
	SAFETY DATA SHEET	Revised edition no : 2 Next Revision Date :09/23
	Ethylene Oxide Pure	PG 005

SECTION 1. IDENTIFICATION OF THE PRODUCT AND COMPANY UNDERTAKING

Product name	Ethylene Oxide
Recommended intended purpose(s)	Biocidal product Fumigant.
Company:	Puregas (Pty) Ltd PO Box 123884, Alrode, 1451, South Africa Tel : (011) 903 9760 Fax: (011) 903 9766 Cellphone: 082 889 6946 (1 st) 082 885 7475 (2 nd) Email: info@puregas.co.za Emergency Tel: 0800 172 743 (Rapid Spill Response)

SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture.	Classification according to 67/548/EEC or 1999/45/EC F+; R12 T; R23 Xi; R36/37/38 Carc. Cat. 2; R45 Muta. Cat. 2; R46 R6 R-phrases 45 May cause cancer. 46 May cause heritable genetic damage. 12 Extremely flammable. 36/37/38 Irritating to eyes, respiratory system and skin. 48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation 6 Explosive with or without contact with air. 23 Also toxic by inhalation.
Hazard statements for physical hazards H220 Extremely flammable gas H280 Contains gas under pressure; may explode if heated Hazard statements for health hazards H302 Harmful if swallowed H319 Causes serious eye irritation H332 Harmful if inhaled H335 May cause respiratory irritation H340 May cause genetic defects H350 May cause cancer H372 Causes damage to the nervous system and to blood forming organs through prolonged or repeated exposure by inhalation.	

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Precautionary Statements

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.

Response

- P304 + P340 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
 P308 + P313 IF exposed or concerned: Get medical advice/attention.

Storage

- P405 Store locked up
 P410 + P403 Protect from sunlight. Store in a well-ventilated place.

Labelling according to Regulation (EC) No 1272/2008 (CLP/GHS)

The product is classified and labelled in accordance with EC directives/German regulations on dangerous substances.



GHS02



GHS06



GHS08



GHS04

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances

CAS No	EC No	Name	% weight
75-21-8	200-849-9	ethylene-oxide	100

REACH

CAS No	Name	REACH registration number
75-21-8	ethylene-oxide	01-2119432402-53

Mixtures

Not applicable

SECTION 4. FIRST AID MEASURES

General information


Remove contaminated soaked clothing immediately.
 Adhere to personal protective measures when giving first aid.
 Seek medical advice immediately.

In case of inhalation

Remove the casualty into fresh air and keep him immobile.
 In the event of pulmonary irritation treat initially with corticoid spray, e.g. Ventolair- or Pulmicort- metered-dose aerosol (Ventolair and Pulmicort are registered trademarks).
 Seek medical treatment immediately.
 In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Send for a doctor.

In case of skin contact

In case of frostbite rinse with plenty of water. Don't remove clothing.


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<p>In case of eye contact</p> <p>In case of ingestion</p> <p>Most important symptoms and effects, both acute and delayed</p> <p>Physician's information / possible symptoms</p> <p>Physician's information / possible dangers</p> <p>Indication of any immediate medical attention and special treatment needed</p> <p>Treatment (Advice to doctor)</p>	<p>In case of frostbite spray with lukewarm (not hot) water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.</p> <p>In case of contact with skin wash off immediately and for a long time (at least 15 minutes) with plenty of water. Refer for medical treatment.</p> <p>Eye rinsing with water carefully while protecting unhurt eye. Call for a doctor immediately.</p> <p>Ingestion is not considered a potential route of exposure.</p> <p>Redness / blebs on the skin. Coughing Cardiac arrhythmia (disordered cardiac rhythm). vomiting Headache Nausea</p> <p>Risk of bullous dermatitis on exposure to vapors. Risk of pulmonary oedema.</p> <p>Treat symptoms. Symptoms may not occur until several hours.</p>
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SECTION 5. FIRE-FIGHTING MEASURES

<p>Suitable extinguishing media</p> <p>Unsuitable extinguishing media</p> <p>Special hazards arising from the substance or mixture</p> <p>Special protective equipment for fire-fighters</p> <p>Additional information</p>	<p>Foam Dry powder Carbon dioxide Water spray jet</p> <p>Full water jet</p> <p>In case of fire formation of dangerous gases possible. Formation of explosive gas mixtures in air. In the event of fire the following can be released: Carbon monoxide (CO).</p> <p>Use breathing apparatus with independent air supply (isolated). Wear full protective clothing.</p> <p>Cool endangered containers with water spray jet. Exposure to fire may cause containers to rupture / explode. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.</p>
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SECTION 6. ACCIDENTAL RELEASE MEASURES

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Personal precautions	Remove persons to safety. Evacuate area. Personal protection by wearing close-fitting protective clothing and breathing apparatus. Eliminate all ignition sources if safe to do so. Keep away sources of ignition.
Environmental precautions	If possible, stop flow of product. Eliminate ignition sources. Do not discharge into the drains/surface waters/groundwater. If necessary, secure leaky pressure receptacles in a salvage packaging. Suppress gases/vapours/mists with water spray jet Do not discharge into the subsoil/soil.
Methods for cleaning up	Ensure adequate air ventilation. Flush away residues with water.
Reference to other sections	Information for safe handling see section 7. Information for personal protective equipment see section 8.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling	Use only in thoroughly ventilated areas. Transfer and handle only in enclosed systems. Containers' temperature may not be increased above 50 °C. Do not heat with open flames. The working pressure in the receptacle must not exceed 10 bar. Barrels and installations thoroughly earthing (grounding). Use antistatic tools. Treatment only in suitable rooms and systems. Provide good room ventilation even at ground level (vapours are heavier than air). Prevent cylinders from falling over. Ensure valve protection device is correctly fitted. Ensure valve outlet cap nut or plug (where provided) is correctly fitted. Open valve slowly to avoid pressure shock. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Do not allow back feed into the container. Suck back of water into the container must be prevented. No water to valves, flanges and other fittings. Purging of pipes and valves with inert gases - to avoid: water, solvents.
General protective measures	Do not inhale gases/vapours/aerosols.
Hygiene measures	At work do not eat, drink and smoke. Wash hands before breaks and after work.
Advice on protection against fire and explosion	The product is combustible. Because of risk of explosion avoid vapours getting into cellar, sewage system and holes. Take precautionary measures against static discharges. Formation of explosive gas mixtures in air.

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Requirements for storage rooms and vessels	<p>Use explosion-proof equipment / fittings and non-sparking tools.</p> <p>Keep in closed original container. Ventilate store-rooms thoroughly. Use transportable pressure equipment. Suitable materials: Normalised steel and carbon steel, tempered steel, aluminium alloys, stainless steel. Valve: Suitable materials: Brass, copper alloys, carbon steels, aluminium alloys, stainless steel.</p>
Advice on storage compatibility	<p>Do not store with spontaneously flammable materials. Do not store together with combustible liquids or combustible solids. Do not store together with animal feedstuffs. Do not store together with explosives. Do not store together with infectious substances. Do not store together with radioactive material. Do not store together with toxic liquids or toxic solids. Do not store together with food. Do not store together with oxidizing liquids or oxidizing solids.</p>
Further information on storage conditions	<p>Ensure valve protection device is correctly fitted. Keep container tightly closed and store at cool and aired place. Prevent cylinders from falling over. Protect of heat. Storage temperature may not exceed 50°C (=122°F). Recommended storage temperature: =< 10 °C.</p>
Recommendation(s) for intended use	<p>Use the product in gaseous form. Dose rates and period of time needed for the biocidal effect have to be determined in each case. Use as biocidal product in accordance with Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products.</p>

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION


Control parameters

Ingredients with occupational exposure limits to be monitored

CAS No	Name	Code	[mg/m ³]	[ppm]	Remark
75-21-8	Ethylene oxide	WEL, 8 hours	9.2	5	EH40, UK
75-21-8	Ethylene oxide	PEL, 8 hours Short-term		1 5	OSHA, USA
75-21-8	Ethylene oxide	TLV, 8 hours Short-term		1 3	ACGIH, USA
75-21-8	Ethylene oxide	REL, 8 hours Short-term	0.18 9	0,1 5	NIOSH, USA


Additional advice

DMEL (workers, inhalation, long-term, systemic effects): 2mg/m³

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DMEL (workers, inhalation, long-term, systemic effects) : 10mg/m ³	
Exposure controls Respiratory protection Hand protection Eye protection Skin and body protection Limitation and surveillance of the environment	Keep self-contained breathing apparatus readily available for emergency use. In case of rescue and maintenance activities in storage containers use environment-independent breathing apparatus because of risk of suffocation by edging out of air oxygen Short-term: filter apparatus; filter AX, otherwise environment-independent breathing apparatus. chemical-resistant gloves Leather gloves Glove material specification [make/type, thickness, permeation time/life]: IIR, >= 0,7 mm, > 30 min. Safety goggles, in case of increased risk add protective face shield. Safety shoes with steel toe. Body covering work clothing, or chemical resistant suit at increased risk. PNEC (freshwater): 0.084 mg/l PNEC (marine water): 0.0084 mg/l / 0.84 mg/l (sporadic emission) PNEC (sewage treatment plant): 13 mg/l PNEC (freshwater sediment): 0.329 mg/kg sediment dw PNEC (marine water sediment): 0.0329 mg/kg sediment dw PNEC (soil): 0.0165 mg/kg See section 7

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES					
Information on basic physical and chemical properties					
Form	Colour	Odour			
Gaseous / liquefied under pressure	colourless	ethereal			
Important health, safety and environmental information					
	Value	Temperature	at	Method	Remark
pH Value	Not applicable				
Boiling Point	10.4°C		1013hPa		
Melting Pont	-111°C				
Flash point	-57 °C			DIN 51755	
Vapourisation rate	No information available				
Flammable (solid)					Not applicable
Flammability (gas)					Flammable
Ignition temperature	429 °C			DIN 51794	
Lower explosion limit	2,6 Vol-%				
Self ignition temperature	no				
Upper explosion limit	99,9 Vol-%				
Vapour pressure	1440 hPa	20 °C			
Relative density	0,89 g/cm3	20 °C			liquid phase

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Vapour density	1,52	20 °C	1013 hPa		air = 1
Solubility in water					multimiscible
Solubility Other			Polar solvent		
Partition coefficient noctano/water (log P O/W)	-0.3	25 °C			
Decomposition temperature	Ca. 560 °C				
Viscosity dynamics	0,25 mPa*s	20 °C			Liquid phase
Oxidising property					No
Explosive properties					Due to its structure the product is not classified explosive
Other information					Vapours are heavier than air

SECTION 10. STABILITY AND REACTIVITY

Reactivity	See section "Possibility of hazardous reactions".
Chemical Stability	Stable under normal conditions
Possibility of Hazardous reactions	Strong exothermic reaction with acids. Risk of polymerisation.
Conditions to avoid	Formation of explosive gas/air mixtures. Heat sources / heat - risk of bursting.
Incompatible materials	Acids. Oxidants. Alkalis. Metallic oxides. Metallic salts. Amine.
Hazardous decomposition products.	Carbon monoxide Hydrogen Methane >= 560 °C
Thermal decomposition	

SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects
Acute toxicity/Irritability/Sensitization



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	Value/Validation	Species	Method	Remark
LD50 acute oral	330 mg/kg	rat		
LC50 acute dermal	No data available			Study scientifically not justified
LC50 acute inhalation	1460 ppm (4 h)	Rat (male)		
Irritability skin	irritant	rabbit		
Irritability eye	strong irritant	rabbit eye		
Skin sensitization	not determined			Study scientifically not justified
Sensitization respiratory system	not determined			Study scientifically not justified

Subacute Toxicity - Carcinogenicity

	Value/Validation	Species	Method	Validation
Subchronic Toxicity	NOAEC 10 ppm	Mouse		May cause damage to the peripheral nervous system (reduced body weight increase, loss of reflexes)
Subchronic toxicity (inhalation of vapours).				
Chronic Toxicity	NOAEC 10 ppm (2 a)	Rat	OECD 453	May cause damage to blood forming organs, reduced body weight increase.
Target organ toxicity, repeated exposure (inhalation of vapours).				
Mutagenicity				Information on genotoxicity in vivo and in vitro available.
Reproduction - Toxicity	NOAEL 0,054 mg/l	Rat	OECD 415	No indication of toxic effects were observed in reproduction studies in animals
Carcinogenicity	Inhalation	Rat	OECD 453	Indications of carcinogenic effects are available from long-term trials
Inhalation				

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Specific target organ toxicity (single exposure)

May cause respiratory irritation

Specific target organ toxicity (repeated exposure)

Causes damage to the nervous system and blood forming organs through prolonged or repeated exposure by inhalation

Aspiration hazard

Not applicable

Toxicity test (Additional information)

In animal studies cancerogenic effects proved.

Experiences made from practice

May cause frost bite

Gases have a suffocation effect.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity

Eco toxicological effects

	Value	Species	Method	Validation
Fish	LC50 84 mg/l (96 h)	Pimephales promelas	EPA 660/3-75/009	
Daphnia	EC50 212 mg/l (48 h)	Daphnia magna	EPA660/3-75/009	
Algae	EC50 240 mg/l (96 h)	Selenastrum capricornutum		This product was not tested. The information was derived from products of similar structure or composition.
Bacteria	EC10 130 mg/l (3 h)	activated sludge	OECD 209	

Persistence and degradability

Physico-chemical degradability:

not determined

Biological degradability:

>60 % (28 d)

OECD 301

Readily degradable

Degradability:

not determined

Bioaccumulative potential:

Because of the n-octanol/water distribution coefficient (log K_{ow}) accumulation in organisms is not expected

Mobility in soil:

high mobility

Absorption in the soil is not likely

K_{oc}: 0.51 – 0.67

Results of PBT and vPvB assessment:

The substance does not meet the PBT/vPvB criteria of REACH, annex XIII

Other adverse effects:

Not known.

Behaviour in sewage plant


When low concentrations are discharged correctly into adapted biological sewage treatment plants, interference with the degradation activity of activated sludge is not likely.

General regulation:

Do not allow uncontrolled leakage of product into the environment.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal

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Waste treatment methods

Waste code No.

16 05 04*

Name of waste

gases in pressure containers (including halons) containing dangerous substances

Wastes marked with an asterisk are considered to be hazardous waste pursuant to Directive 91/689/EEC on hazardous waste.

Recommendations for the product

Dispose of as hazardous waste.

Recommendations for packaging

Transportable pressure equipment (empty, residual pressure): Return to supplier / manufacturer.

SECTION 14. TRANSPORT INFORMATION

	ADR/RID	IMDG	IATA-DGR
UN Number	1040	1040	1040
UN Proper Shipping Name	Ethylene Oxide	Ethylene Oxide with Nitrogen	Ethylene Oxide
Transport Hazard Class(es)	2	2.3 (2.1)	2.3 (2.1)
Packing Group	-	-	-
Environmental Hazards	No	No	No

Special precautions for user

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

No transport as bulk according IBC – Code

Land and Inland navigation transport ADR/RID

Hazard label 2.3 + 2.1

Tunnel restriction code B/D

Classification code 2TF

Marine Transport IMDG

Ems: F-D, S-U

Air transport ICAO/IATA-DGR

Forbidden

SECTION 15. REGULATORY INFORMATION

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

Other regulations (EU)


Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals

(REACH), Annex XVII No 28 - 30.

Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products.

Regulation (EC) No 689/2008 concerning the export and import of dangerous chemicals.

Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals

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(REACH), Annex XVII No 40.

Directive 96/82/EC on the control of major-accident hazards involving dangerous substances.

VOC standard

VOC content >=99 % 20 °C 1440 hPa

Chemical Safety Assessment

For this substance a chemical safety assessment has been carried out.

Exposure scenarios (ESs) see <http://www.ghc.de/media/en/downloads/expo/1400.pdf>

International and national legislations

SECTION 16. OTHER INFORMATION

Recommended uses and restrictions

Use as biocidal product in accordance with Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products.

National and local regulations concerning chemicals shall be observed.

Please note: EN 1422 - Sterilizers for medical purposes - Ethylene oxide sterilizers - Requirements and test methods.

Please note: EN ISO 11135 - Sterilization of health care products - Ethylene oxide - Requirements for the development, validation and routine control of a sterilization process for medical devices.

Further information

The information contained herein is based on the state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product.

Wording of the R/H-phrases specified in chapter 3 (not the classification of the mixture!)

R 12 Extremely flammable.

R 23 Toxic by inhalation.

R 36/37/38 Irritating to eyes, respiratory system and skin.

R 45 May cause cancer.

R 46 May cause heritable genetic damage.

R 6 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 (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)

H350 May cause cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)