

*This document is under review, if you have any input, please email safety@unsw.edu.au.

HS421 Chemical Spills Guideline

Introduction

The purpose of this guideline is to ensure that hazardous chemical spills are dealt with appropriately to protect persons and the environment.

1. Scope	1
2. General Information on spills	1
3. Major Spills	2
4. Minor and Moderate Spills	2
4.1. Minor spill	2
4.2. Moderate spill	3
5. Contents of Spill Kits	3
6. Personal Protective Clothing and Equipment for minor and moderate spills	4
7. Neutralising	4
7.1. For Spills Involving <i>Acids</i>	4
7.2. For Spills involving <i>Alkalis</i>	4
8. Spills involving Organic Solvents	4
9. Spills involving Mercury	4
10. Investigation, Debriefing, Communication and Follow-up	4
11. Acknowledgements	5

1. Scope

This Guideline applies to all UNSW staff and students (and visiting staff and students) who use, transport and store chemicals.

2. General Information on spills

The range and quantity of hazardous chemicals used in laboratories requires careful planning to be able to respond quickly and safely to chemical spills. Determining the quantity and type of materials required for spills management should comprise a risk management approach including review of spill procedures, Safety Data Sheets, emergency response information and consultation with experts. The clean-up of a chemical spill should only be done by knowledgeable and experienced personnel.

Spills will be either: minor; moderate; or major, depending on the volume and nature of the chemical spilt.

Workers in each laboratory need to have a clear understanding of what constitutes minor, moderate, and major spills as it will depend on the types of hazardous chemical found in the area. For example, a spill of 0.5 litres of citric acid presents a lesser risk than a spill of 0.5 litres of hydrofluoric acid.

Spill kits with written instructions, sufficient absorbents and reactants, and personal protective clothing and equipment should be available to clean up spills and laboratory workers need to be trained in their use.

A minor chemical spill is one that the individual laboratory worker can clean up. It will include splashes from decanting, drips down the side of a container and residues on the bench. All need immediate attention as a basic part of good housekeeping.

A moderate spill can be safely handled by trained laboratory staff, without the assistance of specialist emergency services.

All other chemical spills are considered major and will usually result in the immediate evacuation of the area, if not the entire building and likely assistance from emergency services.

3. Major Spills

**UNSW Emergency
Ring Extension 56666 (Internal) or
Ring 9385 6666 (External)**

- Do not take any action that threatens your own health and safety.
- Clear the area. Inform others working close by. They may need to evacuate. Use the building EWIS if the potential for a whole building evacuation is needed.
- Phone UNSW Security on Ext 56666 or 9385 6666.
- If safe to do so:
 - a. Isolate the spill e.g., by placing a boom around it.
 - b. Collect the relevant information such as Safety Data Sheet, risk management forms, SWP, emergency flip chart.
 - c. Contact the area supervisor/safety officer /local emergency warden

The following scenarios are likely to be considered Major Spills and thus require the need for an evacuation:

- 1) Uncontrolled open flame.
- 2) Uncontrolled gas release.
- 3) Large volume spill of liquid dangerous goods (e.g., Multiple litre quantities);
- 4) Any situation which poses imminent threat to human health or safety.

When the alarm sounds, all persons should immediately exit the building and report to their assigned assembly area. Elimination of potential sources of ignition should only be done if it can be accomplished without personal risk. Refer to the [Emergency Flip Chart](#) which is posted in your laboratory.

Remember: Emergency Personnel, in dealing with major spills, will don full chemically resistant suits, boots and airline or self-contained breathing apparatus. **If this is not available to you then do not proceed with the cleanup.**

4. Minor and Moderate Spills

Spills should be cleaned up as soon as they occur. The cause of the spill should be investigated and reported to prevent further recurrence.

4.1. Minor spill

Basic housekeeping by wiping down drips from containers, and splashes from pouring or decanting into other containers, and residues left on benches should be routinely managed. Whilst these are considered minor spills, they are not expected to follow the process below.

This is the basic procedure for dealing with a minor spill:

- 1) Clear the area - check that others working close by are informed.
- 2) An individual should be able to clean up a small spill of a chemical with which they are working.
- 3) Each laboratory should have spill kit buckets strategically located in the laboratory for the clean-up of small spills. See basic list of contents in 3.3.
- 4) Use the proper personal protective clothing and equipment (PPCE) (see 3.4).
- 5) Ensure fire protection is available for flammable spills.



- 6) Control the source of the spill if possible (e.g., picking up a container that has fallen over or turning off a tap on a container).
- 7) Contain free liquids by creating a dam or boom around the spill, absorbing it if appropriate. Prevent spill entry into drains.
- 8) Neutralize acids/alkalis, if applicable (see section 3.5).
- 9) Place all spill residues in an appropriate container.
- 10) Fill in the chemical waste disposal form so that the chemical waste can be collected.
- 11) Decontaminate the affected area using an appropriate material (e.g., decon 90 may be suitable but check the SDS of the spilt material first).
- 12) Decontaminate any affected equipment.
- 13) Assess the area to ensure proper decontamination has taken place.
- 14) Examine walkways, floors, stairs equipment etc. for other hazards or damage.
- 15) Report the spill
- 16) Conduct appropriate investigation and follow up action (see 3.8).

4.2. Moderate spill

This is the basic procedure for dealing with a moderate spill:

- 1) Clear the area - check that others working close by are informed.
- 2) Where possible, have at least 2 trained workers to handle the spill.
- 3) Each laboratory should have spill kit located outside the laboratory where the clean-up team can meet and prepare for the clean-up. See basic list of contents in 5.0 which should be located outside the laboratory.
- 4) Use the proper personal protective clothing and equipment (PPCE) (as outlined in section 6.
- 5) Ensure fire protection is available for flammable spills.
- 6) Control the source of the spill.
- 7) Contain free liquids by creating a dam or boom around the spill, absorbing if appropriate. Prevent spill entry into drains.
- 8) Neutralise acids/alkalis, if applicable (as per section 7).
- 9) Place all spill residues in an appropriate container.
- 10) Fill in the chemical waste disposal form so that the chemical waste can be collected.
- 11) Decontaminate the affected area.
- 12) Decontaminate any affected equipment.
- 13) Assess the area to ensure proper decontamination has taken place.
- 14) Examine walkways, floors, stairs equipment etc. for other hazards or damage.
- 15) Report the spill
- 16) Conduct appropriate investigation and follow up action (section 10).

5. Contents of Spill Kits

The following lists appropriate items for spill kits for a chemical laboratory. The amount of each substance will vary depending on whether it is for the small-spill kits found inside the laboratory, or for the kits intended for the clean-up of moderate spills. The latter are usually located outside the laboratory. The spill kit should be sign posted or easily recognizable and labelled as such. There is a make your own sign option available to [download](#) from the HS website.

- Written procedure for the use of the contents.
- Boom or similar to stop the spill from spreading
- Adequate quantities of absorbent material, e.g., sand, fuller's or diatomaceous earth, or suitable proprietary substances for chemicals.
- Calcium hydroxide (hydrated lime) or Sodium carbonate (soda ash) for use on acidic spills and pesticide spills.
- Sodium bisulfate, for use with alkaline spills.
- A sufficient number of waste-recovery containers, for example, drums made of materials compatible with the substances being kept and appropriately marked as being for emergency use only.
- Approved containers made of appropriate materials, for the purpose of repackaging the contents of any leaking packages.
- Portable pumps and decanting equipment.
- Shovels.
- Yard broom



- Personal Protective Clothing and Equipment (see section 6).

WARNING: DO NOT USE RAGS, PAPER TOWELS OR SAWDUST TO CLEAN UP SPILLS OF OXIDIZING ACIDS.

It is essential that the spill clean-up equipment be appropriate for the chemical spilt. The Safety Data Sheet should be consulted prior to dealing with the spill and during decisions on spill kit contents, particularly the following information:

- hazards of the chemical including acute and chronic health effects.
- reactivity information (i.e., what the chemical could react with).
- safety precautions during handling.
- specific information on dealing with spills of the chemical.

6. Personal Protective Clothing and Equipment for minor and moderate spills

- chemically resistant safety gloves.
- goggles.
- enclosed footwear (e.g., a pair of gum boots);
- Cotton laboratory coat.
- Full or Half face respirator (depending on type and extent of spill) with filters appropriate for the spilt chemical.

7. Neutralising

7.1. For Spills Involving *Acids*

For small spillages of acids, the area should be flushed with water but not to the extent that the spillage is spread unnecessarily. The spillage should be contained with earth or sand and neutralized carefully with soda ash or sodium bicarbonate.

7.2. For Spills involving *Alkalis*

For spillages of alkalis, the spillage should be contained using sand or earth. Sodium bisulphate or citric acid may be used to neutralize the alkali before clean-up. Residual alkali should be washed with water ensuring no contact occurs between washings and any aluminium or zinc containers.

8. Spills involving Organic Solvents

Spillages of organic solvents should be absorbed using diatomaceous earth or a proprietary product suitable for the absorption of such a liquid. Flammable solvents can be cleaned up with absorbent rags which are stored in fully open-headed drums that are sealed, suitably labelled, and disposed of by a licensed contractor.

9. Spills involving Mercury

Detailed spill management information for mercury spills can be located in the SafeSys database.

The problem with any mercury spill is that mercury easily vaporizes at room temperature, where it can be inhaled or absorbed through the skin. Prolonged exposure to mercury vapour adversely affects the nervous system. Symptoms may include irritability, depression, vivid dreams, inflammation of the gums, insomnia, loss of memory and vision impairment.

As far as possible, mercury spillages should be removed using a suction device e.g., a Pasteur pipette. It may be necessary to use a flashlight to find fugitive droplets. Transfer droplets to a zip lock plastic bag. Consolidate the spill as much as possible by using a thin piece of cardboard or plastic. Zinc powder should be applied liberally over any residual mercury to prevent the mercury entering the vapour phase.

Proprietary mercury spill kits are also available containing suction devices, mercury sponges or a specially designed vacuum apparatus. The mixture should then be swept up and contained in a plastic bag which should be tightly sealed. All materials used for cleaning should be disposed of in a safe manner, recognizing the hazards of the spilt material. Requests for disposal of the waste should be made by contacting FM Waste services. If it is possible to conduct some air tests using a portable mercury vapour analyser, do so. If there is any concern about the extent of contamination call the HS Unit who can organize for air testing.

10. Investigation, Debriefing, Communication and Follow-up

- 1) A debriefing session should be conducted for all personnel involved in the spill response after the spill has been resolved.



- 2) Report and investigate the cause of the spill using the online Hazard and Incident reporting system in myUNSW.
- 3) Restock all spill control supplies.
- 4) Repair or refill all damaged or used equipment.
- 5) Re-open the area when it has been cleared and is safe to resume operations.

11. Acknowledgements

AS 2243.3.2: Safety in Laboratories – Chemical Aspects

[Work Health and Safety Act 2011 \(nsw.gov.au\)](http://www.nsw.gov.au)

[Work Health and Safety Regulation 2017 \(nsw.gov.au\)](http://www.nsw.gov.au)

[List of codes of practice | SafeWork NSW](#)

Appendix A: Version Control

Version	Authorised by	Approval Date	Effective Date	Sections modified
1.0	Director, Human Resources	March 2003	March 2003	New document.
0.1	Director, Human Resources	1 November 2006	1 November 2006	Released for consultation purposes.
2.0	Director, Human Resources	1 January 2007	1 January 2007	No changes from consultation.
2.1	Director, Human Resources	8 January 2008	8 January 2008	Expand the section on emergencies and link to the emergency flip chart information.
2.2	Director, Human Resources	3 May 2011	3 May 2011	Check content & links. Update with current University format.
2.3	Director, Human Resources	1 March 2013	1 March 2013	Updated with 2011 WHS legislation references. Refer to SDS instead of MSDS Updated Branding Logo in accordance with UNSW Branding Guidelines. Modified the document identifier from OHS to HS in accordance with WHS legislation review
2.4	Director, UNSW Safety and Sustainability	30 April 2014	30 April 2014	Reviewed for administrative updates
2.5	Director, UNSW Safety and Sustainability	23 March 2016	23 March 2016	Reviewed for administrative updates
3.0	Director, Risk & Safety Management	8 August 2022	8 August 2022	Removed from Governance Updated template and administrative update.

Updates to this document

Any suggestions, recommendations or updates to this document should be emailed to safety@unsw.edu.au with the email header stating *GUIDELINES UPDATE HS421*.

