

**SAFETY DATA SHEET**Revised edition no : 2
Date : 12/05/2014**Ethylene Oxide F90**

PG 004

SECTION 1. IDENTIFICATION OF THE PRODUCT AND COMPANY UNDERTAKING

Product name	Mixture Ethylene oxide 88-98 % / Carbon dioxide 2-12 %
Recommended Intended Purpose	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 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 H331 Toxic if inhaled H335 May cause respiratory irritation H340 May cause genetic defects. H350 May cause cancer
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.

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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	The product is classified and labelled in accordance with EC directives/German regulations on dangerous substances.  GHS02  GHS06
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, carbon dioxide
Special rules for supplemental label elements for certain mixtures	Read attached instructions before use. Restricted to professional users.
Adverse human health effects and symptoms	Contact with liquid may cause cold burns/frostbite. 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

Substances	not applicable			
Mixtures				
CAS No	EC No	Name	% Weight	Classification according to 67/548/EEC
124-38-9	204-696-9	Carbon dioxide	2 - 12	
75-21-8	200-849-9	ethylene-oxide	88 - 98	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	2 - 12	Liq. Gas, H280
75-21-8	200-849-9	ethylene-oxide	88 - 98	Flam. Gas 1, H220 / Liq. Gas, H280 / Carc. 1B, H350 / Muta. 1B, H340 /

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REACHAcute Tox. 3, H331 / Eye Irrit. 2, H319 /
STOT SE 3, H335 / Skin Irrit. 2, H315**CAS No****Name****REACH registration number**

75-21-8

ethylene-oxide

01-2119432402-53

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.
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.

In case of eye contact

Eye rinsing with water carefully while protecting unhurt eye.
Call for a doctor immediately.

In case of ingestion

Ingestion is not considered a potential route of exposure.

Physician's information / possible symptoms

Redness / blebs on the skin.
Coughing
Cardiac arrhythmia (disordered cardiac rhythm).
vomiting
Headache
Nausea

Physician's information / possible dangers

Risk of bullous dermatitis on exposure to vapours.
Risk of pulmonary oedema.

**Indication of any immediate medical attention and special treatment needed
Treatment (Advice to doctor)**

Treat symptoms.
Symptoms may not occur until several hours.

SECTION 5. FIRE-FIGHTING MEASURES**Suitable extinguishing media**

Foam
Dry powder
Carbon dioxide
Water spray jet

Unsuitable extinguishing

Full water jet



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media	
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	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. 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 the saturation vapour pressure of the pure product resulting at a temperature of 50 °C. 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).
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General protective measures	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.
Hygiene measures	Do not inhale gases/vapours/aerosols. 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. Use explosion-proof equipment / fittings and non-sparking tools.
Requirements for storage rooms and vessels	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.
Advice on storage compatibility	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.
Further information on storage conditions	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.
Recommendation(s) for intended use	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.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION



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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).

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

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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

pH value in delivery state	Not applicable
Boiling point	Not determined
Melting point	Not determined

	Value	Temperature	at	Method	Remark
Flash point	-57 °C			DIN 51755	Information concerns to main component
Flammability (gas)					Flammable
Ignition temperature	429 °C			DIN 51794	Information concerns to main component
Lower explosion limit	2,6 Vol-%				Information concerns to main component
Upper explosion limit	99,9 Vol-%				Information concerns to main component
Vapour pressure	2580 – 8170 hPa	20 °C		calculated	
Relative density	0,863 - 0,874 g/cm ³	20 °C		Calculated	liquid phase
Vapour density	1,52	20 °C	1013 hPa		air = 1
Solubility in water	Not determined				
Viscosity dynamic	Not determined				
Oxidising property					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



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Hazardous decomposition products.	Oxidants Alkalis Metallic oxides Metallic salts Amine
	Carbon monoxide Hydrogen Methane
Thermal decomposition	Not determine

SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Acute toxicity/Irritability/Sensitization

	Value/Validation	Species	Method	Remark
LD50 acute oral	330 mg/kg	rat		Information concerns to main component
LC50 acute inhalation	1440 ppm (4 h)	rat		Information concerns to main component
Irritability skin	irritant	rabbit		Information concerns to main component
Irritability eye	strong irritant	rabbit eye		Information concerns to main component
Skin sensitization	not determined			
Sensitization respiratory system	not determined			

Sub-acute 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.			



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Reproduction - Toxicity	NOAEL 0,054 mg/l	Rat	OECD 415	No indication of toxic effects were observed in reproduction studies in animals
Carcinogenicity	Inhalation Information concerns to ethylene oxide.	Rat	OECD 453	Indications of carcinogenic effects are available from long-term trials
	Inhalation Information concerns to ethylene oxide			
Experiences made from practice				
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

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

Persistence and degradability

Physico-chemical degradability:

not determined

Biological degradability:

Readily degradable

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

Degradability:

not determined

Biological eliminability:

not determined

Bio accumulative 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 information to ecology refers to main component.

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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 3300 ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE, 2.3 (2.1), (B/D), Classification code: 2TF

Marine transport IMDG

UN 3300 ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE, 2.3 (2.1)

Ems: F-D, S-U

Air transport ICAO/IATA-DGR

UN 3300 Ethylene oxide and carbon dioxide mixture, 2.3 (2.1)

FORBIDDEN

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

(REACH), Annex XVII No 40.

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

VOC content >=88<=98 % 20 °C 8170 hPa**Chemical Safety Assessment**

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

National and international legislation.

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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)