

Health	3
Fire	2
Reactivity	0
Personal Protection	

Material Safety Data Sheet

Benzyl bromide MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzyl bromide

Catalog Codes: SLB3574

CAS#: 100-39-0

RTECS: XS7965000

TSCA: TSCA 8(b) inventory: Benzyl bromide

CI#: Not applicable.

Synonym: Alpha-bromotoluene

Chemical Name: 1-Bromomethylbenzene

Chemical Formula: (-C(CH₂Br)=CHCH=CHCH=CH-)

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzyl bromide	100-39-0	100

Toxicological Data on Ingredients: Benzyl bromide LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of inhalation. Hazardous in case of ingestion. Corrosive to skin and eyes on contact. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Combustible.

Auto-ignition Temperature: Not available.

Flash Points: CLOSED CUP: 86°C (186.8°F).

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO₂), halogenated compounds.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. **LARGE FIRE:** Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Combustible. When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Combustible material. Corrosive liquid. Poisonous liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch

spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep container dry. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:

Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Liquid.)

Odor: Pungent.

Taste: Not available.

Molecular Weight: 171.04 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 198°C (388.4°F)

Melting Point: -3.9°C (25°F)

Critical Temperature: Not available.

Specific Gravity: 1.443 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether.

Solubility:

Partially soluble in methanol, diethyl ether. Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances:

Reactive with oxidizing agents. Slightly reactive to reactive with metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: May decompose on exposure to moist air or water.

Special Remarks on Corrosivity: Not available.

Polymerization: Yes.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Causes damage to the following organs: kidneys, lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant, permeator), of inhalation. Hazardous in case of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Tumorigen. 0700 In vitro studies in mammal cells, has shown mutagenic action.

Special Remarks on other Toxic Effects on Humans: Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Benzyl bromide UNNA: UN1737 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Massachusetts RTK: Benzyl bromide New Jersey: Benzyl bromide TSCA 8(b) inventory: Benzyl bromide

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 2

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 2

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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**CARBON DIOXIDE, Compressed & Liquefied Gas
(CO₂)****AL062****Warning****SECTION 1. Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Trade name : CARBON DIOXIDE, Compressed & Liquefied Gas
(CO₂) , Aligal 2
SDS Nr : AL062
Chemical formula : CO₂

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Test gas / Calibration gas. Laboratory use Contact supplier for more uses information
Use : Beverage product dispensing. Freezing applications. Refrigerant. Shielding gas.

1.3. Details of the supplier of the safety data sheet

Company identification : Air Liquide Australia Limited
Level 9 / 380 St. Kilda Road
Melbourne VIC 3004 Australia
Tel: + 61 3 9697 9888
Fax: + 61 3 9690 7107
5.1.2.e @AirLiquide.com

1.4. Emergency telephone number

Emergency telephone number : 1800 812 588

SECTION 2. Hazards identification**2.1. Classification of the substance or mixture****Hazard Class and Category Code Regulation EC 1272/2008 (CLP)**

• Physical hazards : Gases under pressure - Refrigerated liquefied gas - Warning - (CLP : Press. Gas) - H281

Classification EC 67/548 or EC 1999/45

: Not classified as dangerous substance/mixture.

2.2. Label elements**Labelling Regulation EC 1272/2008 (CLP)**

• Hazard pictograms



• Hazard pictograms code : GHS04
• Signal word : Warning
• Hazard statements : H281 - Contains refrigerated gas; may cause cryogenic burns or injury.
• Precautionary statements
- Prevention : P282 - Wear cold insulating gloves, face shield, eye protection.
- Response : P336+P315 - Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice / attention.
- Storage : P403 - Store in a well-ventilated place.

2.3. Other hazards**Air Liquide Australia Limited**

Level 9 / 380 St. Kilda Road Melbourne VIC 3004 Australia

Tel: + 61 3 9697 9888

Fax: + 61 3 9690 7107

5.1.2.e @AirLiquide.com

In case of emergency : 1800 812 588

**CARBON DIOXIDE, Compressed & Liquefied Gas
(CO₂)****AL062****SECTION 2. Hazards identification (continued)**

: None.

SECTION 3. Composition/information on ingredients**3.1. Substance / 3.2. Mixture****Substance.**

Substance name	Contents	CAS No	EC No	Annex No		Classification
Carbon dioxide	: 100 %	124-38-9	204-696-9	-----	* 1	Not classified (DSD/DPD) Liq. Gas (H280)

Contains no other components or impurities which will influence the classification of the product.

* 1: Listed in Annex IV / V REACH, exempted from registration.

* 2: Registration deadline not expired.

* 3: Registration not required: Substance manufactured or imported < 1t/y

Full text of R-phrases see chapter 16. Full text of H-statements see chapter 16

SECTION 4. First aid measures**4.1. Description of first aid measures****First aid measures**

- **Inhalation** : In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/ consciousness. Victim may not be aware of asphyxiation.
Low concentrations of CO₂ cause increased respiration and headache.
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
- **Skin/eye contact** : Immediately flush eyes thoroughly with water for at least 15 minutes.
In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- **Skin contact** : Adverse effects not expected from this product.
- **Eye contact** : Adverse effects not expected from this product.
- **Ingestion** : Not expected to present a significant ingestion hazard under anticipated conditions of normal use.

4.2. Most important symptoms and effects, both acute and delayed

: Refer to section 11.

4.3. Indication of any immediate medical attention and special treatment needed

: None.

SECTION 5. Fire-fighting measures**5.1. Extinguishing media****Extinguishing media**

- **Suitable extinguishing media** : All known extinguishants can be used.

5.2. Special hazards arising from the substance or mixture

- Specific hazards** : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products** : None.

5.3. Advice for fire-fighters**Specific methods**

- : Coordinate fire measure to the surrounding fire. Cool endangered containers with water spray jet from a protected position. Do not empty contaminated fire water into drains.
If possible, stop flow of product.
Move away from the container and cool with water from a protected position.
If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire.

**CARBON DIOXIDE, Compressed & Liquefied Gas
(CO₂)****AL062****SECTION 5. Fire-fighting measures (continued)**

- Special protective equipment for fire fighters** : In confined space use self-contained breathing apparatus.
- Flammable class** : Non flammable.

SECTION 6. Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

- Personal precautions** : Try to stop release.
: Evacuate area.
: Use protective clothing.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Ensure adequate air ventilation.

6.2. Environmental precautions

- : None.
: Try to stop release.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3. Methods and material for containment and cleaning up

- Clean up methods** : None.
: Ventilate area.

6.4. Reference to other sections

- : See also sections 8 and 13.

SECTION 7. Handling and storage**7.1. Precautions for safe handling**

- Safe use of the product** : Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Only experienced and properly instructed persons should handle gases under pressure.
The product must be handled in accordance with good industrial hygiene and safety procedures.
Do not smoke while handling product.
Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Safe handling of the gas receptacle** : Refer to supplier's container handling instructions.
Do not allow backfeed into the container.
Protect cylinders from physical damage; do not drag, roll, slide or drop.
When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.
Never attempt to repair or modify container valves or safety relief devices.
Damaged valves should be reported immediately to the supplier.
Keep container valve outlets clean and free from contaminants particularly oil and water.
Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
Close container valve after each use and when empty, even if still connected to equipment.
Never attempt to transfer gases from one cylinder/container to another.
Never use direct flame or electrical heating devices to raise the pressure of a container.
Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.
- General** : Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide. Potential production of solid CO₂ particles must be ruled out. In order to rule out potential electrostatic discharge production, the system must be adequately grounded.

**CARBON DIOXIDE, Compressed & Liquefied Gas
(CO₂)****AL062****SECTION 7. Handling and storage (continued)****Handling**

- : Suck back of water into the container must be prevented.
- Do not allow backfeed into the container.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Refer to supplier's container handling instructions.

7.2. Conditions for safe storage, including any incompatibilities

- : Keep away from combustible materials.
- Keep container below 50°C in a well ventilated place.
- Observe all regulations and local requirements regarding storage of containers.
- Containers should not be stored in conditions likely to encourage corrosion.
- Containers should be stored in the vertical position and properly secured to prevent toppling.
- Stored containers should be periodically checked for general condition and leakage.
- Container valve guards or caps should be in place.
- Store containers in location free from fire risk and away from sources of heat and ignition.

Storage

- : Keep container below 50°C in a well ventilated place.

7.3. Specific end use(s)

- : None.

SECTION 8. Exposure controls/personal protection**8.1. Control parameters****Occupational Exposure Limits****Carbon dioxide**

- : Value 8h (CZ) [mg/m³] : 9000
- : ILV (EU) - 8 H - [mg/m³] : 9000
- : ILV (EU) - 8 H - [ppm] : 5000
- : TLV[®] - TWA [ppm] : 5000
- : TLV[®] - STEL [ppm] : 30000
- : AGW (8h) - Germany [mg/m³] TRGS 900 : 9100
- : AGW (8h) - Germany [ppm] TRGS 900 : 5000
- : MAK (AU) Tagesmittelwert (ml/m³) : 5000
- : MAK (AU) Tagesmittelwert (mg/m³) : 9000
- : MAK (AU) Kurzzeitwerte (ml/m³) : 10000
- : MAK (AU) Kurzzeitwerte (mg/m³) : 18000
- : VLA-ED - Spain [ppm] : 5000
- : VLA-ED - Spain [mg/m³] : 9150
- : VLA-EC - Spain [ppm] : 15000
- : VLA-EC - Spain [mg/m³] : 27400
- : NGV - [ppm] : 5000
- : NGV - [mg/m³] : 9000
- : KTV - [ppm] : 10
- : KTV - [mg/m³] : 10
- : HTP-vården (FI) - 8 H - [ppm] : 5000
- : HTP-vården (FI) - 8 H - [mg/m³] : 9100
- : Grænserværdier (DK) (ppm) : 5000
- : Grænserværdier (DK) (ppm) : 9000
- : Grænserværdier (DK) : 9000
- : GV Value Limit (Norway) [ppm] : 5000
- : GV Value Limit (Norway) [mg/m³] : 9000
- : 8-Hour TWA (PL) (NDS) (mg/m³) : 9000
- : 15-Minute STEL (PL)(NDSch) (mg/m³) : 27000
- : Valori Limite di Soglia (IT) 8 ore [ppm] : 5000

**CARBON DIOXIDE, Compressed & Liquefied Gas
(CO₂)****AL062****SECTION 8. Exposure controls/personal protection (continued)**

	: Valori Limite di Soglia (IT) 8 ore [mg/m ³] : 9000
	: TLV-TWA (Belgium) (ppm) : 5000
	: TLV-STEL (Belgium) (ppm) : 30000
	: Value 15min. (CZ) [mg/m ³] : 45000
DNEL: Derived no effect level	: None available.
PNEC: Predicted no effect concentration	: None available.

8.2. Exposure controls

8.2.1. Appropriate engineering controls	: Systems under pressure should be regularly checked for leakages. Provide adequate general and local exhaust ventilation. Consider work permit system e.g. for maintenance activities.
8.2.2. Individual protection measures, e.g. personal protective equipment	: A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Wear safety glasses with side shields Wear leather safety gloves and safety shoes when handling cylinders.
Personal protection	: Ensure adequate ventilation. Protect eyes, face and skin from liquid splashes.
8.2.3. Environmental exposure controls	: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9. Physical and chemical properties**9.1. Information on basic physical and chemical properties**

Appearance	
- Physical state at 20°C / 101.3kPa	: Liquefied gas.
- Colour	: Colourless.
Odour	: No odour warning properties.
Odour threshold	: Odour threshold is subjective and inadequate to warn for overexposure.
pH value	: Not applicable for gas-mixtures.
Molar mass [g/mol]	: Not applicable for gases and gas-mixtures.
Melting point [°C]	: -56.6
Boiling point [°C]	: -78.5 (s)
Critical temperature [°C]	: 30
Flash point [°C]	: Not applicable for gas-mixtures.
Evaporation rate (ether=1)	: Not applicable for gas-mixtures.
Flammability range [vol% in air]	: Non flammable.
Vapour pressure [20°C]	: 57.3 bar Not applicable.
Relative density, gas (air=1)	: 1.52
Relative density, liquid (water=1)	: 1.03
Solubility in water [mg/l]	: 2000
Partition coefficient n-octanol/water	: Not applicable for gas-mixtures.
Viscosity at 20°C [mPa.s]	: Not applicable.
Explosive Properties	: Not applicable.

9.2. Other information

Other data	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
Molecular weight	: 44

**CARBON DIOXIDE, Compressed & Liquefied Gas
(CO₂)****AL062****SECTION 10. Stability and reactivity****10.1. Reactivity****Stability and reactivity**

: No reactivity hazard other than the effects described in sub-sections below.
: Stable under normal conditions.
Liquid spillages can cause embrittlement of structural materials.

10.2. Chemical stability

: Stable under normal conditions.

10.3. Possibility of hazardous reactions

: None.

10.4. Conditions to avoid

: None.

10.5. Incompatible materials

: None.

10.6. Hazardous decomposition products

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11. Toxicological information**11.1. Information on toxicological effects****Toxicity information**

: In high concentrations cause rapid circulatory insufficiency even at normal levels of oxygen concentration. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness and death

Acute toxicity

: No known toxicological effects from this product.

Rat inhalation LC50 [ppm/4h]

: No data available.

Skin corrosion/irritation

: No known effects from this product.

Serious eye damage/irritation

: No known effects from this product.

Respiratory or skin sensitisation

: No known effects from this product.

STOT-single exposure

: No known effects from this product.

STOT-repeated exposure

: No known effects from this product.

Aspiration hazard

: Not applicable for gases and gas-mixtures.

SECTION 12. Ecological information**12.1. Toxicity**

: No data available.

12.2. Persistence - degradability

: No data available.

12.3. Bioaccumulative potential

: No data available.

12.4. Mobility in soil

: No data available.

12.5. Results of PBT and vPvB assessment

: No data available.

12.6. Other adverse effects**Ecological effects information**

: When discharged in large quantities may contribute to the greenhouse effect.
Can cause frost damage to vegetation.

**CARBON DIOXIDE, Compressed & Liquefied Gas
(CO₂)****AL062****SECTION 12. Ecological information (continued)**

Effect on the global warming : Contains greenhouse gas(es) not covered by 842/2006/EC
Global warming potential [CO₂=1] : 1

SECTION 13. Disposal considerations**13.1. Waste treatment methods**

General : May be vented to atmosphere in a well ventilated place.
Do not discharge into any place where its accumulation could be dangerous.
Refer to the code of practice of EIGA (Doc. 30/10 "Disposal of Gases, downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods
Contact supplier if guidance is required.

General : Do not discharge into any place where its accumulation could be dangerous.
Discharge to atmosphere in large quantities should be avoided.
Contact supplier if guidance is required.

13.2. Additional information

: None.

SECTION 14. Transport information

UN number : 1013
Labelling ADR, IMDG, IATA



: 2.2 : Non flammable, non toxic gas.

Land transport (ADR/RID)

H.I. nr : 20
UN proper shipping name : CARBON DIOXIDE
Transport hazard class(es) : 2
Classification code : 2 A
Packing Instruction(s) : P200
Tunnel Restriction : C/E Tank carriage: Passage forbidden through tunnels of category C, D and E; Other carriage: Passage forbidden through tunnels of category E

HAZCHEM - Emergency Action Code : 2T
2 = Fine water spray.
T = Recommended personal protective equipment : Full fire kit and breathing apparatus.
Appropriate measures : dilute.

Sea transport (IMDG)

Proper shipping name : CARBON DIOXIDE
Class : 2.2
Emergency Schedule (EmS) - Fire : F-C
Emergency Schedule (EmS) - Spillage : S-V
Packing instruction : P200

Air transport (ICAO-TI / IATA-DGR)

Proper shipping name (IATA) : CARBON DIOXIDE
Class : 2.2
Passenger and Cargo Aircraft : Allowed.
Packing instruction - Passenger and Cargo Aircraft : 200

**CARBON DIOXIDE, Compressed & Liquefied Gas
(CO₂)**
AL062
SECTION 14. Transport information (continued)
Packing instruction - Cargo Aircraft only : 200

Special precautions for user

: Avoid transport on vehicles where the load space is not separated from the driver's compartment.
 Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
 Before transporting product containers :

- Ensure there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

Labelling ADR : 2.2 : Non flammable, non toxic gas.

In case of spillage and/or leakage : Clean up even minor leaks or spills if possible without unnecessary risk.

Other transport information : Avoid transport on vehicles where the load space is not separated from the driver's compartment.
 Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
 Before transporting product containers :

- Ensure that containers are firmly secured.
- Ensure there is adequate ventilation.
- Compliance with applicable regulations.

Personal precautions : The driver shall not attempt to deal with any fire of the load.

Emergency action in case of accident : Stop the engine.
 No naked lights. No smoking.
 Mark roads and warns other road users.
 Keep public away from danger area.
 NOTIFY POLICE AND FIRE BRIGADE IMMEDIATELY.

Additional information : None.

SECTION 15. Regulatory information
15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
EU legislation
Seveso directive 96/82/EC : Not covered.

National legislation

: Ensure all national/local regulations are observed.

15.2. Chemical Safety Assessment

: A CSA does not need to be carried out for this product.

SECTION 16. Other information
Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010

Training advice : Asphyxiant in high concentrations.
 Receptacle under pressure.
 May cause frostbite.
 Keep container in a well-ventilated place.
 Do not breathe the gas.
 Ensure all national/local regulations are observed.
 The hazard of asphyxiation is often overlooked and must be stressed during operator training.

List of full text of H-statements in section 3. : H280 - Contains gas under pressure; may explode if heated.

Further information : Classification in accordance with calculation methods of regulation (EC) 1272/2008 CLP / (EC) 1999/45 DPD.
 This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

**CARBON DIOXIDE, Compressed & Liquefied Gas
(CO₂)****AL062****SECTION 16. Other information (continued)**

- Note** : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
- DISCLAIMER OF LIABILITY** : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

The contents and format of this SDS are in accordance with EC Commission Directive 2001/58/EC.

DISCLAIMER OF LIABILITY The information in this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

End of document

Material Safety Data Sheet

1. Product and company identification

Product name : **JEFFSOL® PROPYLENE CARBONATE (JEFFSOL® PC)** **MSDS #** 00019798

Product use : Solvent.

Huntsman Petrochemical Corporation
P.O. Box 4980
The Woodlands, TX 77387-4980

TELEPHONE NUMBERS
Transportation Emergency
Company: (800) 328-8501
CHEMTREC: (800) 424-9300
Medical Emergency: (409) 722-9673 (24 Hour)
General MSDS Assistance: (281) 719-6000
Technical Information: (281) 719-7780
E-MAIL: MSDS@huntsman.com

Validation date : 8/24/2009.

In case of emergency

Spills Leaks Fire or Exposure Call Chemtrec: (800) 424-9300
Medical Emergency Information: (800) 328-8501
In Mexico: 01 800 00 214 00
In Columbia: 01 800 91 6012

2. Hazards identification

- Physical state** : Liquid. [Liquid.]
- Odor** : Faint odor.
- OSHA/HCS status** : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.
- Emergency overview** : CAUTION!
MAY CAUSE EYE IRRITATION. ASPIRATION HAZARD IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE. CONTAMINATION BY MOISTURE WILL RESULT IN A PRESSURE BUILD-UP IN SEALED CONTAINERS.
Slightly irritating to the eyes. Avoid breathing vapor or mist. Avoid contact with eyes. Wash thoroughly after handling. Aspiration hazard if swallowed. Can enter lungs and cause damage.

GENERAL INFORMATION : Read the entire MSDS for a more thorough evaluation of the hazards.

3 . Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Propylene carbonate	108-32-7	60 - 100

4 . First aid measures

Eye contact	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
Skin contact	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Inhalation	Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Ingestion	Wash out mouth with water. Move exposed person to fresh air. Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not induce vomiting. Get medical attention. Never give anything by mouth to an unconscious person.
Notes to physician	: No specific treatment. Treat symptomatically. Call medical doctor or poison control center immediately if large quantities have been ingested.

5 . Fire-fighting measures

Flash point	: Closed cup: 135°C (275°F)
Products of combustion	: No specific data.
Extinguishing media	
Suitable	: Use an extinguishing agent suitable for the surrounding fire.
Not suitable	: None known.
Special exposure hazards	: No specific hazard.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

Personal precautions	: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment.
Environmental precautions	: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
Methods for cleaning up	: If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials), scoop up material and place in a sealable, liquid-proof container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal.

7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Consult local authorities for acceptable exposure limits.

- Preventive Measures** : **Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.**
- Engineering controls** : Use local exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. For guidance on engineering control measures refer to publications such as the ACGIH current edition of 'Industrial Ventilation, a manual of Recommended Practice.'
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

9 . Physical and chemical properties

General information

Appearance

- Physical state** : Liquid. [Liquid.]
- Color** : Colorless.
- Odor** : Faint odor.
- Odor threshold** : Not available.

Important health, safety and environmental information

- pH** : 7
- Boiling point** : 242°C (467.6°F)
- Melting point** : Not available.
- Flash point** : Closed cup: 135°C (275°F)

9 . Physical and chemical properties

Oxidizing properties	: Not available.
Vapor pressure	: 0.0031 kPa (0.023 mm Hg)
Relative density	: 1.2
Solubility	: Soluble in the following materials: cold water, methanol, diethyl ether.
Octanol/water partition coefficient	: Not available.
Viscosity	: Kinematic: 0.016 cm ² /s (1.6 cSt at 43.3°C)
Vapor density	: 3.5 [Air = 1]
Auto-ignition temperature	: 430°C (806°F)
VOC content	: VOC Exempt

10 . Stability and reactivity

Stability and reactivity	: The product is stable.
Hazardous polymerization	: Will not occur.
Hazardous decomposition products	: No specific data.

11 . Toxicological information

Toxicity data

Acute toxicity

Product/ingredient name	test	Species	Result	Exposure
Propylene carbonate	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-

Potential acute health effects

Ingestion	: Practically non-toxic if swallowed.
Inhalation	: No known significant effects or critical hazards.
Eyes	: Slightly irritating to the eyes.
Skin	: Practically non-toxic in contact with skin.

Potential chronic health effects

Target organs	: None known.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.

12 . Ecological information

Aquatic ecotoxicity

Product/ingredient name	test	Result	Species	Exposure
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12 . Ecological information

Propylene carbonate	-	Acute EC50 >1000 mg/L	Daphnia	48 hours
	-	Acute EC50 >900 mg/L	Algae	72 hours
	-	Acute LC50 >1000 mg/L	Fish	96 hours
	-	Chronic NOEC 900 mg/L	Algae	72 hours

Biodegradability

Product/ingredient name	test	Result	Dose	Inoculum
Propylene carbonate	-	>60 % - Readily - 28 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Propylene carbonate	-	-	Readily

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Propylene carbonate	-0.41	-	low

Environmental effects : Readily biodegradable

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

14 . Transport information

Transportation Emergency Number 1-800-424-9300 (CHEMTREC).

Regulatory information	UN number	Proper shipping name	Class	PG*	Label	Additional information
DOT Classification	Not regulated.					-
TDG Classification	Not regulated.					-
IMDG Class	Not regulated.			-		-
IATA-DGR Class	Not regulated.			-		-

PG* : Packing group

15 . Regulatory information

United States

- HCS Classification** : Not regulated.
U.S. Federal regulations : **United States inventory (TSCA 8b)**: All components are listed or exempted.

CERCLA: Hazardous substances. : No ingredients listed.

SARA 313 : No ingredients listed.

This product does not contain nor is it manufactured with ozone depleting substances.

California Prop 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

<u>Ingredient name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant risk level</u>	<u>Maximum acceptable dosage level</u>
Propylene oxide	Yes.	No.	No.	No.

Canada

- WHMIS (Canada)** : Class D-2B: Material causing other toxic effects (Toxic).
CEPA (DSL) : **Canada inventory**: All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR.

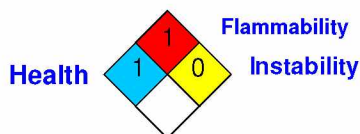
16 . Other information

Label requirements : MAY CAUSE EYE IRRITATION. ASPIRATION HAZARD IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE. CONTAMINATION BY MOISTURE WILL RESULT IN A PRESSURE BUILD-UP IN SEALED CONTAINERS.

Hazardous Material Information System (U.S.A.) :

Health	1
Fire hazard	1
Reactivity	0

National Fire Protection Association (U.S.A.) :



Date of printing : 8/24/2009.

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Date of previous issue : 7/2/2008

Notice to reader

While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.

IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

16 . Other information

Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE. NO PART OF THIS DATA SHEET MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM, OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM HUNTSMAN. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO HUNTSMAN, MANAGER, PRODUCT SAFETY AT THE ABOVE ADDRESS.

Trademarks: JEFFSOL® is a registered trademark of Huntsman Petrochemical Corporation in one or more countries, but not all countries.

Indicates information that has changed from previously issued version.

PROPYLENE OXIDE

Gen. Variant: SDS_MX_GHS

Version 1.0

Revision Date 09/29/2015

Print Date 11/14/2016

SDS No.: BE114

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : PROPYLENE OXIDE
 CAS Number: 75-56-9
 Chemical characterization : Alkyl epoxides
 Chemical Name : methyloxirane
 Synonyms : 1,2-Epoxypropane; Methyl Oxirane; PO

 Identified uses : Monomer; Intermediate

 Prohibited uses : Fuels, fuels blending, fuel additives; Fumigants; Sterilants;
 Pesticides; Munitions

 Company : Lyondell Chemical Company
 LyondellBasell Tower, Suite 300
 1221 McKinney St.
 P.O. Box 2583
 Houston Texas 77252-2583

 Telephone : Customer Service 888 777-0232
 Product Safety 800 700-0946

 Emergency telephone : SETIQ 01 800-00-214-00
 LYONDELL 800-245-4532

 E-mail address : 5.1.2.e @lyb.com

SECTION 2. HAZARDS IDENTIFICATION**GHS Classification**

Flammable liquids	Category 1
Acute toxicity; Oral	Category 4
Acute toxicity; Inhalation	Category 3
Acute toxicity; Dermal	Category 3
Serious eye damage/eye irritation	Category 2A
Germ cell mutagenicity	Category 1B
Carcinogenicity	Category 1B
Specific target organ systemic toxicity - single exposure	Category 3
Respiratory system	
Acute aquatic toxicity	Category 3

GHS Classification Scale (1= severe hazard; 4= slight hazard)

Label elements

Hazard symbols :



Signal Word : Danger

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Hazard Statements : H224 Extremely flammable liquid and vapor.
H302 Harmful if swallowed.
H331 Toxic if inhaled.
H311 Toxic in contact with skin.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H340 May cause genetic defects via the intraperitoneal route only.
H350 May cause cancer.
H402 Harmful to aquatic life.

Precautionary Statements : **Prevention**
P201 Obtain special instructions before use.
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P240 Ground/bond container and receiving equipment.
P243 Take precautionary measures against static discharge.
P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response

P370 + P378 In case of fire: Use dry chemical, carbon dioxide, water spray, or alcohol-resistant foam.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P363 Wash contaminated clothing before reuse.

Storage

P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Disposal

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

No additional information available.

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3. Composition/information on ingredients**Substances****Ingredients**

Chemical Name	CAS-No. EC-No.	Weight %	Component Type
Methyloxirane	75-56-9	<=100.0 %	A

Key:

(A) Substance

SECTION 4. FIRST AID MEASURES**First aid procedures**

- General advice : Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.
Consult a physician/doctor if necessary.
Do not leave the victim unattended.
- If inhaled : Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Do not leave the victim unattended.
Keep patient warm and at rest.
Immediately seek medical attention.
If breathing is difficult, give oxygen.
If unconscious place in recovery position and seek medical advice.
In the event of unconsciousness, apnea or cardiac arrest (no pulse), apply cardiopulmonary resuscitation.
- In case of skin contact : Take off contaminated clothing and shoes immediately.
In case of contact, immediately flush skin with soap and plenty of water.
Seek medical attention if ill effect or irritation develops.
Wash contaminated clothing before reuse.
- In case of eye contact : In case of eye contact, remove contact lens and rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Get medical attention immediately.
- If swallowed : Clean mouth with water and drink afterwards plenty of water.
Do NOT induce vomiting.
If swallowed, call a poison control center or doctor immediately.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.

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Notes to physician

- Symptoms : Causes serious eye irritation.
May cause respiratory irritation.
- Hazards : Harmful if swallowed.
Toxic in contact with skin.
Toxic if inhaled.
May cause genetic defects.
May cause cancer.
- Treatment : There is no specific antidote available.
Treat symptomatically.
Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.
Do not induce vomiting because of possible severe irritant side effects.
In case of ingestion, the stomach should be emptied by gastric lavage under qualified medical supervision.

SECTION 5. FIRE-FIGHTING MEASURES**Flammable properties**

- Flash point : -36 °F (-38 °C)
at 1007.50 hPa (755.69 mm Hg)
- Autoignition temperature : > 752 °F (400 °C)
at 1004.90 - 1018.30 hPa (753.74 - 763.79 mm Hg)
- Lower explosion limit : 1.85 vol%
- Upper explosion limit : 36.25 vol%

Fire fighting

- Suitable extinguishing media : SMALL FIRE: Use dry chemicals, CO₂, water spray or alcohol-resistant foam. LARGE FIRE: Use water spray, water fog or alcohol-resistant foam.
Test results indicate that alcohol resistant foam is most effective in fighting propylene oxide fires.
- Unsuitable extinguishing media : Do not use solid water stream.

Protective equipment and precautions for firefighters

- Specific hazards during fire fighting : Extremely flammable liquid and vapor.
Releases flammable vapors below normal ambient temperatures.
When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined.
Vapors may be heavier than air.
May travel long distances along the ground before igniting and

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flashing back to vapor source.
Diluting with water may not suffice to raise flash point above ambient temperatures.
Heat may build enough pressure to rupture closed containers/spreading fire/increasing risk of burns/injuries.
Cool containers with flooding quantities of water until well after fire is out.
Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
Blanket with alcohol-resistant foam.
Always stay away from tanks engulfed in fire.
For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
Move containers from fire area if it can be done without risk.
Notify authorities immediately if liquid enters sewer/public waters.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

Special protective equipment for fire-fighters : Do not enter fire area without proper protection.
Wear positive pressure self-contained breathing apparatus (SCBA).
Structural firefighter's protective clothing will only provide limited protection.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Use personal protective equipment.
Ensure adequate ventilation.
Eliminate all sources of ignition.
Evacuate personnel to safe areas.

Methods for containment / Methods for cleaning up : Extremely flammable liquid.
Highly reactive material.
Release causes immediate fire/explosion hazard.
Eliminate all sources of ignition.
Evacuate/limit access.
All equipment used when handling this product must be grounded.
Do not touch or walk through spilled material.
Stop leak if you can do it without risk.
Prevent entry into waterways, sewers, basements or confined areas.
A vapor suppressing foam may be used to reduce vapors.
Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
Clay-based absorbants may react with propylene oxide.
Use clean non-sparking tools to collect absorbed material.
Dike large spills and place materials in salvage containers.
Water spray may reduce vapor; but may not prevent ignition in closed spaces.

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SECTION 7. HANDLING AND STORAGE**Handling**

Advice on safe handling : For industrial use only.
 Use only non-sparking tools.
 Wear recommended personal protective equipment.
 Extinguish all ignition sources.
 Containers must be properly grounded before beginning transfer.
 Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair.
 Observe precautions pertaining to confined space entry.
 Check atmosphere for explosiveness and oxygen deficiencies.
 Handle empty containers with care; vapor residue may be flammable/explosive.
 Carefully vent any internal pressure before removing closure.

Storage

Requirements for storage areas and containers : Store only in tightly closed, properly vented containers away from heat, sparks, open flame and strong oxidizing agents.
 Store closed drums with bung in up position.
 Vapor space above stored liquid may be flammable/explosive unless blanketed with inert gas.
 Keep in properly labeled containers.

Advice on common storage : Stainless steel <100 m3, Carbon steel >100 m3.

8. Exposure controls/personal protection**Control parameters****Ingredients with workplace control parameters****Occupational Exposure Limits**

Ingredients	CAS-No.	Type	Limit Value	Basis Revision Date	Additional Information
Methyloxirane	75-56-9	TWA	2 ppm	US (ACGIH) 2012	
Methyloxirane	75-56-9	TWA	20 ppm 50 mg/m3	OEL (MX) March 13, 2000	

Consult local authorities for acceptable exposure limits.

Exposure controls

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Engineering measures

Electrical equipment should be grounded and conform to applicable electrical code.
Use only where ventilation can control exposures to within occupational exposure limit(s).
Use only in an area equipped with explosion proof exhaust ventilation.

Personal protective equipment

- Respiratory protection : If exposure can exceed the exposure limit(s), use only supplied air respirator, recommended or approved by appropriate local, state or international agency, operated in a positive pressure mode.
- Hand protection : Wear chemical resistant gloves such as:
Butyl rubber.
- Eye and face protection : Eye protection, including both chemical splash goggles and face shield, must be worn when possibility exists for eye contact due to splashing/spraying liquid, airborne particles, or vapor.
- Skin and body protection : Complete suit protecting against chemicals
The equipment must be cleaned thoroughly after each use.
- Hygiene measures : Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use.
Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Use good personal hygiene practices.
Wash hands before eating, drinking, smoking, or using toilet facilities.
Take off contaminated clothing and wash before reuse.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

- Physical state : liquid at 68 °F (20 °C) (1,013.25 hPa (760.00 mm Hg))
- Color : Clear, colorless.
- Odor : Sweet.
Ether-like odor.
- Odor Threshold : 44 ppm
Odor is not an adequate warning of potentially hazardous ambient air concentrations.

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Safety data

Flash point	:	-36 °F (-38 °C) at 1007.50 hPa (755.69 mm Hg)
Lower explosion limit	:	1.85 vol%
Upper explosion limit	:	36.25 vol%
Flammability (solid, gas)	:	Not applicable
Oxidizing properties	:	Not considered an oxidizing agent.
Autoignition temperature	:	> 752 °F (400 °C) at 1004.90 - 1018.30 hPa (753.74 - 763.79 mm Hg)
Decomposition temperature	:	not determined
pH	:	Not applicable.
Melting point/range	:	-170 °F (-112 °C)
Boiling point/boiling range	:	95 °F (35 °C) at 1033.0 - 1041.0 hPa (774.8 - 780.8 mm Hg)
Vapor pressure	:	740 hPa (555 mm Hg) at 77 °F (25 °C)
Density	:	0.83 g/cm ³ at 68 °F (20 °C)
Water solubility	:	425 - 450 g/l at 68 °F (20 °C)
Partition coefficient: n-octanol/water	:	log Pow: 0.055 estimated
Viscosity, kinematic	:	0.374 mm ² /s at 68 °F (20 °C) 0.447 mm ² /s at 32 °F (0 °C) (static)
Relative vapor density	:	2.054 (Air = 1.0)
Surface tension	:	71.5 mN/m 1.06g/l at 70 °F (21 °C)

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Explosive properties : Not explosive

Remarks - Other information : No additional information available.

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Not classified as a reactivity hazard.

Chemical stability : Stable under recommended storage conditions.

Conditions to avoid : Heat, sparks, open flame, other ignition sources, and oxidizing conditions.

Materials to avoid : Reacts with anhydrous metal chlorides and peroxides.
Acetylide forming metals.
Bronze.
Brass.
Clay based absorbents.
Severe oxidizing conditions.
Strong acids and strong bases

Hazardous decomposition products : Incomplete combustion may produce carbon monoxide and other toxic gases.

Thermal decomposition : Thermal decomposition may produce carbon monoxide and other toxic vapors.

SECTION 11. TOXICOLOGICAL INFORMATION

Product Summary : The below given information is based on the assessment of the product including impurities.

Acute toxicity**Acute oral toxicity**

: Classified
Harmful if swallowed.

: LD50: 382 - 587 mg/kg
Species: Rat

Acute inhalation toxicity

: Classified
Toxic if inhaled.

: LC50 (Inh): 9.95 mg/l
Exposure time: 4 HOURS
Species: Rat

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Exposure to vapor may cause irritation of the eyes, nose, or throat.

Acute dermal toxicity : Classified
Toxic in contact with skin.

: LD50 Dermal: 950 mg/kg
Species: Rabbit

Skin corrosion/irritation : Based on skin irritation values, not classified.
Liquid may cause slight skin irritation.

Serious eye damage/eye irritation : Classified
Causes serious eye irritation.

Respiratory or skin sensitization : Respiratory sensitization
Not classified
no data available

: Skin sensitization
Not classified
May cause allergic skin reaction.
A small number of dermatitis cases in workers provide some limited evidence that propylene oxide may cause skin sensitization; however, a study conducted in animals did not find skin sensitizing effects.

Chronic toxicity

Component Name	NTP	IARC	OSHA
Methyloxirane	Reasonably Anticipated	2B	

Carcinogenicity : Classified
May cause cancer.
Long term toxicity studies conducted on rodents found tumors to occur at high exposure concentrations (≥ 300 ppm for vapor) but only at sites of contact. The mode of action for propylene oxide induced rodent nasal tumors has been extensively investigated and the evidence supports a complex mode of action with a practical threshold significantly above environmental and work-place exposure levels.

Germ cell mutagenicity : Classified
May cause genetic defects via the intraperitoneal route only.

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Propylene oxide is a monofunctional alkylating agent that is a weak genotoxin. Positive responses in genotoxicity tests, both in vitro and in vivo, for both non-mutational and mutational endpoints have been observed, however, most studies have been at high exposure concentrations and/or have employed repair deficient organisms. No in vivo genotoxicity studies, administering propylene oxide by a physiological route, has been positive.

Reproductive toxicity

Effects on fertility / : Not classified
Effects on or via lactation : No adverse effect observed.

Effects on Development : Not classified
No adverse effect observed.

Target Organ Systemic Toxicant - Single exposure : Classified, May cause respiratory irritation.

: Routes of exposure: Inhalation
Target Organs: Respiratory system

Target Organ Systemic Toxicant - Repeated exposure : Based on repeated exposure toxicity values, not classified., Target organ toxicity associated with repeated exposure to this substance is limited to local tissue injury at the site of initial contact., Significant toxic effects in organs distant from the site of application have not been observed.

Aspiration hazard : Based on physico-chemical values or lack of human evidence, not classified.

12. ECOLOGICAL INFORMATION**Ecotoxicology Assessment**

Acute aquatic toxicity : Classified
Harmful to aquatic life.

Chronic aquatic toxicity : Not classified, based on readily biodegradability and low acute toxicity.

Toxicity to fish :
Harmful to fish.

: LC50: 52 mg/l
Exposure time: 96 HOURS
Species: Oncorhynchus mykiss (rainbow trout)

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: LC50: 89 mg/l
Exposure time: 96 HOURS
Species: mullet.

Toxicity to daphnia and other aquatic invertebrates : Low acute toxicity to aquatic invertebrates.

Toxicity to algae : Low toxicity to algae.

Toxicity to fish (Chronic toxicity) : Low chronic toxicity to fish.

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : Low chronic toxicity to aquatic invertebrates.

Persistence and degradability

Biodegradability : 96 %
Testing period: 28 d
Rapidly degradable.

Bioaccumulative potential

Bioaccumulation : This material is not expected to bioaccumulate.

Mobility in soil

Surface tension : 71.5 mN/m
1.06g/l
at 21 °C

Distribution among environmental compartments : Stability in soil
no data available

: Stability in water
Hydrolyzes slowly.

Additional advice : This material is not expected to persist in the environment.
Environmental fate and pathways : This material is volatile and water soluble.

Results of PBT and vPvB assessment

Not applicable.

Other adverse effects

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Additional ecological information : No additional information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Further information : Contaminated product, soil, water, container residues and spill cleanup materials may be hazardous wastes.
 The product should not be allowed to enter drains, water courses or the soil.
 Burn concentrated liquids in systems designed for low flash point material.
 Dilute aqueous waste may biodegrade.
 Concentrated/raw liquid waste may require 100 fold dilution or more to raise flash point to safe level before discharge to treatment facility.
 Comply with applicable local, state or international regulations concerning solid or hazardous waste disposal and/or container disposal.
 Avoid overloading/poisoning plant biomass.
 Assure effluent complies with applicable regulations.

SECTION 14. TRANSPORT INFORMATION**MEX_ROAD**

UN number : 1280
 Description of the goods : PROPYLENE OXIDE
 Class : 3
 Packing group : I
 Labels : 3

SECTION 15. REGULATORY INFORMATION**Other international regulations****Global Inventory Status**

The ingredients of this product are compliant with the following chemical inventory requirements or exemptions.

*Additional Explanatory Status Statements follow the table, as necessary.

Country/Region	Inventory	Status Description
Australia	AICS	Compliant
Canada	DSL	Compliant
China	IECSC	Compliant
Europe	REACH	See REACH Compliance Statement
Japan	ENCS	Compliant
Korea	KECI	Compliant
New Zealand	NZIoC	Compliant
Philippines	PICCS	Compliant
United States of America	TSCA	Compliant

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Taiwan

TCSCA

Compliant

REACH status

If the product has been purchased from any company of the LyondellBasell group of companies registered in the European Union, we confirm that the chemical substance in this product has been pre-registered or, where required under REACH, registered, and that we have the intention to proceed with any required registration in accordance with the deadlines set forth in REACH. (Regulation (EU) No. 1907/2006)

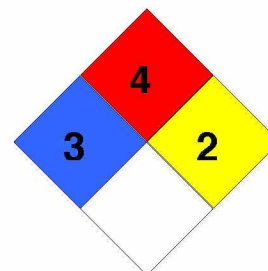
Contact 5.1.2.e@lyb.com for additional global inventory information.

SECTION 16. OTHER INFORMATION**Further information****HMIS Classification**

: Health Hazard: 3
 Chronic Health Hazard: *
 Flammability: 4
 Physical hazards: 2

**NFPA Classification**

: Health Hazard: 3
 Fire Hazard: 4
 Instability: 2

**Other Information**

HMIS rating scale (0 = minimal hazard; 4 = severe hazard)

NFPA rating scale (0 = minimal hazard; 4 = severe hazard)

Material safety datasheet sections which have been updated:

Updated format ; Revised Section(s): 1 - 16 September 28 2015

Disclaimer

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Information is correct to the best of our knowledge at the date of the SDS publication.

It is not a specification sheet nor should any displayed data be construed as a specification.

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