

1-Bromopropane

sc-255818



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

1-Bromopropane

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Santa Cruz Biotechnology, Inc.
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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

C3-H7-Br, CH3CH2CH2Br, "propane, 1-bromo-", "propyl bromide", "brominated hydrocarbon", nPB

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

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

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

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Forms very sensitive explosive metallic compounds.

May impair fertility.

Possible risk of harm to the unborn child.

Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Irritating to eyes, respiratory system and skin.

Highly flammable.

Vapours may cause drowsiness and dizziness.

Harmful to aquatic organisms.

Dangerous for the ozone layer.

Repeated exposure potentially causes skin dryness and cracking*.

Cumulative effects may result following exposure*.

Inhalation, skin contact and/or ingestion may produce health damage*.

* (limited evidence).

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

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

■ At sufficiently high doses the material may be nephrotoxic(i).

e.

■ At sufficiently high doses the material may be hepatotoxic(i).

e.

EYE

■ This material can cause eye irritation and damage in some persons.

SKIN

■ This material can cause inflammation of the skin oncontact in some persons.

■ The material may accentuate any pre-existing dermatitis condition.

■ Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

■ 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 can cause respiratory irritation in some persons.

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

■ Inhalation of vapours may cause drowsiness and dizziness.

This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo.

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

■ Inhalation hazard is increased at higher temperatures.

■ Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages.

Signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident, a single organ alone is (almost) never involved.

■ Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons.

Inebriation and excitation, passing into narcosis, is a typical reaction.

■ In the case of iodised and brominated compounds, exposure effects cannot be described by simple central nervous system depression produced by other halogenated aliphatic hydrocarbons.

Headache, nausea, ataxia (loss of muscle co-ordination), tremors, speech difficulties, visual disturbances, convulsions, paralysis, delirium, mania and apathy are all evidence of additional effects.

CHRONIC HEALTH EFFECTS

■ Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

Ample evidence exists from experimentation that reduced human fertility is directly caused by exposure to the material.

Based on experience with animal studies, exposure to the material may result in toxic effects to the development of the foetus, at levels which do not cause significant toxic effects to the mother.

Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

Chronic intoxication with ionic bromides, historically, has resulted from medical use of bromides but not from environmental or occupational exposure; depression, hallucinosis, and schizophreniform psychosis can be seen in the absence of other signs of

intoxication. Bromides may also induce sedation, irritability, agitation, delirium, memory loss, confusion, disorientation, forgetfulness (aphasias), dysarthria, weakness, fatigue, vertigo, stupor, coma, decreased appetite, nausea and vomiting, diarrhoea, hallucinations, an acne like rash on the face, legs and trunk, known as bronchoderma (seen in 25-30% of case involving bromide ion), and a profuse discharge from the nostrils (coryza).

Long term overexposure may cause adverse effects in liver, respiratory system, kidney and central nervous system. [Albemarle]

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
1-bromopropane	106-94-5	99.9

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.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.

If poisoning occurs, contact a doctor or Poisons Information Centre.

- Avoid giving milk or oils.
- Avoid giving alcohol.

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.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin contact occurs:

- Immediately remove all contaminated clothing, including footwear.
- 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.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.

NOTES TO PHYSICIAN

- Treat symptomatically.

for intoxication due to Freons/ Halons;

A: Emergency and Supportive Measures

- Maintain an open airway and assist ventilation if necessary
- Treat coma and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increased myocardial sensitisation may be treated with propranolol, 1-2 mg IV or esmolol 25-100 microgm/kg/min IV.
- Monitor the ECG for 4-6 hours

B: Specific drugs and antidotes:

- There is no specific antidote

DO NOT administer sympathomimetic drugs as they may cause ventricular arrhythmias.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	138.664 @ 25 C.
Upper Explosive Limit (%):	8.5
Specific Gravity (water=1):	1.354
Lower Explosive Limit (%):	4.6

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 1000 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Liquid and vapour are highly flammable.
- Severe fire hazard when exposed to heat, flame and/or oxidisers.
- Vapour may travel a considerable distance to source of ignition.
- Heating may cause expansion or decomposition leading to violent rupture of containers.

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

Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.

Forms a flammable mixture with air over a narrow concentration range (4.6-8.5%).

FIRE INCOMPATIBILITY

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

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

Environmental hazard - contain spillage.

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.

MAJOR SPILLS

Environmental hazard - contain spillage.

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.

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
- Always release caps or seals slowly to ensure slow dissipation of vapours
- DO NOT allow clothing wet with material to stay in contact with skin
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.

RECOMMENDED STORAGE METHODS

- CARE: Packing of high density product in light weight metal or plastic packages may result in container collapse with product release
- DO NOT use aluminium or galvanised containers
- Packing as supplied by manufacturer.
- Plastic containers may only be used if approved for flammable liquid.
- Check that containers are clearly labelled and free from leaks.
- For low viscosity materials (i) : Drums and jerry cans 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)
- For manufactured product having a viscosity of at least 250 cSt. (23 deg. C)

- Manufactured product that requires stirring before use and having a viscosity of at least 20 cSt (25 deg. C)

STORAGE REQUIREMENTS

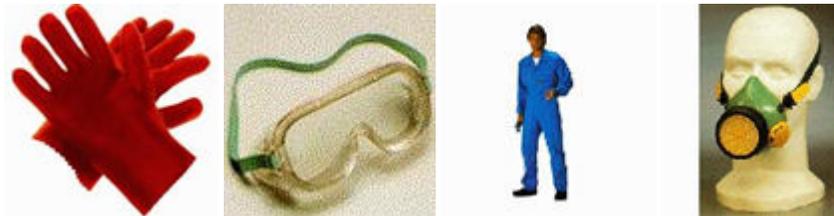
- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.
- DO NOT store in pits, depressions, basements or areas where vapours may be trapped.
- Keep containers securely sealed.

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
US ACGIH Threshold Limit Values (TLV)	1-bromopropane (1-Bromopropane)	10							TLV® Basis: (Liver & embryo/fetal dam; neurotoxicity) , See Notice of Intended Changes (NIC)

PERSONAL PROTECTION



RESPIRATOR

- Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with side shields.
- Chemical goggles.
- 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], [AS/NZS 1336 or national equivalent]

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.
- Wear safety footwear or safety gumboots, eg. Rubber

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
- Neoprene rubber gloves

Do NOT use natural rubber.

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.
- 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

■ Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of

protection.

The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.

Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.

Does not mix with water.

Sinks in water.

State	Liquid	Molecular Weight	122.99
Melting Range (°F)	-166	Viscosity	Not Available
Boiling Range (°F)	160	Solubility in water (g/L)	Immiscible
Flash Point (°F)	57(25 Sigma)	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	914	Vapor Pressure (mmHg)	138.664 @ 25 C.
Upper Explosive Limit (%)	8.5	Specific Gravity (water=1)	1.354
Lower Explosive Limit (%)	4.6	Relative Vapour Density (air=1)	4.3
Volatile Component (%vol)	100	Evaporation Rate	4.5 BuAc=1

APPEARANCE

Highly flammable dense liquid; does not mix with water. Highly volatile with distinctive pungent odor. Data suggests No Flash Point when tested to ASTM D-56 (Tag Closed Cup) but for shipping product is Class 3, packing group II liquid.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

STORAGE INCOMPATIBILITY

■ Haloalkanes:

- are highly reactive:some of the more lightly substituted lower members are highly flammable; the more highly substituted may be used as fire suppressants, not always with the anticipated results.
- may react with the lighter divalent metals to produce more reactive compounds analogous to Grignard reagents.
- may produce explosive compounds following prolonged contact with metallic or other azides
- may react on contact with potassium or its alloys - although apparently stable on contact with a wide range of halocarbons, reaction products may be shock-sensitive and may explode with great violence on light impact; severity generally increases with the degree of halocarbon substitution and potassium-sodium alloys give extremely sensitive mixtures .

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

Section 11 - TOXICOLOGICAL INFORMATION

1-bromopropane

TOXICITY AND IRRITATION

■ 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.

CARCINOGEN

ORGANIC BROMINE COMPOUNDS	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s) P65-MC
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1-bromopropane

US - Maine Chemicals of High Concern List

Carcinogen

REPROTOXIN

1-bromopropane US - California Proposition 65 - Reproductive Toxicity NSRL or MADL (µg/day)

SKIN

1-bromopropane US - California Permissible Exposure Limits for Chemical Contaminants - Skin Skin S

Section 12 - ECOLOGICAL INFORMATION

Harmful to aquatic organisms.
 Dangerous for the ozone layer.
 This material and its container must be disposed of as hazardous waste.
 Avoid release to the environment.
 Refer to special instructions/ safety data sheets.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
1-bromopropane	LOW	No Data Available	LOW	HIGH

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

Name / EHS Cas No / RTECS No	TRN	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3	
1- Bromopr opane / CAS:106 - 94- 5 / 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)	222	269	2		2	NI	NI	NI	0	(0)	0	(2)	(2)			SD	2

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.

- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.

Otherwise:

- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

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 or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material).
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	3
Identification Numbers:	UN2344	PG:	II
Label Codes:	3	Special provisions:	IB2, T4, TP1
Packaging: Exceptions:	150	Packaging: Non-bulk:	202
Packaging: Exceptions:	150	Quantity limitations: Passenger aircraft/rail:	5 L
Quantity Limitations: Cargo aircraft only:	60 L	Vessel stowage: Location:	B
Vessel stowage: Other:	40		

Hazardous materials descriptions and proper shipping names:

Bromopropanes

Air Transport IATA:

ICAO/IATA Class:	3	ICAO/IATA Subrisk:	None
UN/ID Number:	2344	Packing Group:	II
Special provisions:	A3		
Cargo Only			
Packing Instructions:	364	Maximum Qty/Pack:	60 L
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	353	Maximum Qty/Pack:	5 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Y341	Maximum Qty/Pack:	1 L

Shipping name: BROMOPROPANES

Maritime Transport IMDG:

IMDG Class:	3	IMDG Subrisk:	None
UN Number:	2344	Packing Group:	II
EMS Number:	F-E,S-D	Special provisions:	None
Limited Quantities:	1 L		

Shipping name: BROMOPROPANES

Section 15 - REGULATORY INFORMATION



1-bromopropane (CAS: 106-94-5) is found on the following regulatory lists;

"Canada - British Columbia Occupational Exposure Limits", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada National Pollutant Release Inventory (NPRI)", "Canada Substances In Products Regulated Under the Food and Drugs Act (F&DA) That Were In Commerce In Canada Between January 1, 1984 and December 31, 1986 (English)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "International Chemical Secretariat (ChemSec) SIN List (*Substitute It Now!)", "OECD List of High Production Volume (HPV) Chemicals", "US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for Which Emissions Must Be Quantified", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - California Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity", "US - California Proposition 65 - Reproductive Toxicity", "US - Maine Chemicals of High Concern List", "US - New Jersey Right to Know Hazardous Substances (English)", "US - North Dakota Air Pollutants - Guideline Concentrations", "US - Pennsylvania - Hazardous Substance List", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Notice of Intended Changes", "US Department of Transportation (DOT), Hazardous Material Table", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "US TSCA New Chemical Exposure Limits (NCEL)"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Inhalation, skin contact and/or ingestion may produce health damage*.
- Cumulative effects may result following exposure*.
- Repeated exposure potentially causes skin dryness and cracking*.

* (limited evidence).

■ 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.

■ For detailed advice on Personal Protective Equipment, refer to the following U.S. Regulations and Standards:

OSHA Standards - 29 CFR:

1910.132 - Personal Protective Equipment - General requirements

1910.133 - Eye and face protection

1910.134 - Respiratory Protection

1910.136 - Occupational foot protection

1910.138 - Hand Protection

Eye and face protection - ANSI Z87.1

Foot protection - ANSI Z41

Respirators must be NIOSH approved.

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www.Chemwatch.net

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