2-(Dibutylamino)ethanol

sc-229860

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
2-(Dibutylamino)ethanol

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
C10-H23-N-O, [CH3(CH2)3)2NCH2CH2OH, "ethanol, 2-dibutylamino", 2-N-dibutylaminoethanol, 2-dibutylaminoethanol, 2-di-n-butylaminoethanol, "N, N-di-n-butylaminoethanol", "N, N dibutylethanolamine", "N, N dibutyl N-(2-hydroxyethyl)amine", dibutyl-2-hydroxyethyl-amine, DBAE, "beta-N-dibutylaminoethyl alcohol"

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

Causes burns.
Risk of serious damage to eyes.
Harmful in contact with skin and if swallowed.

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.

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.

SKIN

■ Skin contact with the material may be harmful; systemic effects may resultfollowing absorption.
■ The material can produce chemical burns following direct contactwith the skin.
■ When applied to the skin of rabbits dibutylaminoethanol DBAE produced necrosis within 24 hours.
■ 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.
■ Absorption by skin may readily exceed vapor inhalation exposure.
Symptoms for skin absorption are the same as for inhalation.

INHALED

■ If inhaled, this material can irritate the throat andlungs 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 exposure of rats 6 hours/day at 70 ppm dibutylaminoethanol (DBAE) for 1 week resulted in eye and nasal irritation, convulsions.
There was a 57% average weight loss for the group, a two fold increase in liver- to kidney weight ratio, a 10-fold increase in serum bilirubin, a slight increase in clotting time and elevated haematocrits.
■ Inhalation hazard is increased at higher temperatures.

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.
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 limited evidence that, skin contact with this product is more likely to cause a sensitization reaction in some persons compared to the general population.
Secondary amines may react with nitrites to form potentially carcinogenicN-nitrosamines.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
dibutylaminoethanol	102-81-8	>96

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.

NOTES TO PHYSICIAN

■ for poisons (where specific treatment regime is absent)

----------BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.

Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg)	2.775
Upper Explosive Limit (%)	5.5
Specific Gravity (water=1)	0.86 920 C)
Lower Explosive Limit (%)	0.9

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 for fire only.

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_2), nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.
May emit poisonous fumes.

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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- Dry chemical powder.

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Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

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

MAJOR SPILLS

- DO NOT touch the spill material
- 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 USE brass or copper containers / stirrers
- 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

- DO NOT use aluminium, galvanised or tin-plated 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.

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 - Alberta Occupational Exposure Limits	dibutylaminoethanol (2-N-Dibutylaminoethanol)	0.5	3.5						
Canada - British Columbia Occupational Exposure Limits	dibutylaminoethanol (2-N-Dibutylaminoethanol)	0.5							Skin
US NIOSH Recommended Exposure Limits (RELs)	dibutylaminoethanol (2-N-Dibutylaminoethanol)	2	14						[skin]
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	dibutylaminoethanol (2-N-Dibutylaminoethanol)	2	14						
US ACGIH Threshold Limit Values (TLV)	dibutylaminoethanol (2-N-Dibutylaminoethanol)	0.5							TLV Basis eye & upper respiratory tract irritation. BEI-A
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	dibutylaminoethanol (2-N-Dibutylamino-ethanol)	2	14						
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	dibutylaminoethanol (2-N-Dibutylaminoethanol)	2	14						
US - Minnesota Permissible Exposure Limits (PELs)	dibutylaminoethanol (2-N-Dibutylaminoethanol)	2	14						
US - California Permissible Exposure Limits for Chemical Contaminants	dibutylaminoethanol (2-N-Dibutylaminoethanol)	2	14						

US - Hawaii Air Contaminant Limits	dibutylaminoethanol (2-N-Dibutylamino-ethanol)	2	14	4	28		
US - Alaska Limits for Air Contaminants	dibutylaminoethanol (2-N-Dibutylaminoethanol)	2	14				
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	dibutylaminoethanol (2-N-Dibutylaminoethanol)	0.5		1			Skin
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	dibutylaminoethanol (2-N-Dibutylaminoethanol - Skin)	2	14	4	28		
US - Washington Permissible exposure limits of air contaminants	dibutylaminoethanol (2-N-Dibutylamino ethanol)	2		4			
Canada - Nova Scotia Occupational Exposure Limits	dibutylaminoethanol (2-N-Dibutylaminoethanol)	0.5					TLV Basis eye & upper respiratory tract irritation. BEI-A
Canada - Prince Edward Island Occupational Exposure Limits	dibutylaminoethanol (2-N-Dibutylaminoethanol)	0.5					TLV Basis eye & upper respiratory tract irritation. BEI-A
Canada - Northwest Territories Occupational Exposure Limits (English)	dibutylaminoethanol (2-N-Dibutylaminoethanol - Skin)	2	14	4	28		
US - Michigan Exposure Limits for Air Contaminants	dibutylaminoethanol (2-N-Dibutylaminoethanol)	2	14				
US - Oregon Permissible Exposure Limits (Z-1)	dibutylaminoethanol (2-N-Dibutylaminoethanol)	2	14				Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits.

PERSONAL PROTECTION




RESPIRATOR

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

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

- 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.
- Eyewash unit.

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.

State	Liquid	Molecular Weight	173.30
Melting Range (°F)	<-94	Viscosity	7.4 cSt@40°C
Boiling Range (°F)	435- 450	Solubility in water (g/L)	Soluble
Flash Point (°F)	199	pH (1% solution)	Not available
Decomposition Temp (°F)	Not Available	pH (as supplied)	> 9
Autoignition Temp (°F)	464	Vapor Pressure (mmHg)	2.775
Upper Explosive Limit (%)	5.5	Specific Gravity (water=1)	0.86 920 C)
Lower Explosive Limit (%)	0.9	Relative Vapor Density (air=1)	. 2
Volatile Component (%vol)	100	Evaporation Rate	Very Slow

APPEARANCE

Combustible liquid; soluble in water (11.57 g/l). Mild amine, fish like odor. Alkaline reaction.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

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

STORAGE INCOMPATIBILITY

¦ Dibutylaminoethanol

- reacts violently with strong oxidisers, strong acids, isopropyl percarbonate, nitrosyl perchlorate, sodium peroxide, uranium fluoride
- is incompatible with aldehydes, boranes, cellulose nitrate (of high surface area), cresols, isocyanates, nitrates, nitric acid, organic anhydrides, phenols, sulfuric acid

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

Section 11 - TOXICOLOGICAL INFORMATION

dibutylaminoethanol

TOXICITY AND IRRITATION

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

TOXICITY	IRRITATION
Oral (rat) LD50 1070 mg/kg	Skin (rabbit) 5 mg/24H SEVERE
Intraperitoneal (rat) LD50 144 mg/kg	Skin (rabbit) 500 mg - SEVERE
Intraperitoneal (mouse) LD50 52 mg/kg	Eye (rabbit) 20 mg - SEVERE
Dermal (rabbit) LD50 1680 mg/kg	

Oral (Rat) LD50 600 mg/kg *

■ For dibutylaminoethanol (DBAE)

DBAE was studied in rats of both sexes with the OECD Test Guideline 407 for repeated dose 28-day oral toxicity study in rodents, at doses of 0, 25, 100 and 400 mg/kg.

Three males and 5 females died in the 400 mg/kg group. Intermittent cage-licking and chewing were observed in the 100 and 400 mg/kg groups. With 400 mg/kg, convulsions, twitching, tremors, vocalization, pale color of the skin, gasping, hypopnea, decrease in movement, adoption of a prone position and salivation were observed. In addition, bradycardia, reddish tears, exophthalmos and piloerection appeared in some animals of the 400 mg/kg group, together with a high frequency of ambulation in the motor activity test, depressed body weight gain in females and decreased food consumption in both sexes. Furthermore, with 400 mg/kg, plasma chloride levels were decreased in both sexes, the plasma sodium level was decreased in males, and cholesterol and glucose levels were increased and cholinesterase activity reduced in females. Pathological findings in the 400 mg/kg groups were as follows; increase in liver weights and kidney weights, centrilobular hypertrophy of hepatocytes and vacuolation of the epithelium in renal collecting tubules. Additionally, increase in adrenal gland weights and hypertrophy of the zona fasciculata were found in 400 mg/kg females. From these results, the NOELs are considered to be 25 mg/kg /day for males and females.

Genotoxicity of DBAE was studied by a reverse mutation test in bacteria. This substance was not mutagenic in Salmonella typhimurium TA100, TA98, TA1535, TA1537 or Escherichia coli WP2 uvrA, with or without an exogenous metabolic activation system.

DBAE induced structural chromosomal aberrations and polyploidy in CHL/IU cells after short-term (6 hr) treatment, with and without metabolic activation.

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

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

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.

Change in cardiac rate, respiratory depression, diarrhoea, true cholinesterase inhibition recorded.

* BASF MSDS

CARCINOGEN

dibutylaminoethanol	US - Rhode Island Hazardous Substance List	IARC

SKIN

dibutylaminoethanol	US - Washington Permissible exposure limits of air contaminants - Skin	Skin	X
dibutylaminoethanol	US ACGIH Threshold Limit Values (TLV) - Skin	Skin Designation	Yes
dibutylaminoethanol	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	TLV Basis eye & upper respiratory tract irritation. BEI-A
dibutylaminoethanol	US NIOSH Recommended Exposure Limits (RELs) - Skin	Skin	Yes
dibutylaminoethanol	US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs) - Skin	Skin	X
dibutylaminoethanol	US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) - Skin	Skin	X
dibutylaminoethanol	Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin
dibutylaminoethanol	US - Hawaii Air Contaminant Limits - Skin Designation	Skin Designation	X
dibutylaminoethanol	US - Oregon Permissible Exposure Limits (Z2) - Skin	Skin	X
dibutylaminoethanol	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	X
dibutylaminoethanol	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	S
dibutylaminoethanol	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1,3

Section 12 - ECOLOGICAL INFORMATION

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

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. 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 or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	6.1
Identification Numbers:	UN2873	PG:	III
Label Codes:	6.1	Special provisions:	IB3, T4, TP1
Packaging: Exceptions:	153	Packaging: Non-bulk:	203
Packaging: Exceptions:	153	Quantity limitations: Passenger aircraft/rail:	60 L
Quantity Limitations: Cargo aircraft only:	220 L	Vessel stowage: Location:	A
Vessel stowage: Other:	None		

Hazardous materials descriptions and proper shipping names:
Dibutylaminoethanol

Air Transport IATA:

ICAO/IATA Class:	6.1	UN/ID Number:	2873
Packing Group:	III	Special provisions:	None
		Cargo Only	
		Packing Instructions:	663
Maximum Qty/Pack:	220 L	Passenger and Cargo	
Passenger and Cargo		Packing Instructions:	Y642
Maximum Qty/Pack:	60 L	Passenger and Cargo Limited Quantity	
Passenger and Cargo Limited Quantity		Packing Instructions:	655
Maximum Qty/Pack:	2 L		

Shipping Name: DIBUTYLAMINOETHANOL

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	None
UN Number:	2873	Packing Group:	III
EMS Number:	F-A,S-A	Special provisions:	None
Limited Quantities:	5 L		

Shipping Name: N,N-DI-n-BUTYLAMINOETHANOL

Section 15 - REGULATORY INFORMATION

dibutylaminoethanol (CAS: 102-81-8) 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 - 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 Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","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 - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US ACGIH Threshold Limit Values (TLV)","US NIOSH Recommended Exposure Limits (RELs)","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE
■ Inhalation may produce health damage*.
■ Cumulative effects may result following exposure*.
■ Limited evidence of a carcinogenic effect*.
■ Possible skin sensitiser*.
* (limited evidence).

Denmark Advisory list for selfclassification of dangerous substances

Substance	CAS	Suggested codes
dibutylaminoethanol	102- 81- 8	Xn; R22 R43 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.

■ 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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