
	SAFETY DATA SHEET	Revised edition no : 2 Next Revision Date :09/23
	Ethylene Oxide F10/F15/F20/F30	PG 003





SECTION 1. IDENTIFICATION OF THE PRODUCT AND COMPANY UNDERTAKING

Product name Recommended intended purpose(s) Company:	Mixture Ethylene oxide 10-30 % / Carbon dioxide 70-90 % Biocidal product Fumigant 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)
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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. 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 H315 Causes skin irritation H319 Causes serious eye irritation H332 Harmful if inhaled H335 May cause respiratory irritation H340 May cause genetic defects H350 May cause cancer	

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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 1999/45/EC	Remarks for labelling The product is classified and labelled in accordance with EC directives/German regulations on dangerous substances. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  GHS02 </div> <div style="text-align: center;">  GHS06 </div> <div style="text-align: center;">  GHS08 </div> <div style="text-align: center;">  GHS04 </div> </div>
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 6 Explosive with or without contact with air 23 Also toxic by inhalation
S-phrases	53 Avoid exposure - obtain special instructions before use 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
Hazardous ingredients for labelling	Ethylene-oxide
Special rules for supplemental label elements for certain mixtures	Read attached instructions before use Restricted to professional users
Other hazards	Contact with liquid may cause cold burns/frostbite
Adverse human health effects and symptoms	Asphyxiant in high concentrations
Information pertaining to special dangers for human and environment	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.


SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

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Substances		Not applicable		
Mixtures				
CAS No	EC No	Name	% weight	Classification according to 67/548/EEC
124-38-9	204-696-9	Carbon dioxide	70 - 90	
75-21-8	200-849-9	ethylene-oxide	10 - 30	F+ R12; Carc.Cat.2 R45; Muta.Cat.2 R46; T R23; Xi R36/37/38; R6
CAS No	EC No	Name	% weight	Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]
124-38-9	204-696-9	Carbon dioxide	70 - 90	Liq. Gas, H280
75-21-8	200-849-9	ethylene-oxide	10 - 30	Flam. Gas 1, H220 / Liq. Gas, H280 / Carc. 1B, H350 / Muta. 1B, H340 / Acute Tox. 3, H331 / Eye Irrit. 2, H319 / STOT SE 3, H335 / Skin Irrit. 2, H315
REACH				
CAS No	Name			REACH registration number
75-21-8	ethylene-oxide			01-2119432402-53

SECTION 4. FIRST AID MEASURES


General information	<p>Remove contaminated soaked clothing immediately. Adhere to personal protective measures when giving first aid. Seek medical advice immediately.</p>
In case of inhalation	<p>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.</p>
In case of skin contact	<p>In case of frostbite rinse with plenty of water. Don't remove clothing. In case of frostbite spray with lukewarm (not hot) water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance. 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>
In case of eye contact	<p>Eye rinsing with water carefully while protecting unhurt eye. Call for a doctor immediately.</p>
In case of ingestion	<p>Ingestion is not considered a potential route of exposure.</p>
Physician's information / possible symptoms	<p>Redness / blebs on the skin. Coughing Cardiac arrhythmia (disordered cardiac rhythm) Vomiting Headache</p>

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Physician's information / possible dangers Indication of any immediate medical attention and special treatment needed Treatment (Advice to doctor)	Nausea Risk of bullous dermatitis on exposure to vapours. Risk of pulmonary oedema. Treat symptoms. Symptoms may not occur until several hours.
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SECTION 5. FIRE-FIGHTING MEASURES	
Suitable extinguishing media	Foam Dry powder Carbon dioxide Water spray jet
Unsuitable extinguishing media	Full water jet
Special hazards arising from the substance or mixture	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).
Special protective equipment for fire-fighters	Use breathing apparatus with independent air supply (isolated). Wear full protective clothing.
Additional information	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.

SECTION 6. ACCIDENTAL RELEASE MEASURES	
Personal precautions, protective equipment and emergency procedure.	See section 8 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 and material for containment and cleaning up	Ensure adequate air ventilation. Flush away residues with water.
Reference to other sections	Information for safe handling see section 7.

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	Information for personal protective equipment see section 8.
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SECTION 7. HANDLING AND STORAGE	
Precautions for safe handling	<p>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 the saturation vapour pressure of the pure product resulting at a temperature of 50 °C. Barrels and installations thoroughly earthed (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. At work do not eat, drink and smoke. Wash hands before breaks and after work.</p>
General protective measures	Do not inhale gases/vapours/aerosols.
Hygiene measures	<p>At work do not eat, drink and smoke. Wash hands before breaks and after work.</p>
Advice on protection against fire and explosion	<p>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. Use explosion-proof equipment / fittings and non-sparking tools.</p>
Requirements for storage rooms and vessels	<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.</p>

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Further information on storage conditions	<p>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> <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
124-38-9	Carbon dioxide	WEL, 8 hours Short-term	9150 27400	5000 15000	EH40, UK
124-38-9	Carbon dioxide	REL, 8 hours Short-term	9000 54000	5000 30000	NIOSH, USA
124-38-9	Carbon dioxide	PEL, 8 hours	9000	5000	OSHA, USA

Additional advice

Ethylene oxide (EC-No: 200-849-9; CAS-No: 75-21-8): DMEL (workers, inhalation, long-term, systemic effects): 1,6 mg/m³ (0,9 ppm).

Ethylene oxide (EC-No: 200-849-9; CAS-No: 75-21-8): DMEL (workers, inhalation, short-term, systemic effects): 5,0 mg/m³ (2,7 ppm).

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Exposure controls Respiratory protection	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.
Hand protection	Chemical-resistant gloves Leather gloves Glove material specification [make/type, thickness, permeation time/life]: IIR, >= 0,7 mm, > 30 min.
Eye protection	Safety goggles, in case of increased risk add protective face shield.
Skin and body protection	Safety shoes with steel toe. Body covering work clothing, or chemical resistant suit at increased risk.
Limitation and surveillance of the environment	Ethylene oxide (EC-No: 200-849-9; CAS-No: 75-21-8): PNEC (freshwater): 0.084 mg/l Ethylene oxide (EC-No: 200-849-9; CAS-No: 75-21-8): PNEC (marine water): 0.0084 mg/l / 0.84 mg/l (sporadic emission) Ethylene oxide (EC-No: 200-849-9; CAS-No: 75-21-8): PNEC (sewage treatment plant): 13 mg/l Ethylene oxide (EC-No: 200-849-9; CAS-No: 75-21-8): PNEC (freshwater sediment): 0.178 mg/kg Ethylene oxide (EC-No: 200-849-9; CAS-No: 75-21-8): PNEC (marine sediment): 0.0178 mg/kg Ethylene oxide (EC-No: 200-849-9; CAS-No: 75-21-8): PNEC (soil): 0.0136 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	Not determined				
melting point	Not determined				
Flash point	Not determined				
Flammability (gas)					Flammable

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Ignition temperature	429 °C			DIN 51794	Information concerns to ethylene oxide
Lower explosion limit	2.6 Vol %				Information concerns to ethylene oxide
Upper explosion limit	99.9 Vol %				Information concerns to ethylene oxide
Vapour pressure	40570 - 51740 hPa	20 °C		calculated	
Relative density	0,781 - 0,802 g/cm3	20 °C		calculated	liquid phase
Vapour density	1.53	20 °C	1013 hPa		air = 1
Solubility in water	Not determined				
Viscosity Dynamics	Not determined				

Oxidising properties


No

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	Copper, brass and other copper alloys. Acids Oxidants Alkalis Metallic oxides Metallic salts Amine
Hazardous decomposition products.	Carbon monoxide Hydrogen Methane
Thermal decomposition	Remark – Not determined

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SECTION 11. TOXICOLOGICAL INFORMATION				
Acute toxicity/Irritability/Sensitization				
	Value/Validation	Species	Method	Remark
LD50 acute oral	330 mg/kg	rat		Information concerns to ethylene oxide
LC50 acute inhalation	1440 ppm (4 h)	Rat		Information concerns to ethylene oxide.
Irritability skin	irritant			
Irritability eye	irritant			
Skin sensitization	not determined			
Sensitization respiratory system	Not determined			
Subacute Toxicity - Carcinogenicity				
	Value	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). Information concerns to ethylene oxide.			
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) Information concerns to ethylene oxide.			
Mutagenicity				Information on genotoxicity in vivo and in vitro available.
	Information concerns to ethylene oxide.			
Reproduction - Toxicity	NOAEL 0,054 mg/l	Rat	OECD 415	No indication of toxic effects were observed in reproduction studies in animals
	Inhaling Information concerns to ethylene oxide.			
Carcinogenicity		Rat	OECD 453	Indications of carcinogenic effects are available from long-term trials
	Information concerns to ethylene oxide.			
Experiences made from practice				

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May cause frostbite.
Gases have a suffocating effect.

Additional information

The product is a mixture of Carc. Cat. 2.

The product is a mixture of Muta. Cat. 2.

The product has not been tested. The information is derived from the properties of the individual components

SECTION 12. ECOLOGICAL INFORMATION

Toxicity

Eco toxicological effects

Sub-acute Toxicity - Carcinogenicity

	Value	Species	Method	Validation
Fish	LC50 84 mg/l (96 h)	Pimephales promelas	EPA 72-1	Information concerns to ethylene oxide
Daphnia	EC50 137 mg/l (48 h)	Daphnia magna	EPA FIFRA OPP 72-2	Information concerns to ethylene oxide
Algae	EC50 240 mg/l (96 h)	Selenastrum capricornutum		Information concerns to ethylene oxide
Bacteria	EC10 130 mg/l (3 h)	Activated sludge	OECD 209	Information concerns to ethylene oxide

Persistence and degradability

Physio-chemical degradability not determined

Biological degradability

Readily degradable

The product has not been tested. The information was derived from product similar structure or composition.

Degradability

Not determined

Biological Eliminability

Not determined

Bioaccumulative potential

No high bioaccumulation potential (estimated).

Mobility in soil

High mobility.

Results of PBT and vPvB assessment

The substances in this mixture do not meet the PBT/vPvB criteria of REACH, annex XIII.


Other adverse effects

Not known.

General regulation

Do not allow uncontrolled leakage of product into the environment.

The ecotoxic effect of the product has not been tested. The information on this was derived from products of

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similar structure or composition.

SECTION 13. DISPOSAL CONSIDERATIONS

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

Land and inland navigation transport ADR/RID

UN 1041 ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE, 2.1, (B/D), Classification code: 2F

Marine transport IMDG

UN 1041 ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE, 2.1

Ems: F-D, S-U

Air transport ICAO/IATA-DGR

UN 1041 Ethylene oxide and carbon dioxide mixture, 2.1

Cargo aircraft only: Package max. 25 kg.

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

No transport as bulk according IBC - Code

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 >=10<=30 % 20 °C 51740 hPa.

Chemical Safety Assessment

Chemical safety assessments for substances in this mixture were carried out.

Local by-laws and national legislation

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.

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

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).