Safety data sheet
Propylene oxide.

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

1.1. Product identifier
Product name
Propylene oxide.
Trade name
Propylene Oxide
1,2-Epoxypropane
Methyloxirane

EC No (from EINECS): 200-879-2
CAS No: 75-56-9
Index-Nr. 603-055-00-4
Chemical formula C3H6O
REACH Registration number:
01-2119480483-35

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.
Uses advised against
Consumer use.

1.3. Details of the supplier of the safety data sheet
Company identification
BOC, PO Box 1201, Bluebell, Dublin
E-Mail Address ReachSDS@boc.com

1.4. Emergency telephone number
Emergency phone numbers (24h): 1850 333 435

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification acc. to Regulation (EC) No 1272/2008/EC (CLP/GHS)
Flam. Liq. 1 - Extremely flammable liquid and vapour.
Carc. 1B - May cause cancer.
Muta. 1B - May cause genetic defects.
Acute Tox. 4 - Harmful if inhaled.
Eye Irrit. 2 - Harmful in contact with skin.
STOT SE 3 - Harmful if swallowed.
Skin Irrit. 2 - Causes serious eye irritation.
- May cause respiratory irritation.
- Causes skin irritation.

Classification acc. to Directive 67/548/EEC & 1999/45/EC
F+; R12 **|** Carc. Cat.2; R45 **|** Mut. Cat.2; R46 **|** Xn; R20/21/22 **|** Xi; R36/37/38
Extremely flammable.
Harmful by inhalation, in contact with skin and if swallowed.
Irritating to eyes, respiratory system and skin.
May cause cancer.
May cause heritable genetic damage
Risk advice to man and the environment
Liquid.

2.2. Label elements
- Labelling Pictograms

- Signal word
Danger

- Hazard Statements

H224	Extremely flammable liquid and vapour.
H350	May cause cancer.
H340	May cause genetic defects.
H332	Harmful if inhaled.
H312	Harmful in contact with skin.
H302	Harmful if swallowed.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H315	Causes skin irritation.

- Precautionary Statements

Precautionary Statement Prevention

P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P260	Do not breathe gas, vapours.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary Statement Response

P381	Eliminate all ignition sources if safe to do so.
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P304+P340+P315	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice/attention.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338+P315	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
P332 + P313	If skin irritation occurs: Get medical advice/attention.

Precautionary Statement Storage

P403	Store in a well-ventilated place.
P405	Store locked up.

Precautionary Statement Disposal
None.

2.3. Other hazards
Contact with liquid may cause cold burns/frost bite.

SECTION 3: Composition/information on ingredients

Substance / Mixture: Substance.

3.1. Substances
Propylene oxide.
CAS No: 75-56-9
Index-Nr.: 603-055-00-4
EC No (from EINECS): 200-879-2
REACH Registration number:
01-2119480483-35
Contains no other components or impurities which will influence the classification of the product.

3.2. Mixtures
Not applicable.

SECTION 4: First aid measures

4.1. Description of first aid measures
First Aid General Information:
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
First Aid Inhalation:
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
First Aid Skin / Eye:
Remove contaminated clothing. Drench affected area 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. Immediately flush eyes thoroughly with water for at least 15 minutes.
First Aid Ingestion:
Rinse mouth with water, do not induce vomiting, call a doctor.

4.2. Most important symptoms and effects, both acute and delayed
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination. May result in pulmonary oedema. May cause irritation to cornea (with temporary disturbance to vision). Irritating to eyes, respiratory system and skin.

4.3. Indication of any immediate medical attention and special treatment needed
Obtain medical assistance. Treat with a corticosteroid spray as soon as possible after inhalation.

SECTION 5: Fire fighting measures

5.1. Extinguishing media
Suitable extinguishing media
All known extinguishants can be used.
Unsuitable extinguishing media
Do not use a solid water stream.

5.2. Special hazards arising from the substance or mixture
Specific hazards
Exposure to fire may cause containers to rupture/explode. Can form violent, spontaneously explosive mixture in air.
Hazardous combustion products
If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition:
Carbon monoxide.

5.3. Advice for fire-fighters
Specific methods
If possible, stop flow of product. Continue water spray from protected position until container stays cool. If leaking do not extinguish a flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire. Move container away or cool with water from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.

Special protective equipment for fire-fighters
Use self-contained breathing apparatus and chemically protective clothing. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to EN 469 will provide a basic level of protection from chemical incidents. EN 469:2005: Protective clothing for fire-fighters. Performance requirements for protective clothing for fire-fighting.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Consider the risk of potentially explosive atmospheres. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Monitor concentration of released product. Evacuate area. Use self-contained breathing apparatus and chemically protective clothing. Eliminate ignition sources. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation.
6.2. Environmental precautions
Try to stop release.

6.3. Methods and material for containment and cleaning up
Keep area evacuated and free from ignition sources until any spilled liquid has evaporated. (Ground free from frost). Ventilate area. Absorb excess liquid spillage on inorganic adsorbent material such as fine sand, brick dust etc. Place spent adsorbent in sealed packages and contact specialist waste disposal contractor. Dispose of waste according to national legislation.

6.4. Reference to other sections
See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Keep away from ignition sources (including static discharges). Purge air from system before introducing substance. Avoid contact with pure copper, mercury, silver and brass with greater than 65% copper. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your supplier if in doubt. Ensure equipment is adequately earthed. Suck back of water into the container must be prevented. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Do not allow backfeed into the container. Purge system with dry inert gas (e.g. helium or nitrogen) before substance is introduced and when system is placed out of service. Assess the risk of potentially explosive atmosphere and the need for explosion-proof equipment. Consider the use of only non-sparking tools. Do not smoke while handling product. Only experienced and properly instructed persons should handle the product. Protect cylinders from physical damage; do not drag, roll, slide or drop. 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. Avoid suckback of water, acid and alkalis. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Take precautionary measures against static discharges. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Ensure the complete system has been (or is regularly) checked for leaks before use. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment. 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 contaminates particularly oil and water. Never attempt to transfer product from one cylinder/container to another.

7.2. Conditions for safe storage, including any incompatibilities
Keep container below 50°C in a well ventilated place. Segregate from oxidant gases and other oxidants in store. . 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 falling over. Stored containers should be periodically checked for general conditions 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. Keep away from combustible materials. All electrical equipment in the storage areas should be compatible with the risk of potentially explosive atmosphere.

7.3. Specific end use(s)
None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
Exposure limit value

Value type	value	**Note**
Great Britain - LTEL	5 ppm	EH 40/07
TLV	20 ppm	

Derived No Effect Levels

Type	Exposure	Value	Population	Effects
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	1,7 mg/m^3	Consumer	Local

Predicted No Effect Concentrations
PNEC not available.
Not required.

8.2. Exposure controls
Appropriate engineering controls
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. Product to be handled in a closed system and under strictly controlled conditions. Keep concentrations well below occupational exposure limits. Consider work permit system e.g. for maintenance activities. Preferably use permanent leak-tight connections (eg. welded pipes). Systems under pressure should be regularly checked for leakages. Provide adequate general or local ventilation. Gas detectors should be used when quantities of flammable gases/vapours may be released. Gas detectors should be used when toxic quantities may be released.
Personal protective equipment
Eye and face protection
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. Wear a face-shield when transfilling and breaking transfer connections. Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Full-face mask recommended.
Guideline:
EN 136: Respiratory protective devices. Full face masks. Requirements, testing, marking.
Skin protection
Hand protection
Advice: Chemically resistant gloves complying with EN 374 should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Material: Chloroprene
Min. Breakthrough time: 15 min
Guideline: EN 374-1/2/3 Protective gloves against

chemicals and micro-organisms.
Protection index: 1

Advice: Wear cold insulating gloves.
Guideline: EN 511 Protective gloves against cold.

Body protection
Protect eyes, face and skin from contact with product. Keep suitable chemically resistant protective clothing readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.
Guideline:
EN 943: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles.
Other protection
Wear flame resistant/retardant clothing. Take precautionary measures against static discharges. Wear working gloves and safety shoes while handling gas cylinders.
Guideline:
ISO 20345 Safety footwear
Respiratory protection
Keep self contained breathing apparatus readily available for emergency use.Use SCBA in the event of high concentrations.The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD.When allowed by a risk assessment Respiratory Protective Equipment (RPE) may be used.
Guideline:
EN 136: Respiratory protective devices. Full face masks. Requirements, testing, marking.

Material:
Filter AX
Guideline:
EN 14387: Respiratory protective devices. Gas filter(s) and combined filter(s). Requirements, testing, marking
Thermal hazards
If there is a risk of contact with the liquid, all protective equipment should be suitable for extremely low temperatures.
Environmental Exposure Controls
Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste product treatment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties
General information
Appearance/Colour: Colourless liquid.
Odour: Ethereal
Melting point: -112 °C
Boiling point: 34 °C
Flash point: -37 °C
Flammability range: 1,9 %(V) - > 36 %(V)
Vapour Pressure 20 °C: 0,6 bar
Relative density, gas: 3,6
Solubility in water: 405 g/l
Partition coefficient: n-octanol/water: 0,03 logPow
Autoignition temperature: 430 °C
Viscosity:
Dynamic: 0,58 mPa.s
Kinematic: 0,374 mm2/s
Molecular weight: 58,08 g/mol
Relative density, liquid: 0,8
Critical pressure: 209 bar

9.2. Other information
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity
Unreactive under normal conditions.

10.2. Chemical stability
Stable under normal conditions. May polymerise.

10.3. Possibility of hazardous reactions
Can form potential explosive atmosphere in air. May react violently with oxidants.

10.4. Conditions to avoid
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Avoid moisture in installation systems.

10.5. Incompatible materials
Air, Oxidiser. Moisture. May react violently with alkalis. May react violently with acids. May polymerise in the presence of catalysts. May react violently with alkaline-earth and alkali metals. For material compatibility see latest version of ISO-11114.

10.6. Hazardous decomposition products
If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition:
Carbon monoxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute oral toxicity
Value: LD50
Species: Rat
Value in standard unit mg/kg: 380 mg/kg
Acute inhalation toxicity
Value: LC50
Species: Mouse
Exposure time: 4 h
Value in standard unit mg/l: 4 mg/l
Acute dermal toxicity
Value: LD50
Species: Rabbit
Value in standard unit mg/kg: 1.244 mg/kg
Skin irritation
Irritant
Eye irritation
Species: Rabbit
Irritant
Sensitization
Species: Guinea-pig
This substance is not classified as a sensitizer.

Repeated dose toxicity
Species: Rat
Route of application: Oral
Value type: LOAEL
Value: 300 mg/kg bw/day

Species: Rat
Route of application: Inhalation
Value type: LOAEL
Value: 362 mg/m3
Genetic toxicity in vitro
Method: OECD Test Guideline 471 (Bacterial Reverse Mutation Assay)
Mutagenic.
Genetic toxicity in vivo
Species: Mouse
Method: OECD Test Guideline 483 (Mammalian Spermatogonial Chromosome Aberration Test)
Result: Mutagenic.
Assessment mutagenicity
May cause genetic defects.
Carcinogenicity
Value type: LOAEL
Value: 300 ppm
Species: Rat
Route of application: Inhalation
Method: OECD Guideline 451 (Carcinogenicity Studies)
Assessment carcinogenicity
May have carcinogenic effect.
Toxicity to reproduction/fertility
Species: Rat
Method: OECD Test Guideline 415 (One-Generation Reproduction Toxicity Study)
Assessment toxicity to reproduction
Toxic effect
Developmental toxicity/teratogenicity
Species: Rat
Route of application: Inhalation
Method: OECD Test Guideline 414 (Prenatal Developmental Toxicity Study)
Assessment teratogenicity
No indication of toxic effects
Experiences with human exposure
Depression of central nervous system.

Inhalation of vapours in high concentrations may cause shortness of breath (lung oedema).

SECTION 12: Ecological information

12.1. Toxicity
No known ecological damage caused by this product.
Acute and prolonged toxicity fish
Species: Fathead Minnow (Pimephales promelas)
Exposure time: 72 h
Value in standard unit mg/l: > 100 mg/l
Acute and prolonged toxicity fish
Species: Bluegill (Lepomis macrochirus)
Exposure time: 96 h
Value in standard unit mg/l: 215 mg/l
Acute and prolonged toxicity fish
Species: Gold fish (Carassius auratus)
Exposure time: 24 h
Value in standard unit mg/l: 170 mg/l

Acute and prolonged toxicity fish
Species: Mosquito fish (Gambusia affinis)
Exposure time: 96 h
Value in standard unit mg/l: 141 mg/l
Acute and prolonged toxicity fish
Species: Common mullet (Mugil cephalus)
Exposure time: 96 h
Value in standard unit mg/l: 89 mg/l
Acute and prolonged toxicity fish
Species: Guppy (Poecilia reticulata)
Exposure time: 336 h
Value in standard unit mg/l: 32 mg/l
Acute and prolonged toxicity fish
Species: Rainbow trout (Oncorhynchus mykiss)
Exposure time: 96 h
Value in standard unit mg/l: 52 mg/l
Acute toxicity aquatic invertebrates
Species: Daphnia magna
Exposure time: 48 h
Value type: EC50
Value in standard unit mg/l: 350 mg/l
Toxicity aquatic plants
Species: Algae
Exposure time: 96 h
Value type: EC50
Value in standard unit mg/l: 240 mg/l

12.2. Persistence and degradability
Readily biodegradable
Biodegradation
Test type: Closed bottle test.
Biodegradation: 12 - 14 %
Exposure time: 28 d
Physical chemical eliminability
Not determined.

12.3. Bioaccumulative potential
Does not bioaccumulate.
Chemical oxygen demand (COD)
Not determined.

12.4. Mobility in soil
The substance has high mobility in soil.

12.5. Results of PBT and vPvB assessment
Not classified as PBT or vPvB.

12.6. Other adverse effects
Depending on local conditions and existing concentrations, disturbances in the biodegradation process of activated sludge are not likely.

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste product should be flared through a suitable burner with flash back arrestor. Toxic and corrosive gases formed during combustion should be scrubbed before discharge to atmosphere. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required. Refer to the EIGA code of practice (Doc.30 “Disposal of Gases", downloadable at http://www.eiga.org) for more

guidance on suitable disposal methods.

SECTION 14: Transport information

ADR/RID

14.1. UN number
1280

14.2. UN proper shipping name
Propylene Oxide

14.3. Transport hazard class(es)
Class: 3
Classification Code: F1
Labels: 3
Hazard number: 33
Tunnel restriction code: (D/E)
Emergency Action Code: 3YE

14.4. Packing group (Packing Instruction)
P001

14.5. Environmental hazards
None.

14.6. Special precautions for user
None.

IMDG

14.1. UN number
1280

14.2. UN proper shipping name
Propylene Oxide

14.3. Transport hazard class(es)
Class: 3
Labels: 3
EmS: F-E, S-D

14.4. Packing group (Packing Instruction)
P001

14.5. Environmental hazards
None.

14.6. Special precautions for user
None.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Substance name: Propylene oxide
Ship type required: 2
Pollution category: Y

IATA

14.1. UN number
1280

14.2. UN proper shipping name
Propylene Oxide

14.3. Transport hazard class(es)
Class: 3
Labels: 3

14.4. Packing group (Packing Instruction)
P304

14.5. Environmental hazards
None.

14.6. Special precautions for user
None.

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 they are firmly secured. Ensure that the cylinder valve is closed and not leaking. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that the valve protection device (where provided) is correctly fitted. Ensure adequate ventilation. Ensure compliance with applicable regulations.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
Seveso Directive 96/82/EC: Listed

15.2. Chemical safety assessment
CSA has been carried out.

SECTION 16: Other information

Ensure all national/local regulations are observed. Ensure operators understand the toxicity hazard. Users of breathing apparatus must be trained. Ensure operators understand the flammability hazard. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Advice
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. Details given in this document are believed to be correct at the time of going to press.
Further information
Note:
When using this document care should be taken, as the decimal sign and its position complies with rules for the structure and drafting of international standards, and is a comma on the line.
As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1.000 is one thousand and not one (to three decimal places).

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