

**Ethylene oxide****ALSA056**

2.3 : Toxic gas.



2.1 : flammable gas.

**Danger****SECTION 1. Identification of the substance/mixture and of the company/undertaking****Product identifier**

Trade name : Ethylene oxide  
SDS Nr : ALSA056  
Chemical description : Ethylene oxide  
CAS No :000075-21-8  
EC No :200-849-9  
Index No :603-023-00-X  
Registration-No. : Registration deadline not expired.  
Chemical formula : C2H4O

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use. Laboratory use Chemical reaction / Synthesis.  
Contact supplier for more uses information

**Details of the supplier of the safety data sheet**

Company identification : AIR LIQUIDE (PTY) LTD  
Crn Vereeniging Road & Andre Marais Street  
Alrode, Alberton  
Gauteng SOUTH AFRICA  
Tel. : +27 87 288 1100  
E-Mail address (competent person) : scr.sales@airliquide.com

**Emergency telephone number**

Emergency telephone number : +27 87 288 1100

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

- Health hazards : Acute toxicity, Inhalation - Category 3 - Danger - (CLP : Acute Tox. 3) - H331  
Skin irritation - Category 2 - Warning - (CLP : Skin Irrit. 2) - H315  
Eye irritation - Category 2A - Warning - (CLP : Eye Irrit. 2) - H319  
Germ cell mutagenicity - Category 1B - Danger - (CLP : Muta. 1B) - H340  
Carcinogenicity - Category 1B - Danger - (CLP : Carc. 1B) - H350  
Specific Target Organ Toxicity - Single exposure - Respiratory tract irritation - Category 3 - Warning - (CLP : STOT SE 3) - H335
- Physical hazards : Flammable gases - Category 1 - Danger - (CLP : Flam. Gas 1) - H220  
Gases under pressure - Liquefied gas - Warning - (CLP : Press. Gas) - H280  
Explosive with or without contact with air - (CLP : EUH006)

## Ethylene oxide

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### SECTION 2. Hazards identification (continued)

#### Classification EC 67/548 or EC 1999/45

: F+; R12  
 Carc. Cat. 2; R45  
 Muta. Cat. 2; R46  
 T; R23  
 Xi; R36/37/38

#### Label elements

##### Labelling Regulation EC 1272/2008 (CLP)

##### • Hazard pictograms



##### • Hazard pictograms code

: GHS06 - GHS02 - GHS08 - GHS04

##### • Signal word

: Danger

##### • Hazard statements

: H331 - Toxic if inhaled.  
 H220 - Extremely flammable gas.  
 H350 - May cause cancer.  
 H340 - May cause genetic defects.  
 H319 - Causes serious eye irritation.  
 H315 - Causes skin irritation.  
 H280 - Contains gas under pressure; may explode if heated.  
 H335 - May cause respiratory irritation.

##### • Supplemental hazard information

: EUH006 - Explosive with or without contact with air.

##### • Precautionary statements

###### - Prevention

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

###### - Response

: 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.  
 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.  
 P332+P313 - If skin irritation occurs : Get medical advice.  
 P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
 P302+P352 - IF ON SKIN : Wash with plenty of soap and water.

###### - Storage

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

#### Other hazards

: None.

### SECTION 3. Composition/information on ingredients

#### Substance / 3.2. Mixture

Substance.

Substance name	Contents	CAS No	EC No	Index No	Registration no	Classification
Ethylene oxide	: 100 %	75-21-8	200-849-9	603-023-00-X	* 2	F+; R12 R6 Carc. Cat. 2; R45 Muta. Cat. 2; R46 T; R23 Xi; R36/37/38 ----- Flam. Gas 1 (H220) Acute Tox. 3 (H331) Carc. 1B (H350) Muta. 1B (H340) Eye irrit 2 (H319) Skin Irrit. 2 (H315) STOT SE 3 (H335) Liq. Gas (H280)

**Ethylene oxide****ALSA056****SECTION 3. Composition/information on ingredients (continued)**

Expl. (EUH006)

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 &lt; 1t/y

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

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

- 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.
- Skin contact : Remove contaminated clothing.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

**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. May cause irritation to cornea (with temporary disturbance to vision). In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination. May cause irritation to skin. Refer to section 11.

**Indication of any immediate medical attention and special treatment needed**

- : Obtain medical assistance.  
Treat with corticosteroid spray as soon as possible after inhalation

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

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

**Special hazards arising from the substance or mixture**

- Specific hazards** : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products** : Incomplete combustion may form carbon monoxide.

**Advice for fire-fighters**

- Specific methods** : If possible, stop flow of product.  
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.  
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
- Special protective equipment for fire fighters** : Use self-contained breathing apparatus and chemically protective clothing.

**Ethylene oxide****ALSA056****SECTION 6. Accidental release measures****Personal precautions, protective equipment and emergency procedures**

- : Try to stop release.
- 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.

**Environmental precautions**

- : Try to stop release.
- Reduce vapour with fog or fine water spray.

**Methods and material for containment and cleaning up**

- : Ventilate area.
- Keep area evacuated and free from ignition sources until any spilled liquid has evaporated. (Ground free from frost).
- Hose down area with water.
- Wash contaminated equipment or sites of leaks with copious quantities of water.

**Reference to other sections**

- : See also sections 8 and 13.

**SECTION 7. Handling and storage****Precautions for safe handling****Safe use of the product**

- : 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.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Avoid exposure, obtain special instructions before use.
- Take precautionary measures against static discharge.
- Purge air from system before introducing gas.
- Keep away from ignition sources (including static discharges).
- Do not smoke while handling product.
- Assess the risk of potentially explosive atmosphere and the need for explosion-proof equipment.
- Consider the use only non-sparking tools.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Installation of a cross purge assembly between the cylinder and the regulator is recommended.
- Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.
- Avoid suck back of water, acid and alkalis.

**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.

**Ethylene oxide****ALSA056****SECTION 7. Handling and storage (continued)**

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.

**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. 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. Keep away from combustible materials. All electrical equipment in the storage areas should be compatible with the risk of potentially explosive atmosphere.
- Observe all regulations and local requirements regarding storage of containers.
- Containers should not be stored in conditions likely to encourage corrosion.

**Specific end use(s)**

- : None.

**SECTION 8. Exposure controls/personal protection****Control parameters**

- Occupational Exposure Limits** : Ethylene oxide : TLV<sup>©</sup> -TWA [ppm] : 1
- DNEL: Derived no effect level** : None available.
- PNEC: Predicted no effect concentration** : None available.

**Exposure controls**

- Appropriate engineering controls** : Product to be handled in a closed system.  
Ensure exposure is below occupational exposure limits (where available).  
Preferably use only permanent leak-tight installations (e.g. welded pipes).  
Gas detectors should be used when flammable gases/vapours may be released.  
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.  
Alarm detectors should be used when toxic gases may be released.
- 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.  
Keep suitable chemically resistant protective clothing readily available for emergency use.  
Keep self contained breathing apparatus readily available for emergency use.  
Protect eyes, face and skin from liquid splashes.  
Wear leather safety gloves and safety shoes when handling cylinders.  
Consider the use of flame resistant anti-static safety clothing.  
Wear goggles and a face shield when transfilling or breaking transfer connections
- 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****Information on basic physical and chemical properties**

- Appearance**
- Physical state at 20°C / 101.3kPa : Gas.
- Colour : Colourless.
- Odour** : Ethereal. Poor warning properties at low concentrations.
- Odour threshold** : Odour threshold is subjective and inadequate to warn for overexposure.

**Ethylene oxide****ALSA056****SECTION 9. Physical and chemical properties (continued)**

Molar mass [g/mol]	: 44
Melting point [°C]	: -112
Boiling point [°C]	: 10.4
Critical temperature [°C]	: 196
Flash point [°C]	: Not applicable for gases and gas-mixtures.
Evaporation rate (ether=1)	: Not applicable for gases and gas-mixtures.
Flammability range [vol% in air]	: 2.6 to 100
Vapour pressure [20°C]	: 1.4 bar
Relative density, gas (air=1)	: 1.5
Relative density, liquid (water=1)	: 0.89
Solubility in water [mg/l]	: No reliable data available.
Partition coefficient n-octanol/water	: -0.3
Auto-ignition temperature [°C]	: 440

**Other information**

Other data	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
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**SECTION 10. Stability and reactivity****Reactivity**

: No reactivity hazard other than the effects described in sub-sections below.

**Chemical stability**: Stable under normal conditions.  
May polymerise.  
Containers are commonly pressurised to 5-7 bars with nitrogen.**Possibility of hazardous reactions**: Can form explosive mixture with air.  
May react violently with oxidants.**Conditions to avoid**: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.  
May decompose violently at high temperature and/or pressure or in the presence of a catalyst.  
Avoid moisture in installation systems.**Incompatible materials**: Air, Oxidiser.  
For additional information on compatibility refer to ISO 11114**Hazardous decomposition products**

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

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

Acute toxicity	
Rat inhalation LC50 [ppm/4h]	: 1450
Skin corrosion/irritation	: Irritation to skin .
Serious eye damage/irritation	: Irritation to eyes.
Respiratory or skin sensitisation	: No known effects from this product.
Carcinogenicity	: May have carcinogenic effect.

**Ethylene oxide****ALSA056****SECTION 11. Toxicological information (continued)**

<b>Germ cell mutagenicity</b>	: Possible risk of irreversible effects.
<b>Reproductive toxicity</b>	: No known effects from this product.
<b>STOT-single exposure</b>	: Damage to red blood cells (haemolytic poison). May cause irritation to the respiratory tract.
<b>STOT-repeated exposure</b>	: Damage to red blood cells (haemolytic poison).
<b>Aspiration hazard</b>	: Not applicable for gases and gas-mixtures.

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

: No data available.

**Persistence - degradability**

: No data available.

**Bioaccumulative potential**

: No data available.

**Mobility in soil**

: No data available.

**Results of PBT and vPvB assessment**

: No data available.

**Other adverse effects**

<b>Effect on ozone layer</b>	: None.
<b>Effect on the global warming</b>	: No known effects from this product.

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

: Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Must not be discharged to atmosphere. 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

**Additional information**

: None.

**SECTION 14. Transport information**

**UN number** : 1040  
**Labelling ADR, IMDG, IATA**



: 2.1 : flammable gas.  
2.3 : Toxic gas.

**Land transport (ADR/RID)**

**H.I. nr** : 263  
**UN proper shipping name** : ETHYLENE OXIDE

**Ethylene oxide****ALSA056****SECTION 14. Transport information (continued)**

Transport hazard class(es) : 2  
Classification code : 2 TF  
Packing Instruction(s) : P200  
Tunnel Restriction : B/D Tank carriage: Passage forbidden through tunnels of category B, C, D  
Environmental hazards : None.

**Sea transport (IMDG)**

Proper shipping name : ETHYLENE OXIDE  
Class : 2.3  
Packing group : P200  
Emergency Schedule (EmS) - Fire : F-D  
Emergency Schedule (EmS) - Spillage : S-U  
Packing instruction : P200

**Air transport (ICAO-TI / IATA-DGR)**

Proper shipping name (IATA) : ETHYLENE OXIDE  
Class : 2.3  
Passenger and Cargo Aircraft : DO NOT LOAD IN PASSENGER AIRCRAFT.  
Cargo Aircraft only : FORBIDDEN.

**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 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.  
- Ensure there is adequate ventilation.

**SECTION 15. Regulatory information****Safety, health and environmental regulations/legislation specific for the substance or mixture****EU legislation**

Restrictions on use : Restricted to professional users (Annex XVII REACH).  
Seveso directive 96/82/EC : Listed

**National legislation**

: Ensure all national/local regulations are observed.

**Chemical Safety Assessment**

: This product is either exempt from REACH, does not meet the minimum volume threshold for a CSR or the CSA has not yet been carried out.



**Ethylene oxide****ALSA056****SECTION 16. Other information**

- Indication of changes** : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010
- Training advice** : Ensure operators understand the toxicity hazard.  
Ensure operators understand the flammability hazard.  
Users of breathing apparatus must be trained.
- List of full text of R-phrases in section 3.** : R6 : Explosive with or without contact with air.  
R12 : Extremely flammable.  
R23 : Toxic by inhalation.  
R36/37/38 : Irritating to eyes, respiratory system and skin.  
R45 : May cause cancer.  
R46 : May cause heritable genetic damage.
- List of full text of H-statements in section 3.** : EUH006 - Explosive with or without contact with air.  
H220 - Extremely flammable gas.  
H280 - Contains gas under pressure; may explode if heated.  
H315 - Causes skin irritation.  
H319 - Causes serious eye irritation.  
H331 - Toxic if inhaled.  
H335 - May cause respiratory irritation.  
H340 - May cause genetic defects.  
H350 - May cause cancer.
- Note** : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
- DISCLAIMER OF LIABILITY** : 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. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

**End of document**