
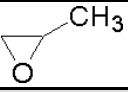


SAFETY DATA SHEET		PR/EHD/OH/F-313	 بترو رابغ Petro Rabigh
PRODUCT NAME : PROPYLENE OXIDE			
SDS Reference No. SDS-06-0001	REV NO. 1.4: January 13, 2020	Page 1 of 16	

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product Identifier

Product Name:	Propylene oxide
Description:	The substance is a mono constituent substance (origin: organic)
REACH Registration Number:	01-2119480483-35-xxxx
EC Number:	200-879-2
EC name:	Methyloxirane
CAS Number:	75-56-9
CAS name:	Methyloxirane
IUPAC name:	1,2-Epoxypropane
Molecular formula:	C3H6O
Molecular weight range:	58.0791
Structural formula:	

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

IDENTIFIED USES:
 Manufacturing of propylene oxide
 Distribution of propylene oxide - Industrial
 Use of propylene oxide in polymer production - Industrial
 Use of propylene oxide as an intermediate - Industrial
 Laboratory use of propylene oxide - Professional

MOST COMMON TECHNICAL FUNCTION OF SUBSTANCE (WHAT IT DOES):
 Intermediates
 Laboratory chemicals


USES BY CONSUMERS ADVISED AGAINST
 No uses identified to be advised against.

1.3 Manufacturer or supplier's details

Manufacturer	Rabigh Refining and Petrochemical Company
Address	PLANT PO Box 101, Rabigh 21911, Kingdom of Saudi Arabia Tel: +966 12 425 0390 Free Number : 800 440 9000
E-mail of person responsible for this SDS	stephane.dallaire@petrorabigh.com

1.4 Emergency telephone number

Emergency telephone numbers (24-hour)	Asia Pacific (except China):	CareChem 24 +65 3158 1074	English, Cantonese, Indonesian, Japanese, Korean, Malay, Mandarin, Thai, Vietnamese
	China (Off-land)	CareChem 24 +86 512 8090 3042	English, Mandarin
	US, Canada Outside above area	ChemTrec 1-800-424-9300 +703-527-3887	English
	Europe, America, Middle East, Africa (Europe & English Speaking):	CareChem 24 +44 (0) 1235 239 670	English, Albanian, Bulgarian, Czech, Danish, Dutch, Finnish, French, German, Greek, Hungarian, Italian, Lithuanian, Norwegian, Polish, Portuguese, Romanian, Russian, Serb-Croat, Slovak, Spanish, Swedish, Turkish, Ukrainian
	Asia Pacific (except China):	CareChem 24 +65 3158 1074	English, Cantonese, Indonesian, Japanese, Korean, Malay, Mandarin, Thai, Vietnamese

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SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

2.2.1 Classification and labeling in Annex of Directive 67/548/EEC:

Endpoints	Classification	Reason for no classification
Explosiveness		conclusive but not sufficient for classification
Oxidizing properties		conclusive but not sufficient for classification
Flammability	F+; R12	
Thermal stability		conclusive but not sufficient for classification
Acute toxicity	Xn; R20/21/22	
Acute toxicity- irreversible damage after single exposure		conclusive but not sufficient for classification
Repeated dose toxicity		conclusive but not sufficient for classification
Irritation / Corrosion	Xi: R36/37/38	
Sensitization		conclusive but not sufficient for classification
Carcinogenicity	Carcinogen Category 2; R45	conclusive but not sufficient for classification
Mutagenicity - Genetic Toxicity	Mutagen Category2 ; R46	conclusive but not sufficient for classification
Toxicity to reproduction fertility		conclusive but not sufficient for classification
Toxicity to reproduction development		conclusive but not sufficient for classification
Toxicity to reproduction - breastfed babies		conclusive but not sufficient for classification
Environment		conclusive but not sufficient for classification

Labeling

Indication of danger:

F+ - extremely flammable

T

R-phrases:

R12 Extremely flammable
 R20/21/22 harmful by inhalation, in contact with skin and if swallowed
 R36/37/38 irritating to eyes, respiratory system and skin
 R45 may cause cancer
 R46 may cause heritable genetic damage


S-phrases:

S45 in case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
 S54 S53 - avoid exposure - obtain special instructions before use

2.2.2 Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]:

Endpoints	Classification	Reason for no classification
Explosiveness		conclusive but not sufficient for classification
Oxidizing properties		conclusive but not sufficient for classification
Flammability	Flammable Liquid 1	
Thermal stability		conclusive but not sufficient for classification
Acute toxicity	Acute Tox. 4.	
Acute toxicity- irreversible damage after single exposure	STOT SE 3 – Cat 3 for Respiratory tract irritation	
Repeated dose toxicity		conclusive but not sufficient for classification

Conform to Regulation (EC) No. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), Annex II -Europe

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Irritation / Corrosion	Eye Irritation 2	New test data demonstrate that propylene oxide is not irritating to the skin and hence, Skin Irritation Category 2 classification is not warranted.
Sensitization		conclusive but not sufficient for classification
Carcinogenicity	Carcinogen 1B	conclusive but not sufficient for classification
Mutagenicity - Genetic Toxicity	Mutagen 1B	conclusive but not sufficient for classification
Toxicity to reproduction fertility		conclusive but not sufficient for classification
Toxicity to reproduction development		conclusive but not sufficient for classification
Toxicity to reproduction - breastfed babies		conclusive but not sufficient for classification
Environment		conclusive but not sufficient for classification

Labelling

Signal word: Danger

Hazard pictograms:



Hazard statements:


- H224: Extremely flammable liquids and gases
- H302: Harmful if swallowed
- H312: Harmful in contact with skin
- H315: Causes skin irritation
- H319: causes serious eye irritation
- H332: Harmful if inhaled
- H335: May cause respiratory irritation
- H340: May cause genetic defects via the intraperitoneal route only
- H350: May cause cancer

Precautionary statements:

- P201: Obtain special instructions before use
- P202: Do not handle until all safety precautions have been read and understood.
- P280: Wear protective gloves/protective clothing/eye protection/face protection.
- P281: Use personal protective equipment as required.
- P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- P233: Keep container tightly closed.
- P240: Ground/bond container and receiving equipment.
- P241: Use explosion-proof electrical/ventilating/lighting/... / equipment.
- P242: Use only non-sparking tools.
- P243: Take precautionary measures against static discharge.

2.2.3 Classification according to Globally Harmonized System of Classification and Labelling of Chemicals [UN- /GHS]:		
Endpoints	Classification	Reason for no classification
Explosiveness		conclusive but not sufficient for classification
Oxidising properties		conclusive but not sufficient for classification
Flammability	Flammable Liquid 1	
Thermal stability		conclusive but not sufficient for classification
Acute toxicity	Acute Toxicity 4	
Acute toxicity- irreversible damage after single exposure	STOT SE 3	

Conform to Regulation (EC) No. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), Annex II - Europe

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Aspiration		classification is not warranted based on expert judgment of several physicochemical properties
Repeated dose toxicity		
Irritation / Corrosion	Eye Irritation 2	
Sensitisation		conclusive but not sufficient for classification
Carcinogenicity	Carcinogen 1B	
Mutagenicity - Genetic Toxicity	Mutagen 1B	
Toxicity to reproduction fertility		conclusive but not sufficient for classification
Toxicity to reproduction development		conclusive but not sufficient for classification
Toxicity to reproduction - breastfed babies		conclusive but not sufficient for classification
Environment	Acute Aquatic Hazard 3	

Labelling

Single word:

Danger

Hazard pictograms:




Hazard statements:

- H224: Extremely flammable liquid and vapor
- H302: Harmful if swallowed
- H312: Harmful in contact with skin
- H319: Causes serious eye irritation
- H332: Harmful if inhaled
- 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:

- P201: Obtain special instructions before use
- P202: Do not handle until all safety precautions have been read and understood.
- P280: Wear protective gloves/protective clothing/eye protection/face protection.
- P281: Use personal protective equipment as required.
- P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- P233: Keep container tightly closed.
- P240: Ground/bond container and receiving equipment.
- P241: Use explosion-proof electrical/ventilating/lighting/... / equipment.
- P242: Use only non-sparking tools.
- P243: Take precautionary measures against static discharge.
- P273: Avoid release to the environment
- P501: Dispose of contents/container in accordance with local/regional/national/international regulations (to be specified).

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2.3 Other hazards	
Substance meets the criteria for PBT or vPvB according to Regulation (EC) No. 1907/2006, Annex XIII:	Not applicable.
Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII:	Not applicable.
Other hazards which do not result in classification:	Not applicable.

SECTION 3: Composition/information on ingredients

3.1 Classification of the substance or mixture	
IUPAC Name:	1,2-Epoxypropane
Description:	Propylene oxide
Degree of purity:	> 99% (w/w)

Constituents:

Product / Ingredient name	Identifiers	Typical concentration	Classification			
			67/548/EEC	Regulation (EC) No. 1272/2008 [CLP]	UN-GHS	Type
methyloxiranel	EC: 200-879-2	>99% (w/w)	Xn; R20/R21/22 F+; R12	Acute Tox. 4 STOT SE 3 H224, H302, H312, H332	Acute Tox. 4 STOT SE 3 H224, H302, H312, H332	[A]
	CAS: 75-56-9	>99% (w/w)	See section 16 for the full Text of the R-phrases	See section 16 for the full Text of the H-phrases	See section 16 for the full Text of the H-phrases	

Impurities: Impurities are not present at concentrations that affect the Classification and Labeling of this substance.

Type


[A] Constituent

3.2 Mixtures	
IUPAC Name:	Not applicable
Description:	Not applicable
Degree of purity:	Not applicable

There are no additional ingredients present which, within the current knowledge of the supplier, are classified and contribute to the classification of the substance and hence require reporting in this section.

SECTION 4: First aid measures

4.1 Description of 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 10minutes. Get medical attention following exposure or if feeling unwell.
Inhalation	Remove victim to fresh air wearing self-contained breathing apparatus, and keep at rest in a position comfortable for breathing. 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 following exposure or if feeling unwell. 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.
Skin contact	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention following exposure or if feeling unwell. Wash clothing before reuse. Clean shoes thoroughly before reuse.

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Ingestion	Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. 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
Protection of first-aiders	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects	
Eye contact	No relevant human information is available.
Inhalation	No relevant human information is available.
Skin contact	No relevant human information is available.
Ingestion	Harmful if swallowed

Over-exposure signs/symptoms

Eye contact	No specific data. However, information available from human reports indicates propylene oxide is irritating to the eyes.
Inhalation	No specific data.
Skin contact	No specific data. However, a small number of cases in workers provide some limited evidence that repeated dermal exposure to liquid propylene oxide may cause skin sensitization.
Ingestion	No specific data

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled
Specific treatments	No specific treatment

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	In case of fire, use water spray (fog), foam or dry chemical.
Unsuitable extinguishing media	Do not use full jet water stream.

5.2 Special hazards arising from the substance of mixture

Hazards from the substance or mixture	In a fire or if heated, a pressure increase will occur and the container may burst/explode. Can form violent, spontaneously explosive mixture in air.
Hazardous thermal decomposition products	Decomposition products may include the following materials: carbon monoxide and carbon dioxide


5.3 Advice for firefighters

Special protective actions for fire-fighting	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. If possible, stop flow of product. Continue water spray from protected position until container stays cool. Prevent water used in emergency cases from entering sewers and drainage systems.
Specific protective equipment for fire-fighting	Fire-fighters shall wear self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
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For emergency responders	Consider the risk of potentially explosive atmospheres. Eliminate ignition sources. If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel". Wear self-contained breathing apparatus when entering area unless atmosphere is proved by monitoring to be safe. Ensure adequate ventilation.
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6.2 Environmental precautions	Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
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6.3 Methods and materials for containment and cleaning up	
Small spill	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
Large spill	Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, watercourses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

6.4 Reference to other sections	See Section 1 for emergency contact information. See Section 8 for information on appropriate personal protective equipment. See Section 13 for additional waste treatment information.
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SECTION 7: Handling and storage

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

7.1 Precautions for safe handling
<p>7.1.1. Recommendations shall be specified to:</p> <ul style="list-style-type: none"> (a) keep away from ignition sources, flames, static discharges; (b) allow safe handling of the substance such as containment and measures to prevent fire as well as aerosol and dust generation; (c) prevent handling of incompatible substances or mixtures; (d) reduce the release of the substance or mixture to the environment, such as avoiding spills or keeping away from drains; (e) use only properly specified equipment and materials which are suitable for this product. For example, avoid contact with pure copper, silver and brass with greater than 65% copper; (f) ensure equipment is adequately earthed, and use of only non-sparking tools <p>7.1.2. Advice on general occupational hygiene shall be provided, such as:</p> <ul style="list-style-type: none"> (a) not to eat, drink, and smoke in work areas; (b) wash hands after use; and (c) remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage, including any incompatibilities
<ul style="list-style-type: none"> (a) store in accordance with local regulations; (b) store in original container protected from direct sunlight in a dry, cool (<50°C) and well-ventilated area, away from incompatible materials (see section 10) and food and drink; (c) keep container tightly closed and sealed until ready for use; (d) containers that have been opened must be carefully resealed and kept upright to prevent leakage; (e) do not store in unlabelled containers; and (f) use appropriate containment to avoid environmental contamination.

7.3 Specific end use(s)	
Recommendations	No information is available
Industrial sector specific solutions	No information is available

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SECTION 8: Exposure controls/personal protection

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

8.1 Control parameters

<u>Occupational exposure limits</u>				
Product/Ingredient name	Exposure limit values			
Substance	Form	TWA	STEL	Reference
Propylene oxide	Vapor	5ppm (11.3 mg/m ³)	not available	EH40 WELs (UK)
	Vapor	2ppm (4.76mg/m ³)	not available	ACGIH (2011)
		100ppm (240mg/m ³)	not available	OSHA (29 CFR 1910)

Recommended monitoring procedures

Personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances.

Derived no effect levels

Product / Ingredient name	Type	Exposure	Value	Population	Effects
Propylene oxide	DNEL	Short term, Inhalation	170 mg/m ³	Worker	Local
	DNEL	Long term Inhalation	5 mg/m ³	Worker	Local
	DNEL	Short term, Inhalation	170 mg/m ³	Consumer	Local
	DNEL	Long term Inhalation	1.7mg/m ³	Consumer	Local

Predicted no effect concentrations


Product / Ingredient name	Type	Compartment Detail	Value	Method Detail
Propylene oxide	PNEC	Fresh water	not available; not required	-
	PNEC	Marine	not available; not required	-
	PNEC	Intermittent release	not available; not required	-
	PNEC	Fresh water sediment	not available; not required	-

8.2 Exposure controls

Appropriate engineering controls	If user operations generate dust, fumes, gas, vapour or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
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Individual protection measures

Hygiene measures:	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Eye/face protection:	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, gases or dusts. Recommended: safety glasses with side-shields
Skin protection Hand protection:	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 are necessary. >8 hours (breakthrough time): butyl rubber, nitrile rubber, PVC, Viton®
Body protection:	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.
Other skin protection:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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Respiratory protection:	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. Recommended: organic vapor filter (Type A)
Environmental exposure controls:	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.


SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance		
Physical state:		
Form:	Liquid at 20°C and 1013kPa	
Color:	Colourless	
Odour:	Sweet, ether-like	
Odour threshold :	Not available	
pH:	Not available	
Melting point/freezing point range:	-112°C	
Boiling point	35C at 103.30-104.13kPa	
Relative density (Water=1)	0.830 at 20°C	
Vapour Pressure:	74kPa at 25°C	
Surface tension:	Not surface active	Surface activity of 1.06g/L solution at 21C is 71.5mN/m
Water solubility:	42.5-45.0% (w/w) (ca. 425-450 g/L) at 20°C and pH=8	
Partition coefficient; n-octanol/water (log value):	<1. A value of 0.055 as the mean of the two measured log values was estimated.	
Flash point:	equilibrium method closed cup: -38°C at 100.75kPa	
Evaporation rate:	not provided	
Flammability (gas):	extremely flammable	Flammability derived from flash point and boiling point
Burning time:	no information	
Burning rate:	no information	
Upper/lower flammability or explosive limits:	LEL: 2.8% in air UEL: 37.0% in air	
Relative density:	not provided	
Viscosity:	Static: 0.374mm ² /s at 20°C 0.447 mm ² /s at 0°C	
Explosive properties:	non explosive	
Self-ignition temperature	>400°C at 100.49-101.83kPa	
Decomposition temperature:	not information	
Oxidising properties:	not applicable	
Stability in organic solvents and identity or relevant degradation products	No information	
Dissociation constant	not applicable	
Granulometry	not applicable	The substance is manufactured and marketed in a non-solid or granular form.


9.2 Other properties

No additional information

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SECTION 10: Stability and reactivity
10.1 Reactivity
No specific test data related to reactivity available for this product or its ingredients.
10.2 Chemical stability
The product is stable under normal conditions
10.3 Possibility of hazardous reactions
Under normal conditions of storage and use, hazardous reactions will not occur.
10.4 Conditions to avoid
Keep away from heat, sparks and flame.
10.5. Incompatible materials
Air, oxidizing agents, acids, alkalis. For material computability see latest version of ISO 11114.
10.6 Hazardous decomposition products
Under normal conditions of storage and use, hazardous decomposition products should not be produced. The substance will burn to carbon oxides.

SECTION 11: Toxicological information																		
11.1 Information on toxicological effects																		
Acute Toxicity																		
<table border="1"> <thead> <tr> <th>Product / Ingredient name</th> <th>Species</th> <th>Results</th> <th>Dose</th> <th>Exposure</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Propylene oxide</td> <td>rat</td> <td>LD50 Oral</td> <td>382 – 587 mg/kg bw</td> <td>-</td> </tr> <tr> <td>rat</td> <td>LC50 inhalation</td> <td>4197 ppm (9,950mg/m³)</td> <td>4h</td> </tr> <tr> <td>rabbit</td> <td>LD50 dermal</td> <td>1.5 mL/kg bw (950mg/kg bw)</td> <td>-</td> </tr> </tbody> </table>	Product / Ingredient name	Species	Results	Dose	Exposure	Propylene oxide	rat	LD50 Oral	382 – 587 mg/kg bw	-	rat	LC50 inhalation	4197 ppm (9,950mg/m ³)	4h	rabbit	LD50 dermal	1.5 mL/kg bw (950mg/kg bw)	-
Product / Ingredient name	Species	Results	Dose	Exposure														
Propylene oxide	rat	LD50 Oral	382 – 587 mg/kg bw	-														
	rat	LC50 inhalation	4197 ppm (9,950mg/m ³)	4h														
	rabbit	LD50 dermal	1.5 mL/kg bw (950mg/kg bw)	-														
Conclusion/summary: No relevant human information is available																		
Repeated dose Toxicity; oral																		
<table border="1"> <thead> <tr> <th>Product / Ingredient name</th> <th>Species</th> <th>Results</th> <th>Dose</th> <th>Exposure</th> </tr> </thead> <tbody> <tr> <td>Propylene oxide</td> <td>rat</td> <td>LOAEL</td> <td>15 mg/kg bw</td> <td>150 weeks</td> </tr> </tbody> </table>	Product / Ingredient name	Species	Results	Dose	Exposure	Propylene oxide	rat	LOAEL	15 mg/kg bw	150 weeks								
Product / Ingredient name	Species	Results	Dose	Exposure														
Propylene oxide	rat	LOAEL	15 mg/kg bw	150 weeks														
Conclusion/summary: No relevant human information is available. However, data are not required in accordance with column 2 of REACH Annex IX.																		
Repeated dose Toxicity; inhalation																		
<table border="1"> <tbody> <tr> <td rowspan="2">Propylene oxide</td> <td>rat</td> <td>NOAEC</td> <td>30ppm</td> <td>24 months</td> </tr> <tr> <td>rat</td> <td>LOAEC</td> <td>100ppm</td> <td>28 months</td> </tr> </tbody> </table>	Propylene oxide	rat	NOAEC	30ppm	24 months	rat	LOAEC	100ppm	28 months									
Propylene oxide		rat	NOAEC	30ppm	24 months													
	rat	LOAEC	100ppm	28 months														
Conclusion/summary: Only limited repeated exposure experience is reported for propylene oxide exposure in humans. A group of workers exposed to a mixture of alkene oxides, including propylene oxide (<1ppm) reportedly did not exhibit clinical abnormalities.																		
Repeated dose Toxicity; dermal																		
Conclusion/summary: Data are not required; inhalation is the main route of exposure.																		
Repeated dose Toxicity; other routes																		
Conclusion/summary: This information is not available.																		
Irritation: skin																		
Conclusion/Summary: There are no reports of human skin irritation associated with propylene oxide exposure.																		
Irritation: eyes																		
Conclusion/Summary: Information available from human reports indicates propylene oxide is irritating to the eyes; Classification Cat. 2, H319.																		
Irritation: respiratory tract																		
Conclusion/Summary: Information available from human reports indicate propylene oxide may cause irritation to the respiratory tract; Classification Cat. 3, H335.																		
Sensitisation: skin																		

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Product / Ingredient name	Species	Results	Dose	Exposures
Propylene oxide	guinea pigs	not sensitizing	No data	No data
	split adjuvant Test	No. with Positive reactions	10%	24-48h

Conclusion/Summary: Propylene oxide is not considered a skin sensitizer.

Sensitisation: respiratory tract

Conclusion/Summary: No human data are available indicating a concern for respiratory sensitization.

Mutagenicity

Product/ingredient name	Method	Results	Dose
Propylene oxide	In vitro: bacteria reverse mutation essays	mutagenic	20-500ug/ml
	In vivo: mouse chromosome aberration assay	mutagenic	400ppm

Conclusion/summary: Limited human information is available. Generally, propylene oxide is classified as a germ cell mutagen but there is no evidence that it interacts with germ cell DNA.

Carcinogenicity

Product / Ingredient name	Method	Results	Dose
Propylene oxide	Inhalation; mouse	NOAEC:100ppm	103 weeks (6h/d; 5d/w)
	oral; rat	LOAEL: 15mg/kg bw (twice weekly)	60mg/kg (150weeks)
	dermal; no information is available	-	-

Conclusion/summary: Propylene oxide is classified as Cat. 2 carcinogen (R45). According to EU Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulation (EC) No. 1272/2008 Annex VI, the classification is: H350, Cat. 1B.

Reproduction Toxicity

Effects on fertility

Product / Ingredient name	Method	Results	Dose
Propylene oxide	Rat (inhalation); OECD Test Guideline 416 (Two- Generation Reproduction Toxicity Study)	NOAEC: 300ppm	0, 30, 100, 300ppm vapour. Whole body; 14 weeks (6h/d; 5d/w)

Conclusion/summary: No information available for carcinogenicity via dermal, oral or other exposure routes. No relevant human information is available.

Toxicity of reproduction

Developmental toxicity

Product / Ingredient name	Method	Results	Dose
Propylene oxide	rabbit (inhalation); OECD Test Guideline 414 (Prenatal Developmental Toxicity Study)	NOAEC: 300ppm	0 and 500ppm

Conclusion/summary: No information available for carcinogenicity via dermal, oral or other exposure routes. No relevant human information is available.

Teratogenicity

Conclusion/Summary: No relevant human or non-human information is available


Specific target organ toxicity (single exposure)

Conclusion/summary: No relevant human or non-human information is available


Specific target organ toxicity (repeated exposure)

Product / Ingredient name	Category	Route of exposure	Target organs
Propylene oxide	Category 2	dermal, inhalation and oral	Eyes, respiratory tract, ingestion system

Aspiration hazards

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Hazards:	No relevant human or non-human information is available; not warranted based on expert judgement.			
Information on the likely routes of exposure:	No relevant human or non-human information is available			
Potential acute health effects				
Eye contact:	Propylene oxide is acutely harmful and irritating to the eye.			
Inhalation:	Propylene oxide is acutely harmful and irritating to the respiratory tract by inhalation			
Skin contact:	No known significant effects or critical hazards.			
Ingestion:	Propylene oxide is acutely harmful if swallowed.			
Symptoms related to the physical, chemical and toxicological characteristics				
Eye contact:	Irritation; Xi, R36			
Inhalation:	Irritation; Xi, R37			
Skin contact:	Irritation; Xi, R38			
Ingestion:	Toxic; R22			
Delayed and immediate effects and also chronic effects from short and long term exposure				
Short-term exposure				
Potential immediate effects:	Propylene oxide is harmful and irritating to the eye and respiratory tract by inhalation and if swallowed			
Potential delayed effects:				
Long-term exposure				
Potential immediate effects:	No relevant human or non-human information is available			
Potential delayed effects:	No relevant human or non-human information is available			
Potential chronic health effects				
Product / Ingredient name	Result	Target	Dose	Duration
Propylene oxide	DNEL; Acute-inhalation, local effects	workers	170mg/m ³ (71ppm)	15 minutes – 8 hours
	DNEL; long term-inhalation, local effects	workers	5mg/m ³ (2ppm)	8 hours
	DNEL; Acute-inhalation, local effects	general population	170mg/m ³ (71ppm)	15 minutes – 8 hours
	DNEL; long term -inhalation, local effects	general population	1.7mg/m ³ (0.7ppm)	24 hours
Conclusion/summary:				
General:	Propylene oxide is acutely harmful and irritating to the eye, respiratory tract by inhalation. Harmful if swallowed.			
Carcinogenicity:	Classified as Carcinogen Cat. 2 (R45; May cause cancer)			
Mutagenicity:	Classified as Mutagen Cat. 2 (R46; May cause heritable genetic damage)			
Teratogenicity:	No human or non-human information is available.			
Developmental effects:	No human information is available.			
Fertility effects:	No known significant effects or critical hazards.			
Other information:	Not available			

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SECTION 12: Ecological information

12.1 Toxicity

Acute Toxicity

Product / Ingredient name	Result	Species/Medium	Exposure
Propylene oxide	LC50: 52 mg/L	for freshwater fish:	96 hours
	LC50: 89 mg/L	LC50 for marine water fish: 89 mg/L	96 hours
	EC50/LC50: 350 mg/L	freshwater invertebrates	48 hours
	EC50/LC50: 240 mg/L	freshwater algae	96 hours
	EC50/LC50: 350 mg/L	freshwater invertebrates	48 hours
	EC50 (96 h): 240 mg/L	algae and aquatic plants	96 hours
	EC10/LC10 or NOEC: 100 mg/L	aquatic micro-organisms	28 days

Calculation of Predicted No Effect Concentration (PNEC)

Product / Ingredient name	PNEC	Species/Medium	Assessment factor	Remarks
Propylene oxide	0.052 mg/L	aqua: freshwater	1000	Extrapolation method: assessment factor
	0.0052 mg/L	aqua: marine water	10,000	ditto
	0.52 mg/L	aqua: (intermittent releases)	100	ditto
	0.245 mg/kg sediment dw	sediment (freshwater)	-	Extrapolation method: partition coefficient
	0.0245 mg/kg sediment dw	Sediment (marine water)	-	ditto
	0.0186 mg/kg soil dw	soil	-	ditto
	10 mg/L	STP	10	Extrapolation method: assessment factor

Conclusion/summary: No information of other organisms is available.

12.2 Persistence and degradability

Product / Ingredient name	Aquatic half-life	Photolysis	Potential
Propylene oxide	not available	not available	not available

Conclusion/summary: No information is available

12.3 Bioaccumulative potential

Product / Ingredient name	LogP _{ow}	BCF	Biodegradability
Propylene oxide	not available	not available	Readily biodegradable

Conclusion/summary: No information is available

12.4 Mobility in soil


Soil/water partition coefficient (K _{oc})	not available
Mobility	The substance has high mobility in soil

12.5 Results of PBT and vPvB assessment

PBT:	P: not available B: not available T: not available the substance does not fulfill the PBT criteria
vPvB:	vP: Not available. vB: Not available. the substance does not fulfill the vPvB criteria.

12.6 Other adverse effects

No known significant effects or critical hazards.

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SECTION 13: Disposal considerations

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

13.1 Waste treatment methods

Product	
Methods of disposal:	The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. 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.
Hazardous waste:	The classification of the product may meet the criteria for a hazardous waste.
Packaging	
Methods of disposal:	The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.
Special precautions:	This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.


SECTION 14: Transport information

	ADR/RID	ADN/ADNR	IMDG	IATA
14.1 UN number	1280	1280	1280	1280
14.2 UN proper shipping name	Propylene oxide	Propylene oxide	Propylene oxide	Propylene oxide
14.3 Transport hazard class(es)	3	3	3	3
14.4 Packing group	1	-	1	1
14.5 Environmental hazards	None	None	None	None
14.6 Special precautions for user	None	None	None	None
14.7 Additional information	EAC: 3YE	-	Ship type: 2 Pollution category: Y	Avoid transport on vehicles where the load is not separated from driver's compartment
14.8 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	-	-	Substance name: Propylene oxide	-

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

<p>EU Regulation (EC) No. 1907/2006 (REACH)</p> <p>Annex XIV - List of substances subject to authorization</p> <p>Substances of very high concern</p> <p>None of the components are listed.</p>
<p>Annex XVII – Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles</p> <p>Not applicable</p>

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Other EU regulations	
Europe inventory:	All components are listed or exempted.
Black List Chemicals:	Not listed
Priority List Chemicals:	Not listed
Integrated pollution prevention and control list (IPPC) - Air:	Not listed
Integrated pollution prevention and control list (IPPC) - Water:	Not listed

International regulations	
Chemical Weapons Convention List Schedule I Chemical:	Not listed
Chemical Weapons Convention List Schedule II Chemicals:	Not listed
Chemical Weapons Convention List Schedule III Chemicals:	Not listed

15.2 Chemical Safety Assessment
This product contains substances for which Chemical Safety Assessments are still required.

SECTION 16: Other information

Indicates information that has changed from previously issued version.	
Abbreviations and acronyms:	ATE = Acute Toxicity Estimate CLP = Classification, Labeling and Packaging Regulation [Regulation (EC) No.1272/2008] DNEL = Derived No Effect Level EUH statement = CLP-specific Hazard statement PNEC = Predicted No Effect Concentration RRN = REACH Registration Number DNEL=Derived No Effect Level DMEL=Derived Minimum Effect Level DMEL=Derived Minimum Effect Level NOAEL= No Observable Adverse Effect Level STOT= Systematic Target Organ Toxicity


Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]	
Classification	Justification
Extremely Flammable (Cat 1, H224)	Based on flash point and boiling point
Acutely toxic 4	Expert judgment
STOT SE 3, Cat 3	Expert judgment
H302	Expert judgment
H312	Expert judgment
H332	Expert judgment

Full text of abbreviated H statements:	H224 Flammable liquids, category 1 H302 Harmful if swallowed H312 Acute toxicity, category 4 (dermal) H319 Eye irritation; category 2 H332 Acute toxicity, category 4 (inhalation) H335 Respiratory tract irritation
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Full text of classifications[CLP/GHS]:	Acute Tox. 4, H302 ACUTE TOXICITY: ORAL - Category 4
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Full text of abbreviated R phrases	R12: Flammable liquids/gases; category 1 R20: Inhalation R21: Dermal R22: Oral R36: Eye irritation, category 2 R37: Respiratory tract irritation R38: Skin irritation R22: Harmful if swallowed R45: Carcinogenicity, category 1A R46: Cell germ Mutagenicity, categories 1A, 1B
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Conform to Regulation (EC) No. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), Annex II -Europe

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Full text of classifications[DSD/DPD]	Xn - Harmful
Version	1.4
Date of printing	1/13/2020
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