(±)-Propylene oxide

sc-215755

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
(±)-Propylene oxide

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
C3-H6-O, "propane, 1, 2-epoxy-", epoxypropane, "2, 3-epoxypropane", "methyl ethylene oxide", "methyl oxirane", "propane, epoxy-", "propene oxide", "propylene epoxide", "1, 2-propylene oxide", NCI-C50099

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	4		
Toxicity:	2		
Body Contact:	2		
Reactivity:	2		
Chronic:	3		

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

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

May cause CANCER.
May cause heritable genetic damage.
Harmful by inhalation, in contact with skin and if swallowed.
Irritating to eyes, respiratory system and skin.
Extremely flammable.
Vapours may cause drowsiness and dizziness.

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.
■ Not normally a hazard due to physical form of product.
■ Considered an unlikely route of entry in commercial/industrial environments.
■ 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.

EYE

■ There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation.
Severe inflammation may be expected with pain.

SKIN

■ Skin contact with the material may be harmful; systemic effects may resultfollowing absorption.
■ The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time.
Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering.
■ 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.
■ Aqueous solutions containing less than 10% propylene oxide may be very irritating or, if the concentration is high enough, burns.

INHALED

■ Inhalation of vapors or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.
■ 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 narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.
■ Inhalation hazard is increased at higher temperatures.
■ Symptoms of systemic intoxication by propylene oxide include ataxia and general depression.
One case of human poisoning reported in Russia resulted from vapour exposure to 1500 ppm w/v for 10 minutes.
■ Acute effects from inhalation of high vapor concentrations may be chest and nasal irritation with coughing, sneezing, headache and even nausea.

CHRONIC HEALTH EFFECTS

■ Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
There is ample evidence that this material can be regarded as being able to cause cancer in humans based on experiments and other information.
Based on experiments and other information, there is ample evidence to presume that exposure to this material can cause genetic defects that can be inherited.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
Propylene oxide is a cumulative central nervous system depressant and a mild cytoplasmic poison.
When administered by inhalation propylene oxide induced haemangiomas or haemangiosarcomas of the nasal cavity in mice of both sexes, the incidence of adrenal pheochromocytomas and peritoneal mesotheliomas in male weanling rats. Oral administration by gavage, produced dose-dependent increases in the incidence of local tumors, mainly squamous cell carcinomas of the fore-stomach. Subcutaneous injection in female mice, increased the incidence of local tumors, mainly fibrosarcomas.
Because of its alkylating properties, propylene oxide is unequivocally mutagenic and also clastogenic in several in vitro test systems. In vivo, the mutagenicity is weak and has been demonstrated only in exceptional circumstances such as after intraperitoneal injection of high doses.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
propylene oxide	75-56-9	>99

Section 4 - FIRST AID MEASURES

SWALLOWED

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

EYE
■ If this product comes in contact with the eyes: · Wash out immediately with fresh running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN
■ If skin contact occurs: · Immediately remove all contaminated clothing, including footwear · Flush skin and hair with running water (and soap if available).

INHALED
· If 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.
Treatment of inhalation poisoning with anti-histamines and sodium thiosulfate has been suggested by Beljaev etal, 1971.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	399.783 @ 17.8 C
Upper Explosive Limit (%):	36
Specific Gravity (water=1):	0.830 @ 20 C
Lower Explosive Limit (%):	2.3

EXTINGUISHING MEDIA
· Alcohol stable foam.
· Water spray or fog.
· Foam.

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.
May emit clouds of acrid smoke.

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

PERSONAL PROTECTION
Glasses:
Chemical goggles.
Gloves:
1.TEFLON 2.PVA
Respirator:
Type AX Filter of sufficient capacity

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.
· DO NOT allow clothing wet with material to stay in contact with skin.
· DO NOT USE brass or copper containers / stirrers.
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.
· 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/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
Canada - British Columbia Occupational Exposure Limits	propylene oxide (Propylene oxide)	2							2B; S
US - Minnesota Permissible Exposure Limits (PELs)	propylene oxide (Propylene oxide)	20	50						
Canada - Alberta Occupational Exposure Limits	propylene oxide (1,2-Epoxypropane (Propylene oxide))	2	4.7						
US OSHA Permissible Exposure Levels (PELs) - Table Z1	propylene oxide (Propylene oxide)	100	240						
US ACGIH Threshold Limit Values (TLV)	propylene oxide (Propylene oxide)	2							TLV Basis: eye & upper respiratory tract irritation
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	propylene oxide (Propylene oxide)	20	50						
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	propylene oxide (Propylene oxide)	100	240						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	propylene oxide (Propylene oxide)	20	50						
US - Idaho - Limits for Air Contaminants	propylene oxide (Propylene oxide)	100	240						
US - California Permissible Exposure Limits for Chemical Contaminants	propylene oxide (Propylene oxide; 1,2-epoxy-propane)	2	4.75						

Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	propylene oxide (Propylene oxide)	20	48				
US - Hawaii Air Contaminant Limits	propylene oxide (Propylene oxide)	20	50				
US - Alaska Limits for Air Contaminants	propylene oxide (Propylene oxide)	20	50				
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	propylene oxide (Propylene oxide)	2		4			SEN, T20
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	propylene oxide (1,2-Epoxypropane, see Propylene oxide)	100	240	150	360		
US - Washington Permissible exposure limits of air contaminants	propylene oxide (1, 2-Epoxypropane (Propylene oxide))	20		30			
Canada - Nova Scotia Occupational Exposure Limits	propylene oxide (Propylene oxide)	2					TLV Basis: eye & upper respiratory tract irritation
Canada - Prince Edward Island Occupational Exposure Limits	propylene oxide (Propylene oxide)	2					TLV Basis: eye & upper respiratory tract irritation
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	propylene oxide (Propylene oxide)	100	240				
Canada - Northwest Territories Occupational Exposure Limits (English)	propylene oxide (1,2-Epoxypropane (Propylene oxide))	20	47	30	71		
US - Michigan Exposure Limits for Air Contaminants	propylene oxide (Propylene oxide)	20	50				
US - Oregon Permissible Exposure Limits (Z-1)	propylene oxide (Propylene oxide)	100	240				

ENDOELTABLE

PERSONAL PROTECTION




RESPIRATOR

Type AX Filter of sufficient capacity
Consult your EHS staff for recommendations

EYE

· Safety glasses with side shields.
· Chemical goggles.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.
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.
· Neoprene gloves.

OTHER

· Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area.
· Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted.
· Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely.
· Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood.
· Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
· 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

· Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area.
· Work should be undertaken in an isolated system such as a "glove-box" . Employees should wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system.
· Within regulated areas, the carcinogen should be stored in sealed containers, or enclosed in a closed system, including piping systems, with any sample ports or openings closed while the carcinogens are contained within.
· Open-vessel systems are prohibited.
· Each operation should be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation.
· Exhaust air should not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean make-up air should be introduced in sufficient volume to maintain correct operation of the local exhaust system.
· For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
· Except for outdoor systems, regulated areas should be maintained under negative pressure (with respect to non-regulated areas).
· Local exhaust ventilation requires make-up air be supplied in equal volumes to replaced air.
· Laboratory hoods must be designed and maintained so as to draw air inward at an average linear face velocity of 150 feet/ min. with a minimum of 125 feet/ min. Design and construction of the fume hood requires that insertion of any portion of the employees body, other than hands and arms, be disallowed.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.
Mixes with water.

State	Liquid	Molecular Weight	58.08
Melting Range (°F)	-156	Viscosity	Not Available
Boiling Range (°F)	94	Solubility in water (g/L)	Miscible
Flash Point (°F)	-35(closed cup	pH (1% solution)	Not available.
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	840	Vapor Pressure (mmHg)	399.783 @ 17.8 C
Upper Explosive Limit (%)	36	Specific Gravity (water=1)	0.830 @ 20 C
Lower Explosive Limit (%)	2.3	Relative Vapor Density (air=1)	2.0
Volatile Component (%vol)	100	Evaporation Rate	Not available
Gas group	IIB		

propylene oxide	
log Kow (Prager 1995):	0.03

APPEARANCE

Clear highly flammable liquid; mixes with water. Sweet ether like odour. Soluble in alcohol and ether.

log Kow 0.03 Experimental and modelled log Kow values of 0.03 and 0.37, respectively indicate that the potential for bioaccumulation of propylene oxide in aquatic organisms is likely to be low.

Material	Value

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

· Presence of heat source and ignition source.
· Presence of incompatible materials.
· Product is considered stable.

STORAGE INCOMPATIBILITY

■ High pressure, bench scale experiments, involving 1,2-epoxides require a well-designed agitated reactor, with adequate provision for reaction heat removal and emergency pressure relief, prevention of back-flow from the reactor to oxide storage vessels, avoidance of a reaction atmosphere of 100% ethylene oxide vapor and/or presence of air and the avoidance of the use of excess oxides. A range of exothermic decomposition energies for epoxides is given as 45-80 kJ/mol.
· Epoxides are highly reactive with acids, bases, and oxidizing and reducing agents.
· Epoxides react, possibly with anhydrous metal chlorides, ammonia, amines and group 1 metals.
The material is highly reactive and may decompose explosively in contact with a number of materials.
Propylene oxide:
· contact with steam, water may lead to runaway reaction
· is able to form unstable peroxides - acids, caustics and metal halides can cause hazardous polymerisation
· reacts with acids, ammonia, amines, acetylene forming metals, clay-based adsorbents
· is incompatible with anhydrous metal chlorides, caustics, ammonium hydroxide, salts
· attacks some plastics, rubber and coatings
· flow or agitation may generate electrostatic charges due to low conductivity and may cause ignition of vapours.

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

Section 11 - TOXICOLOGICAL INFORMATION

propylene oxide

TOXICITY AND IRRITATION

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

TOXICITY	IRRITATION
Oral (rat) LD50: 380 mg/kg	Skin (rabbit):415 mg Open Moderate
Inhalation (rat) LCLo: 4000 ppm/4h	Skin (rabbit): 50 mg/6m SEVERE
Dermal (rabbit) LD50: 1245 mg/kg	Eye (rabbit): 5 mg SEVERE
	Eye (rabbit): 20 mg/24h Moderate

■ 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 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.
WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen
[National Toxicology Program: U.S. Dep. of Health & Human Services 2002].

CARCINOGEN

	US - Rhode Island Hazardous Substance List	IARC	
PROPYLENE OXIDE	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
PROPYLENE OXIDE	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
Propylene oxide (inhalation)	US Air Toxics Hot Spots TSD for Describing Available Cancer Potency Factors	IARC Class	2B
Propylene oxide (oral)	US Air Toxics Hot Spots TSD for Describing Available Cancer Potency Factors	IARC Class	
VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	CA Prop 65; IRIS; NTP 11th ROC

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
propylene oxide	HIGH		LOW	HIGH

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.
¦ 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: 3
Identification Numbers: UN1280 PG: I
Label Codes: 3 Special provisions: A3, N34,
T11, TP2,
TP7
Packaging: Exceptions: None Packaging: Non- bulk: 201
Packaging: Exceptions: None Quantity limitations: 1 L
Passenger aircraft/rail:
Quantity Limitations: Cargo 30 L Vessel stowage: Location: E
aircraft only:
Vessel stowage: Other: 40
Hazardous materials descriptions and proper shipping names:
Propylene oxide

Air Transport IATA:

ICAO/IATA Class: 3 ICAO/IATA Subrisk: None
UN/ID Number: 1280 Packing Group: I
Special provisions: None
Cargo Only
Packing Instructions: 30 L Maximum Qty/Pack: 1 L
Passenger and Cargo Passenger and Cargo
Packing Instructions: 361 Maximum Qty/Pack: 351
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: Forbidden Maximum Qty/Pack: Forbidden
Shipping Name: PROPYLENE OXIDE

Maritime Transport IMDG:

IMDG Class: 3 IMDG Subrisk: None
UN Number: 1280 Packing Group: I
EMS Number: F-E , S-D Special provisions: None
Limited Quantities: 0
Shipping Name: PROPYLENE OXIDE

Section 15 - REGULATORY INFORMATION

propylene oxide (CAS: 75-56-9,16088-62-3) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Objectives","Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Industrial Hazardous Substances","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Saskatchewan Occupational Health and Safety Regulations - Designated Chemical Substances","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Ingredient Disclosure List (SOR/88-64)","Canada National Pollutant Release Inventory (NPRI)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","IMO IBC Code Chapter 17: Summary of minimum requirements","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs","International Chemical Secretariat (ChemSec) REACH SIN* List (*Substitute It Now!) 1.0","OECD Representative List of High Production Volume (HPV) Chemicals","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Proposition 65 - Carcinogens","US - California Proposition 65 - Priority List for the Development of NSRLs for Carcinogens","US - California Toxic Air Contaminant List Category II","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Maine Chemicals of High Concern List","US - Massachusetts Oil & Hazardous Material List","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 Class A toxic air pollutants: Known and Probable Carcinogens","US - Washington Permissible exposure limits of air contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)","US Clean Air Act - Hazardous Air Pollutants","US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances","US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Acute Exposure Guideline Levels (AEGLs) - Final","US EPA Carcinogens Listing","US EPA High Production Volume Program Chemical List","US EPA Master Testing List - Index I Chemicals Listed","US EPCRA Section 313 Chemical List","US Food Additive Database","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US National Toxicology Program (NTP) 11th Report Part B. Reasonably Anticipated to be a Human Carcinogen","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Inventory","US TSCA Section 4/12 (b) - Sunset Date/Status","US TSCA Section 8 (d) - Health and Safety Data Reporting","USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27"

Section 16 - OTHER INFORMATION

ND
Substance CAS Suggested codes propylene oxide 75- 56- 9 Carc3; R40 Mut3; R68 Rep3; R63 Xn; R22 Xi; R38 propylene oxide 16088- 62- 3 Carc3; R40 Mut3; R68 Rep3; R63 Xn; R22 Xi; R38

Ingredients with multiple CAS Nos
Ingredient Name CAS propylene oxide 75-56-9, 16088-62-3

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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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