Safe Method of Use 11
HSNO Class 6.1 – Acutely Toxic Compounds

HSNO Class 6.1 Toxic Compounds will cover a wide range of chemicals, for which an exhaustive list cannot be supplied. Always consult MSDS sheets prior to handling any chemical, observe precautions and follow the recommendations for their handling.

The mandatory recommendations in the SMOU will apply to HSNO Class 6.1 A and B compounds and should be treated as recommendations for handling HSNO Class 6.1C compounds where this appropriate.

MSDS databases (ChemWeb Gold and CCOHS) are available via the LEARN Database

Appendix 1 provides a list (albeit not exhaustive) of HSNO 6.1 A, B and C Acutely Toxic Compounds with their classifications for your guidance.

Please also note that chemicals that have primary HSNO classification of Class 3, 4, 5 or 8 may also be toxic.

A. Incompatibilities

- Care ***should*** be taken to keep HSNO Class 6.1A and B compounds well away from liquid acids, bases, strongly oxidising solutions and reactive compounds.

B. Storage

- Containers with toxic compounds with an oral LD50 less than 5 milligrams/kg (HSNO 6.1A), ***shall*** be clearly labelled with identity of compound and a warning indicating their toxicity.

- If containers with HSNO 6.1 A toxic compounds that are liquids and are held in a refrigerator, these containers ***should*** be stored inside a separate secondary container (ie a plastic box) which has clear warnings of the toxic properties of its contents.

- Laboratories with Toxic Compounds with an oral LD50 less than 5 milligrams/kg (HSNO 6.1A) in quantities capable of delivering a lethal dose ***shall*** be locked at the end of the working day or when no laboratory personnel are present. NB: Buildings with secure perimeter security fulfil this requirement). These compounds ***should*** be stored separately in a locked cupboard or storeroom.

- Cyanides ***must*** always be stored away from acids.

C. Documentation

- A register ***should*** be kept of all primary containers of HSNO Class 6.1A compounds (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 compounds included in Schedule 1 of the Chemical Weapons (Prohibition) Act (see Appendix 3).

D. Use

- MSDS Sheets ***shall*** be consulted for correct handling of individual toxic compounds.

- 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 dusts.

- Care ***should*** be taken to ensure that weighing areas in which HSNO Class 6.1A and B compounds are handled are kept clean.

- Work with highly toxic compounds (with an oral LD50 less than 5 milligrams/kg) ***shall*** be undertaken in designated areas of the laboratory. It is recommended that work with such compounds 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 compounds (with an oral LD50 less than 5 milligrams/kg) ***should*** not be undertaken alone or after hours except:
  1. When specific permission is given by the Laboratory Manager or Principal Investigator.

  OR

  2. or at least one other person is present in the laboratory room when these compounds are handled.

E. 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 dusts.

- Chemically resistant gloves ***shall*** be worn when handling toxic compounds. Consult MSDS sheet and Safe Method of Use for Gloves to determine resistance of glove material to the compound you propose to handle.

- Safety Glasses ***shall*** be worn when handling HSNO Class 6.1 compounds and undertaking activities that would present the reasonable probability of compound splashing in the eye.

Activities that would present a reasonable risk of splash include:

- Opening centrifuge tubes
- Using syringes (particularly when forcing solutions through cartridges, or unblocking tubing or columns)***
- Vigorous mixing/vortexing
- Pouring

*** Wherever possible, syringes with Leur locks ***shall*** be used for this type of procedure.

F. Disposal

- Undiluted toxic compounds ***shall*** never be discharged to sewer.

- Disposal of toxic compounds ***shall*** be undertaken by a licensed chemical waste contractor.

- Please contact Hazards and Containment Manager to arrange for disposal.

G. Small Spills

- Consult MSDS 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

H. Large Spills

- Consult MSDS datasheets 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 MSDS to be made available

Appendix 1 - HSNO 6.1 A, B and C Toxic Compounds

Note that classification is based on the oral LD50 of compound in an undiluted form

A. HSNO 6.1A toxic Compounds(e.g. oral LD50< 5 mg/kg)

	CAS #
Cycloheximide	66-81-9
Di-isopropylfluorophosphate (DFP)	55-91-4
Dimethyl fluorophosphate	5954-50-7
Fluoroacetic acid	144-49-0
Hydrogen cyanide	74-90-8
Hyoscamine (Duboisine)	101-31-5
Isobenzan	297-98-9
Mercury (II) oxide	21908-53-2
Phosphorus (yellow)	7723-14-0
Potassium Cyanide	151-50-8
Sodium Cyanide	143-33-9
Tetraethyl pyrophosphate	107-49-3

B. HSNO 6.1B compounds (e.g. 5 mg/kg < oral LD50 <50 mg/kg)

	CAS #
Actinomycin D	50-76-0
Anabasine	494-52-0
Calciferol	50-14-6
Cyanogen Bromide	506-68-3
Di-n-butyltin diacetate	1067-33-0
Digitonin	11024-24-1
Digitoxin	71-63-6
Dimethylene diisothiocyanate	3688-08-2
Dimethylenimine	151-56-4
1,2-Dimethylhydrazine	540-73-8
Hexaethyl tetraphosphate	757-58-4
Mercury (II) acetate	6129-23-3
Mercury (II) nitrate	10045-94-0
Mercuric cyanide	592-04-01
Mercury (II) dithiocyanate	592-85-8
Methylhydrazine	60-34-4
Nicotine	54-11-5
Nicotine HCl	2920-51-1
N-Nitroso-N-methylurethane	615-53-2
Pentachlorophenol	87-85-56
Phenylarsonic acid	98-05-5
Phosphorodithioic acid	42509-80-8
Potassium silver cyanide	506-61-6

Sodium azide	26628-22-8
Sodium selenite	10102-18-8
Sodium fluoride	7681-49-4
Sodium metavanadate	13718-26-8
Strophanthin K	005-63-3
Tetrachloro-1,3-dioxolon-2-one	22432-68-4
Tetraethyl lead	78-00-0

C. HSNO 6.1C Compounds (e.g. 50 mg/kg < oral LD50 < 300 mg/kg)

	CAS #
Acrylamide monomer	79-06-1
Acrylamide monomer solutions (>40% acrylamide)	79-06-1
Alkyl lead	
Allylthiourea	109-57-9
Ammonium metavanadate	7803-55-6
Aniline	62-53-3
Arsenic trichloride	7784-34-1
Arsenic trioxide	327-53-3
Berylllium	7440-41-7
Boron trifluoride	7637-07-2
Cadmium	7440-43-9
Cetylpyridinium chloride	12303-5
Chloropicrin	76-06-02
Chromium trioxide	1333-82-0
Di-n-butyltin dilaurate	77-58-7
Dimethyl sulphate	77-78-1
Ethylene dibromide	106-93-4
Ethylene oxide	72-21-8
Formaldehyde solution (40%)	50-00-0
Furfuraldehyde	98-01-1
Hydrazine hydrate	7803-57-8
Hydrazine (30-60%)	302-01-2
Hydrazinium chloride	2644-70-4
Hydrogen cyanamide	420-04-02
Hydrogen fluoride	7664-39-3
Lithium fluoride	7789-24-4
Mercaptoacetic acid(Thioglycollic acid)	68-11-1
2-Mercaptoethanol	60-24-2
Mercury (II) chloride	10112-91-1
Mercury (I) iodide	7783-30-4
Mercury (I) nitrate	10415-75-5
Mercury (II) sulphate	7783-5-9
Metaldehyde	108-62-3
3-Methylbenzothiazol-2-one hydrochloride (MBTH)	38894-11-0
Methyl chloromethyl ether	107-30-2
Methyl isothiocyanate	556-61-6
Methyl orange	547-58-0

Nicotine hydrogen tartrate	105-31-6
Nitrobenzene	98-95-3
Osmium (IV) tetraoxide	10026-04-6
1,10-Phenanthroline hydrate	5144-89-8
Selenium dioxide	7446-08-14
Sodium nitrite	7632-00-0
Sodium selenate	13410-01-0
Tetraphenylarsonium chloride	507-28-8
Thallium compounds	
Thiomersal	54-64-8
Toluene Diisocyanate	584-84-9

Toxic gases

A. HSNO 6.1A (LC50 < 100 ppm)

Phosphine gas	7803-51-2

B. HSNO 6.1B (100 ppm < LC50 < 500 ppm)

Chlorine	7782-50-5
Hydrogen Cyanide	74-90-8
Hydrogen sulfide	7783-06-4
Methyl bromide	74-83-9
Nitrogen dioxide	10102-44-0

C. HSNO 6.1C (500 ppm < LC50 < 2500 ppm)

Carbon monoxide	630-08-01

Alkaloid toxins

HSNO 6.1A

□aminitin	21150-20-9
□aminitin	21150-22-1
□aminitin	21150-23-2
□aminitin	21705-02-2
amanin	21150-21-0
Aconitine	302-27-2
Colchicine	64-86-8
Feraconitine	127-29-7
Physostigmine	57-47-6
Physostigmine salycylate	57-47-6
Physostigmine sulfate	64-64-7
Saxitoxin	35523-89-8

HSNO 6.1B

Brucine	357-57-3
Strychnine	57-24-9
Strychnine salts	

Appendix 2: Venoms and Toxins

Venoms with LD50 (ip or iv) less than 500 μg/kg (all HSNO 6.1A)

Snake (N naja)
Snake (B asper)
Snake (H major)
Seawasp (C fleckeri)
Ant (P badius)
Frog (P bicolor)
Scorpion (C noxious)

Toxins (All HSNO 6.1A)

Abrin (all types)
Aflatoxins (all types)
Botulinum toxins (all types)
Cholera toxins
Contoxins
Ricin (all subunits)
Saxitoxin
Shiga toxin
Shigella shiga neurotoxin
Staphylococcus aureus toxin SEA
Staphylococcus aureus toxin SEB
Staphylococcus aureus toxin SEF
T-2 toxin
Tetrodotoxin (and derivatives)

Appendix 3: Compounds included in Schedule 1 of the Chemical Weapons (Prohibition) Act

O-alkyl-phosphonofluoridates including:	
Sarin	107-44-8
Soman	96-64-0
Di-isopropylfluorophosphate (DFP)	55-91-4
Dimethyl fluorophosphate	5954-50-7
Methylcyclohexyl fluorophosphate)(GF)	329-99-7
O-alkyl-N,N dialkyl phosphoramidocyanidates	
Tabun	77-81-6
O-alkyl s-2-dialkyl-aminoalkylphosphonothiolates	
VX	50782-69-9
Sulfur mustards	
2-chloroethylchloromethylsulfide	2625-76-5
Bis(2-chloroethylsulfide)	505-60-2
Bis(2-chloroethylthio)methane	63869-13-6
Sesquimustard: 1,2-Bis (2-chloroethylthio)ethane	3563-36-8
1,3-Bis(2-chloroethylthio)-n-propane	63905-10-2
1,4-Bis(2-chloroethylthio)-n-butane	142868-93-7
1,5-Bis(2-chloroethylthio)-n-pentane	142868-94-8
Bis(2-chloroethylthiomethyl)ether	63918-90-1
O-Mustard: Bis(2-chloroethylthioethyl)ether	63918-89-8
Lewisites	
Lewisite 1: 2-chlorovinyldichloroarsine	541-25-3
Lewisite 2: Bis(2-chlorovinyl)chloroarsine	40334-69-8
Lewisite 3: Tris(chlorovinyl)arsine	40334-70-1
Nitrogen mustards	
HN1: Bis(2-chloroethyl)ethylamine	538-07-8
HN2: Bis(2-chloroethyl)methylamine	51-75-2
HN3: Tris(2-chloroethyl)amine	555-77-1
Ricin	9009-86-3