (mobile)
Karen Haynes	School Technical Manger	2623 / 0422 113 935 (mobile)
Hongwei Wu	Head of Department	7592 / 0428 898 198 (mobile)

Elected Worksafe Occupational Safety and Health Representatives

Name	Location	☎
Araya Abera	205.210	9709
Jimmy (Xiao) Hua	001.105	9242 / 7830
Jason Wright	500.2212	3046

First Aid

Refer to site specific signage in each laboratory for area First Aiders. For B500 labs refer to the Department of Applied Chemistry Laboratory Safety Induction and Department Handbook.

Curtin Health Service 🕐 9.00 am to 4.30 pm ☎ 9266 7345

For emergencies, a Nurse is in attendance at Bentley Campus Curtin Health Service from 8.00 am to 7.30pm, Monday to Friday during semester times.

Fire Wardens

Refer to site specific signage in each laboratory. For B500 labs refer to the Department of Applied Chemistry Laboratory Safety Induction and Department Handbook.

Curtin Health, Safety and Emergency Management ☎ 9266 4900

Evacuation and Emergency Procedures

It is the duty of the person 'on the spot' in an emergency situation to make the decision to:

(a) Call for **HELP** and assistance if the situation is less than critical.

(b) **Call for 'EVACUATION' if it is critical**. This person makes the decision if delay is likely to endanger life. Dial 000 if the situation is life-threatening and if possible, request a bystander call Security 9266 4444.

The Senior Technical Officer, Fire Warden or Safety and Health Representative, or in their absence, a Technical Officer must be informed as soon as possible.

EMERGENCY EVACUATION GUIDELINE

The sounding of the EWIS Alert and Evacuation alarm will constitute the evacuation signal. The alternate evacuation signal will be a fire alarm bell or a verbal directive issued by the appropriate warden or member of staff.

In some instances, such as a chemical incident, bomb threat, medical emergency, etc. instructions will be given over the building's PA system prior to the evacuation alarm being sounded.

1 Discovering an Emergency

1.1 Remain calm
1.2 Dial 000 (or 000) to report the emergency
1.3 Press Fire Alarm, break glass if available/appropriate
1.4 Alert Technical staff, Wardens and other occupants
1.5 Only attempt to deal with the actual emergency if you have received training such as fire extinguisher, use of first aid and if it is safe to do so

2 Emergency Evacuation

2.1 The Alert and/or Evacuation alarm or a Floor Warden or other member of staff may give a verbal warning. Once the Alert alarm has commenced it will automatically go into the Evacuation tone (low then increasing siren tone followed by a recorded announcement to evacuate the area). Always react immediately, follow your warden's instruction and commence evacuation of the building. If safe to do so – unplug any heating devices that might be on, remove items from the hotplate and pull down the shields on the fume cupboards.
2.2 Remain calm
2.3 Ensure that persons in your immediate vicinity are aware that they may have to evacuate

2.4 Collect small personal belongings (such as keys, purse, etc. do not take computers and other large items) providing they are IMMEDIATELY and SAFELY accessible

2.5 Assist disabled persons in your immediate area as required

2.6 Unless directly involved in controlling the emergency or assisting wardens, immediately leave the building by the primary Emergency Exit. The primary exit for each laboratory will have been identified to you in your area induction and is usually the door from which you enter the laboratory.

2.7 Any laboratory doors that are normally electronically locked will unlock automatically only when the Evacuation Alarm is activated. In other emergencies there is a break glass switch to the side of the door.

2.8 Lifts are not to be used in an emergency evacuation

2.9 Proceed to the designated Muster Point for the building. Do not congregate around the exit doors or on roadways and remain at the Muster Point until directed otherwise by a Warden.

2.10 Do not re-enter the building until the Fire Chief or Warden has advised that the area is clear.

All buildings on campus have emergency lighting and all emergency exits are signed in **green** with white writing.

In an emergency during a teaching class the demonstrator will direct students to:

(i) If time permits, turn off electrical devices and/or equipment and discontinue laboratory operations; and,

(ii) In a controlled sequence, move students and exit in an orderly manner through the nearest appropriate exit to the assembly area.

Evacuation Diagrams are prominently displayed in all buildings.

Curtin Health and Safety

☏ 9266 4900

Curtin University's Health and Safety office deals with worker's compensation, injury management and risk management. It is important that you view the website, http://healthandsafety.curtin.edu.au/ as it contains detailed guidance notes and policies on safety and health issues at Curtin. A list of the University's Safety and Health Representatives is also available.

SDS – ChemAlert

Curtin H&S manages the ChemAlert database which is used to manage all hazardous substances on the University campus.
Accessible at http://healthandsafety.curtin.edu.au/hazardous-materials/chemicals.cfm or https://chemalert.rmt.com.au/curtin/).

Incident Reporting

Curtin H&S also manages hazard and incident reporting via an online system accessed at http://healthandsafety.curtin.edu.au/event_and_hazard/index.cfm. In the event of any accident, property damage or exposed hazard it is your 'Duty of Care' to report it via the prescribed Curtin H&S system. 'Near misses' should also be reported via this system. The intention is not be judgemental but to use the information constructively to improve the Department's safety and provide best practice to staff and students.

Laboratory Protocols

The following are taken from the Australian/New Zealand standard AZ/NS 2243. 1:2005 Safety in Laboratories.

Safe Laboratory Conduct

1. Always act responsibly. Horseplay, running, unauthorized experiments etc. are strictly forbidden.
2. Appropriate clothing must always be worn, PPE Minimum Requirements are identified on page 10.
3. No food or drink (including chewing gum) is to be handled or consumed in a laboratory.
4. Keep all emergency exits and corridors free from obstructions.
5. Never undertake any work unless the hazards of the operation are known and the safety precautions adopted (refer to the following section on Risk Assessments).
6. Report all accidents, no matter how trivial, to the technical staff and your supervisor.
7. Always use safety carriers for transporting chemicals in glass or plastic containers with a capacity of 2L or greater. Never carry incompatible substances together.
8. Immediately wash skin areas which come into contact with chemicals, irrespective of concentration, and report this to the technical staff and your supervisor.
9. Immediately report all spills to the technical staff and your supervisor and ensure they are cleaned up immediately.
10. Never store incompatible substances in the same area.
11. Always use a fume cupboard when working chemicals
12. Label all safety equipment and maintain it in good operating condition. Check and inspect safety equipment for correct operation in accordance with the manufacturer's instructions and report in writing any requirement for maintenance to the Technical Staff.
13. Ensure that all safety equipment is not obstructed and remains accessible at all times.
14. Keep safety information and emergency procedures related to your laboratory work prominently displayed at all times in each laboratory.
15. Dispose of specialised wastes (e.g. broken glassware, biological or chemically contaminated items) according to the waste procedures highlighted during your laboratory induction.

Laboratory Procedures

Note: All documentation and forms referred to in this Handbook are available from the Technical staff on request.

Laboratory Access and Inductions

Required Documentation

Before gaining access to the Department's laboratories a researcher must complete the relevant safety documentation. The purpose of this documentation is to ensure that all projects have been assessed for risks to health and safety, that any such risks are controlled, and that the project is approved by the academic supervisor. By completing these documents the Department will satisfy the requirements of the OSH Act and Regs[1].

The required safety documentation is detailed below:

1. **A Project Risk Assessment**
    - A *HAZOP* is required for all researchers working in the laboratory for one year or greater, or for shorter projects containing high levels of risk.
    - The *Scope of Work* is required for all other research projects.
    - *Guides* are available for these documents.
2. ***Chemical Risk Assessments (CRA)***
    - Required for each chemical that will be used by an individual researcher.
    - A *Guide* is available for this document.
    - Chemicals will not be provided without an authorised CRA.
3. ***Chemical Engineering Safety Inductions***
    - An induction is required before a researcher can work in a Laboratory. Each laboratory has a separate induction, you will not be granted access to B001, B205, B220A, B305, B500, or B601 laboratories unless you have completed the induction specific to that area.
    - Inductions sessions are done in groups.

All *HAZOP* forms and *Scopes of Work* (with the accompanying *Chemical Risk Assessments*) need to be checked by your supervisor and sent to a Senior Technical Officer. The Technical staff will review your documents and provide feedback from the perspective of safety and equipment availability.

Visitors to the Department of Chemical Engineering

The laboratories are Restricted Areas, only people who have been inducted are allowed in.
All visitors need to be escorted by Curtin staff.
The Senior Technical Officer needs to be informed of any planned tours.

[1] The Occupational Safety and Health Act 1984, and the Occupation Safety and Health Regulations 1996.

After-hours Access

The normal operating hours of the Department's laboratories are 8am – 5pm, Monday to Friday. Work outside of these hours requires written permission from the technical staff, your supervisor, and the Head of Department – this can be achieved by using the *After-hours Access Request Form.*

After-hours Procedure

To work after-hours:

- At least two people must work in the same room ("Buddy System")
- These two people must be:
  - Postgraduate or staff member from Chemical Engineering
  - Be both inducted into that particular laboratory
  - Have both been granted afterhours access for that room and times
  - Have Cardax Access
  - Inform the Technical staff before 5pm who will be working after-hours
- Researchers working after-hours must to call Security (4444) at 5pm or when they arrive to inform that that they will be working after-hours.
- The researchers must contact Security again when leaving.

No-one is to work alone.
Minimum PPE must be worn at all times.
At the completion of your work you must pack up all equipment and clean up your work area.

Pack-Up Time

Between 4:45 – 5pm all researchers who do not possess after-hours access are required to clean up their work area in preparation to leave the lab at 5pm.

PPE Minimum Requirements

The minimum Personal Protective equipment (PPE) and clothing requirements to enter a Departmental laboratory are:

- Fully enclosed footwear (covering the foot completely and having no holes to let any liquid in)
- Full length trousers or a full length skirt.
- Safety glasses or safety over-glasses over prescription glasses.
  - Personnel wearing contact lenses must inform the technical staff as special precautions may be required.

The following additional minimum PPE and clothing requirements apply when handling chemicals in a laboratory:

- Lab Coats (protective, easy to remove)
- Gloves – Ensure these are the appropriate type of gloves for the chemicals that you will be using, refer to the chemical's MSDS for specific details.
- Long hair should be tied back
- Jewellery and clothing must not get in the way of your work

Additional notes on PPE

Please note that additional PPE may be required beyond that identified above, this will be dependent on the particular chemical you are handling or the particular process that you are undertaking. The Technical staff stock some of this additional PPE, examples include: earmuffs, face masks, respirators, aprons and chemical suits.

Lab users should have their own safety glasses and lab coats. One pair will be provided to all Postgraduate and staff researchers when first requesting access to the laboratories.

In order to prevent contamination from chemical handing:

- Laboratory coats must not be worn outside of lab areas.
- Gloves must be removed before handling doors, when using computers, and phones, and your own mobile phone.

Restricted Access Areas

The following laboratories are restricted access and require specific permission in order to receive card access:
B001.106 – PIV lab
B205.146 – Furnace Lab
B601.115 – Biological Lab

The following stores are restricted to Technical staff only:
B205 Chemical Store
B205.249 Store
B206 Flammable Store
B220A Chemical Store
B601 Chemical Store

Classroom Access

There will be no access to 205:145 during scheduled teaching class times.
Class Timetables will be posted on the lab door.
Do not use equipment and chemicals belonging to classes.
Do not work in a teaching laboratory unless you have permission from the Technical staff.

Signage

Observe all danger and information signs before attempting to enter a lab, these signs are erected for your safety and the safety of others – particular examples include signs that read “NO ENTRY” or “DANGER”.

General Laboratory Health and Safety

Laboratory Emergency Stop Buttons

Emergency Stop Buttons are large red buttons located in each laboratory; their positions will be pointed out to you during your laboratory specific induction.

These buttons are only to be pressed in the event of an emergency as they will shut off electrical power to the entire lab. In the case of B500 and B220A the entire floor will lose power.

This button must not be obstructed. Avoid activities next these buttons or you may accidentally press one.

Fire Extinguishers

In an emergency do not use a fire extinguisher unless you are trained and confident in its use.
In the event of a fire follow the protocols laid out in the **Evacuation and Emergency Procedures** on page 5.

Safety Showers

Safety Showers and eye wash stations are fitted in every lab, with the exception of B001 in which no chemicals can be handled.
Safety showers are operated by a pull-down handle.
Eye wash stations are operated by either a foot-pedal or a push lever.

Ensure that you are familiar with the operation of piece of vital safety equipment.

First Aid Kit

Each Laboratory has a First Aid Kit near the primary exit. If you use an item from the kit you must inform the Technical staff.

Electrical Safety

All electrical equipment and appliances must be tested and tagged before use.

If the piece of equipment:

- has no tag,

- has an out of date tag,
- is damaged,
- is faulty

Do not use it. Return it to the Technical staff to arrange testing and tagging.

When power boards and extension cords are required they must:

- not be used to power another power board
- Be individually switched.

Double adapters and travel adapters are not prohibited by Curtin's Electrical policy.

Unattended Activities

If you need to leave your experiment unattended you will need to:

- First stay with the experiment during its initial set up or warm up process.
- Complete an *Unattended Experiment form* and prominently display this on your equipment. This form details the steps required to safely turn off your experiment in an emergency.
- Return at regular intervals to make sure that everything is running correctly.

Chairs

Space in our laboratories is limited so chairs are not permitted due to the risk they pose in an emergency. If you have a medical condition that requires you to sit please inform the Senior Technical Officer for your area.

Bags

Bags must not be brought into the laboratories. An appropriate location to store your bags will be identified in each laboratory induction.

Chemical and Gas Safety

Gas, Gas Cylinders and Regulators

Only the Technical staff and those trained by the Technical Staff can handle gas cylinders.

All gas cylinders must be transported with a gas trolley and be appropriately strapped in. All cylinders must be clamped into position away from heat sources.
The appropriate regulator must be fitted to the cylinder for operation. Advice can be sought from our gas suppliers (BOC) or Technical staff.

Notify Technical Staff when gas cylinders are empty.

Ordering and Sourcing Chemicals

The Senior Technical Officer staff must be informed prior to any chemical purchase or before a chemical is brought onto site. This is automatically done if you follow the Department's purchasing procedures.

If you plan to bring a chemical onsite it is your responsibility to seek permission from the Senior Technical Officer and to provide a copy of the SDS.

SDS (Safety Data Sheet) – ChemAlert

SDSs for the chemicals contained in each of the Department's laboratories are filed in that laboratory.
SDS's can also be obtained from the supplier / manufacturers website or from ChemAlert (see page 7 for links to ChemAlert).

Access to Chemicals

You will only be given access to a chemical if you have an approved *Chemical Risk Assessment (CRA)* for that chemical.

Access to chemicals from the B205 and B220A chemical stores are restricted to certain times during the day, these times are identified in your laboratory specific induction.

During this time the Technical staff will dispense small aliquots of chemicals. The small, labelled aliquots may be kept in your cupboard, the original container will be returned to the Technical staff as instructed during your induction.

If you need chemicals outside of Chem. Store Access Hours email the Technical staff your requirements prior to the opening times and the chemicals will be organised for you.

Only the Technical staff have access to the Chemical store.

Storing Chemicals

Samples and aliquots of chemicals may be stored in your project cupboard.
Stock Chemicals need to be returned to the appropriate location identified in your laboratory specific induction.

Dispensing Chemicals

There is strictly no pipetting from stock chemical bottles. Doing so will contaminate the chemical for other researchers.
Decant all chemicals another container (e.g. beaker) before pipetting or measuring.
Use a funnel when decanting chemicals.
Dispense chemicals in the fume cupboard.

Do not return unused chemical aliquots to the stock chemical bottle. If you are unable to use the excess chemical you must dispose of it according to the Waste Procedure.

When diluting acids/alkalis add the acid/alkali to your pre-measured water rather than the other way around, this will prevent excessive heat being generated and potential sputtering.

Moving Chemicals

All goods must be carried appropriately, using a Winchester carrier or trolley. Hold the bottle by the neck and the base when carrying

Chemical and Sample Labels

Labelling of chemicals and samples is necessary in order to correctly identify the contents and hazards associated with your sample or chemical. Correct labelling is a requirement of the Occupational Safety and Health Regulations and Hazardous Substances Regulations.

The requirements for chemical labelling are prescribed in **Appendix 1 – Labelling Procedure** on page 23 .

Chemical and Sample labels are available in each laboratory.

Chemical Waste

To prevent unnecessary hazards, chemical waste must be correctly identified, it is your responsibility to identify your waste and provide it to the Technical staff for storage and disposal.

Chemical waste labels are available in each laboratory.

Do not use lab glassware as a waste container, amber glass bottles and black plastic bottles of various sizes are available in each laboratory.

The requirements for chemical waste are prescribed in **Appendix 2 – Waste Procedure** on page 24.

Other Waste

Glass is disposed in the designated Glass Bin. Remove any non-glass parts before disposal.

Each lab has a small yellow **sharps** disposal bin. All sharp objects (except glass) go into this sharps bin.

Dispose of gloves, tissues, filters, paper towels and other consumables that have come into contact with chemicals in the yellow chemical waste bin (or autoclave bag for B305 researchers).

All other rubbish goes into the general rubbish bins.

Storage of Chemicals

Storage of chemicals in laboratories should be kept to a minimum. It is essential that chemicals are stored appropriately according to the classification system and table below.

Classification System

1	Explosives	2.1	Flammable gas
2.2	Non-flammable gas	2.3	Oxidizing gas
3	Flammable liquid	4.1	Flammable solid
4.2	Spontaneously combustible	4.3	Dangerous when wet
5.1	Oxidizing agent	5.2	Organic peroxide
6.1	Toxic	6.2	Infectious
7	Radioactive	8	Corrosive
9	Miscellaneous		

	Class or subsidiary risk	2.1	2.2	2.3	3	4.1	4.2 S	4.2 L	4.3	5.1 S	5.1 L	5.2	6.1 S	6.1 L	6.2	7	8 S	8 L	9*	Food stuffs
Explosives	1	REFER TO *Explosives Regulations 1963*																		
Compressed Gases	2.1	0	1	3	X	X	X	X	X	X	X	X	3	3	X	X	3	X	3	3
	2.2	1	0	0	3	3	X	X	X	1	1	3	0	0	X	X	3	X	1	3
	2.3	3	0	0	X	X	X	X	X	X	X	X	0	0	X	X	3	X	3	X
Flammable Liquids	3	X	3	X	0	3	X	X	X	X	X	X	3	3	X	X	1	3	3	3
Flammable Solids	4.1	X	3	X	3	0	X	X	X	X	X	X	3	3	X	X	1	1	1	1
Spontaneous	4.2 S	X	X	X	X	X	0	1	X	X	X	X	3	3	X	X	1	1	1	3
Combustible	4.2 L	X	X	X	X	X	1	0	X	X	X	X	3	3	X	X	1	1	3	3
Dangerous When Wet	4.3	X	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	X	X
Oxidisers	5.1 S	X	1	X	X	X	X	X	X	0	1	3	X	X	X	X	X	X	3	X
	5.1 L	X	1	X	X	X	X	X	X	1	0	3	X	X	X	X	X	X	3	X
Organic Peroxides	5.2	X	3	X	X	X	X	X	X	3	3	0	X	X	X	X	X	X	3	X
Poisonous &	6.1 S	3	0	0	3	3	3	3	X	X	X	X	0	1	X	X	1	3	3	X
Infectious	6.1 L	3	0	0	3	3	3	3	X	X	X	X	1	0	X	X	3	1	3	X
Substances	6.2	X	X	X	X	X	X	X	X	X	X	X	X	X	0	X	X	X	X	X
Radioactives	7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0	X	X	X	X
Corrosives	8 S	3	3	3	1	1	1	1	X	X	X	X	1	3	X	X	0	1	3	X
	8 L	X	X	X	3	1	1	1	X	X	X	X	3	1	X	X	1	0	3	X
Miscellaneous	9*	3	1	3	3	1	1	3	X	3	3	3	3	3	X	X	3	3	0	X
	Food stuffs	3	3	X	3	1	3	3	X	X	X	X	X	X	X	X	X	X	X	0

* Aerosols which are flammable, toxic or corrosive shall be segregated as Class 2.1, Class 6.1 or Class 8, respectively.

L - Substances which are liquids
S - Substances which are solids
0 - No general segregation required
1 - Segregate by a distance of at least 1m
3 - Segregate by a distance of at least 3m
X - Segregate in separate depots at least 5m apart or segregate by a distance of At least 5m with the use of a screen wall.

Fume Cupboard Use

Chemical mixing and any process that produces fumes or vapours must be carried out in a fume cupboard.

Work with the sashes down as low as possible. You must be able to comfortably handle your chemicals in the fume cupboard, but should not have the sash any higher than this.

Do not store items in the fume cupboard. Process your chemical waste as per the procedure detailed in this document and return all equipment to their appropriate locations.

Clean the fume cupboard once you are finished.

Do not place tissues or papers in the fume cupboards, they will be sucked up by the motor and can damage the fume cupboard.

Do not mix incompatible items in the fume cupboard

Label all samples in the fume cupboard

Do not leave experiments unattended without an *Unattended Experiment Form*.

Fume Cupboard Emergencies

In an emergency the large red Emergency Stop button can be pressed to stop power connected to the fume cupboard and the flow of gases connected to the fume cupboard. Pressing the Emergency Stop button will not stop the extraction system.

If a fume cupboard 'fails' and stops extracting you will hear an alarm and will see an indicator light turn on.
Only restart the fume cupboard if it is safe to do so. If you are unsure how to proceed, contact the Technical staff for help.

If you are unable to restart the fume cupboard and there is an active experiment inside the fume cupboard you must evacuate everyone from the Laboratory and inform the Technical staff.
This is especially important if a fume cupboard containing **Hydrofluoric Acid (HF)** has stopped working. Evacuation of the area may save lives.

Spill Management

All chemical spills must be cleaned up immediately. Chemical spill kits are located in all laboratories. If you are unsure of the correct way to clean up a spill, contact the Technical staff for help.

Glass/Plastic Containers

Glass and plastic containers can be found in each laboratory.

Do not store samples in lab glassware (beakers, volumetric flasks etc.), avoid using lab bottles (glass bottles with blue caps) for your solutions unless plastic bottles are inappropriate for your solution.

High Risk Substances

Hazardous Substances that Require Health Surveillance

Chemicals on the Health Surveillance List require stringent handling procedure and personal medical checks to ensure that you are not being exposed these particularly harmful substances.

If you need to use one of the following chemicals (or family of chemicals) please speak first with one of the Senior Technical Officers who can discuss the process and *Handling Procedure* with you.

- Acrylonitrile
- Inorganic Arsenic
- Asbestos
- Benzene
- Cadmium
- Inorganic chromium
- Creosote
- Crystalline silica
- Isocyanates
- Lead
- Inorganic mercury
- 4, 4'-methylene bis 2-chloroaniline (MOCA)
- Organophosphate pesticides
- Polycyclic aromatic hydrocarbons (PAH)
- Pentachlorophenol (PCP)
- Thallium
- Vinyl chloride

Hydrofluoric Acid

Hydrofluoric Acid (HF) work can only be carried out in 205.145 and 205.148 using the established procedures.

- HF can only be handled by trained operators in the required PPE using a specially equipped fume cupboard.
- HF procedures are conducted with a buddy.
- HF procedures can only be undertaken during normal operating hours.
- HF procedures cannot be carried out while teaching classes are running in 205:145.

All laboratory users must adhere to danger signs and no entry signs that are erected during HF procedures.

Liquid Nitrogen

Liquid Nitrogen (LN_2) is only available in the B205 labs.
LN_2 may only be handled by the Technical staff.
At least two days email notice will be needed before the use of Liquid Nitrogen due to the limited storage capacity in B205.

Laboratory Safety as a Culture

You must do everything you can to keep yourself and others safe while working in the lab.

Remember - Safety is Paramount

If anyone working in the lab feels that the work activity they or other lab users are undertaking or being requested to undertake is unsafe, they are entitled to refuse to do the activity until it is made safe.

If you feel that something is unsafe please inform the Technical staff and your supervisor.

Disciplinary Measures

Anyone not complying with laboratory procedures will receive a formal warning; their supervisor will also be notified of this warning. If that person is again found to be breaching laboratory safety, they will be suspended from the laboratory and be required to meet with their Supervisor, Head of Department and the School Technical Manager to explain their actions.
Further breaches will result in escalating laboratory bans.

General Laboratory Operations

Equipment Training

If you do not know how to use a piece of equipment you will need to ask the Technical staff to train you.

Equipment and Analytical Instrument Use

Do not use equipment that you haven't been trained on and deemed competent to use.

If you need to leave your equipment unattended you will need to:

- First stay with the equipment during its initial set up or warm up process.
- Complete an *Unattended Experiment form* and prominently display this on your equipment. This form details the steps required to safely turn off your experiment in an emergency.
- Return at regular intervals to make sure that everything is running correctly.

For shared equipment you must remove any samples and clean the instrument promptly so that it can be used by others.
Any data generated needs to be saved to your USB drive.
Switch off analytical instrument after use only if it is part of the SOP, however do leave the computer on.
Booking sheets, Log Books, and Instrument User sheets need to be filled out.
Do not overbook the analytical equipment.

Analytical Instruments in Other Departments

If you need to use an instrument in another department your Project Supervisor needs to contact the Department to request access and make the appropriate appointments

Ordering Chemicals, Consumables, and Equipment

Laboratory orders are placed via a Request To Order (RTO). This ensures that correct authorisations are gained from a Senior Technical Officer and Head of Department. The form also communicates all of the information required to place your order.

Contact the Technical staff for an *RTO Form*, *RTO Guide*, and the *Instructions for purchase requestor Undergrad and Postgrad students*.

Manufacturing/Workshop Requests

Submit your detailed designs and supporting information to a Senior Technical Officer who will review your request, and communicate it to the workshop.
No students are allowed in the workshop unless invited and escorted by a technical staff member.

Cupboards

Project cupboard are issued to researchers who require cupboard space, this space may also be allocated by the Technical staff to another researcher to share as available space requires.

Label your cupboard with your name and mobile contact number
Equipment is not to be stored in your project cupboard. You must clean and return equipment once you are finished for other researchers to use.

Laboratory Benches

Laboratory benches are for all students to use.

Due to limited space benches are a shared area and must be kept clear when not in use.
When you have finished your day's work you must clean your workbench for the next person.

Booking Sheets

Equipment that is in high demand will have a booking sheet in order to ensure all researchers have an opportunity to use it.
You can book this equipment by writing your name in the appropriate block (e.g. 8-12am or 1-5pm) or by writing a specific time period (e.g. *9:30-10am John*).
Certain equipment may have additional restrictions on booking times. Observe the instructions on the booking sheet.

You must arrive within the first hour of your booking or your booking will be cancelled. If you can't turn up for your booking please let the Technical staff know.
If you are seen using equipment which you haven't booked, your samples may be removed from the instrument.

Fume cupboards and ovens can be shared as long as there is space and the work is compatible.

Ovens

When booking the oven be sure to write your name and the temperature on the booking sheet.
If someone else has booked the oven and set the temperature **do not** change the temperature, you could damage their work.
Once you have finished using the oven remove your samples promptly.
If samples are in an unbooked oven or have been placed in the oven during your booking time and the temperature has been changed, inform the Technical staff.
Make sure all samples are as per the labelling procedure.

Deionised and Ultrapure Water

Deionised (DI) water and Ultrapure water are available in all laboratories with the exception of B001.
DI water is maintained at ≤1µs/cm
Ultrapure water is maintained at ≥15MΩ.cm

Washing

It is your responsibility to wash and rinse all glassware and plasticware after use. There should be no stains or labels present when you have finished.

In B205, 220A, and 601 you must then provide the washed glassware and plasticware to the Technical staff for thorough washing in the glassware washer.

Do not return unwashed glassware and plasticware to the cupboards.

Ensure that you wash your hands before leaving the laboratory.

Lab Phones

Lab phones are for internal calls only.

Maintenance

Inform the Technical staff of all maintenance issues.

Laboratory Management

Notify the Technical staff if you see that:

- consumable stocks are getting low
- something is broken
- something is damaged
- something is not working correctly

Contact

The best way to contact the Technical staff is via email.
Even if you talk to a Technical staff about something it is best to back it up with an email so that there is a record of the request.
All emails need to be sent and received at your Curtin email account.
If you need supervision, training, help setting up equipment or to discuss documents you will need to make an appointment.

Appendix 1 – Labelling Procedure

LABELLING

- **Everything needs to be labelled – from beakers on hotplates to your sample containers and waste.**
- **Use a new label each time.**
- **Chem Alert Labels are required for decanted chemicals.**
- **Use the correct Dangerous Goods (DG) diamond.**
- **It needs to be legible and in English, no shorthand.**
- **Write the chemical name in full, no abbreviations or formulas.**
- **List all the chemicals in the container.**
- **Write your name in full.**
- **Include precent or grams/mL of all the components.**
- **Include the date.**
- **Remove all other labels from the container.**
- **Secure the label to the outside front of the container.**
- **If the label is too big to fit on the sample container place the sample container in another container – bag, box etc. – then affix the label to this container.**
- **Nothing else is acceptable**
- **Samples that do not conform will be disposed of.**

- ***Non Compliance = Laboratory ban.***

Appendix 2 – Waste Procedure

Waste Procedure

- Do not dispose of chemicals via sink or bins.
- The chemical waste should be of similar composition with no mixing of incompatible waste.
- Ensure that the waste is segregated into proper containers and each container labelled.
- Waste containers must be completely sealed to prevent spillage.
- Liquid waste must be in screw top containers only.
- Do not completely fill containers of liquid waste. Leave 20% of air space to allow for vapour expansion and to reduce the potential for spills when moving containers.
- All waste containers must be labelled with the special waste label with the words "Hazardous Waste".
- Attach a chemical waste label directly to each waste container.
- All waste containers (hazardous and non-hazardous) should be clearly labelled in English with the full chemical name(s).No abbreviations or formulas.
- Appropriate Hazard warning information (class diamond) must be placed on the container.
- All waste containers must be marked with an accumulation date which is the date that container become full or the date it is turned in for disposal.
- All waste containers should have the name of waste generator.
- List all the chemicals in the container and the percentage of each chemical on the waste label.
- Waste will not be accepted if the label is incomplete.
- Use the copy of the blank Waste Manifest Excel Sheet provided, Fill in the following:
  - List all the chemicals in the container and the percentage of each chemical.
  - DG class, sub class (if applicable), UN Number, Packing group, EAC (Hazchem Code). These are listed on MSDS, under Transport Information section.
  - Record the size of the waste, the quantity (how many containers) of the waste and the total amount in L or Kg.
  - Write your supervisor's name and print your name and your signature.
- You may list more than one container. Please skip a line between listing.
- Hazardous Waste can never be left unattended.
- **Waste must be given directly to the Area Technician.**