

## Material Safety Data Sheet PROPYLENE OXIDE

### Section 1 - Product Identification

Synonyms : 1,2-epoxypropane; 1,2-propylene oxide; 2,3-epoxypropane; AD 6 (suspending agent); propyleneoxide  
Molecular Weight : 58.09 g/mol  
Chemical Formula : C<sub>3</sub>H<sub>6</sub>O  
Company Identification : Tradeasia International Pte. Limited  
Address : 133 Cecil Street # 12-03 Keck Seng Tower, Singapore  
Tel: +65-6227 6365  
Fax: +65-6225 6286  
Email: contact@chemtradeasia.com

Recommended use of the chemical and restrictions on use

The product is used in chemical industries and commercial use, particularly in :

- Chemical intermediate
- Chemical raw material
- Disinfectant

### Section 2 – Composition/Information on Ingredients

The product contains greater than 99.9 percent (%) cream of tartar (potassium bitartrate)

Chemical Name	EC No/CAS No	Purity, %
Propylene Oxide	75-56-9	99

### Section 3 – Hazards Identification

#### 3.1 Classification of the substance according to GHS

Class	Category	Hazard Statements
Flam. Liq	Category 1	H224: Extremely flammable liquid and vapour
Carc.	Category 1B	H350: May cause cancer
Muta.	Category 1B	H340: May cause genetic defects
Acute Tox.	Category 3	H331: Toxic if inhaled.
Acute Tox.	Category 3	H311: Toxic in contact with skin.
Acute Tox.	Category 4	H302: Harmful if swallowed
Eye Irrit.	Category 2	H319: Causes serious eye irritation

## Section 4 – First-Aid Measures

### 4.1. Description of first aid measures

#### General:

Check the vital functions. Unconscious: maintain adequate airway and respiration. Respiratory arrest: artificial respiration or oxygen. Cardiac arrest: perform resuscitation. Victim conscious with labored breathing: half-seated. Victim in shock: on his back with legs slightly raised. Vomiting: prevent asphyxia/aspiration pneumonia. Prevent cooling by covering the victim (no warming up). Keep watching the victim. Give psychological aid. Keep the victim calm, avoid physical strain. Depending on the victim's condition: doctor/hospital. Alcohol consumption increases the toxicity.

#### After inhalation:

Remove the victim into fresh air. Immediately consult a doctor/medical service.

#### After eye contact:

Rinse immediately with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. Do not apply neutralizing agents. Take victim to an ophthalmologist if irritation persists.

#### After ingestion:

Rinse mouth with water. Immediately after ingestion: give lots of water to drink. Do not induce vomiting. Give activated charcoal. Consult a doctor/medical service if you feel unwell.

### 4.4 Medical attention and special treatment

Treat symptomatically.

## Section 5 – Fire Fighting Measures

### 5.1. Extinguishing media

#### 5.1.1 Suitable extinguishing media:

Small fire: Quick-acting ABC powder extinguisher, Quick-acting BC powder extinguisher, Quick-acting class B foam extinguisher, Quick-acting CO2 extinguisher.

Major fire: Class B foam (alcohol-resistant), Water spray if puddle cannot expand.

#### 5.1.2 Unsuitable extinguishing media:

Small fire: Water (quick-acting extinguisher, reel); risk of puddle expansion.

Major fire: Water; risk of puddle expansion.

### 5.2. Special hazards arising from the substance or mixture

Upon combustion: CO and CO2 are formed. Polymerizes on exposure to temperature rise: release of heat.

### 5.3. Advice for firefighters

#### 5.3.1 Instructions:

Cool tanks/drums with water spray/remove them into safety. Physical explosion risk: extinguish/cool from behind cover. Do not move the load if exposed to heat. After cooling: persistent risk of physical explosion. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it.

#### 5.3.2 Special protective equipment for fire-fighters:

Gas-tight suit. Compressed air/oxygen apparatus.

## Section 6 – Accidental Release Measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Keep upwind. Seal off low-lying areas. Close doors and windows of adjacent premises. Stop engines and no smoking. No naked flames or sparks. Spark- and explosionproof appliances and lighting equipment. Keep containers closed.

#### 6.1.1 Protective equipment for non-emergency personnel

See heading 8.2

#### 6.1.2 Protective equipment for emergency responders

Gas-tight suit.

Suitable protective clothing

### 6.2. Environmental precautions

Contain released product, pump into suitable containers. Plug the leak, cut off the supply. Dam up the liquid spill. Try to reduce evaporation. Prevent soil and water pollution. Prevent spreading in sewers.

### 6.3. Methods and material for containment and cleaning up

Take up liquid spill into absorbent material, e.g.: sand, earth, vermiculite kieselguhr, powdered limestone. Do not take up in combustible material such as: sawdust. Scoop absorbed substance into closing containers. Carefully collect the spill/leftovers. Damaged/cooled tanks must be emptied. Do not use compressed air for pumping over spills. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling.

## Section 7 – Handling and Storage

### 7.1. Precautions for safe handling

Use spark-/explosionproof appliances and lighting system. Take precautions against electrostatic charges. Keep away from naked flames/heat. Keep away from ignition sources/sparks. Gas/vapour heavier than air at 20°C. Observe strict hygiene. Keep container tightly closed. Remove contaminated clothing immediately. Cool before opening. Do not discharge the waste into the drain.

### 7.2. Conditions for safe storage, including any incompatibilities

#### 7.2.1 Safe storage requirements:

Storage temperature: < 50 °C. Ventilation at floor level. Fireproof storeroom. Keep locked up. Provide for an automatic sprinkler system. Provide for a tub to spills. Provide the tank with earthing. Unauthorized persons are not admitted. May be stored under nitrogen. Meet the legal requirements.

#### 7.2.2 Keep away from:

Heat sources, ignition sources, combustible materials, oxidizing agents, (strong) acids, (strong) bases, amines, peroxides.

#### 7.2.3 Suitable packaging material:

Steel, stainless steel, carbon steel, aluminium, iron, glass.

#### 7.2.4 Non suitable packaging material:

Copper, plastics.

### 7.3. Specific end use(s)

If applicable and available, exposure scenarios are attached in annex. See information supplied by the manufacturer

## Section 8 – Exposure Controls/Personal Protection

### 8.1. Control parameters

#### 8.1.1 Occupational exposure

##### a) Occupational exposure limit values

If limit values are applicable and available these will be listed below.

##### Belgium

Oxyde de propylène	Time-weighted average exposure limit 8 h	2 ppm
	Time-weighted average exposure limit 8 h	5 mg/m <sup>3</sup>

##### The Netherlands

1,2-Epoxypropaan	Time-weighted average exposure limit 8 h (Public occupational exposure limit value)	2.5 ppm
	Time-weighted average exposure limit 8 h (Public occupational exposure limit value)	6 mg/m <sup>3</sup>

##### France

Oxyde de propylène	Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative)	20 ppm
	Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative)	50 mg/m <sup>3</sup>

##### Germany

Propylenoxid	Time-weighted average exposure limit 8 h (TRGS 900)	2 ppm
	Time-weighted average exposure limit 8 h (TRGS 900)	4.8 mg/m <sup>3</sup>

##### UK

Propylene oxide	Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005))	5 ppm
	Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005))	12 mg/m <sup>3</sup>

##### USA (TLV-ACGIH)

Propylene oxide	Time-weighted average exposure limit 8 h (TLV - Adopted Value)	2 ppm
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##### b) National biological limit values

If limit values are applicable and available these will be listed below.

## Section 9 – Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

Physical form	Liquid
Odour	Sweet odour
	Ether-like odour
Odour threshold	35 - 200 ppm
	8.4 - 480 mg/m <sup>3</sup>
Colour	Colourless
Particle size	Not applicable (liquid)
Explosion limits	1.9 - 39 vol %
	45 - 580 g/m <sup>3</sup>
Flammability	Extremely flammable liquid and vapour.
Log Kow	< 1 ; Experimental value ; OECD 117 ; 20 °C
Dynamic viscosity	0.58 mPa.s ; 20 °C
Kinematic viscosity	0.374 mm <sup>2</sup> /s ; 20 °C ; OECD 114
	0.447 mm <sup>2</sup> /s ; 0 °C ; OECD 114
Melting point	-112 °C ; 1013 hPa
Boiling point	35 °C ; 1033 hPa - 1041 hPa ; EU Method A.2
Flash point	-38 °C ; 1007 hPa ; EU Method A.9
Evaporation rate	34 ; Butyl acetate
Relative vapour density	2.0
Vapour pressure	740 hPa ; 25 °C ; EU Method A.4
Solubility	Water ; 42.5 g/100 ml - 45 g/100 ml ; 20 °C ; EU Method A.6
	Ethanol ; complete
	Ether ; complete
Relative density	0.83 ; 20 °C ; EU Method A.3
Decomposition temperature	No data available
Auto-ignition temperature	> 400 °C ; 1005 hPa - 1018 hPa ; EU Method A.15
Explosive properties	No chemical group associated with explosive properties
Oxidising properties	No chemical group associated with oxidising properties
pH	No data available

### 9.2. Other information

Minimum ignition energy	0.13 mJ
Critical temperature	209 °C
Critical pressure	49000 hPa
Surface tension	71.5 mN/m ; 21 °C ; 1.06 g/l ; EU Method A.5
Relative density saturated vapour/air mixture	1.6
Saturation concentration	1405 g/m <sup>3</sup>
Dissociation constant	Data waiving

## Section 10 – Stability and Reactivity

### 10.1. Reactivity

May build up electrostatic charges: risk of ignition. May be ignited by sparks. Gas/vapour spreads at floor level: ignition hazard. Substance has neutral reaction.

### 10.2. Chemical stability

Unstable on exposure to heat.

### 10.3. Possibility of hazardous reactions

May form peroxides. Polymerizes on exposure to some compounds e.g. (some) acids/bases. Reacts violently with many compounds e.g.: with (strong) oxidizers: (increased) risk of fire/explosion. Reacts violently with many compounds e.g.: with (strong) oxidizers: (increased) risk of fire/explosion.

### 10.4. Conditions to avoid

#### Precautionary measures

Use spark-/explosionproof appliances and lighting system. Take precautions against electrostatic charges. Keep away from naked flames/heat. Keep away from ignition sources/sparks.

### 10.5. Incompatible materials

Combustible materials, oxidizing agents, (strong) acids, (strong) bases, amines, peroxides.

### 10.6. Hazardous decomposition products

## Section 11 – Toxicological Information

### 11.1. Information on toxicological effects

#### 11.1.1 Test results

##### Acute toxicity

###### propylene oxide

Route of exposure	Parameter	Method	Value	Exposure time	Species	Value determination	Remark
Oral	LD50	Equivalent to OECD 401	382 mg/kg bw - 587 mg/kg bw		Rat (male/female)	Experimental value	
Dermal	LD50	Single skin penetration LD50 rabbits	960 mg/kg bw	4 h	Rabbit	Experimental value	
Inhalation (vapours)	LC50	Equivalent to OECD 403	9.95 mg/l	4 h	Rat (male/female)	Experimental value	

##### Conclusion

Harmful if swallowed.

Toxic in contact with skin.

Toxic if inhaled.

##### Corrosion/irritation

###### propylene oxide

Route of exposure	Result	Method	Exposure time	Time point	Species	Value determination	Remark
Eye	Irritating			24 hours	Rabbit	No reliable data available	Single exposure
Skin	Not irritating	OECD 404	4 h	1; 24; 48; 72 hours	Rabbit	Experimental value	
Not applicable (in vitro test)	Not corrosive	OECD 431	4 h		Reconstructed human epidermis	Experimental value	
Inhalation	Irritating	Human observation					

##### Conclusion

Causes serious eye irritation.

May cause respiratory irritation.

Not classified as irritating to the skin

##### Respiratory or skin sensitisation

###### propylene oxide

Route of exposure	Result	Method	Exposure time	Observation time point	Species	Value determination	Remark
Skin	Not sensitizing	Equivalent to method of Maguire (1973)	48 h	24; 48 hours	Guinea pig (male)	Experimental value	

##### Conclusion

Not classified as sensitizing for skin

Not classified as sensitizing for inhalation

##### Specific target organ toxicity

###### propylene oxide

Route of exposure	Parameter	Method	Value	Organ	Effect	Exposure time	Species	Value determination
Oral								Data waiving
Dermal								Data waiving
Inhalation (vapours)	NOAEC	Equivalent to OECD 453	30 ppm		No adverse systemic effects	123 weeks (6h/day, 5 days/week) - 124 weeks (6h/day, 5 days/week)	Rat (male/female)	Experimental value
Inhalation (vapours)	LOAEC	Equivalent to OECD 451	200 ppm	Nose	Irritation	103 weeks (6h/day, 5 days/week)	Rat (male/female)	Experimental value

## Section 12 – Ecological Information

### 12.1. Toxicity

propylene oxide

	Parameter	Method	Value	Duration	Species	Test design	Fresh/salt water	Value determination
Acute toxicity fishes	LC50	EPA 660/3 - 75/009	52 mg/l	96 h	Oncorhynchus mykiss	Static system	Fresh water	Experimental value; GLP
Acute toxicity crustacea	EC50	EPA 660/3 - 75/009	350 mg/l	48 h	Daphnia magna	Static system	Fresh water	Experimental value; GLP
Toxicity algae and other aquatic plants	ErC50	EPA 660/3 - 75/009	240 mg/l	96 h	Pseudokirchneria subcapitata	Static system	Fresh water	Experimental value; GLP
Long-term toxicity fish								Data waiving
Long-term toxicity aquatic crustacea								Data waiving
Toxicity aquatic micro-organisms	NOEC	OECD 301C	100 mg/l	28 day(s)	Activated sludge			Experimental value
Toxicity sediment organisms								Data waiving

	Parameter	Method	Value	Duration	Species	Value determination
Toxicity soil macro-organisms						Data waiving
Toxicity soil micro-organisms						Data waiving
Toxicity terrestrial plants						Data waiving
Toxicity other terrestrial organisms						Data waiving
Toxicity birds						Data waiving

#### Conclusion

Not classified as dangerous for the environment according to the criteria of Regulation (EC) No 1272/2008

### 12.2. Persistence and degradability

propylene oxide

#### Biodegradation water

Method	Value	Duration	Value determination
OECD 301C: Modified MITI Test (I)	86 %	28 day(s)	Experimental value

#### Phototransformation air (DT50 air)

Method	Value	Conc. OH-radicals	Value determination
Other	32 day(s)		Literature

#### Biodegradation soil

Method	Value	Duration	Value determination
			Data waiving

#### Half-life water (t1/2 water)

Method	Value	Primary degradation/mineralisation	Value determination
	12.9 day(s); Fresh water	Primary degradation	Experimental value
	2.4 day(s); Salt water	Primary degradation	Experimental value

#### Conclusion

Readily biodegradable in water

### 12.3. Bioaccumulative potential

propylene oxide

#### BCF fishes

Parameter	Method	Value	Duration	Species	Value determination
					Data waiving

#### Log Kow

Method	Remark	Value	Temperature	Value determination
OECD 117		< 1	20 °C	Experimental value

#### Conclusion

Low potential for bioaccumulation (Log Kow < 4)

### 12.4. Mobility in soil

propylene oxide



## Section 13 – Disposal Considerations

### 13.1. Waste treatment methods

#### 13.1.1 Provisions relating to waste

##### European Union

Hazardous waste according to Directive 2008/98/EC, as amended by Regulation (EU) No 1357/2014 and Regulation (EU) No 2017/997.

Waste material code (Directive 2008/98/EC, Decision 2000/0532/EC).

07 01 01\* (wastes from the manufacture, formulation, supply and use (MFSU) of basic organic chemicals: aqueous washing liquids and mother liquors).

Depending on branch of industry and production process, also other waste codes may be applicable.

#### 13.1.2 Disposal methods

Recycle/reuse. Incinerate under surveillance with energy recovery. Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. May be discharged to wastewater treatment installation. Do not discharge into drains or the environment.

#### 13.1.3 Packaging/Container

##### European Union

Waste material code packaging (Directive 2008/98/EC).

15 01 10\* (packaging containing residues of or contaminated by dangerous substances).

## Section 14 – Transport Information

### Road (ADR)

#### 14.1. UN number

UN number	1280
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#### 14.2. UN proper shipping name

Proper shipping name	Propylene oxide
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#### 14.3. Transport hazard class(es)

Hazard identification number	33
Class	3
Classification code	F1

#### 14.4. Packing group

Packing group	I
Labels	3

#### 14.5. Environmental hazards

Environmentally hazardous substance mark	no
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#### 14.6. Special precautions for user

Special provisions	
Limited quantities	none.

## Section 15 – Regulatory Information

### 15.1. Safety, health and environmental regulations

This Safety Data Sheet was prepared in accordance with Safe Work Australia's Code of Practice for the Preparation of Safety Data Sheets for Hazardous Chemicals.

### 15.2 Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP)

Not allocated

### AICS

All components are listed in the Australian Inventory of Chemical Substances.

## Section 16 : Additional Information

### Full text of any H-statements referred to under heading 3:

H224 Extremely flammable liquid and vapour.  
H302 Harmful if swallowed.  
H311 Toxic in contact with skin.  
H319 Causes serious eye irritation.  
H331 Toxic if inhaled.  
H335 May cause respiratory irritation.  
H340 May cause genetic defects.  
H350 May cause cancer.

(*)	INTERNAL CLASSIFICATION BY BIG
CLP (EU-GHS)	Classification, labelling and packaging (Globally Harmonised System in Europe)
DMEL	Derived Minimal Effect Level
DNEL	Derived No Effect Level
EC50	Effect Concentration 50 %
ErC50	EC50 in terms of reduction of growth rate
LC50	Lethal Concentration 50 %
LD50	Lethal Dose 50 %
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
PBT	Persistent, Bioaccumulative & Toxic
PNEC	Predicted No Effect Concentration
STP	Sludge Treatment Process
vPvB	very Persistent & very Bioaccumulative

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