

Chemical Risk Management Protocol

Safe Methods of Use (SMOU)

Class 6 Toxic Chemicals

(HSNO Classes 6.1, 6.5-6.9)

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1 Purpose

This Safe Method of Use (SMOU) applies to principal investigators (PIs), laboratory managers, designated laboratory persons (DLPs), and all staff and students who direct or participate in the use of Class 6 toxic chemicals at the University of Auckland.

2 Disclaimer

The Safety Data Sheet (SDS) should be consulted for specific information about the chemical you will be using. The Gold FFX SDS Database is available on the Library database. Instructions on how to source this information can be found on the Health, Safety and Wellbeing Databases website:

<https://www.auckland.ac.nz/en/health-safety-wellbeing/health-safety-topics/laboratory-safety/chemical-safety/databases.html>

Please read this SMOU in conjunction with the Chemical Risk Management Guidelines.

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

3 Classification and scope

Class 6 toxic chemicals include a wide range of chemicals for which an exhaustive list cannot be supplied. Always consult the SDS prior to handling any chemical, observe precautions and follow the recommendations for their handling.

Please note that chemicals with other hazard classifications e.g. flammable, oxidising, or corrosive, may also be acutely or chronically toxic.

For the purpose of this SMOU, "toxic chemicals" are those belonging to the HSNO classes 6.1, 6.5, 6.6, 6.7, 6.8 and 6.9.

3.1 Acutely toxic chemicals

Acutely toxic chemicals are classified based on the smallest LD50 out of the three possible routes of exposure (i.e. oral, dermal or inhalation) to the undiluted chemical.

Classifications:

LD50	HSNO Class	Corresponding GHS 7 Class
<5 mg/kg	6.1A	Acute oral/dermal/inhalation toxicity Category 1
>5 mg/kg, <50 mg/kg	6.1B	Acute oral/dermal/inhalation toxicity Category 2
>50 mg/kg, < 300 mg/kg	6.1C	Acute oral/dermal/inhalation toxicity Category 3

Note that 6.1A (Category 1) is the most hazardous class.

3.2 Other classes of highly toxic chemicals

The following classes are for chemicals with chronic and/or non-lethal exposure effects.

HSNO Class	Corresponding GHS 7 Class
6.5A	Respiratory sensitisation Category 1
6.5B	Skin sensitisation Category 1
6.6A/B	Germ cell mutagenicity Category 1/2
6.7A/B	Carcinogenicity category 1/2
6.8A/B	Reproductive toxicity category 1/2
6.9A	Specific target organ toxicity – single exposure Category 1/2 Specific target organ toxicity – repeated exposure Category 1/2
6.9B (narcotic effects)	Specific target organ toxicity – single exposure Category 3 narcotic effects

Note for Classes 6.6-6.9, Category 1 means the effect is known, and Category 2 means the effect is suspected, but has limited evidence.

Sensitisation refers to the body developing an allergic response to a sensitising chemical, often after repeated exposure.

Germ cell mutagenicity means it may cause genetic defects in offspring

Carcinogenicity means it may cause cancer

Reproductive toxins may damage fertility or the unborn child.

Specific target organ toxicity means it may cause damage to organs through prolonged or repeated exposure

4 Storage

- All containers of HSNO 6.1A chemicals shall be clearly labelled with the identity of the chemical and a warning indicating their toxicity. This includes working containers and lab samples.
- HSNO 6.1 A liquids stored in a refrigerator should be stored inside a separate secondary container (ie a plastic box) which has clear warnings of the toxic properties of its contents.
- HSNO 6.1A toxic chemicals in quantities capable of delivering a lethal dose shall be stored in a separate secure area, e.g. a locked toxic cabinet.
- HSNO Class 6.1 chemicals shall be stored separately from HSNO Class 5 oxidisers and organic peroxides.
- Care should be taken to keep other HSNO Class 6.1A and B chemicals separated from liquid acids and bases, to prevent unintended reaction and release of toxic vapours.
- **Toxic cyanides and inorganic azides** must be stored in one central secure location, separately from corrosive acids, in such a way that they can never come into contact, e.g. utilising secondary containment. These substances evolve highly toxic gas when combined with acids.
- All HSNO Class 6.5 chemicals that are classified as known carcinogens chemicals should be kept in secure storage.

5 Documentation

A register should be kept of all primary containers of HSNO Class 6.1A chemicals (with an oral LD50 less than 5 milligrams/kg) in quantities capable of delivering a lethal dose for each laboratory room or storage area.

A register shall be kept of all sodium fluoroacetate, and this must be sent to the Hazard and Containment Manager annually.

6 Use

- SDS Sheets shall be consulted for correct handling of individual toxic chemicals.
- Fume hoods shall be used when handling toxic chemicals that are gases, vapours, or solids likely to generate dust.
- Gloves of the appropriate impermeable material shall always be used when handling gases, liquids, solids or dusts that are known to possess acute or chronic toxic effects.
- Care should be taken to ensure that weighing areas in which toxic chemicals are handled are kept clean.
- Inorganic cyanides and azides must never come in contact with acids as poisonous HCN gas or poisonous and explosive HN_3 gas will form.
- Trizol must not be combined with bleach, as it creates poisonous gas.

If you are pregnant or breastfeeding please consult the Safety Topic: Working in the laboratory while pregnant or breastfeeding – found on the University of Auckland Health, Safety and Wellbeing website.

<https://www.auckland.ac.nz/en/health-safety-wellbeing/health-safety-topics/laboratory-safety/Workinginthelaboratorywhilepregnantorbreastfeeding>

6.1 Additional controls for HSNO Class 6.1A chemicals

- Work with these chemicals shall be undertaken in designated areas of the laboratory. It is recommended that work takes place on an impervious tray or a similar shallow secondary container to prevent contamination of bench surfaces.
- Work with undiluted HSNO Category 6.1A chemicals shall not be undertaken alone.
 - When these substances are used, at least one other competent person must be present in the laboratory.
 - Specific permission must be obtained from the supervisor or lab manager before these substances may be used in the laboratory.

6.2 Additional controls for sensitisers

- Known sensitisers such as first- and second- generation peptide coupling reagents should be clearly identified as sensitisers and stored separately in sealed containers.
- Weighing out known sensitisers should be conducted on a specified balance inside a fume cupboard.
- Lab occupants should be advised when work with known sensitisers is being conducted and should be aware of the cumulative effects of exposure to these chemicals which may occur (hyper-sensitisation).

7 Personal Protective Equipment

- Wherever practicable, fume hoods shall be used when handling HSNO 6.1 A and B toxic compounds that are gases, vapours, or solids likely to generate dust.
- Chemically resistant gloves shall be worn when handling toxic chemicals. Consult the SDS to determine the most appropriate glove material to use.
- Medical oxygen should be available when handling toxic cyanide chemicals.
- Safety glasses shall be worn when handling HSNO Class 6.1 chemicals.

8 Disposal

- Disposal of toxic chemicals should be undertaken by a licensed chemical waste contractor.
- Refer to the Chemical Risk Management Protocol Guideline [“2. Using Chemicals”](#) section 14 for disposal information.
- Please contact the Chemical Safety Advisor for advice regarding disposal.

9 Spills

Refer to the Chemical Risk Management Protocol Guideline [“2. Using Chemicals”](#) section 11 and the specific SDS for full spill response instructions.

9.1 Small Spills

- Consult SDS for correct clean up procedure
- Use correct gloves
- If liquid, use absorbent material in spill kits to wipe up – wiping from outside of spill toward centre.
- Place used absorbent material in impermeable/airtight container which should then be placed in a fume hood.
- Solids can be placed directly impermeable/airtight container which should then be placed in a fume hood.
- Inform Laboratory Manager and arrange for immediate disposal

9.2 Large Spills

- Consult SDS for correct procedure.
- In event that toxic gases or dusts are liberated outside the confines of a fume hood, turn off all sources of ignition and evacuate the laboratory immediately
- Close all doors to laboratory and prevent re-entry until ‘all-clear’ given
- Call fire brigade immediately
- Inform Laboratory Manager to arrange for SDS to be made available