

# N-tert-Butyldiethanolamine

sc-228740



The Power is Question

Material Safety Data Sheet

Hazard Alert Code Key:

EXTREME

HIGH

MODERATE

LOW

## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

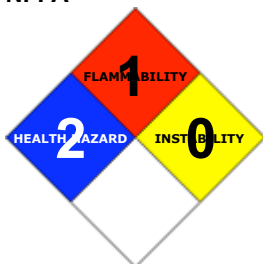
### PRODUCT NAME

N-tert-Butyldiethanolamine

### STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

### NFPA



### SUPPLIER

Santa Cruz Biotechnology, Inc.  
2145 Delaware Avenue  
Santa Cruz, California 95060  
800.457.3801 or 831.457.3800

### 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

C8-H19-N-O2, (CH3)3CN(CH2CH2OH)2, "N, N-bis(2-hydroxyethyl)-tert-butylamine", "2, 2' -butyliminodiethanol"

## Section 2 - HAZARDS IDENTIFICATION

### CHEMWATCH HAZARD RATINGS

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

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



### CANADIAN WHMIS SYMBOLS



### EMERGENCY OVERVIEW

## **RISK**

Harmful if swallowed.

Causes burns.

Risk of serious damage to eyes.

## **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.

■ The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

■ Amines without benzene rings when swallowed are absorbed throughout the gut.

Corrosive action may cause damage throughout the gastrointestinal tract.

■ Ingestion of amine epoxy-curing agents (hardeners) may cause severe abdominal pain, nausea, vomiting or diarrhea.

The vomitus may contain blood and mucous.

#### **EYE**

■ The material can produce chemical burns to the eye following direct contact.

Vapors or mists may be extremely irritating.

■ If applied to the eyes, this material causes severe eye damage.

■ Vapors of volatile amines irritate the eyes, causing excessive secretion of tears, inflammation of the conjunctiva and slight swelling of the cornea, resulting in "halos" around lights.

This effect is temporary, lasting only for a few hours.

#### **SKIN**

■ The material can produce chemical burns following direct contact with the 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.

■ Volatile amine vapors produce irritation and inflammation of the skin.

Direct contact can cause burns.

■ 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.

■ Amine epoxy-curing agents (hardeners) may produce primary skin irritation and sensitization dermatitis in predisposed individuals.

Cutaneous reactions include erythema, intolerable itching and severe facial swelling.

#### **INHALED**

■ If inhaled, this material can irritate the throat and lungs of some persons.

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

■ Inhalation of amine vapors may cause irritation of the mucous membrane of the nose and throat, and lung irritation with respiratory distress and cough.

Swelling and inflammation of the respiratory tract is seen in serious cases; with headache, nausea, faintness and anxiety. There may also be wheezing.

■ Inhalation of epoxy resin amine hardeners (including polyamines and amine adducts) and may produce bronchospasm and coughing episodes lasting several days after cessation of the exposure.

Even faint traces of these vapors may trigger an intense reaction in individuals showing "amine asthma".

### **CHRONIC HEALTH EFFECTS**

■ Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue.

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 limited evidence that, skin contact with this product is more likely to cause a sensitization reaction in some persons compared to the general population.

Both secondary amines and tertiary amines can be nitrosated by nitrosating agents to yield nitrosamines. In the case of tertiary amines, the mechanism involves intermediate conversion of the tertiary amine to a secondary amine.

Some types of nitrosamines have been shown to be carcinogenic in tests using laboratory animals. In general, all nitrosamines are presumed to be carcinogenic unless they've been tested and shown to be relatively harmless. Nitrosamines are often generated as undesired byproducts in certain foods (especially bacon) and cosmetic and hygiene products (such as shampoo and hair conditioner).

The occurrence of significant levels of nitrosamines in commercial products is normally not accepted. In formulations which contain nitrosating agents, formation of nitrosamines can become a concern where secondary and/or tertiary amines are used as pH control agents.

The most typical nitrosating agents added to formulations are nitrite salts such as sodium or potassium nitrite. Such nitrites are generally added as corrosion inhibitors. Formation of nitrosamine contaminants in such formulations usually results from the reaction of such nitrosating agents with secondary and/or tertiary amines. Nitrosation can occur during product preparation, either during heating or at moderate temperatures. It can also occur while a product sits on a shelf, especially if the product sits for months in a warehouse that becomes warm. Many efforts have been made to eliminate nitrosamines from various substances, or to reduce their concentrations to the lowest practical levels. In various types of food, the use of ascorbic acid (vitamin C) and alpha-tocopherol (vitamin E) and their salts is known to inhibit nitrosamine formation.

In animal experiments the oesophagus is shown to be the most important target organ for nitrosamines, independent of the route of application. The mechanism of this organotrophy cannot be explained sufficiently. The high oesophageal epithelium metabolic activation of nitrosamines, together with a comparatively low DNA repair, probably plays the most important role. In addition chronic stress factors, which

lead to high stimulation of epithelial turnover, are a pacemaker for malignant progression. In some countries, the traditional consumption of extremely hot drinks leads to constant burns of the oesophagus, which increases the risk. Mate, a non-alcoholic brew, frequently consumed as tea in Uruguay, appears to be a high risk factor for oesophageal cancer.

Inhalation of epoxy resin amine hardeners (including polyamines and amine adducts) and may produce bronchospasm and coughing episodes lasting several days after cessation of the exposure. Even faint traces of these vapors may trigger an intense reaction in individuals showing "amine asthma".

### Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
N-tert-butyl-diethanolamine	2160-93-2	>98

### Section 4 - FIRST AID MEASURES

#### SWALLOWED

· For advice, contact a Poisons Information Center or a doctor at once. · Urgent hospital treatment is likely to be needed.

#### EYE

■ If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with 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: · Immediately flush body and clothes with large amounts of water, using safety shower if available. · Quickly remove all contaminated clothing, including footwear.

#### INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested. Inhalation of vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g.

#### NOTES TO PHYSICIAN

■ For acute or short-term repeated exposures to highly alkaline materials:  
· Respiratory stress is uncommon but present occasionally because of soft tissue edema.  
· Unless endotracheal intubation can be accomplished under direct vision, cricothyroidotomy or tracheotomy may be necessary.  
Probable mucosal damage may contraindicate gastric lavage.

### Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Not available
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	~40-45
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 full body protective clothing with breathing apparatus.  
When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

#### GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Combustible.  
· Slight fire hazard when exposed to heat or flame.  
Combustion products include: carbon dioxide (CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), other pyrolysis products typical of burning organic material.  
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:  
Safety Glasses.  
Full face- shield.  
Gloves:  
Respirator:  
Type A Filter of sufficient capacity

### Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.
- Clean up all spills immediately.
- Avoid breathing vapors and contact with skin and eyes.

**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**

- 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.

**RECOMMENDED STORAGE METHODS**

■ Glass container.

DO NOT use aluminum or galvanized containers.

- Lined metal can, Lined metal pail/drum
- Plastic pail.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

**STORAGE REQUIREMENTS**

- Store in original containers.
  - Keep containers securely sealed.
- DO NOT store near acids, or oxidizing agents.
- No smoking, naked lights, heat or ignition sources.

**Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION**

**EXPOSURE CONTROLS**

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
Canada - Ontario Occupational Exposure Limits	N-tert-butyl-diethanolamine (Particles (Insoluble or Poorly Soluble) Not Otherwise)		10 (I)						
Canada - British Columbia Occupational Exposure Limits	N-tert-butyl-diethanolamine (Particles (Insoluble or Poorly Soluble) Not Otherwise Classified (PNOC))		10 (N)						
Canada - Ontario Occupational Exposure Limits	N-tert-butyl-diethanolamine (Specified (PNOS) / Particules (insolubles ou peu solubles) non précisées par ailleurs)		3 (R)						
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	N-tert-butyl-diethanolamine (Particulates not otherwise regulated Respirable fraction)		5						
US - California Permissible Exposure Limits for Chemical Contaminants	N-tert-butyl-diethanolamine (Particulates not otherwise regulated Respirable fraction)		5						(n)
US - Oregon Permissible Exposure Limits (Z-1)	N-tert-butyl-diethanolamine (Particulates not otherwise regulated (PNOR) (f) Total Dust)	-	10						Bold print identifies substances for which the Oregon

Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means "particles not otherwise regulated."

US - Michigan Exposure Limits for Air Contaminants	N-tert-butyl-diethanolamine (Particulates not otherwise regulated, Respirable dust)	5
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Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means "particles not otherwise regulated."

US - Oregon Permissible Exposure Limits (Z-1)	N-tert-butyl-diethanolamine (Particulates not otherwise regulated (PNOR) (f) Respirable Fraction)	5
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US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	N-tert-butyl-diethanolamine (Particulates not otherwise regulated (PNOR)(f)- Respirable fraction)	5
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Canada - Prince Edward Island Occupational Exposure Limits	N-tert-butyl-diethanolamine (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)	10
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See Appendix B current TLV/BEI Book

ENDOELTABLE

**PERSONAL PROTECTION**



**RESPIRATOR**

- type a filter of sufficient capacity.
- Consult your EHS staff for recommendations

**EYE**

- Chemical goggles.
- Full face shield.

**HANDS/FEET**

- Wear chemical protective gloves, eg. PVC.
- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

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: 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.

Leather wear not recommended: Contaminated leather footwear, watch bands, should be destroyed, i.e. burnt, as it cannot be adequately decontaminated.

- Neoprene gloves.

#### OTHER

- Overalls.
- PVC Apron.

#### ENGINEERING CONTROLS

- Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

#### PHYSICAL PROPERTIES

Liquid.

Mixes with water.

Corrosive.

Alkaline.

State	Liquid	Molecular Weight	161.25
Melting Range (°F)	Not available	Viscosity	Not Available
Boiling Range (°F)	505- 509	Solubility in water (g/L)	Miscible
Flash Point (°F)	Not available	pH (1% solution)	Not available
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Not available
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	~40-45
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	>1
Volatile Component (%vol)	Not available.	Evaporation Rate	Not available

#### APPEARANCE

Tan solid or viscous light straw-coloured liquid (dependent on ambient conditions) with faint amine-like odour; mixes with water.

### Section 10 - CHEMICAL STABILITY

#### CONDITIONS CONTRIBUTING TO INSTABILITY

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

#### STORAGE INCOMPATIBILITY

- Avoid contact with copper, aluminium and their alloys.

Avoid strong acids.

Avoid reaction with oxidizing agents.

Corrodes aluminium and steel in the presence of moisture and carbon dioxide.

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

### Section 11 - TOXICOLOGICAL INFORMATION

N-tert-butyl-diethanolamine

#### TOXICITY AND IRRITATION

##### N-TERT-BUTYLDIETHANOLAMINE:

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.
- The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

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 hyperreactivity 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 respiratory tract irritation, and result in damage to the lung including reduced lung function.

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.

No significant acute toxicological data identified in literature search.

## CARCINOGEN

VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	CA Prop 65; IARC; NTP 11th ROC
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## Section 12 - ECOLOGICAL INFORMATION

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

### Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
N-tert-butyl-diethanolamine	HIGH	No Data Available	LOW	HIGH

### 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 \_\_\_\_\_  
 \_\_\_\_\_ Alcoholic 293 85 0 0 0 R 0 0 0 0 0 1 D 1 beverages / CAS:2160-93-2 /

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=Acute aquatic toxicity LC/EC1C50 (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=Lung injury, 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

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

### 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. 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: 8

Identification Numbers: UN2735 PG: III

Label Codes: 8 Special provisions: IB3, T7,

TP1, TP28

Packaging: Exceptions: 154 Packaging: Non- bulk: 203

Packaging: Exceptions: 154 Quantity limitations: 5 L

Passenger aircraft/rail:

Quantity Limitations: Cargo 60 L Vessel stowage: Location: A  
aircraft only:  
Vessel stowage: Other: 52  
Hazardous materials descriptions and proper shipping names:  
Amines, liquid, corrosive, n.o.s., or Polyamines, liquid, corrosive, n.o.s.

**Air Transport IATA:**

ICAO/IATA Class: 8 ICAO/IATA Subrisk: None  
UN/ID Number: 2735 Packing Group: III  
Special provisions: A3  
Cargo Only  
Packing Instructions: 60 L Maximum Qty/Pack: 856  
Passenger and Cargo Passenger and Cargo  
Packing Instructions: 5 L Maximum Qty/Pack: 852  
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity  
Packing Instructions: 1 L Maximum Qty/Pack: Y841  
Shipping Name: AMINES, LIQUID, CORROSIVE, N.O.S. \*  
(CONTAINS N-TERT-BUTYLDIETHANOLAMINE)

**Maritime Transport IMDG:**

IMDG Class: 8 IMDG Subrisk: None  
UN Number: 2735 Packing Group: III  
EMS Number: F-A , S-B Special provisions: 223 274  
Limited Quantities: 5 L  
Shipping Name: AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S. 8(contains N-tert-butyl-diethanolamine)

## Section 15 - REGULATORY INFORMATION

**N-tert-butyl-diethanolamine (CAS: 2160-93-2) is found on the following regulatory lists;**

"Canada Non-Domestic Substances List (NDSL)", "US - Pennsylvania - Hazardous Substance List", "US EPA High Production Volume Chemicals 1994 List of Additions", "US Toxic Substances Control Act (TSCA) - Inventory"

## Section 16 - OTHER INFORMATION

**ND**

Substance CAS Suggested codes N- tert- butyl-diethanolamine 2160- 93- 2 Xi; R38

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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](http://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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