

Pentane

sc-250672



The Power to Question

Material Safety Data Sheet

Hazard Alert Code
Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

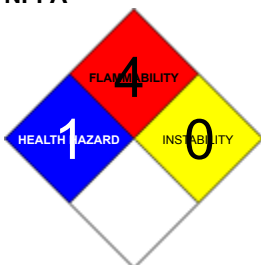
PRODUCT NAME

Pentane

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

C5-H12, H3C(CH2)3CH3, "amyl hydride", "normal pentane", normal-pentane, "n pentane", "solvent hydrocarbon", "hydrocarbon solvent", "aliphatic hydrocarbon solvent"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	4	
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

HARMFUL - May cause lung damage if swallowed.

Extremely flammable.

Repeated exposure may cause skin dryness and cracking.

Vapours may cause drowsiness and dizziness.

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

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result.

(ICSC13733).

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

■ Ingestion of pentanes may result in diarrhoea, haemorrhage of the mucous membranes, or when the liquid vapourises in the trachea, asphyxiation leading to brain damage or death.

Ingestion may also cause nausea, vomiting and abdominal swelling.

■ Considered an unlikely route of entry in commercial/industrial environments.

The liquid may produce gastrointestinal discomfort and may be harmful if swallowed.

EYE

■ Although the liquid is not thought to be an irritant, direct contact with the eye may produce transient discomfort characterized by tearing or conjunctival redness (as with windburn).

■ Eye-contact with the liquid pentanes may result in inflammation of the iris and mucous membranes resulting in pain and lachrymation.

Eye contact with liquid or very high vapour concentrations may result in drying, redness, swelling and pain.

SKIN

■ The liquid may be miscible with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis.

The material is unlikely to produce an irritant dermatitis as described in EC Directives .

■ Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.

■ 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.

■ Material on the skin evaporates rapidly and may cause tingling, chilling and even temporary numbness.

■ Symptoms of pentane exposure may include drying, cracking, itching, blistering, redness, pigmentation, swelling, burning and pain.

Because pentane boils just below body temperature, absorption is not expected to be a significant route of entry.

INHALED

■ 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 vapors or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.

■ There is some evidence to suggest that the material can cause respiratory irritation in some persons.

The body's response to such irritation can cause further lung damage.

■ Inhalation of high concentrations of gas/vapor causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.

■ Central nervous system (CNS) depression may include general discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness.

Serious poisonings may result in respiratory depression and may be fatal.

- Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. Vapor is heavier than air and may displace and replace air in breathing zone, acting as a simple asphyxiant.
- Symptoms of pentane inhalation exposure may include, hyperactivity, anaesthesia and a persistent taste of gasoline.

Light anaesthesia occurs in mice after 10 minutes exposure to 70000 ppm n-pentane.

CHRONIC HEALTH EFFECTS

- Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following. Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
- Chronic exposure to pentanes may result in chemical pneumonitis, pulmonary oedema or peripheral neuropathy. Prolonged or repeated inhalation may cause dizziness, weakness, weight loss, anaemia, nervousness, pain in the limbs and peripheral numbness ("pins and needles").

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
Pentane	109-66-0	>98

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.
- Avoid giving milk or oils.
- Avoid giving alcohol.
- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

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 or hair contact occurs

- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED

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

NOTES TO PHYSICIAN

- Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically.

For acute or short term repeated exposures to petroleum distillates or related hydrocarbons

- Primary threat to life, from pure petroleum distillate ingestion and/or inhalation, is respiratory failure.
- Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO₂ 50 mm Hg) should be intubated.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg)	500.291 @ 25 deg.
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Upper Explosive Limit (%)	7.8
Specific Gravity (water=1)	0.63
Lower Explosive Limit (%)	1.4

EXTINGUISHING MEDIA

- Foam.
- Dry chemical powder.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- May be violently or explosively reactive.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 500 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Liquid and vapor are highly flammable.
- Severe fire hazard when exposed to heat, flame and/or oxidizers.

Combustion products include carbon dioxide (CO₂), other pyrolysis products typical of burning organic material. Contains low boiling substance Closed containers may rupture due to pressure buildup under fire conditions.

FIRE INCOMPATIBILITY

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

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Containers, even those that have been emptied, may contain explosive vapours.
- Do NOT cut, drill, grind, weld or perform similar operations on or near containers.

Contains low boiling substance

Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.

- Check for bulging containers.
- Vent periodically
- Electrostatic discharge may be generated during pumping - this may result in fire.
- Ensure electrical continuity by bonding and grounding (earthing) all equipment.
- Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<=1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec).
- Avoid splash filling.
- Do NOT use compressed air for filling discharging or handling operations.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

Packing as supplied by manufacturer. Plastic containers may only be used if approved for flammable liquid.

- For low viscosity materials (i) Drums and jerricans must be of the non-removable head type. (ii) Where a can is to be used as an inner package, the can must have a screwed enclosure.
- For materials with a viscosity of at least 2680 cSt. (23 deg. C)

STORAGE REQUIREMENTS

- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.

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 - Quebec Permissible Exposure Values for Airborne Contaminants (English)	n-pentane (n-Pentane)	120	350						
Canada - Prince Edward Island Occupational Exposure Limits	n-pentane (n-Pentane)	600							TLV Basis peripheral neuropathy
US OSHA Permissible Exposure Levels (PELs) - Table Z1	n-pentane (Pentane)	1000	2950						
US NIOSH Recommended Exposure Limits (RELs)	n-pentane (n-Pentane)	120	350			610	1800		(Ceiling ([15-minute]))
US - Hawaii Air Contaminant Limits	n-pentane (Pentane)	600	1,800	750	2,250				
US - Washington Permissible exposure limits of air contaminants	n-pentane (Pentane)	600		750					
US - Michigan Exposure Limits for Air Contaminants	n-pentane (Pentane)	600	1800	750	2250				
Canada - Nova Scotia Occupational Exposure Limits	n-pentane (n-Pentane)	600							TLV Basis peripheral neuropathy
Canada - Northwest Territories Occupational Exposure Limits (English)	n-pentane (Pentane)	600	1771	750	2213				
Canada - British Columbia Occupational Exposure Limits	n-pentane (Diesel fuel, as total hydrocarbons, Inhalable)		100 (V)						Skin
Canada - British Columbia Occupational Exposure Limits	n-pentane (Kerosene /Jet fuels, as total hydrocarbon)		200 (P)						Skin

		vapour, Revised 2003)				
Canada - Alberta Occupational Exposure Limits	n-pentane (Kerosene/Jet fuels, as total hydrocarbon vapour)	200				
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	n-pentane (Diesel fuel as total hydrocarbons, (vapour))	100	150			Skin
Canada - Alberta Occupational Exposure Limits	n-pentane (Diesel fuel, as total hydrocarbons)	100				
US - California Permissible Exposure Limits for Chemical Contaminants	n-pentane (Pentane)	600	1,800			
US - Minnesota Permissible Exposure Limits (PELs)	n-pentane (Pentane)	600	1800	750	2250	
Canada - Ontario Occupational Exposure Limits	n-pentane (Pentane, All isomers / Pentane, tous les isomères)	600	1,770	750	2,210	
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	n-pentane (Pentane)	600	1800	750	2250	
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	n-pentane (Pentane)	1000	2950			
US - Idaho - Limits for Air Contaminants	n-pentane (Pentane)	1000	2950			
Canada - British Columbia Occupational Exposure Limits	n-pentane (Pentane, all isomers)	600				

US - Alaska Limits for Air Contaminants	n-pentane (Pentane)	600	1800	750	2250
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	n-pentane (Pentane, all isomers)	600		750	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	n-pentane (Pentane)	600	1,800	750	2,250
Canada - Alberta Occupational Exposure Limits	n-pentane (Pentane, all isomers)	600	1770		
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	n-pentane (Pentane)	1000	2950		

US - Oregon Permissible Exposure Limits (Z-1)

n-pentane (Pentane)	500	1,500
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Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits.

PERSONAL PROTECTION



RESPIRATOR

•Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with side shields.
- Chemical goggles.

HANDS/FEET

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.

- Neoprene gloves

Wear chemical protective gloves, eg. PVC.

OTHER

- Overalls.
- PVC Apron.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

ENGINEERING CONTROLS

For flammable liquids and flammable gases, local exhaust ventilation or a process enclosure ventilation system may be required. Ventilation equipment should be explosion-resistant.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.

Does not mix with water.

Floats on water.

State	Liquid	Molecular Weight	72.15
Melting Range (°F)	-202	Viscosity	Not Available
Boiling Range (°F)	97(n-pentane)	Solubility in water (g/L)	Immiscible
Flash Point (°F)	-56	pH (1% solution)	Not applicable.
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	500	Vapor Pressure (mmHg)	500.291 @ 25 deg.
Upper Explosive Limit (%)	7.8	Specific Gravity (water=1)	0.63
Lower Explosive Limit (%)	1.4	Relative Vapor Density (air=1)	2.5
Volatile Component (%vol)	100	Evaporation Rate	28.6 BuAc=1
Gas group	IIA		

n-pentane

log Kow (Sangster 1997)

3.39

APPEARANCE

Mobile, highly flammable liquid with a mild gasoline-like odor; floats on water. Miscible with alcohol, ether and many organic solvents. Odor threshold 300-500 ppm. with 50% recognition at 990 ppm. Solubility in water 0.04% at 20 deg. C. Other pentane isomers are 2-methyl butane, tetramethyl methane and ethyl dimethyl methane (3-dimethyl butane).

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.

- Product is considered stable.

STORAGE INCOMPATIBILITY

| n-Pentane

- reacts violently with strong oxidisers
- attacks some plastics, rubber and coatings
- may generate static charges o flow or agitation, due to low conductivity

Avoid reaction with oxidizing agents.

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

Section 11 - TOXICOLOGICAL INFORMATION

n-pentane

TOXICITY AND IRRITATION

N-PENTANE

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

TOXICITY	IRRITATION
Inhalation (human) LCLo 130000 ppm	Nil Reported
Inhalation (rat) LC50 >6100 ppm	
Inhalation (human) TCLo 90000 ppm (5m) [GENIUM and CCINFO, V.W.&R.]	

CARCINOGEN

n-pentane	US - Rhode Island Hazardous Substance List	IARC
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SKIN

n-pentane	Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin
n-pentane	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1

Section 12 - ECOLOGICAL INFORMATION

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.

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

Name / EHS	TRN	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Cas No																
/																
RTECS																
No																
Pentane	110	561	3	3	R	3	NI	0	0	0	1	1			E	2
/	5															
CAS:109																
- 66- 0																
/																

Legend: EHS=EHS Number (EHS=GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships) NRT=Net Register Tonnage, A1a=Bioaccumulation log Pow, A1b=Bioaccumulation BCF, A1=Bioaccumulation, A2=Biodegradation, B1=Acuteaquatic toxicity LC/ECIC50 (mg/l), B2=Chronic aquatic toxicity NOEC (mg/l), C1=Acute mammalian oral toxicity LD50 (mg/kg), C2=Acute mammalian dermal toxicity LD50 (mg/kg), C3=Acute mammalian inhalation toxicity LC50 (mg/kg), D1=Skin irritation & corrosion, D2=Eye irritation& corrosion, D3=Long-term health effects, E1=Tainting, E2=Physical effects on wildlife & benthic habitats,

E3=Interference with coastal amenities, For column A2: R=Readily biodegradable, NR=Not readily biodegradable. For column D3: C=Carcinogen, M=Mutagenic, R=Reprotoxic, S=Sensitising, A=Aspiration hazard, T=Target organ systemic toxicity, L=Lunginjury, N=Neurotoxic, I=Immunotoxic. For column E1: NT=Not tainting (tested), T=Tainting test positive. For column E2: Fp=Persistent floater, F=Floater, S=Sinking substances. The numerical scales start from 0 (no hazard), while higher numbers reflect increasing hazard. (GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships)

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (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. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. 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:	None	Hazard class or Division:	3
Identification Numbers:	UN1265	PG:	I
Label Codes:	3	Special provisions:	T11, TP2
Packaging: Exceptions:	150	Packaging: Non-bulk:	201
Packaging: Exceptions:	150	Quantity limitations: Passenger aircraft/rail:	1 L
Quantity Limitations: Cargo aircraft only:	30 L	Vessel stowage: Location:	E
Vessel stowage: Other:	None		

Hazardous materials descriptions and proper shipping names:

Pentanes

Air Transport IATA:

ICAO/IATA Class:	3	ICAO/IATA Subrisk:	None
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UN/ID Number:	1265	Packing Group:	I
Special provisions:	None		
Cargo Only			
Packing Instructions:	361	Maximum Qty/Pack:	30 L
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	351	Maximum Qty/Pack:	1 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Forbidden	Maximum Qty/Pack:	Forbidden
Shipping Name: PENTANES LIQUID			
Maritime Transport IMDG:			
IMDG Class:	3	IMDG Subrisk:	None
UN Number:	1265	Packing Group:	I
EMS Number:	F-E,S-D	Special provisions:	None
Limited Quantities:	0	Marine Pollutant:	Yes
Shipping Name: PENTANES, liquid			

Section 15 - REGULATORY INFORMATION

n-pentane (CAS: 109-66-0) is found on the following regulatory lists;

"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 Domestic Substances List (DSL)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "International Fragrance Association (IFRA) Survey: Transparency List", "US - Hawaii Air Contaminant Limits", "US - Michigan Exposure Limits for Air Contaminants", "US - Washington Permissible exposure limits of air contaminants", "US ACGIH Threshold Limit Values (TLV)", "US DOE Temporary Emergency Exposure Limits (TEELs)", "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 TSCA Section 12(b) - List of Chemical Substances Subject to Export Notification Requirements", "USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Inhalation and/or ingestion may produce health damage*.
- Cumulative effects may result following exposure*.
- May produce discomfort of the respiratory system*.

* (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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Issue Date: Sep-12-2008

Print Date: Oct-25-2011