



Safe Method of Use 16

Compounds that have Chronic Toxicity HSNO Categories 6.5 to 6.8 (Sensitisers, Carcinogenic Compounds, Mutagenic Compounds/ and Reproductive Toxins)

Purpose: This Safe Method of Use applies to **principal investigators (PIs), sector managers, designated laboratory person (DLPs)**, technical staff and students who use laboratories within the University of Auckland.

HSNO Categories 6.5 to 6.8 (compounds with chronic toxicity) 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.

Lists of some carcinogens and reproductive toxins are given in Appendices 1 and 2.

MSDS databases (ChemWeb Gold and CCOHS) are available via the LEARN Database. Always consult an MSDS database before using chemical for the first time.

Please also note that chemicals that have primary HSNO classification of Class 3, 4, 5 or 8 may also be carcinogenic and/or reproductive toxins or may have adverse side effects resulting from chronic exposure..

A. Storage

- All HSNO Class 6.5 compounds that are classified as known carcinogens ie IARC Category 1 compounds **should** be kept in secure storage.

B. Use

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

- Gloves of the appropriate impermeable material **shall** always be used when handling gases, liquids, solids or dusts that are known possess chronic toxic effects.
- Fume Hoods **shall** always be used when handling gases, liquids or dusts that are known possess chronic toxic effects.

C. Personal Protective Equipment

- Fume hoods **shall** always be used when handling toxic compounds that are gases, liquids, solids or dusts.
- Chemically resistant gloves **shall** be worn when handling toxic compounds. Consult MSDS sheet and Section on Personal Protective Equipment to determine resistance of glove material to the compound you propose to handle.
- Safety glasses **shall** be worn when handling these compounds where there is a splash hazard.

D. Disposal

- Disposal of toxic compounds **should** be undertaken by a licensed chemical waste contractor.
- Please contact Hazards and Containment Manager to arrange for disposal.

E. 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
- Solids can be placed directly impermeable/airtight container
- Inform Laboratory Manager and arrange for immediate disposal

F. 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 2: Carcinogens and possible carcinogens

The following is a list of IARC listed carcinogens. The list not exhaustive and MSDS must be consulted.

The following are the relevant IARC Criteria:

Group 1	The agent is carcinogenic to humans- sufficient evidence between exposure to the agent and human cancer
Group 2A	The agent is probably carcinogenic in humans – limited evidence of carcinogenicity in experimental animals
Group 2B	The agent is possibly carcinogenic in humans – limited evidence in humans but absence of sufficient evidence in experimental animals or inadequate evidence in humans (human data not available) but sufficient evidence in experimental animals

SUBSTANCE	CAS #	IARC 1	IARC 2A	IARC 2B
ACETALDEHYDE	75-07-0			X
ACETAMIDE	60-35-5			X
ACRYLAMIDE	79-06-1			X
ACRYLONITRILE	107-13-1		X	
ADRIAMYCIN	23214-92-8		X	
AFLATOXINS	NONE	X		
O-AMINOAZOTOLUENE	97-56-3			X
4-AMINODIPHENYL	92-67-1	X		
2-AMINO-5 (5-NITRO-2-FURYL) 1,3,4-THIADIAZOLE	59716-87-9			X
3-AMINO-1,2, 3-TRIAZOLE	61-82-5			X
AMITROLE	61-82-5			X
AMOSITE	12172-73-5	X		
ANISIDINE (O,P-ISOMERS)	29191-52-4		X	
ARSENIC & SOLUBLE COMPOUNDS, AS	7440-38-2	X		
ASBESTOS, AMOSITE	12172-73-5	X		
ASBESTOS, CHRYBOTILE	12001-29-5	X		
ASBESTOS, CROCODOLITE	12001-28-4	X		
ASBESTOS, OTHER FORMS	NONE	X		
AZASERINE	115-02-6			X
AZATHIOPRINE	446-86-6	X		
BENZAL CHLORIDE	98-87-3			X
BENZ(A)ANTHRACENE	56-55-3		X	
BENZENE	71-43-2	X		

SUBSTANCE	CAS #	IARC 1	IARC 2A	IARC 2B
BENZIDINE	92-87-5	X		
BENZOTRICHLORIDE	106-51-4			X
BENZO(A)PYRENE	50-32-8		X	
BENZYL CHLORIDE	100-44-7			X
BENZYL VIOLET 4B	1694-09-3			X
BERYLLIUM AND COMPOUNDS, AS BE	7440-41-7		X	
N,N-bis(chloromethyl)-2-Naphthylamine	494-03-01	X		
BISCHLOROETHYL NITROSOUREA	154-93-8		X	
BITUMEN	8052-42-4			X
1,3-BUTADIENE	106-99-0			X
1,4-BUTANEDIOL				
DIMETHYLSULFONATE	55-98-1	X		
BUTYLPHENO- XYISOPROPYL				
CHLOROETHYL SULFITE	140-57-8			X
B-BUTYROLACTONE	3068-88-0			X
CADMIUM CHLORIDE	10108-64-2		X	
CADMIUM DUSTS AND SALTS, AS CD	7440-43-9		X	
CARBON TETRACHLORIDE	56-23-5			X
CHLORAMBUCIL	305-03-3	X		
CHLORDECONE	143-05-0			X
1-CHLORO-2,3-EPOXYPROPANE	106-89-8		X	
1-(2-CHLOROETHYL)- 3-CYCLOHEXYL- 1-NITROSOUREA	13010-47-4		X	
CHLOROETHYLENE	75-01-4	X		
CHLOROFORM	67-66-3			X
BIS(CHLORO- METHYL)ETHER	542-88-1	X		
CHLOROMETHYL METHYL ETHER	107-30-2	X		
4-CHLORO-O- PHENYLDIAMINE	95-83-0			X
4-CHLORO-TOLUIDINE	95-69-2			X
2-CHLOROPHENOL	95-57-8			X
3-CHLOROPHENOL	108-43-0			X
4-CHLOROPHENOL	106-48-9			X
CHROMIUM (VI) COMPOUNDS, AS CR, WATER SOLUBLE	NONE	X		
CHROMIUM TRIOXIDE	1333-82-0			
CHRYSOTILE	12001-29-5	X		
CISPLATIN	15663-27-1		X	
CITRUS RED NO. 2	6358-53-8			X
P-CRESIDINE	120-71-8			X
CRISTOBALITE	14464-46-1		X	
CROCIDOLITE	12001-28-4	X		
CUPFERRON	135-20-6			
CYCASIN	14901-08-7			X
CYCLOPHOSPHAMIDE	50-18-0	X		
DDT (DICHLORODIPHENYL -TRICHLORETHANE)	50-29-3			X
DACARBAZINE	4342-03-4			X
DAUNOMYCIN	20830-31-3			X
N,N'-DIACETYLBENZIDINE	613-35-4			X
2,4-DIAMINOANISOLE	615-05-4			X
2,4-DIAMINOANISOLE SULFATE	39156-41-7			X

SUBSTANCE	CAS #	IARC 1	IARC 2A	IARC 2B
4,4'-DIAMINODIPHENYL ETHER	101-80-4			X
2,4-DIAMINOTOLUENE	95-80-7			X
DIBENZ(A,H)ACRIDINE	226-36-8			X
DIBENZ(A,J)ACRIDINE	224-42-0			X
DIBENZA(A,H)ANTHRACENE	53-70-3		X	
7H-DIBENZO(C,G)CARBAZOLE	194-59-2		X	
DIBENZO(A,E)PYRENE	192-65-4			X
DIBENZO(A,H)PYRENE	189-64-0			X
DIBENZO(A,I)PYRENE	189-55-9			X
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8			X
1,2-DIBROMOETHANE	106-93-4		X	
3,3'-DICHLOROBENZIDINE	91-94-1			X
3,3'-DICHLORO-4,4'-DIAMINODIPHENYL ETHER	28434-86-8			X
1,2-DICHLOROETHANE	107-06-2			X
DICHLOROMETHANE	75-09-2			X
2,4-DICHLOROPHENYL-P-NITROPHENYL ETHER	1836-75-5			X
1,3-DICHLOROPROPENE	542-75-6			X
DIEPOXYBUTANE	1464-53-5			X
DIETHYLDITHIOCARBAMIC ACID 2-CHLORALLYL ESTER	95-06-7			X
DI(2-ETHYLHEXYL)PHTHALATE	117-81-7			X
1,2-DIETHYLHYDRAZINE	1615-80-1			X
DIETHYLSTILBESTROL	56-53-1	X		
DIETHYL SULFATE	64-67-5		X	
DIGLYCIDYL RESORCINOL ETHER	101-90-6			X
DIHYDROSAFROLE	94-58-6			X
4-DIMETHYLAMINOAZO-BENZENE	60-11-7			X
3,3'-DIMETHYLBENZIDENE	119-93-7			X
7,12-Dimethylbenzanthracene (DMBA)	57-97-6	X		
DIMETHYL CARBOMYL CHLORIDE	79-44-7		X	
1,1-DIMETHYLHYDRAZINE	57-14-7			X
1,2-DIMETHYLHYDRAZINE	540-73-8			X
N,N-DIMETHYL-NITROSOAMINE	65-72-9		X	
DIMETHYL SULFATE	77-78-1		X	
Dimethoxybenzidine	119-90-4			X
1,4-DIOXANE	123-91-1			X
DI-SEC-OCTYL-PHTHALATE	117-81-7			X
EPICHLOROHYDRIN	106-89-8		X	
1,2-EPOXYPROPANE	75-56-9		X	
ETHYL ACRYLATE	140-88-5			X
ETHYLENE DIBROMIDE	106-34-4		X	
ETHYLENE DICHLORIDE	107-06-2			X
ETHYLENE OXIDE	75-21-8		X	
ETHYLENE THIOUREA	96-45-7			X
ETHYL METHANE SULPHONATE	62-50-0		X	
FORMALDEHYDE	50-00-0		X	
2-(2-FORMYLHYDRAZINO)-4-(5-NITRO-2-FURYL)THIAZOLE	3570-75-0			X
GLYCIDALDEHYDE	765-34-4			X
HEMATITE UNDERGROUND MINING	NONE	X		

SUBSTANCE	CAS #	IARC 1	IARC 2A	IARC 2B
HEXACHLOROBENZENE	118-74-1			X
HEXAMETHYL PHOSPHORAMIDE	680-31-9			X
INDENO(1,2,3-CD)PYRENE	193-30-5			X
IRON DEXTRAN COMPLEX	9004-66-4			X
KEPONE	143-50-0			X
LASIOSCARPINE	303-34-4			X
LEAD, INORGANIC DUSTS AND FUMES, AS PB	7439-92-1			X
MAGENTA MANUFACTURE	632-99-5	X		
MELPHALAN	148-82-3	X		
MERPHALAN	531-76-0			X
METHYLAZOXYMETHANOL	590-96-5			X
METHYLAZOXYMETHANOL SULFATE	592-62-1			X
5-METHYLCHRYSENE	NONE			
METHYLENE CHLORIDE	75-09-2			X
4,4'-METHYLENE BIS(2-CHLOROANILINE)	101-14-4		X	
4,4'-METHYLENE DIANILINE	101-77-9			X
4,4'-METHYLENE BIS(2-METHYLANILINE)	838-88-0			X
METHYL METHANESULPHONATE	66-27-3			X
2-METHYL-1- NITROANTHRAQUINONE	129-15-7			X
N-METHYL-N'-NITRO- N-NITROSOQUANIDINE	70-25-7		X	
METHYLTHIOURACIL	56-04-2			X
METRONIDAZOLE	443-48-1			X
MIREX	2385-85-5			X
MITOMYCIN C	50-07-7			X
MONOCROTALINE	315-22-0			X
MUSTARD GAS	505-60-2	X		
NAFENOPIIN	3771-19-5			X
NAPHTHA (COAL TAR)	8030-30-6	X		
ALPHA-NAPHTHYLAMINE	134-32-7			
BETA-NAPHTHYLAMINE	91-59-8	X		
NICKEL, METAL	7440-02-0	X		
NICKEL, INSOLUBLE COMPOUNDS, AS NI	7440-02-0	X		
NICKEL, SOLUBLE COMPOUNDS, AS NI	7440-02-0	X		
NIRIDAZOLE	61-57-4			X
5-NITROACENAPHTHENE	602-87-9			X
1-[(NITROFURFURYLIDENE)AMINO]- 2-IMIDAZOLIDINONE	555-84-0			X
N-[4-(5-NITRO-2-FURYL) -2-THIAZOLYL] ACETAMIDE	531-82-8			X
NITROGEN MUSTARD	51-75-2		X	
NITROGEN MUSTARD N-OXIDE	302-70-5			X
2-NITROPROPANE	79-46-9			X
N-NITROSODI-N -BUTYLAMINE (DBN)	924-16-3			X
N-NITROSODIETHANOLAMINE (NDELA)	1116-54-7			X
N-NITROSODIETHYLAMINE (NDEA)	55-18-5		X	
N-NITROSODIMETHYLAMINE	62-75-9		X	
N-NITROSODI-N- PROPYLAMINE (NDP)	621-64-7			X
N-NITROSOMETHYLETHYLAMINE	10595-95-6			X

SUBSTANCE	CAS #	IARC 1	IARC 2A	IARC 2B
N-NITROSO-N-METHYLUREA (NMU)	684-93-5			X
N-NITROSOMETHYLVINYLAMINE (NMVA)	13256-13-8			X
N'-NITROSONORNICOTINE (NNN)	16543-55-8			X
N-NITROSOPIPERIDINE (NPIP)	100-75-4			X
N-NITROSOPYRROLIDINE (NPYR)	930-55-2			X
N-NITROSOSARCOSINE (NSAR)	13256-22-9			X
OIL ORANGE SS	2646-17-5			X
4,4'-OXYDIANILINE	101-80-4			X
OXYMETHOLONE	434-07-1			
PANFURAN S	794-93-4			X
PARTICULATE POLYCYCLIC AROMATIC HYDROCARBONS	65995-93-2	X		
PHENACETIN	66-44-2		X	
PHENAZOPYRIDE HYDROCHLORIDE	136-40-3			X
PHENOXYACETIC ACID HERBICIDES	NONE			X
PHENOXYBENZAMINE HYDROCHLORIDE	63-92-3			X
PHENYTOIN (+ SODIUM SALTS)	57-41-0			X
POLYBROMINATED BIPHENYLS (PBBs)	36355-01-8			X
POLYCHLORINATED BIPHENYLS (PCBs)	1336-36-3		X	
PONCEAU MS	3761-53-3		X	
PONCEAU 3R	65997-15-1		X	
PROCARBIZINE HYDROCHLORIDE	366-70-1		X	
PROPANE SULTONE	1120-71-4			X
BETA-PROPIOLACTONE	57-57-8			X
PROPYLENE OXIDE	75-56-9		X	
PROPYLTHIOURACIL	51-52-5			X
QUARTZ	14808-60-7		X	
SACCHARIN	81-07-2			X
SAFROLE	94-59-7			X
SILICA-CRYSTALLINE, CRISTOBALITE	14464-46-1		X	
SILICA-CRYSTALLINE, QUARTZ	14808-60-7		X	
SILICA-CRYSTALLINE, TRIDYMIT	15468-32-3		X	
SILICA-CRYSTALLINE, TRIPOLI	1317-95-9		X	
STERIGMATOCYSTIN	10048-13-2			X
STREPTOZOTOCIN	18883-66-4			X
STYRENE, MONOMER	100-42-5			X
TALC (CONTAINING ASBESTOS FIBERS)	NONE	X		
2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN	1746-01-6			X
TETRACHLOROETHYLENE	127-18-4			X
TETRACHLOROMETHANE	56-23-5			X
THIOACETAMIDE (TTA)	62-55-5			X
4,4'-THIODIANILINE	139-65-1			X
THIOUREA	62-56-6			X
O-TOLIDINE	119-93-7			X
TOLUENE-2,4-DIAMINE	95-80-7			X

SUBSTANCE	CAS #	IARC 1	IARC 2A	IARC 2B
O-TOLUIDINE	95-53-4			X
TOXAPHENE	8001-35-2			X
TREMOLITE	1332-21-4	X		
TREOSULPHAN	299-75-2	X		
TRIDYMITTE	15468-32-3		X	
TRIPOLI	1317-95-9		X	
TRIS(1-AZIRIDINYL) PHOSPHINE SULFIDE	52-24-4		X	
TRIS(2,3-DIBROMOPROPYL) PHOSPHATE	126-72-7		X	
TRYPAN BLUE (COMMERCIAL GRADE)	72-57-1			X
URACIL MUSTARD	66-75-1			X
URETHANE (ETHYL CARBAMATE)	51-79-6			X
VINYL BENZENE	100-42-5			X
VINYL BROMIDE	593-60-2		X	
VINYL CHLORIDE	75-01-4	X		
VINYL CYANIDE	107-13-1		X	
ZINC BERYLLIUM SILICATE	39413-47-3		X	

Appendix 2: Reproductive Toxins

Acrylonitrile
Aniline
Arsenic and its compounds
Benzene
Benzo(a)pyrene
Beryllium
Boric acid (Boron)
Cadmium and its compounds
Carbon monoxide
Chlordecone (Kepone)
Chloroform
Chloroprene
Dibromochloropropane (DBCP)
Dichlorobenzene
1,1-Dichloroethane
Dichloromethane
Dioxane
Epichlorohydrin
Ethylene Dibromide
Ethylene Dichloride
Ethylene Oxide
Fluorocarbons
Formaldehyde
Formamides
Lead (Organic)
Manganese and its compounds
Mercury and its compounds (Inorganic)
Methyl n-butyl ketone
Methyl chloroform
Methyl ethyl ketone (MEK)
Nitrogen Dioxide
Ozone
Platinum and its compounds
Polybrominated biphenyls (PBB)
Polychlorinated biphenyls (PCB)
Selenium and its compounds
Styrene
Tellurium and its compounds
Tetrachloroethylene
Thallium and its compounds
Toluene
Toluene-2,4-diisocyanate
o-Toluidine
Trichloroethylene
Vinyl chloride
Vinylidene chloride
Xylene