Science Research Laboratory Induction

Escape from UTS

This three-minute video Escape from UTS is designed to show students and staff how to evacuate University buildings in the event of a fire or other emergency

It should be viewed annually

https://www.uts.edu.au/about/about-our-campus/staying-safe-campus/emergency-evacuations

Evacuation and Emergency

Evacuation is two phase:

- alert tone (beep-beep); prepare to evacuate
- evacuate tone (whoop-whoop); evacuate to the assembly point

Wardens wear red caps; follow their directions

Phased zone evacuation means different floors will be in alarm and will evacuate at different times

Dial “6” for emergency

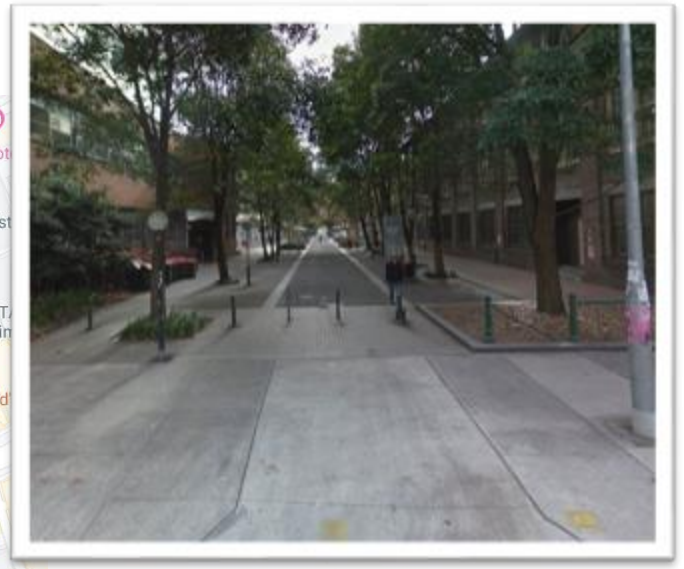
From any internal phone

Connects to Security 24/7

From external phones or mobiles dial **1800 249 559**

Evacuation and Emergency

- Keep away from the outside of the building
- Move to assembly area in Jones St pedestrian mall as shown in images
- Security will meet you at the Assembly Area and advise you when it is safe to go back inside the building
- Don’t congregate near road, move further down.



Emergency Procedures

Evacuation diagrams are located throughout the buildings

Contain evacuation procedures and emergency response

“You Are Here” map showing evacuation route and exits

Building Signage

Follow EXIT signs

Note ALERT and EVAC flashing lights in corridors and labs for hearing impaired

ALERT and EVAC lights in circulation areas

Fire Doors

Most laboratory doors are fire doors

Do NOT chock these doors open

Do not obstruct or put any objects in the path of fire doors

Smoke doors and screens

Smoke doors close in the event of an alarm

They can still be opened in order to pass through for evacuation

Look for a green button nearby to open them

Fire and Emergency Utilities

Door signage where utilities may be in a cupboard

Two Types of Break Glass Alarms

1. Emergency (WIP cabinets only – trigger an evacuation)
2. Emergency door release (in corridors close to doors)

Red WIP is a Wireless Intercom Phone to the Fire Control Room

Fire Hose Reel (water)

Report Hazards, Accidents and Incidents

- Report any hazard, accident or incident online using HIRO within 24 hours
- Hazard and Incident Reporting Online
- https://www.uts.edu.au/about/safety-and-wellbeing/hazard-and-incident-response/reporting-hazards-and-incidents
- Staff or Student ID login
- Staff will need to log an incident on behalf of visitors and volunteers
- Tutorial induction once you log in to the site
- Check that HIRO report submits to appropriate supervisor or manager

For PhD students, this is your supervisor, Honours students will need to search

First Aid

- Selected Science staff are First Aid officers

  They are trained and accredited

  Identified on Hazard Information posters

  First Aid kits are available throughout the buildings and are the responsibility of first aid officers
- All Security Officers are First Aid trained

  Dial 6
- University Health Service

  CB01.06.001, Phone: 9514 1177

Safety and Your Responsibilities

You have a duty of care to:

- Yourself,
- Your colleagues,
- To follow all directions to maintain a safe working environment

Your responsibilities

Hazards and Risks

Hazard

Is something that can *cause harm* to you or to the environment

Risk

Is the *likelihood* and the *consequence* of the hazard affecting you or the environment

Hazard versus Risk – Example

The work activity is:

- Install a car battery
- What are the hazards?

Hazard versus Risk - Example

- Hazards are high:

  Corrosive
  Explosive
  Environmental (Lead, Pb)

- Risks are low:

  The system is entirely enclosed so the likelihood of exposure is small

  The risk can change by introducing other hazards e.g. jumper leads (electrical hazard)

Common Hazards in Research Environment

Chemical	Biological	Electrical
Manual Handling	Plant and Equipment	We can reduce the risk associated with these hazards by considering how to safely perform these activities before we do them.

Risk Assessments

- Every new activity or project must have a risk assessment performed before it is commenced. The risk assessment must:
  - Define the activity
  - Identify the hazards
  - Identify controls
  - Estimate the level of risk

A **Risk Assessment** (RA) is a document that identifies sensible measure to control the risks in your research activities

Estimating the Level of Risk

Take into account

- **Consequence:** the *severity* of harm

- **Likelihood**: the *chance* of an incident

Consequence (or seriousness) that may be:	Likelihood (or chance) that may be:
Insignificant: Non-injury incident. Minor effects on biological or physical environment.	**Almost certain:** The event will occur on an annual basis.
Minor: Injury or ill health requiring first aid. Moderate, short-term effects but not affecting ecosystem functions	**Likely:** The event has occurred several times or more in your career.
Moderate: Injury or ill health requiring medical attention. Serious medium-term environmental effects	**Possible:** The event might occur once in your career.
Major: Injury or ill health requiring hospital admission. Very serious long term impairment of ecosystem functions.	**Unlikely:** The event does occur somewhere from time to time.
Catastrophic: Fatality or permanent disabling injury. Very serious long term impairment of ecosystem functions.	**Rare:** Heard of something like this occurring elsewhere.

Risk Matrix

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	High risk	High risk	Extreme risk	Extreme risk	Extreme risk
Likely	Medium risk	High risk	High risk	Extreme risk	Extreme risk
Possible	Low risk	Medium risk	High risk	Extreme risk	Extreme risk
Unlikely	Low risk	Low risk	Medium risk	High risk	Extreme risk
Rare	Low risk	Low risk	Medium risk	High risk	High risk

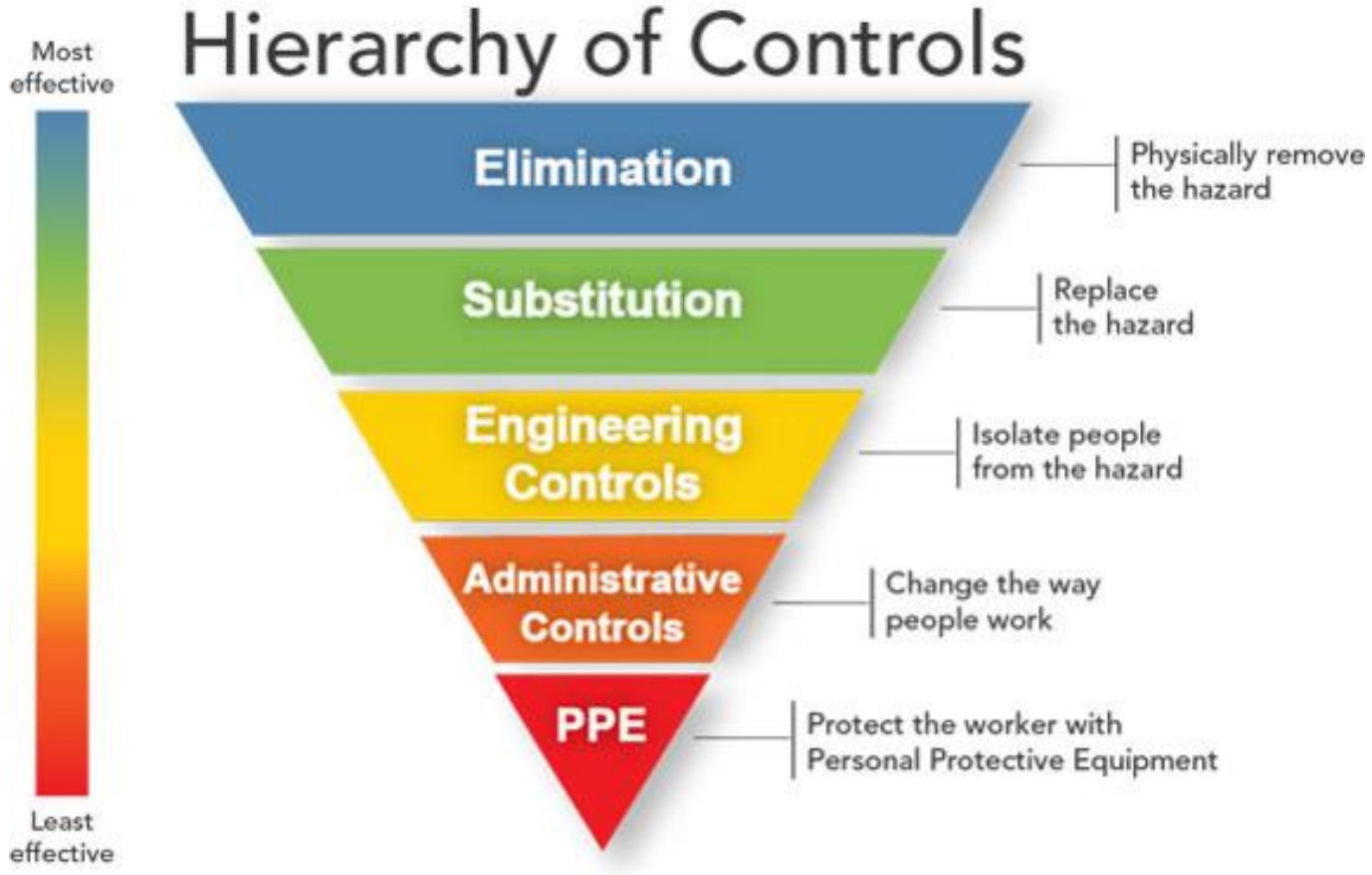
Risk Assessment Forms

- The Safety and Wellbeing website has a page on Risk Management with the following information
  - How to perform a risk assessment (RA)
    - All activities must be risk assessed and approved for safety prior to carrying them out
    - If changes in the activity or location occur, the RA must be re-assessed
  - Word format templates for Risk Assessments and Safe Work Method Statements (SWMS)
    - SWMSs are required for any activities with a residual risk greater than low
  - A link to the Online Risk Register (ORR)
    - This is a collection of all currently existing risk assessments and SWMSs
  - Your supervisor must approve your risk assessment **before** you undertake the activity

High Risk Activities

- Activities assessed as High or Extreme Risk must NOT be undertaken
  - Consult with your supervisor
  - Eliminate activity if possible
  - Substitute highly rated hazard with a lower rated hazard
  - Implement more controls – for example a SWMS
- Safe work method statement (SWMS)
  - Outlines the steps to perform the activity that must be referred to each time the activity is performed
  - Lists steps that must NEVER be performed and all steps that MUST be performed to ensure the safety of the activity
  - Must also be approved by your supervisor

Hierarchy of Controls



Typical Controls

- Elimination
  - Change method to eliminate risk
- Substitute
  - Use a less hazardous chemical or lower risk equipment
- Engineering
  - Fume cupboards, biosafety cabinets, shielding, ventilation, exhaust
- Administration
  - Induction, training, safety data sheets, risk assessments, standard operating procedures (SOPs), emergency shutdown
- Personal protective equipment (PPE)
  - Footwear, lab coat, safety glasses, gloves

Chemical Hazards

- Chemical risk assessment template
- Online chemical inventory database (OCID)
- Labelling template
- Safety data sheets (SDS) and where to get them
  - Chemical manufacturers
  - Safety Data Sheet (SDS) Collection

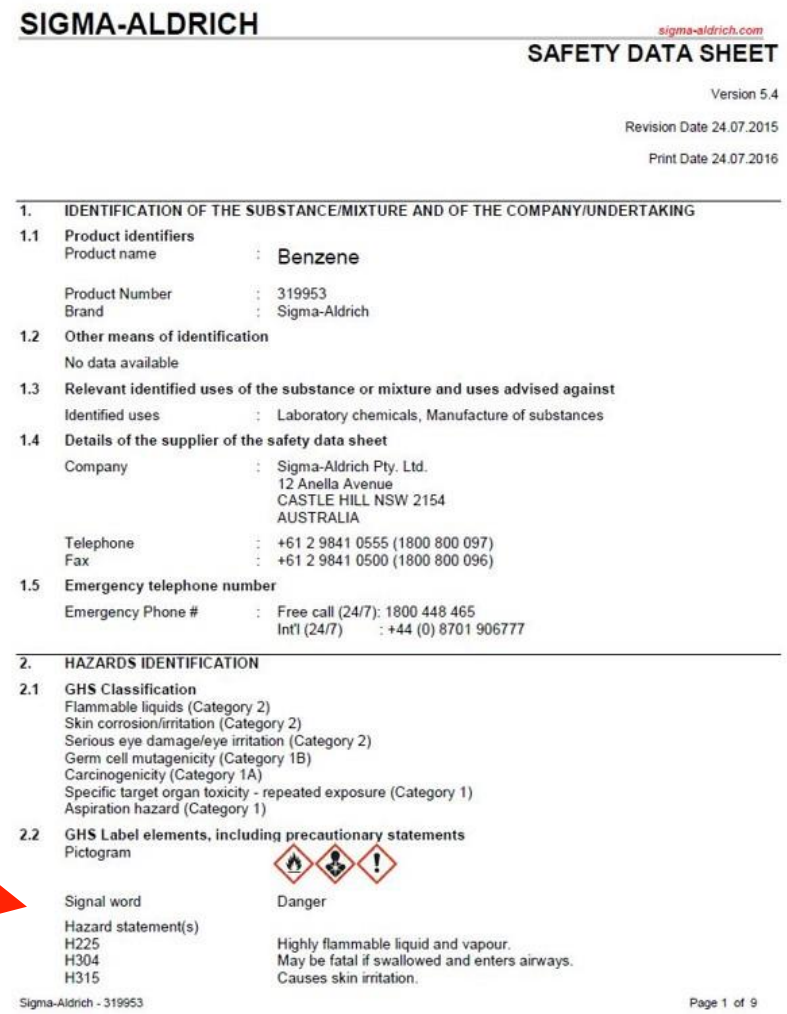
Read the chemical section of the Safety and Wellbeing website to understand your legal requirements regarding chemical safety

Chemical Hazards

Is a chemical hazardous?

Refer to the Safety Data Sheet (SDS) from the manufacturer or SDS Collection

Look for “Hazard statement(s)”



SIGMA-ALDRICH sigma-aldrich.com

SAFETY DATA SHEET

Version 5.4

Revision Date 24.07.2015

Print Date 24.07.2016

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifiers

Product name : Benzene

Product Number : 319953

Brand : Sigma-Aldrich

1.2 Other means of identification

No data available

1.3 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.4 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Pty. Ltd.
12 Anella Avenue
CASTLE HILL NSW 2154
AUSTRALIA

Telephone : +61 2 9841 0555 (1800 800 097)

Fax : +61 2 9841 0500 (1800 800 096)

1.5 Emergency telephone number

Emergency Phone # : Free call (24/7): 1800 448 465
Int'l (24/7) : +44 (0) 8701 906777

2. HAZARDS IDENTIFICATION

2.1 GHS Classification

Flammable liquids (Category 2)
Skin corrosion/irritation (Category 2)
Serious eye damage/eye irritation (Category 2)
Germ cell mutagenicity (Category 1B)
Carcinogenicity (Category 1A)
Specific target organ toxicity - repeated exposure (Category 1)
Aspiration hazard (Category 1)

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H225 Highly flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.

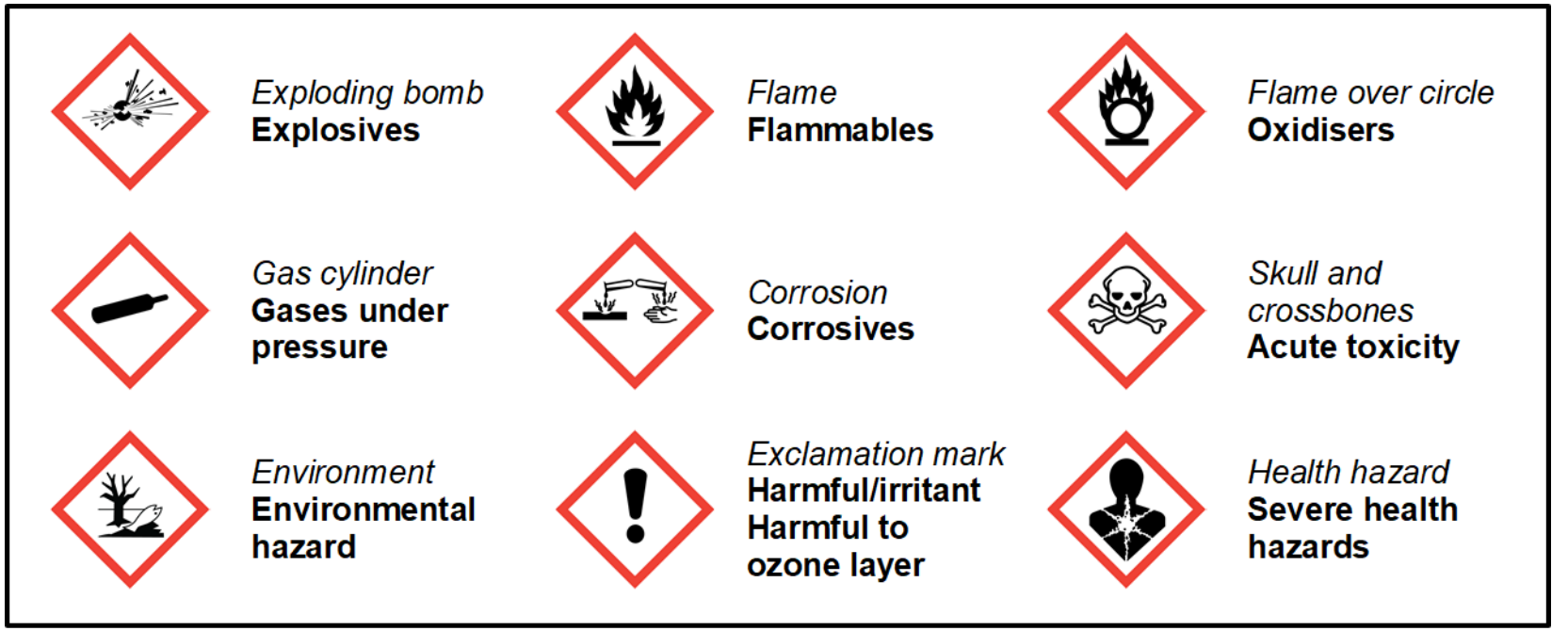
Sigma-Aldrich - 319953 Page 1 of 9

Safety Data Sheets

- The SDS must be easily accessible in the area it is used or stored, this could be a paper print out or via the SDS Collection on a WHS Lab Computer, and identifies:
- The hazardous nature of the substance (e.g. flammable, toxic, corrosive)
- Control measures
  - PPE required
  - Storage requirements
- First aid
- Spill containment
- Fire fighting
- Physico-chemical properties

Globally Harmonised System (GHS)

- GHS is the system of classification and labelling of chemicals used in Australia and uses the following symbols.



Chemical Risk Assessments (CRA)

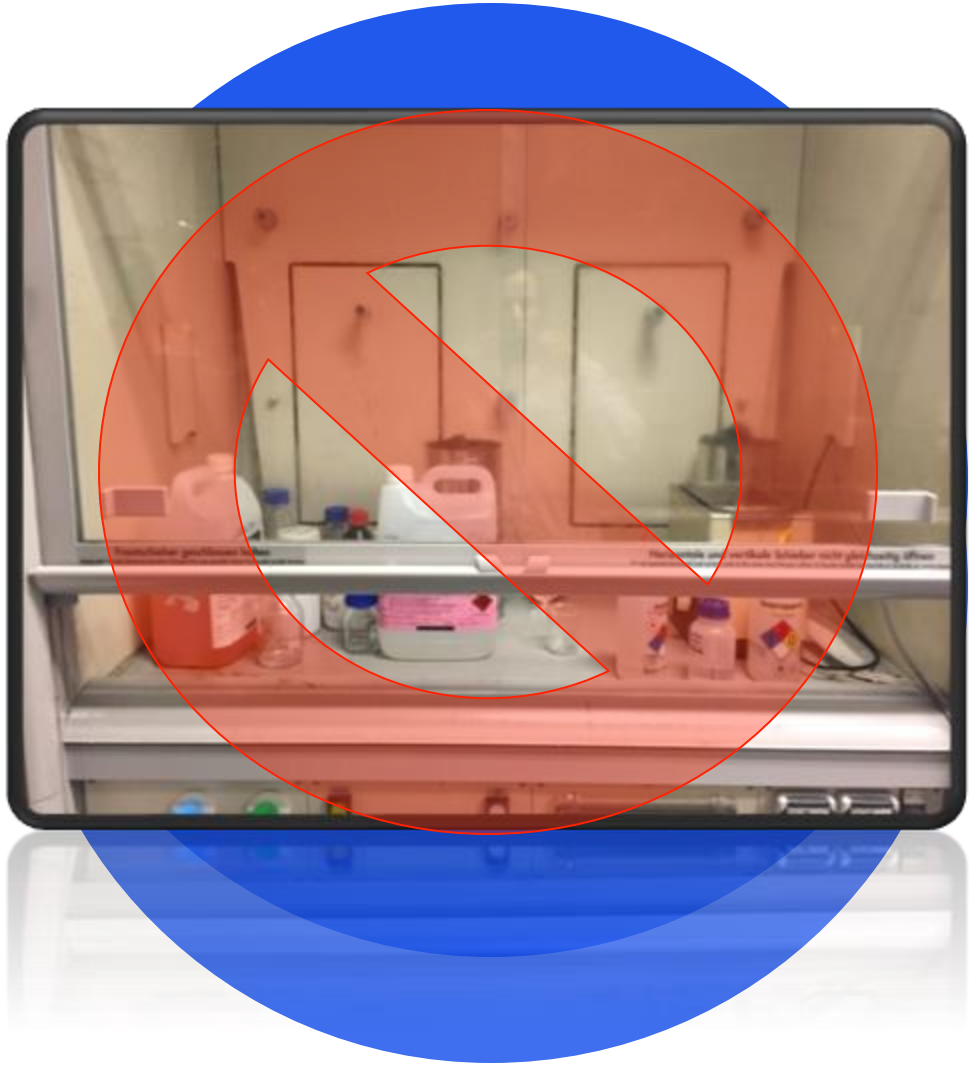
- Is required for any chemical that is hazardous
- A copy of the CRA must be located in the laboratory where the chemical is to be used or stored
- A register is kept of all chemicals on OCID (Login = Science, Password = mango) UTS internal access only
- The Laboratory Manager must be advised when chemical arrives
- If you obtain a chemical from another area, you must have a risk assessment for the use of the chemical in the new location signed by your supervisor and the Manager of the new lab area

Chemical Labels

- The Chemical Label Creator (UTS internal access only) helps you create compliant GHS labels for decanted chemicals
- All chemical containers not in immediate use (e.g. stored >12 hr) must be labelled with
  - Chemical name
  - Date
  - Your name
  - Risk and Safety Phrases
  - Expiry date

Chemical Storage

- No incompatible chemicals stored together, check SDS
  - Flammables must be stored in flammable cabinets only
  - Flammables must NOT be stored in domestic fridges
  - Oxidising agents and corrosives away from flammables
  - Fume hoods are not for storage
  - Label original chemical bottles with the owner's name and date opened
  - If there are multiple hazard symbols, store according to first symbol



Fume Hood Types

Ducted Fume Hoods

Can be used for most chemicals (specialised hoods required for HF and perchloric acid)

Has vertical sash and horizontal windows

Can adjust flow

Ductless Fume Hoods

Can be used for a limited range of chemicals depending on filters fitted

Fan must be turned on to use

All chemicals must be removed before turning off

Use of Ducted Fume Hoods

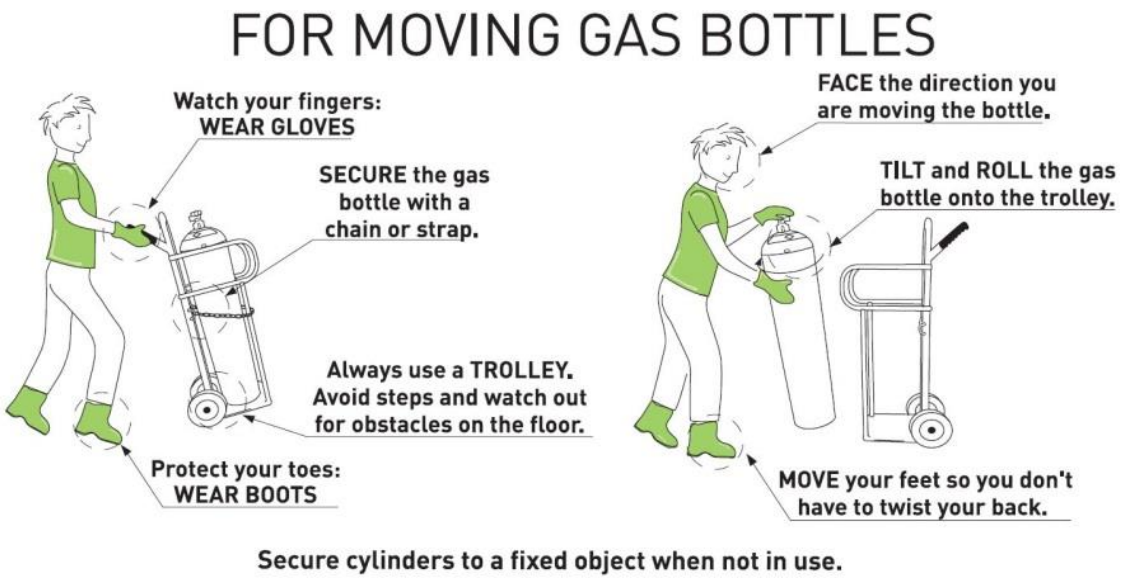
- Instructions for use are posted next to the fume hood
- Check the fume hood is working correctly before use (no alarm or red light, air is flowing properly), green indicator light is on
- Always work at least 15 cm in from the opening of the fume hood
- Lower sash as far as practical for your safety
- Wear appropriate PPE (ensure gloves are long enough to cover wrist between lab coat)
- Close the sash completely when leaving the fume hood unattended!
- If using sliding windows, ensure just your arm is through the opening and your body is behind the closed portion
- NEVER put your head inside the fume hood!
- Remove all organics from fume hood if using Piranha solution (Corrosive acid)
- DO NOT use perchloric acid or HF inside the fume hood (a specialised fume hood is required for this, contact staff in Chemistry)
- Remove any unnecessary items from the fume hood to prevent disrupting the air flow
- For long term experiments fill out the overnight experiment form and post on the sash of the fume hood

Use of Ductless Fume Hoods

- These can be used only for the chemicals compatible with the filters fitted for that particular hood
- Often these are not suitable for powders and particles
- Talk to the Lab Manager if you are unsure
- These should not be used for chemical reactions where the potential products may not be known
- The window with the arm cut-outs should be lowered while in use
- Some of these have a saturation sensor that will alarm if the filters require replacement – do not use if it is in alarm
- Check the flow is sufficient by checking the meter on the front of the hood

Compressed Gases

- Must be appropriately secured at all times
- Not stored - must be in use
- Training required for changing and handling
- Segregation according to DG class
- Backflash arrestors for fuel (e.g. hydrogen gas)



Chemical Waste Streams

- Talk to your lab manager to see how chemical waste is organised in your area *before* you start working
- Hazardous liquid waste is categorised as;
  - Halogenated hydrocarbons (Cl, F, Br, I)
  - Non-halogenated hydrocarbons
  - Aqueous metal salts
- Solid or other waste should be clearly labelled with type of waste and chemical names

Cryogenic Liquids

- Most commonly used are liquid nitrogen (LN_2), liquid helium (LHe)
- Training required before use
- Wear appropriate PPE
  - Gloves
  - Face shield
  - Covered footwear
- Consider transport around the buildings. A maximum of 2L is permitted in lifts with people
- Consult risk assessments on ORR for transport and use
- Oxygen depletion alarms may be required if used in confined spaces

Spill Kits

- Talk to your lab manager to find out where spill kits are located in your area
- Use for small liquid spills only
- Get help for larger or very hazardous spills (lab staff or dial 6 for emergency)
  - Evacuate local area around spill
  - Post signage indicating danger if possible

Biological Hazards

- Read the Safety and Wellbeing website to understand your requirements when working with or around microbiological hazards, communicable diseases, sharps, GMOs and Quarantine samples.
- Microbiological
- Communicable diseases
- Sharps and needlestick injuries

Biological Hazards

- Microorganisms
  - Pathogens, infectious agents
- Pathology samples
  - Blood fractions, tissues
- Soil, Earth, Vegetation
  - Skin sensitivities, spores
- Genetically Manipulated Organisms (GMOs)
- Approved Arrangement Material

Control of Biological Hazards

The use of some biological samples is regulated by various legislation, standards and codes

- GMOs – Gene Technology Act 2000
- Imported samples – Biosecurity Act 2015
- Pathogens – AS/NS 2243.3:2002 Safety in laboratories – Microbiology

Control of Biological Hazards

High risk biological hazards require pre-approval from the UTS Biosafety Committee. These include all experiments using one or more of the following:

- GMOs
- Pathogens
- Cytotoxins
- Radiation

All individuals must be included on the approval before they commence work using any of the above.

Types of Control for Biological Hazards

- Containment
  - Biological Safety Cabinets
  - PPE – gloves, safety glasses, footwear, lab coats
  - Decontamination and spill procedures
- Other Measures
  - Restricted access
  - Immunisation (e.g. hepatitis B, tetanus)

Physical Containment 2 (PC2)

- This signage indicates that the laboratory has been certified for work with pathogens or GMOs
- All persons working in an PC2 lab must have completed
  a local area induction for PC2 and comply with the OGTR and Biosafety committee regulations
- Speak to the facility manager before entering this lab

Approved Arrangements (AA)

- This signage indicates that the laboratory has been certified for work with imported samples / goods
- All persons working in an AA must comply with the Biosecurity regulations
- Speak to the facility manager before entering this lab

Sharps and Needles

- Sharps include all syringe needles, scalpel blades, razor blades etc.
- If you experience a needle stick injury, obtain medical attention immediately (dial 6) and lodge a HIRO report
- Do NOT re-sheath needles after use
- Use yellow medical sharps waste containers for needles and sharps
- Put sharp end in first
- Do NOT overfill container
- Never place sharps directly into the yellow clinical waste bins
- Pipette tips are also considered as sharps
- Dispose of tips in provided marked containers

Other Clinical Waste

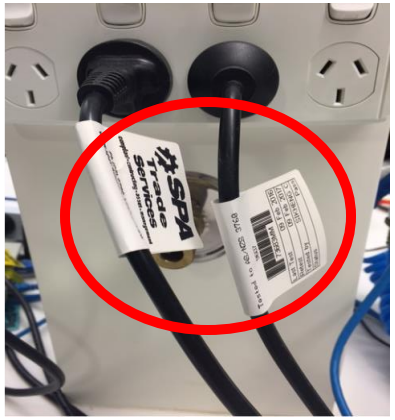
- All waste at UTS is hand sorted
- Do not place any items that look “medical” in the general waste
- Use the yellow clinical waste bins or other bins provided; consult your lab manager
- This includes syringe barrels that have only been used to dispense water, samples or solutions

Waste Management

- Each research facility will have local arrangements for managing different waste streams
  - Please consult the lab manager for the protocols used in each specific area
- All labs have red bins for the disposal of broken glass
  - Ensure that NO GLASSWARE is disposed of in general waste bins
- A glassware washing and lab coat laundering service is offered in most labs
  - Consult your lab manager for information about local arrangements

Electrical Safety

- The Safety and Wellbeing website has a section on Electrical Safety you should read
- Most labs and field sites are “hostile operating environments”, so all portable appliances must be tested for earth leakage (or residual current)
- Look for PAT (portable appliance testing) tag on power cord and electrical appliance to indicate test has been performed
- Check that tag date is not beyond expiry date
- Never use appliance with red “Danger: Do Not Operate” tag
- Any electrical appliances brought in from an external source MUST be PAT approved at UTS prior to use
- The Science Workshop has a qualified electrician who can advise



Manual Handling

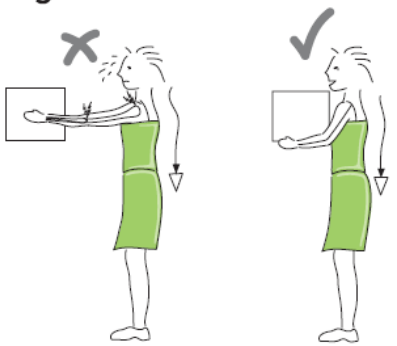
- Read the Safety and Wellbeing website to understand your requirements before undertaking any manual handling activities or tasks
- 15-20 kg max
- Use lifting aids
- Don’t lift away from body/ straight back/no twisting while lifting
- Lift in smaller units if possible
- Ensure heavy objects are not stored above shoulder height
- Use trolleys for transport (available from Science Store)
- All heavy equipment that cannot be moved by pallet jack must be moved by a professional mover
- Manual Handling training is available through Safety and Wellbeing

Manual handling tips

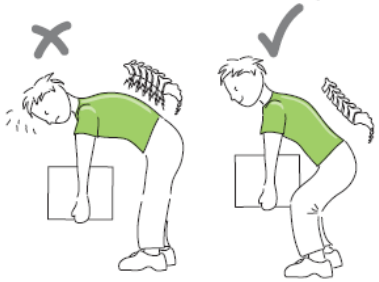
UNIVERSITY OF TECHNOLOGY SYDNEY

Tips for manual handling!

1. **Plan -** assess the load and determine if you need assistance
2. **Clear** the path
3. **Move** in close to the load



4. **Place** your feet shoulder width apart
5. **Secure** your grip and hold the load close to your body
6. **Maintain** normal curves of the spine



7. **Hold** your head upright
8. **Power** the lift with legs and body weight

9. **Don't** twist
10. **Use** smooth, controlled movements

For further information, visit the Safety & Wellbeing web site at: www.safetyandwellbeing.uts.edu.au

Manual Handling 09/13

Plant and Equipment

- Read the Safety and Wellbeing sections on Plant and Equipment and Noise to understand your requirements before undertaking any work with plant and/or equipment
- Always take care with Laboratory Equipment / Instrumentation that may have:
    - Moving parts
    - Electrical hazards – especially if outer casing removed
    - Noise (use ear plugs)
    - Heat production (wear thermal gloves)
    - Heavy to move (use suction pads)
    - Radiation, UV, laser (use eye and skin protection)
- Read Standard Operating Procedures
- Take note of Warning Signage
- Training is required for hazardous plant and equipment – ask your Lab Manager

After-Hours Work

- Should be considered as part of a risk assessment for the activity
- Use Duress Alarms where available
- Avoid high-risk work outside of regular hours
- Your supervisor must approve of plans for after-hours work in the laboratory or field
- Place signage on A/H work in progress with your contact number
- Arrange to couple work times with colleagues
- Security constraints: swipe access restrictions evening & weekends
- Room lighting may require manual resetting
- Same considerations should be made when working in isolation e.g. Level 0, Building 7 - no mobile coverage and limited visibility
- After hours and working in isolation procedures are here

Building Services

- The building infrastructure is managed by Building Services, for example plumbing, electrical, air-conditioning, gas, etc.
- Dial “6” for emergency or ext. 1192 for urgent or out-of-hours requests
- Contact Building Supervisor (Buildings 4 and 7), Alex Duskin or Building Services branch on ext. 7477 directly for other issues
- Complete Building Services website form or dial ext. 7477 for general faults
- Cleaning issues or jobs can be lodged using this form or by dialling ext. 1013
- See Lab Manager for further information if required

Emergency Infrastructure in Labs

- Safety shower and eyewash stations are available in case of emergencies
- Ceiling sprinkler system and smoke detectors
- Fire fighting equipment:
  - Fire extinguishers (CO_2)
  - Fire blankets
  - Fire hoses
- Do not obstruct these services!

Emergency Gas and Power Isolation

- The emergency stop buttons will cut the power or gas to the entire lab
- You must advise staff if these are activated, either intentionally or accidentally so that they can reset them

General Lab Rules

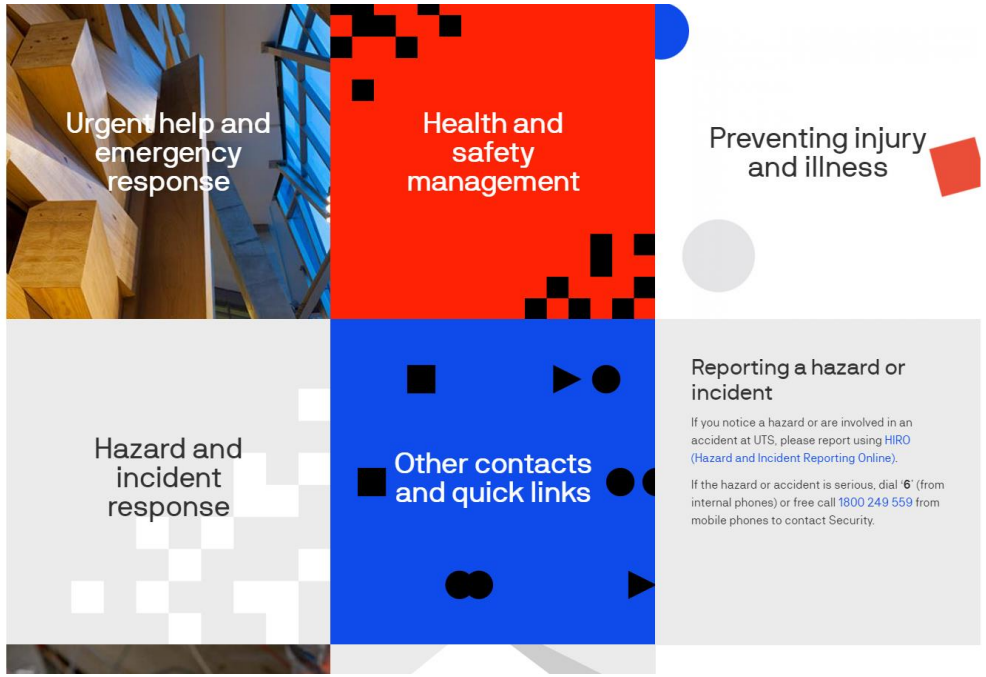
The DON'Ts	The DOs
No eating	Follow all signs and instructions
No drinking • This includes closed bottles!	Wear lab coat, safety glasses and any other PPE required (denoted by red floor tape)
No smoking	Wear solid and closed-in footwear
No samples in public areas	Remove gloves and lab coat when moving from lab to public areas
	Wash hands before leaving lab

Gloves Off

Hazard Information Posters

- All lab entry doors have a hazard information poster, they show:
  - Likely hazards in the lab
  - Precautionary measures required by lab users
  - First Aid Officer information
  - Building Services contact details
  - The location of eye wash and safety showers

Online Resources



- Safety and Wellbeing website
  - Has quick links as shown on the right as well as lots of specific information about lab and other safety issues

- Faculty of Science – Health and Safety Plan 2018 – 2020
  - Access it by going to the Online Management System (UTS internal access only)

Research Project Safety Plan (RPSP)

- All lab users MUST have a Research Project Safety Plan (RPSP)
- The form and procedure documents can be found here
- This document includes a register of the risk assessments relevant to your project
- Must be developed with your supervisor
- All people involved in the project must be consulted and be in possession of a copy of the document
- Consult all relevant facility managers
- Is approved by the supervisor
- Must be revised every 6 months or when any changes are made to the project

Where to from here?

- Complete the Science Research Induction Assessment
- Complete your RPSP
- Register for access to the Research Facilities and undertake the local area induction for all areas you will require access to
- Please refer to our Induction Site to find more details (UTS Internal access only)
- Please note that your Supervisor requests your swipe access after you have completed all the above requirements. The lab manager will not approve your access if any of these have not been completed.
- Get a Laboratory eNotebook

Key Contacts Technical Services (Research)

General Manager Technical Services	Kelly Hales
Health and Safety Advisor	Kamel Elmargi
Technical Services Manager (Research) Bio, Health and Environment	Mercedes Ballesteros
Technical Services Manager (Research) Physics and Chemistry	Katie McBean
Technical Services Manager (ERNST)	Fiona Ryan
Technical Services Manager (Operations)	TBA