

α -Zearalenol

sc-202388

Material Safety Data Sheet



The Power is Question

Hazard Alert Code Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

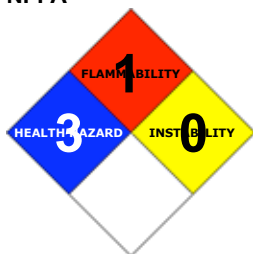
PRODUCT NAME

α -Zearalenol

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

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EMERGENCY:

ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

C18-H24-O5, "2, 4-dihydroxy-6-[6 α , 10-dihydroxy-trans-1-undecenyl]benzoic acid mhu-", lactone, "(3S, 7S, 11E)-3, 4, 5, 6, 7, 8, 9, 10-octahydro-7, 14, 16-trihydroxy-3-", methyl-1H-2-benzoxacyclotetradecin-1-one, "1H-2-benzoxacyclotetradecin-1-one, 3, 4, 5, 6, 7, 8, 9, 10-octahydro-7, ", "14, 16-trihydroxy-3-methyl-, (3S-(3R*, 7S*, 11E))-", (+)- α -zearalenol, α -trans-zearalenol, trans- α -zearalenol

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability:	1	
Toxicity:	2	
Body Contact:	2	
Reactivity:	1	
Chronic:	2	
		Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Accidental ingestion of the material may be damaging to the health of the individual.

EYE

■ Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result.

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SKIN

■ Skin contact is not thought to have harmful health effects, however the material may still produce health damage following entry through wounds, lesions or abrasions.

■ There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons.

■ Open cuts, abraded or irritated skin should not be exposed to this material.

■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

■ The material is not thought to produce respiratory irritation (as classified using animal models). Nevertheless inhalation of dusts, or fume, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.

■ Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.

■ Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.

■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

■ There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Exposure to the material may cause concerns for human fertility, on the basis that similar materials provide some evidence of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects, but which are not a secondary non-specific consequence of other toxic effects.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.

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Zearalenone has been identified in cornmeal and cornflakes destined for human consumption at levels up to 70 microgram/kg - this corresponds to doses 400-600 times lower than those required to cause effects in monkeys and mice under experimental conditions. Substantially higher levels have occasionally been found in beer and sour porridge prepared from contaminated maize and sorghum in certain areas of Africa. Although no adverse effects have as yet been reported in man possible health hazards connected with daily intake may be significant

Zearalenone exerts oestrogenic effects. Typical symptoms in female domestic animals consuming contaminated food consist of uterus hyperplasia, vulvovaginitis, and a decrease in fertility (which also affects male animals. The milk of cows consuming contaminated hay may contain considerable amounts of zearalenone. Drinking contaminated milk causes accelerated maturation of the genital organs in girls, a disturbance of the oestrus cycle in adult women, and a decrease of fertility in men.

Zearalenone binds at the intracellular oestrogen receptor of the uterus as well as to oestrogen receptors in the hypothalamus and pituitary gland. This results in disturbances of the oestrogen-feedback mechanism. The use of zearalenone as a substitute for oestrogen in post-menopausal women ceased after carcinogenic activity was observed in laboratory animals.

Zearalenone was teratogenic in rats and pigs. Skeletal malformations were especially prevalent. The underlying mechanism may have further aggravate underlying osteoporosis in post-menopausal women.

Zearalenone has produced oestrogenic effects in animals and field cases of a specific oestrogenic syndrome in pigs and infertility in cattle have been recorded at feed levels of 0.1-6.8 mg/kg and 14 mg/kg respectively. Oestrogenic syndrome in pigs is characterised by enlarged oedematous vulvae and mammary glands. Ingestion of grain contaminated with zearalenone during late gestation might be related to still-birth and splayleg in sows.

Zearalenone produces pituitary and liver tumours in mice. No increase in the incidence of tumours has been observed in rats.

Mycotoxins are dietary oestrogens of fungal origin. Cereals stored under moist conditions can become contaminated by moulds that produce mycotoxins. Both domestic livestock and humans consume significant quantities of mycotoxins following consumption of contaminated rice, corn, wheat and barley.

In common with other oestrogen mimics, mycotoxins may alter fertility and produce reproductive deficits in farm animals and mammals.

Zearalenone is held responsible for the fertility problems and oestrogenisation of farm animals, in particular pigs, observed after feeding of contaminated hay or corn ("mould corn disease").

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
alpha-zearalenol	36455-72-8	>85
residuals as		
tetrahydrofuran	109-99-9	
methylene chloride	75-09-2	
acetone	67-64-1	

petroleum ether	8032-32-4.
n-hexane	110-54-3
methanol	67-56-1

Section 4 - FIRST AID MEASURES

SWALLOWED

· If swallowed do NOT induce vomiting. · If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

EYE

■ If this product comes in contact with the eyes: · Wash out immediately with fresh running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

■ If skin contact occurs: · Immediately remove all contaminated clothing, including footwear · Flush skin and hair with running water (and soap if available).

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN

■ Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not Available
Specific Gravity (water=1):	Not Available
Lower Explosive Limit (%):	Not Available

EXTINGUISHING MEDIA

· Foam.
· Dry chemical powder.

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.
· Wear breathing apparatus plus protective gloves.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Combustible solid which burns but propagates flame with difficulty.
· Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO₂), other pyrolysis products typical of burning organic material.

May emit poisonous fumes.

May emit corrosive fumes.

FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

Respirator:

Type AX-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

· Clean up waste regularly and abnormal spills immediately.
· Avoid breathing dust and contact with skin and eyes.
· Wear protective clothing, gloves, safety glasses and dust respirator.
· Use dry clean up procedures and avoid generating dust.
· Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
· Dampen with water to prevent dusting before sweeping.
· Place in suitable containers for disposal.

MAJOR SPILLS

■ Moderate hazard.

· CAUTION: Advise personnel in area.

· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
 - Wear protective clothing when risk of exposure occurs.
- Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.
- Do NOT cut, drill, grind or weld such containers.
 - In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

- Glass container.
- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

STORAGE REQUIREMENTS

- Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
Canada - Alberta Occupational Exposure Limits	alpha-zearalenol (Methanol (Methyl alcohol))	200	262	250	328				
Canada - British Columbia Occupational Exposure Limits	alpha-zearalenol (Methanol)	200		250					Skin
US - Minnesota Permissible Exposure Limits (PELs)	alpha-zearalenol (Methyl alcohol)	200	260	250	325				
US ACGIH Threshold Limit Values (TLV)	alpha-zearalenol (Methanol)	200		250					TLV Basis: headache; eye damage. BEI
US NIOSH Recommended Exposure Limits (RELs)	alpha-zearalenol (Methyl alcohol)	200	260	250	325				[skin]
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	alpha-zearalenol (Methyl alcohol)	200	260	250	325				
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	alpha-zearalenol (Methyl alcohol)	200	260						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	alpha-zearalenol (Methyl alcohol)	200	260	250	310				
US - California Permissible Exposure Limits for Chemical Contaminants	alpha-zearalenol (Methyl alcohol; methanol)	200	260	250	325	1000			

US - Idaho - Limits for Air Contaminants	alpha-zearalenol (Methyl alcohol)	200	260			
US - Hawaii Air Contaminant Limits	alpha-zearalenol (Methyl alcohol (methanol))	200	260	250	325	
US - Alaska Limits for Air Contaminants	alpha-zearalenol (Methyl alcohol (Methanol))	200	260	250	310	
US - Michigan Exposure Limits for Air Contaminants	alpha-zearalenol (Methyl alcohol)	200	260	250	325	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	alpha-zearalenol (Methyl alcohol (methanol) - Skin)	200	260	250	310	
US - Washington Permissible exposure limits of air contaminants	alpha-zearalenol (Methanol (Methyl alcohol))	200		250		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	alpha-zearalenol (Methyl alcohol (methanol))	200		250		Skin
US - Oregon Permissible Exposure Limits (Z-1)	alpha-zearalenol (Methyl alcohol (methanol))	200	260			
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	alpha-zearalenol (Methyl alcohol)	200	260			
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	alpha-zearalenol (Methyl alcohol)	200	262	250	328	
US OSHA Permissible Exposure Levels (PELs) - Table Z1	alpha-zearalenol (Methyl alcohol)	200	260			
Canada - Northwest Territories Occupational Exposure Limits (English)	alpha-zearalenol (Methyl alcohol (Methanol) - Skin)	200	262	250	328	
Canada - Nova Scotia Occupational Exposure Limits	alpha-zearalenol (Methanol)	200		250		TLV Basis: headache; eye damage. BEI
Canada - Prince Edward Island Occupational Exposure Limits	alpha-zearalenol (Methanol)	200		250		TLV Basis: headache; eye damage. BEI

Canada - Alberta Occupational Exposure Limits	tetrahydrofuran (Tetrahydrofuran)	50	147	100	295	
Canada - British Columbia Occupational Exposure Limits	tetrahydrofuran (Tetrahydrofuran Revised 2005)	50		100		Skin
US NIOSH Recommended Exposure Limits (RELs)	tetrahydrofuran (Tetrahydrofuran)	200	590	250	735	
US OSHA Permissible Exposure Levels (PELs) - Table Z1	tetrahydrofuran (Tetrahydrofuran)	200	590			
US ACGIH Threshold Limit Values (TLV)	tetrahydrofuran (Tetrahydrofuran)	50		100		TLV Basis: upper respiratory tract irritation; central nervous system impairment; kidney damage
US - Minnesota Permissible Exposure Limits (PELs)	tetrahydrofuran (Tetrahydrofuran)	200	590	250	735	
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	tetrahydrofuran (Tetrahydrofuran)	200	590			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	tetrahydrofuran (Tetrahydrofuran)	200	590	250	735	
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	tetrahydrofuran (Tetrahydrofuran)	200	590	250	735	
US - California Permissible Exposure Limits for Chemical Contaminants	tetrahydrofuran (Tetrahydrofuran)	200	590	250	735	
US - Idaho - Limits for Air Contaminants	tetrahydrofuran (Tetrahydrofuran)	200	590			
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	tetrahydrofuran (Tetrahydrofuran)	100	300			
US - Hawaii Air Contaminant Limits	tetrahydrofuran (Tetrahydrofuran)	200	590	250	735	
US - Alaska Limits for Air Contaminants	tetrahydrofuran (Tetrahydrofuran)	200	590	250	735	
Canada - Saskatchewan Occupational	tetrahydrofuran (Tetrahydrofuran)	50		100		Skin

Health and Safety Regulations - Contamination Limits						
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	tetrahydrofuran (Tetrahydrofuran)	200	590	250	700	
US - Michigan Exposure Limits for Air Contaminants	tetrahydrofuran (Tetrahydrofuran)	200	590	250	735	
Canada - Prince Edward Island Occupational Exposure Limits	tetrahydrofuran (Tetrahydrofuran)	50		100		TLV Basis: upper respiratory tract irritation; central nervous system impairment; kidney damage
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	tetrahydrofuran (Tetrahydrofuran)	200	590			
Canada - Nova Scotia Occupational Exposure Limits	tetrahydrofuran (Tetrahydrofuran)	50		100		TLV Basis: upper respiratory tract irritation; central nervous system impairment; kidney damage
US - Oregon Permissible Exposure Limits (Z-1)	tetrahydrofuran (Tetrahydrofuran)	200	590			
Canada - Northwest Territories Occupational Exposure Limits (English)	tetrahydrofuran (Tetrahydrofuran)	200	590	250	735	
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	methylene chloride (METHYLENE CHLORIDE)	0.6				
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	methylene chloride (METHYLENE CHLORIDE)	0.3				
US ACGIH Threshold Limit Values (TLV)	methylene chloride (Dichloromethane)	50				TLV Basis: carboxyhemoglobinemia; central nervous system impairment. BEI
Canada - Alberta Occupational Exposure Limits	methylene chloride (Methylene chloride (Dichloromethane))	50	174			
Canada - British Columbia Occupational Exposure Limits	methylene chloride (Dichloromethane)	25				2B
US - Idaho - Acceptable Maximum Peak Concentrations	methylene chloride (Methylene chloride (Z37.23-1969))	500			1,000	

US - Idaho - Limits for Air Contaminants	methylene chloride (Methylene chloride)		[2]			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	methylene chloride (Methylene chloride)	500			1,000	
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	methylene chloride (Methylene chloride)		See Table Z-2			
US - California Permissible Exposure Limits for Chemical Contaminants	methylene chloride (Methylene chloride; dichloromethane (see also section 5202))	25	87	125	435	
US - Hawaii Air Contaminant Limits	methylene chloride (Methylene chloride)	25				See 912-202-41
US - Oregon Permissible Exposure Limits (Z-1)	methylene chloride (Methylene Chloride)	25				TWA (See 1910.1052)
US - Michigan Exposure Limits for Air Contaminants	methylene chloride (Methylene chloride, see R 325.51651 et seq.F)	25	87	125	434	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	methylene chloride (Methylene chloride (dichloromethane))	200	700	250	870	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	methylene chloride (Dichloromethane, see Methylene chloride)	200	720	200	720	
US - Washington Permissible exposure limits of air contaminants	methylene chloride (Dichloromethane (Methylene chloride) (See chapter 296-859 WAC))	25		125		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	methylene chloride (Methylene chloride (dichloromethane))	50		63		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	methylene chloride (Dichloromethane)	50		75		T20
Canada - Quebec Permissible Exposure	methylene chloride (Methylene chloride)	50	174			

Values for
Airborne
Contaminants
(English)

US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift	methylene chloride (Methylene Chloride: see 1910.1052)	25		125	
Canada - Northwest Territories Occupational Exposure Limits (English)	methylene chloride (Methylene chloride (Dichloromethane))	100	347	500	1737
Canada - Nova Scotia Occupational Exposure Limits	methylene chloride (Dichloromethane)	50			TLV Basis: carboxyhemoglobinemia; central nervous system impairment. BEI
Canada - Prince Edward Island Occupational Exposure Limits	methylene chloride (Dichloromethane)	50			TLV Basis: carboxyhemoglobinemia; central nervous system impairment. BEI
US TSCA New Chemical Exposure Limits (NCEL)	methylene chloride (Halogenated alkanes (P84-106/107))	1.0			
US - Minnesota Permissible Exposure Limits (PELs)	acetone (Acetone)	750	1800	1000	2400
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	acetone (ACETONE)	26			
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	acetone (ACETONE)	13			
Canada - British Columbia Occupational Exposure Limits	acetone (Acetone)	250		500	
US ACGIH Threshold Limit Values (TLV)	acetone (Acetone)	500		750	TLV Basis: Upper respiratory tract & eye irritation; CNS impairment; hematologic effects
US NIOSH Recommended Exposure Limits (RELs)	acetone (Acetone)	250	590		
Canada - Alberta Occupational Exposure Limits	acetone (Acetone)	500	1200	750	1800

US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	acetone (Acetone)	750	1800	1000	2400	
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	acetone (Acetone)	1000	2400			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	acetone (Acetone)	750	1800	1000	2400	
US - Idaho - Limits for Air Contaminants	acetone (Acetone)	1000	2400			
US - California Permissible Exposure Limits for Chemical Contaminants	acetone (Acetone)	500	1200	750	1780	3000
US - Alaska Limits for Air Contaminants	acetone (Acetone)	750	1800	1000	2400	
US - Michigan Exposure Limits for Air Contaminants	acetone (Acetone)	750	1800	1000	2400	
US - Oregon Permissible Exposure Limits (Z-1)	acetone (Acetone)	1,000	2,400			
US - Hawaii Air Contaminant Limits	acetone (Acetone)	750	1,780	1,000	2,375	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	acetone (Acetone)	1,000	2,400	1,250	3,000	
US - Washington Permissible exposure limits of air contaminants	acetone (Acetone)	750		1,000		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	acetone (Acetone)	500		750		
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	acetone (Acetone)	500	1190	1000	2380	

US OSHA Permissible Exposure Levels (PELs) - Table Z1	acetone (Acetone)	1000	2400			
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	acetone (Acetone)	1000	2400			
Canada - Northwest Territories Occupational Exposure Limits (English)	acetone (Acetone)	1000	2370	1250	2970	
Canada - Nova Scotia Occupational Exposure Limits	acetone (Acetone)	500		750		TLV Basis: Upper respiratory tract & eye irritation; CNS impairment; hematologic effects
Canada - Prince Edward Island Occupational Exposure Limits	acetone (Acetone)	500		750		TLV Basis: Upper respiratory tract & eye irritation; CNS impairment; hematologic effects
Canada - British Columbia Occupational Exposure Limits	petroleum ether (VM & P Naphtha Revised 2009)		(H)			
Canada - Alberta Occupational Exposure Limits	petroleum ether (VM & P Naphtha)	300	1400			
US NIOSH Recommended Exposure Limits (RELs)	petroleum ether (VM & P Naphtha)		350	1800		(Ceiling ([15-minute]))
US - Minnesota Permissible Exposure Limits (PELs)	petroleum ether (VM & P Naphtha)	300	1350	400	1800	
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	petroleum ether (VM & P Naphtha)	300	1350	400	1800	
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	petroleum ether (VM & P Naphtha)	300	1350	400	1800	
US - Hawaii Air Contaminant Limits	petroleum ether (VM & P Naphtha)	300	1,350	400	1,800	
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	petroleum ether (VM and P Naphtha)	300		375		
US - Washington Permissible exposure limits of air contaminants	petroleum ether (VM & P Naphtha)	300		400		

US - Alaska Limits for Air Contaminants	petroleum ether (V M & P Naphtha)	300	1350	400	1800	
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	petroleum ether (VM&P Naphtha)	300	1370			
Canada - Northwest Territories Occupational Exposure Limits (English)	petroleum ether (VM & P Naphtha)	300	1350	400	1800	
US - Michigan Exposure Limits for Air Contaminants	petroleum ether (VM & P Naphtha)	300	1350	400	1800	
Canada - British Columbia Occupational Exposure Limits	n-hexane (n-Hexane)	20				Skin
US - Minnesota Permissible Exposure Limits (PELs)	n-hexane (n-Hexane)	50	180			
US ACGIH Threshold Limit Values (TLV)	n-hexane (n-Hexane)	50				TLV Basis: central nervous system impairment; peripheral neuropathy; eye irritation
US NIOSH Recommended Exposure Limits (RELs)	n-hexane (n-Hexane)	50	180			
Canada - Alberta Occupational Exposure Limits	n-hexane (n-Hexane)	50	176			
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	n-hexane (n-Hexane)	50	180			
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	n-hexane (n-Hexane.)	500	1800			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	n-hexane (n-Hexane)	50	180			
US - California Permissible Exposure Limits for Chemical Contaminants	n-hexane (n-Hexane)	50	180			
US - Idaho - Limits for Air Contaminants	n-hexane (n-Hexane)	500	1800			

US OSHA Permissible Exposure Levels (PELs) - Table Z1	n-hexane (n-Hexane)	500	1800			
US - Hawaii Air Contaminant Limits	n-hexane (n-Hexane)	50	180			
US - Alaska Limits for Air Contaminants	n-hexane (n-Hexane)	50	180			
US - Michigan Exposure Limits for Air Contaminants	n-hexane (n-Hexane)	50	180			
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	n-hexane (Hexane (n-hexane))	100	360	125	450	
US - Washington Permissible exposure limits of air contaminants	n-hexane (Hexane - n-hexane)	50		75		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	n-hexane (Hexane (n-Hexane))	50		62.5		Skin
Canada - Prince Edward Island Occupational Exposure Limits	n-hexane (n-Hexane)	50				TLV Basis: central nervous system impairment; peripheral neuropathy; eye irritation
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	n-hexane (n-Hexane)	500	1800			
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	n-hexane (n-Hexane)	50	176			
US - Oregon Permissible Exposure Limits (Z-1)	n-hexane (Hexane (n-hexane))	500	1,800			
Canada - Northwest Territories Occupational Exposure Limits (English)	n-hexane (Hexane (n-Hexane))	100	352	125	440	
Canada - Nova Scotia Occupational Exposure Limits ENDOELTABLE	n-hexane (n-Hexane)	50				TLV Basis: central nervous system impairment; peripheral neuropathy; eye irritation

PERSONAL PROTECTION



RESPIRATOR

Type AX-P Filter of sufficient capacity

Consult your EHS staff for recommendations

EYE

■ When handling very small quantities of the material eye protection may not be required.

For laboratory, larger scale or bulk handling or where regular exposure in an occupational setting occurs:

- Chemical goggles
- Face shield. Full face shield may be required for supplementary but never for primary protection of eyes
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

■ Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.

· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.

· Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

· Rubber gloves (nitrile or low-protein, powder-free latex). Employees allergic to latex gloves should use nitrile gloves in preference.

· Double gloving should be considered.

· PVC gloves.

· Protective shoe covers.

· Head covering.

Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocautchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.

OTHER

· For quantities up to 500 grams a laboratory coat may be suitable.

· For quantities up to 1 kilogram a disposable laboratory coat or coverall of low permeability is recommended. Coveralls should be buttoned at collar and cuffs.

· For quantities over 1 kilogram and manufacturing operations, wear disposable coverall of low permeability and disposable shoe covers.

· For manufacturing operations, air-supplied full body suits may be required for the provision of advanced respiratory protection.

· Eye wash unit.

· Ensure there is ready access to an emergency shower.

· For Emergencies: Vinyl suit.

ENGINEERING CONTROLS

■ Enclosed local exhaust ventilation is required at points of dust, fume or vapor generation.

HEPA terminated local exhaust ventilation should be considered at point of generation of dust, fumes or vapors.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

State	Divided Solid	Molecular Weight	320.4
Melting Range (°F)	Not Available	Viscosity	Not Applicable
Boiling Range (°F)	Not Applicable	Solubility in water (g/L)	Partly Miscible
Flash Point (°F)	Not Available	pH (1% solution)	Not Applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not Applicable

Autoignition Temp (°F)	Not Available	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not Available	Specific Gravity (water=1)	Not Available
Lower Explosive Limit (%)	Not Available	Relative Vapor Density (air=1)	Not Applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not Applicable

APPEARANCE

Solid; does not mix well with water.

log Kow 0.32-0.46 log Kow 1.25 log Kow -0.24 log Kow 4.66 An estimated BCF of 2,000 using log Kow suggests the potential for bioconcentration in aquatic organisms is very high. Based on 100% degradation after 4 days in water inoculated with gasoline contaminated soil and 100% degradation after 25 days in water inoculated with activated sewage sludge, biodegradation is expected to be an important fate process for n-heptane in water. log Kow -0.82- -0.66

Material	Value
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Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.

STORAGE INCOMPATIBILITY

- Avoid reaction with oxidizing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

ALPHA-ZEARALENOL

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

METHYLENE CHLORIDE:

TETRAHYDROFURAN:

■ The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.

ALPHA-ZEARALENOL:

■ No significant acute toxicological data identified in literature search.

TETRAHYDROFURAN:

TOXICITY	IRRITATION
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Oral (rat) LD50: 2816 mg/kg

Inhalation (human) TClO: 25000 ppm

Inhalation (rat) LC50: 2100 ppm/3h

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Oral (human) LDLo: 50 mg/kg* [CCINFO]* Nil reported

TOXICITY	IRRITATION
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METHYLENE CHLORIDE:

Oral (human) LDLo: 357 mg/kg

Skin
(rabbit):
810
mg/24hr-
SEVERE

Oral (rat) LD50: 1600 mg/kg

Skin (rabbit): 100mg/24hr-Moderate

Inhalation (human) TClO: 500 ppm/ 8 hr

Eye(rabbit):
162 mg -

Inhalation (rat) LC50: 88000 mg/m³/30 m

Eye(rabbit): 500 mg/24hr - Mild

■ The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.

Inhalation (human) TCLo: 500 ppm/ 1 y - I Eye(rabbit): 10 mg - mild

ACETONE:

Oral (man) TDLo: 2857 mg/kg

Eye
(human):
500 ppm -
Irritant

Oral (rat) LD50: 5800 mg/kg

Eye (rabbit): 3.95 mg - SEVERE

Inhalation (human) TCLo: 500 ppm

Eye
(rabbit):
20mg/24hr
-Moderate

Inhalation (man) TCLo: 12000 ppm/4 hr

Skin (rabbit):395mg (open) - Mild

Inhalation (man) TCLo: 10 mg/m³/6 hr

Skin
(rabbit):
500
mg/24hr -
Mild

Inhalation (rat) LC50: 50100 mg/m³/8 hr

Dermal (rabbit) LD50: 20000 mg/kg

■ The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

for acetone:

The acute toxicity of acetone is low. Acetone is not a skin irritant or sensitiser but is a defatting agent to the skin. Acetone is an eye irritant. The subchronic toxicity of acetone has been examined in mice and rats that were administered acetone in the drinking water and again in rats treated by oral gavage. Acetone-induced increases in relative kidney weight changes were observed in male and female rats used in the oral 13-week study. Acetone treatment caused increases in the relative liver weight in male and female rats that were not associated with histopathologic effects and the effects may have been associated with microsomal enzyme induction. Haematologic effects consistent with macrocytic anaemia were also noted in male rats along with hyperpigmentation in the spleen. The most notable findings in the mice were increased liver and decreased spleen weights. Overall, the no-observed-effect-levels in the drinking water study were 1% for male rats (900 mg/kg/d) and male mice (2258 mg/kg/d), 2% for female mice (5945 mg/kg/d), and 5% for female rats (3100 mg/kg/d). For developmental effects, a statistically significant reduction in foetal weight, and a slight, but statistically significant increase in the percent incidence of later resorptions were seen in mice at 15,665 mg/m³ and in rats at 26,100 mg/m³. The no-observable-effect level for developmental toxicity was determined to be 5220 mg/m³ for both rats and mice.

Teratogenic effects were not observed in rats and mice tested at 26,110 and 15,665 mg/m³, respectively. Lifetime dermal carcinogenicity studies in mice treated with up to 0.2 mL of acetone did not reveal any increase in organ tumor incidence relative to untreated control animals.

The scientific literature contains many different studies that have measured either the neurobehavioural performance or neurophysiological response of humans exposed to acetone. Effect levels ranging from about 600 to greater than 2375 mg/m³ have been reported. Neurobehavioral studies with acetone-exposed employees have recently shown that 8-hr exposures in excess of 2375 mg/m³ were not associated with any dose-related changes in response time, vigilance, or digit span scores. Clinical case studies, controlled human volunteer studies, animal research, and occupational field evaluations all indicate that the NOAEL for this effect is 2375 mg/m³ or greater.

PETROLEUM ETHER:

Inhalation (rat) LC50: 3400
ppm/4h

Eye
(human):
880
ppm/15m

■ for petroleum:

This product contains benzene which is known to cause acute myeloid leukaemia and n-hexane which has been shown to metabolize to compounds which are neuropathic.

This product contains toluene. There are indications from animal studies that prolonged exposure to high concentrations of toluene may lead to hearing loss.

This product contains ethyl benzene and naphthalene from which there is evidence of tumours in rodents

Carcinogenicity: Inhalation exposure to mice causes liver tumours, which are not considered relevant to humans. Inhalation exposure to rats causes kidney tumours which are not considered relevant to humans.

Mutagenicity: There is a large database of mutagenicity studies on gasoline and gasoline blending streams, which use a wide variety of endpoints and give predominantly negative results. All in vivo studies in animals and recent studies in exposed humans (e.g. petrol service station attendants) have shown negative results in mutagenicity assays.

Reproductive Toxicity: Repeated exposure of pregnant rats to high concentrations of toluene (around or exceeding 1000 ppm) can cause developmental effects, such as lower birth weight and developmental neurotoxicity, on the foetus. However, in a two-generation reproductive study in rats exposed to gasoline vapour condensate, no adverse effects on the foetus were observed.

Human Effects: Prolonged/ repeated contact may cause defatting of the skin which can lead to dermatitis and may make the skin more susceptible to irritation and penetration by other materials.

Lifetime exposure of rodents to gasoline produces carcinogenicity although the relevance to humans has been questioned. Gasoline induces kidney cancer in male rats as a consequence of accumulation of the alpha2-microglobulin protein in hyaline droplets in the male (but not female) rat kidney. Such abnormal accumulation represents lysosomal overload and leads to chronic renal tubular cell degeneration, accumulation of cell debris, mineralisation of renal medullary tubules and necrosis. A sustained regenerative proliferation occurs in epithelial cells with subsequent neoplastic transformation with continued exposure. The alpha2-microglobulin is produced under the influence of hormonal controls in male rats but not in females and, more importantly, not in humans.

N-HEXANE:

Oral (rat) LD50: 28710
mg/kg

Eye(rabbit):
10 mg -
Mild

Inhalation (human) TClO: 190
ppm/8W

Inhalation (rat) LD50:
48000 ppm/4h

■ The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

METHANOL:

Oral (human)
LDLo: 143 mg/kg

Skin
(rabbit): 20
mg/24
h-Moderate

Oral (man) LDLo: 6422
mg/kg

Eye (rabbit): 40
mg-Moderate

Oral (man)
TDLo: 3429
mg/kg

Eye
(rabbit):
100

mg/24h-
Moderate

Oral (rat) LD50: 5628 mg/kg

Inhalation
(human) TCLO:
86000 mg/m³

Inhalation (human) TCLO:
300 ppm

Inhalation (rat)
LC50: 64000
ppm/4h

Dermal (rabbit) LD50:
15800 mg/kg

■ The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

CARCINOGEN

DICHLOROMETHANE	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
DICHLOROMETHANE	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
Methylene chloride	US Air Toxics Hot Spots TSD for Describing Available Cancer Potency Factors	IARC Class	2B

REPROTOXIN

methylene chloride	ILO Chemicals in the electronics industry that have toxic effects on reproduction	Reduced fertility or sterility	
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SKIN

tetrahydrofuran	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1
acetone	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1
n-hexane	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1
methanol	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants - Skin	Skin Designation	X
methanol	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants - Skin	Skin Designation	X
methanol	US - Washington Permissible exposure limits of air contaminants - Skin	Skin	X

methanol	US - Minnesota Permissible Exposure Limits (PELs) - Skin	Skin Designation	X
methanol	US - Hawaii Air Contaminant Limits - Skin Designation	Skin Designation	X
methanol	US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	X
methanol	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1

Section 12 - ECOLOGICAL INFORMATION

No data

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
tetrahydrofuran	LOW		LOW	HIGH
methylene chloride	LOW	HIGH	LOW	HIGH
acetone	LOW	HIGH	LOW	HIGH
n-hexane	LOW		MED	MED
methanol	LOW		LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

B. Component Waste Numbers

When tetrahydrofuran is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U213 (waste code I).

When methylene chloride is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U080 (waste code T).

When acetone is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U002 (waste code I).

When methanol is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U154 (waste code I).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

Legislation addressing waste disposal requirements may differ by country, state and/or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

Section 15 - REGULATORY INFORMATION

alpha-zearalenol (CAS: 36455-72-8) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Saskatchewan Industrial Hazardous Substances", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada National Pollutant Release Inventory (NPRI)", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO Provisional Categorization of Liquid Substances - List 2: Pollutant only mixtures containing at least 99% by weight of components already assessed by IMO", "International Council of Chemical Associations (ICCA) - High Production Volume List", "US - Minnesota Hazardous Substance List", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US ACGIH Threshold Limit Values (TLV)", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US DOT Coast Guard Bulk Hazardous Materials - List of Flammable and Combustible Bulk Liquid Cargoes", "US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives"

Regulations for ingredients

tetrahydrofuran (CAS: 109-99-9) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits", "Canada - British Columbia Occupational Exposure Limits", "Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Industrial Hazardous Substances", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada Domestic Substances List (DSL)", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada National Pollutant Release Inventory (NPRI)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "OECD Representative List of High Production Volume (HPV) Chemicals", "US - Alaska Limits for Air Contaminants", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Massachusetts Oil & Hazardous Material List", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Hazardous Substance List", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know Hazardous Substances", "US - Oregon Permissible Exposure Limits (Z-1)", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Discarded Chemical Products List - ""U"" Chemical Products", "US - Washington Permissible exposure limits of air contaminants", "US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US EPA High Production Volume Program Chemical List", "US EPA Master Testing List - Index I Chemicals Listed", "US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives", "US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes", "US Toxic Substances Control Act (TSCA) - Inventory", "US TSCA Section 12(b) - List of Chemical Substances Subject to Export Notification Requirements", "US TSCA Section 4 - Chemicals Subject to Testing Consent Orders", "US TSCA Section 4/12 (b) - Sunset Date/Status", "US TSCA Section 8 (a) - Preliminary Assessment Information Rules (PAIR) - Reporting List", "US TSCA

Section 8 (d) - Health and Safety Data Reporting"

methylene chloride (CAS: 75-09-2) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Environmental Persistent or Chronic Hazardous Substances","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Saskatchewan Occupational Health and Safety Regulations - Designated Chemical Substances","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada ARET (Accelerated Reduction / Elimination of Toxics) Substance List","Canada Domestic Substances List (DSL)","Canada Environmental Protection Act (CEPA) 1999 - Schedule 1 Toxic Substances List","Canada Environmental Quality Guidelines (EQGs) Water: Aquatic life","Canada Environmental Quality Guidelines (EQGs) Water: Community","Canada Ingredient Disclosure List (SOR/88-64)","Canada National Pollutant Release Inventory (NPRI)","Canada Priority Substances List (PSL1, PSL 2)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","GESAMP/EHS Composite List - GESAMP Hazard Profiles","IMO IBC Code Chapter 17: Summary of minimum requirements","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs","International Council of Chemical Associations (ICCA) - High Production Volume List","OECD Representative List of High Production Volume (HPV) Chemicals","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Proposition 65 - Carcinogens","US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens","US - California Toxic Air Contaminant List Category II","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Acceptable Maximum Peak Concentrations","US - Idaho - Limits for Air Contaminants","US - Maine Chemicals of High Concern List","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Hazardous Materials","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Hazardous Constituents","US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Class A toxic air pollutants: Known and Probable Carcinogens","US - Washington Dangerous waste constituents list","US - Washington Discarded Chemical Products List - ""U"" Chemical Products","US - Washington Permissible exposure limits of air contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)","US CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)","US CERCLA Priority List of Hazardous Substances","US Clean Air Act - Hazardous Air Pollutants","US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe, with qualifications","US CWA (Clean Water Act) - Priority Pollutants","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Acute Exposure Guideline Levels (AEGs) - Interim","US EPA Carcinogens Listing","US EPA High Production Volume Program Chemical List","US EPA Master Testing List - Index I Chemicals Listed","US EPA National Priorities List - Superfund Chemical Data Matrix (SCDM) - Hazard Ranking System - Hazardous Substance Benchmarks","US EPCRA Section 313 Chemical List","US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives","US Food Additive Database","US List of Lists - Consolidated List of

Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act", "US National Toxicology Program (NTP) 11th Report Part B. Reasonably Anticipated to be a Human Carcinogen", "US NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of Combustion", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA Carcinogens Listing", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US OSHA Permissible Exposure Levels (PELs) - Table Z2", "US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide", "US RCRA (Resource Conservation & Recovery Act) - Appendix IX to Part 264 Ground-Water Monitoring List 1", "US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261", "US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Inorganic and Organic Constituents 1", "US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes", "US RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards", "US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants", "US -Texas Air Monitoring Comparison Values for Evaluating Carbonyls", "US Toxic Substances Control Act (TSCA) - Inventory", "US TSCA Section 8 (d) - Health and Safety Data Reporting", "WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water"

acetone (CAS: 67-64-1) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Objectives", "Canada - Alberta Occupational Exposure Limits", "Canada - British Columbia Occupational Exposure Limits", "Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Industrial Hazardous Substances", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada Controlled Drugs and Substances Act Schedule VI", "Canada Domestic Substances List (DSL)", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 18: List of products to which the Code does not apply", "IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances", "International Fragrance Association (IFRA) Survey: Transparency List", "OECD Representative List of High Production Volume (HPV) Chemicals", "United Nations List of Precursors and Chemicals Frequently used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances Under International Control - Table II", "US - Alaska Limits for Air Contaminants", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Massachusetts Oil & Hazardous Material List", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Hazardous Substance List", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know Hazardous Substances", "US - Oregon Permissible Exposure Limits (Z-1)", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Discarded Chemical Products List - ""U"" Chemical Products", "US - Washington Permissible exposure limits of air contaminants", "US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)", "US CERCLA Priority List of Hazardous Substances", "US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest", "US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US DOT Coast Guard Bulk Hazardous Materials - List of Flammable and Combustible Bulk Liquid Cargoes", "US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals", "US EPA Acute Exposure Guideline Levels (AEGs) - Interim", "US EPA Carcinogens Listing", "US EPA High Production Volume Program Chemical List", "US EPA Master Testing List - Index I Chemicals Listed", "US EPA National Priorities List - Superfund Chemical Data Matrix (SCDM) - Hazard Ranking System - Hazardous Substance Benchmarks", "US EPA Voluntary Children's Chemical Evaluation Program (VCCEP)", "US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives", "US

Food Additive Database", "US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act", "US NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of Combustion", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US RCRA (Resource Conservation & Recovery Act) - Appendix IX to Part 264 Ground-Water Monitoring List 1", "US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Inorganic and Organic Constituents 1", "US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes", "US RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards", "US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants", "US -Texas Air Monitoring Comparison Values for Evaluating VOCs", "US Toxic Substances Control Act (TSCA) - Inventory", "US TSCA Section 4 - Chemicals Subject to Testing Consent Orders", "US TSCA Section 4/12 (b) - Sunset Date/Status", "USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27"

petroleum ether (CAS: 8032-32-4) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits", "Canada - British Columbia Occupational Exposure Limits", "Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Industrial Hazardous Substances", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada Domestic Substances List (DSL)", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada National Pollutant Release Inventory (NPRI)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances", "International Council of Chemical Associations (ICCA) - High Production Volume List", "International Fragrance Association (IFRA) Survey: Transparency List", "OECD Representative List of High Production Volume (HPV) Chemicals", "US - Alaska Limits for Air Contaminants", "US - Hawaii Air Contaminant Limits", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know Hazardous Substances", "US - Pennsylvania - Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Permissible exposure limits of air contaminants", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US EPA High Production Volume Program Chemical List", "US NIOSH Recommended Exposure Limits (RELs)", "US Toxic Substances Control Act (TSCA) - Inventory", "US TSCA Section 8 (a) Inventory Update Rule (IUR) - Partial Exemptions"

n-hexane (CAS: 110-54-3) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits", "Canada - British Columbia Occupational Exposure Limits", "Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada Domestic Substances List (DSL)", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada National Pollutant Release Inventory (NPRI)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances", "OECD Representative List of High Production Volume (HPV) Chemicals", "US - Alaska Limits for Air Contaminants", "US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Massachusetts Oil & Hazardous Material List", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Hazardous Substance List", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know Hazardous Substances", "US - Oregon Permissible Exposure Limits (Z-1)", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Permissible exposure limits of air contaminants", "US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US ACGIH Threshold Limit Values (TLV)", "US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US EPA High Production Volume Program Chemical List", "US EPA Master Testing List - Index I Chemicals Listed", "US EPA Master Testing List - Index II Chemicals Removed", "US EPCRA Section 313 Chemical

List", "US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act", "US NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of Combustion", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US -Texas Air Monitoring Comparison Values for Evaluating Carbonyls", "US Toxic Substances Control Act (TSCA) - Inventory"

methanol (CAS: 67-56-1) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Objectives", "Canada - Alberta Occupational Exposure Limits", "Canada - British Columbia Occupational Exposure Limits", "Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Industrial Hazardous Substances", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada Domestic Substances List (DSL)", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada National Pollutant Release Inventory (NPRI)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals", "US - Alaska Limits for Air Contaminants", "US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)", "US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - California Toxic Air Contaminant List Category II", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Maine Chemicals of High Concern List", "US - Massachusetts Oil & Hazardous Material List", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Hazardous Substance List", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know Hazardous Substances", "US - Oregon Permissible Exposure Limits (Z-1)", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Discarded Chemical Products List - ""U"" Chemical Products", "US - Washington Permissible exposure limits of air contaminants", "US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US ACGIH Threshold Limit Values (TLV)", "US CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)", "US Clean Air Act - Hazardous Air Pollutants", "US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe, with qualifications", "US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US DOT Coast Guard Bulk Hazardous Materials - List of Flammable and Combustible Bulk Liquid Cargoes", "US EPA Acute Exposure Guideline Levels (AEGs) - Interim", "US EPA High Production Volume Program Chemical List", "US EPCRA Section 313 Chemical List", "US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives", "US Food Additive Database", "US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act", "US NFPA 30A Typical Flammable and Combustible Liquids Found at Motor Fuel Dispensing Facilities", "US NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of Combustion", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide", "US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes", "US RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards", "US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants", "US Toxic Substances Control Act (TSCA) - Inventory"

Section 16 - OTHER INFORMATION

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■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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