

Disulfiram

sc-205654



The Power to Question

Material Safety Data Sheet

Hazard Alert Code
Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Disulfiram

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

C10-H20-N2-S4, (C2H5)2NC(=S)-S-S-CN(=S)(C2H5)2, "bis((diethylamino)thioxomethyl) disulfide", "bis(diethylthiocarbamoyl) disulfide", "bis(N, N-diethylthiocarbamoyl) disulfide", bis(diethylthiocarbamoyl)disulfide, "1, 1' -dithiobis(N, N-diethylthioformamide)", disulphiram, "ethyl thiram", "ethyl thiurad", "formamide, 1, 1' -dithiobis(N, N-diethylthio-", "tetraethylthioperoxydicarbonic diamide", "tetraethylthiram disulfide", "N, N, N, ' N' -tetraethyl disulfide", "thiuram disulfide, tetraethyl", Abstensil, Abstinil, Abstiny, Alcophobin, Alk-Aubs, Antabus, Antabuse, Antadix, Antaenyl, Antaethan, Antaethyl, Antaetil, Antalcol, Antetan, Antethyl, Antetil, Anteyl, Antiaethan, Antietanol, Anti-ethyl, Antietil, Antikol, Antivitium, Aversan, Averzan, Bonibal, Contralin, Contrapot, Cronetal, Dicupral, Disetil, Disulfan, Disulfuram, Disulphuram, "Dupon Fungicide 4472", "Ekagom TEDS", "ENT 27340", Ephorran, Espenal, Esperal, Etabus, Ethyldithiorame, Ethyldithiurame, "Ethyl TUADS", "Ethyl Tuex", Exhoran, Hoca, Krotenal, NCI-CO2959, Nocbin, Noxal, "NSC 190940", Refusal, Ro-Sulfiram, Stopetyl, TATD, Tenurid, Tenutex, TETD, Tetidis, Tetradin, Tetradine, Tetraetil, Teturam, Teturamin, Thireranide, "Thiuram E", Thiuranide, Tillram, Tiuram, TTD, TTS, "TUADS, Ethyl", "USAF B-33"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability	1		
Toxicity	2		
Body Contact	1		
Reactivity	1		
Chronic	3		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Harmful if swallowed.

May cause SENSITISATION by skin contact.

Harmful danger of serious damage to health by prolonged exposure if swallowed.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

■ Lethal doses of some thiocarbamates have produced muscle weakness and ascending paralysis progressing to respiratory paralysis and death in animals.

Exposure to small quantities of thiocarbamates and intake of small quantities of ethanol may produce flushing, breathing difficulties, nausea and vomiting and lowered blood pressure.

■ The acute toxicity of thiocarbamates is generally low, because of their rapid metabolism.

Exposure to high doses may produce signs such as loss of appetite, squinting, excessive production of saliva, watery eyes, hairs standing on end, labored breathing, reduced body temperature, incoordination, depression and rapid muscle twitching.

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.

SKIN

■ Skin contact is not thought to produce harmful health effects (as classified using animal models).

Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions.

■ 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 either adverse health effects or irritation of the respiratory tract following inhalation (as classified using animal models).

Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

■ 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

■ Harmful danger of serious damage to health by prolonged exposure if swallowed.

Harmful danger of serious damage to health by prolonged exposure if swallowed.

This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects.

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.

There is some evidence that inhaling this product is more likely to cause a sensitization reaction in some persons compared to the general population.

There is some evidence that human exposure to the material may result in developmental toxicity. This evidence is based on animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects.

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.

Some dithiocarbamates may cause birth defects and cancer and may affect male reproductive capacity. They may also cause goiter (overactivity of the thyroid gland) and nerve disorders.

Thiocarbamates have been shown to alter sperm form and therefore reproduction.

Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).

Prolonged exposure has resulted in peripheral and optic neuritis (inflammation of nerves). Hyperactive hepatitis has also been reported.

Limb reduction anomalies have been recorded in infants whose mothers took disulfiram during pregnancy.

When introduced by the oral route, disulfiram increase the incidence of liver cell tumours and caused a slight increase in the number of lung tumours in males of one strain of mice, but not in another.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
disulfiram	97-77-8	95

Section 4 - FIRST AID MEASURES

SWALLOWED

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise

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 dust is inhaled, remove from contaminated area.
- Encourage patient to blow nose to ensure clear passage of breathing.

- If irritation or discomfort persists seek medical attention.

NOTES TO PHYSICIAN

■ Treat symptomatically.

Medical literature on human exposure to thiocarbamate derivatives is scarce.

- Animal studies suggest that contact dermatitis and thyroid hyperplasia may occur following exposure.
- These compounds do not have the cholinergic properties of structurally related carbamate insecticides.

As a general rule thiocarbamates can be absorbed by the skin, mucous membranes and respiratory and gastrointestinal tract. They are eliminated quickly via expired air and urine.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg)	7.501 x 10 ⁻⁶ (25 C, calc)
Upper Explosive Limit (%)	Not available.
Specific Gravity (water=1)	1.3
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.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 100 metres in all directions.

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), nitrogen oxides (NO_x), sulfur oxides (SO_x), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

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

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Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact by using protective equipment.
- Use dry clean up procedures and avoid generating dust.
- Place in a suitable, labelled container for waste disposal.

Environmental hazard - contain spillage.

MAJOR SPILLS

Environmental hazard - contain spillage.

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

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

STORAGE REQUIREMENTS

- Store below 38 deg. C.

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	disulfiram (Disulfiram)		2						
Canada - British Columbia Occupational Exposure Limits	disulfiram (Disulfiram)		2						
US ACGIH Threshold Limit Values (TLV)	disulfiram (Disulfiram)		2						TLV Basis vasodilation; nausea
US NIOSH Recommended Exposure Limits	disulfiram (Disulfiram)		2						(TWA ([Precautions should be taken to avoid concurrent exposure to

(RELs)						ethylene dibromide.]))
US - Minnesota Permissible Exposure Limits (PELs)	disulfiram (Disulfiram)	2				
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	disulfiram (Disulfiram)	2				
US - California Permissible Exposure Limits for Chemical Contaminants	disulfiram (Disulfiram)	2				
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	disulfiram (Disulfiram)	2				
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	disulfiram (Disulfiram)	2				
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	disulfiram (Disulphiram)	2		4		
US - Hawaii Air Contaminant Limits	disulfiram (Disulfiram)	2		5		
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	disulfiram (Disulfiram)	-	2	-	5	
US - Washington Permissible exposure limits of air contaminants	disulfiram (Disulfram)	2		4		
US - Alaska Limits for Air Contaminants	disulfiram (Disulfiram)	2				
Canada - Nova Scotia Occupational Exposure Limits	disulfiram (Disulfiram)	2				TLV Basis vasodilation; nausea

Canada - Prince Edward Island Occupational Exposure Limits	disulfiram (Disulfiram)	2		TLV Basis vasodilation; nausea
US - Michigan Exposure Limits for Air Contaminants	disulfiram (Disulfiram)	2		
Canada - Northwest Territories Occupational Exposure Limits (English)	disulfiram (Disulfiram)	2	5	

PERSONAL PROTECTION



RESPIRATOR

•Particulate. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with side shields.
- Chemical goggles.

HANDS/FEET

Wear chemical protective gloves, eg. PVC.

NOTE The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

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

- 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, AS/NZS 2161.1 or national equivalent).

- 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, AS/NZS 2161.10.1 or national equivalent) 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, AS/NZS 2161.10.1 or national equivalent) 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.

OTHER

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

ENGINEERING CONTROLS

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.

- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

Does not mix with water.

Sinks in water.

State	Divided solid	Molecular Weight	296.54
Melting Range (°F)	147- 163	Viscosity	Not Applicable
Boiling Range (°F)	243(17 mm Hg)	Solubility in water (g/L)	Immiscible
Flash Point (°F)	Not available	pH (1% solution)	6-8 (3% slurry)
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available.	Vapor Pressure (mmHg)	7.501 x 10 ⁻⁶ (25 C, calc)
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	1.3
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	Not applicable
Volatile Component (%vol)	Not applicable	Evaporation Rate	Not applicable

APPEARANCE

■ The thiurams are manufactured from a secondary amine (dimethylamine or diethylamine) and carbon disulfide to form a dithiocarbamate; two of these dithiocarbamate molecules are attached to each other using an oxidiser such as hydrogen peroxide. Thiuram sulfides degrade to their respective dithiocarbamates when exposed to heat or alkaline conditions and to carbon disulfide and amine in acid. Odorless crystalline powder or pellets; does not mix with water (1.3 g/cm³). Slight bitter taste.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

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

STORAGE INCOMPATIBILITY

- Thiocarbamates and dithiocarbamates are incompatible with acids, peroxides, and acid halides.
- Flammable gases are generated by the combination of thiocarbamates and dithiocarbamates with aldehydes, nitrides, and hydrides.

Avoid reaction with oxidizing agents.

Avoid strong acids.

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

Section 11 - TOXICOLOGICAL INFORMATION

disulfiram

TOXICITY AND IRRITATION

DISULFIRAM

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

TOXICITY

IRRITATION

Oral (rat) LD50 500 mg/kg

Eye (rabbit) 100 mg - Mild

Oral (human) LDLo 160 mg/kg

Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema.

The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.

Acute Toxicity Acute oral and dermal toxicity data are available for several thiurams. The acute oral LD50 for tetramethyl thiuram monosulfide (TMTM) is 1320 mg/kg, for tetramethyl thiuram disulfide (TMTD), 1080 mg/kg, for tetraethyl thiuram disulfide (TETD), approximately 1300 mg/kg. The acute dermal LD50 for TMTM and TMTD is >2000 mg/kg; for TETD, 2050 mg/kg. The acute inhalation LC50 for TMTD is 4.4 mg/l. Acceptable data on two routes of exposure are available for all three compounds. Given their structural and biological similarity it is expected that the inhalation toxicity of TETD and TMTM would closely resemble that of TMTD.

Mutagenicity Bacterial reverse mutation assays, in vitro and in vivo chromosome aberration studies, and other in vitro and in vivo genetic toxicity studies have been conducted on thiurams. Positive and negative results have been observed in essentially all in vitro studies conducted on these compounds. The results of in vivo mutagenicity studies are uniformly negative. It has been concluded that thiurams are weakly mutagenic when tested using in vitro methods and non-mutagenic using in vivo methods.

Repeated Dose Toxicity Several 90-day subchronic toxicity studies and an 18-month carcinogenicity study have been conducted on TMTD. A 90-day study and a 2-year carcinogenicity study have been conducted on TETD. Fifteen-day, 28-day and 18-month studies have been conducted on TMTM. In addition, TETD has been used as a human drug for several decades with few adverse effects reported.

Reproductive and Developmental Toxicity Developmental toxicity data are available for all three materials; reproductive toxicity data are available for TMTD. The results of these studies show that none of these compounds are selective or specific developmental or reproductive toxins.

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

The substance is classified by IARC as Group 3

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).

CARCINOGEN

Disulfiram	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3
Disulfiram	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A4
disulfiram	US - Rhode Island Hazardous Substance List	IARC	
TWAPPM~	US - Maine Chemicals of High Concern List	Carcinogen	A4

Section 12 - ECOLOGICAL INFORMATION

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

This material and its container must be disposed of as hazardous waste.

Avoid release to the environment.

Refer to special instructions/ safety data sheets.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions

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

! Puncture containers to prevent re-use and bury at an authorized landfill.

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



DOT:

Symbols:	G	Hazard class or Division:	9
Identification Numbers:	UN3077	PG:	III
Label Codes:	9	Special provisions:	8, 146, 335, B54, IB8, IP3, N20, T1, TP33
Packaging: Exceptions:	155	Packaging: Non-bulk:	213
Packaging: Exceptions:	155	Quantity limitations: Passenger aircraft/rail:	No limit
Quantity Limitations: Cargo aircraft only:	No limit	Vessel stowage: Location:	A
Vessel stowage: Other:	None		

Hazardous materials descriptions and proper shipping names:

Environmentally hazardous substance, solid, n.o.s

Air Transport IATA:

UN/ID Number:	3077	Packing Group:	III
Special provisions:	A97		
Cargo Only			
Packing Instructions:	956	Maximum Qty/Pack:	400 kg
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	Y956	Maximum Qty/Pack:	400 kg
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	956	Maximum Qty/Pack:	30 kg G

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. *(CONTAINS DISULFIRAM)

Maritime Transport IMDG:

IMDG Class:	9	IMDG Subrisk:	None
UN Number:	3077	Packing Group:	III
EMS Number:	F-A,S-F	Special provisions:	274 335
Limited Quantities:	5 kg	Marine Pollutant:	Yes

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.(contains disulfiram)

Section 15 - REGULATORY INFORMATION

disulfiram (CAS: 97-77-8) 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 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 Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "International Council of Chemical Associations (ICCA) - High Production Volume List", "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 - 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 - 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 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 Dangerous waste constituents list", "US - Washington Permissible exposure limits of air contaminants", "US ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "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 NIOSH Recommended Exposure Limits (RELs)", "US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "US TSCA Section 8 (a) - Preliminary Assessment Information Rules (PAIR) - Reporting List", "US TSCA Section 8 (d) - Health and Safety Data Reporting"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Cumulative effects may result following exposure*.
 - Limited evidence of a carcinogenic effect*.
 - Possible respiratory sensitiser*.
 - May be harmful to the foetus/ embryo*.
- * (limited evidence).

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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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