PUREGAS	SAFETY DATA SHEET	Version: 4 Revision date: 2025-04-24
	Ethylene Oxide F30, F20, F15, F10	PG-SDS-03

This SDS conforms to the Globally Harmonised System (GHS), South African Regulations on Hazardous Chemical Agents, and SANS 10234, SANS 11014 & SANS 10228.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product name	Ethylene Oxide F30 / F20 / F15 / F10
Chemical Name	Mixture: Ethylene oxide, Carbon dioxide
Other means of identification	Carbon dioxide/ethylene oxides, mixtures, conc carbon dioxide Ethylene oxide/ Carbon dioxide, mixtures, conc ethylene oxide
Recommended Intended Purpose	This substance is used by consumers, in articles, by professional workers (widespread uses including biocidal uses), in formulation or re-packing, at industrial sites, and in manufacturing.
Company Information	**Puregas (Pty) Ltd** PO Box 123884, Alrode, 1451, Gauteng, South Africa **Tel:** (011) 903 9760 **Fax:** (011) 903 9766 **Cellphone:** 082 889 6946 (1st) 082 885 7475 (2nd) **Email:** info@puregas.co.za Website: www.puregas.co.za
Emergency Telephone	0800 172 743 Rapid Spill Response - 24 hours, 7 days a week

SECTION 2. HAZARDS IDENTIFICATION

Classification of the mixture - GHS classification as published through ECHA

Hazard Classification	Category	Hazard Statement	
Flammable Gas	1	H220	Extremely flammable gas.
Gases under pressure	2.2	H280	Contains gas under pressure; may explode if heated
Gases under pressure	2.2	H281	Contains refrigerated gas, may cause cryogenic burns/injury
Acute Toxicity	3	H331	Toxic if inhaled
Skin Irritant	2	H315	Causes skin irritation
Eye Irritant	2A	H319	Causes serious eye irritation
Skin Sens	1B	H317	May cause allergic skin reaction
Germ cell mutagenicity	1B	H340	May cause genetic defects
Carcinogenicity	1B	H350	May cause cancer
Reproductive toxicity	1A	H360	May damage fertility or unborn child
Specific target organ toxicity	3	H335	May cause respiratory irritation
Specific target organ toxicity	3	H372	May cause drowsiness or dizziness

Hazard Pictograms

GHS02 GHS06 GHS08 GHS04

Signal Word: **Dangerous**

Precautionary Statements

General:	P101	If medical advice is needed, have product container or label at hand
	P102	Keep out of reach of children
	P103	Read carefully and follow all instructions
Prevention	P201	Obtain special instructions before use.
	P202	Do not handle until all safety precautions have been read and understood.

	P201 P260 P262 P264 P270 P272 P271 + P403 P280	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Do not breathe gas Do not get in eyes, on skin, or on clothing. Wash exposed skin thoroughly after handling Do not eat, drink or smoke when using this product. Contaminated work clothing must not be allowed out of the workplace. Use and store only outdoors or in a well-ventilated place. Wear protective gloves/protective clothing/eye protection/face protection.
Response	P308 + PP313 P303 + P340 P311 P305+ P351 + P338 P337+P313 P302 + P336 + P315 P333+P313 P377 P381	If exposed or concerned: Get medical advice/attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison centre or doctor. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention. IF EYE IRRITATION PERSISTS: Get medical advice/attention. IF ON SKIN: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention. IF SKIN IRRITATION OR RASH OCCURS: Get medical advice/attention. LEAKING GAS FIRE: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.
Storage	P405 P410 + P403	Store locked up. Protect from sunlight. Store in a well-ventilated place.
Disposal	P501	Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.
Main Hazard	All Cylinders are portable gas containers and must be regarded as pressure vessels at all times. The product is flammable, and its potential to cause asphyxia by displacement of air, with the resultant lowering of the oxygen content below that necessary to support life	
Flammable Hazard	Flammable product	
Chemical Hazard	No hazardous decomposition compounds formed.	
Biological Hazard	Readily degradable. The product has not been tested	
Health Hazards	Prolonged inhalation of substantial concentrations results in unconsciousness; light and moderate anaesthesia is attained, and deep anaesthesia seldom occurs. Inhalation is fatal only if the gas acts as a simple asphyxiant, depriving the body of necessary oxygen. Direct contact with liquid form can cause frostbite and freeze-burns in exposed tissues.	
Other Hazards	Asphyxiant in high concentrations. Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.	

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixtures

CAS No	EC No	Name	% Weight
124-38-9	204-696-9	Carbon dioxide	70-90
75-21-8	200-849-9	Ethylene-oxide	10-30
UN Number	3300	**REACH registration number**	01-2119432402-53

See Section 8 for Exposure Guidelines and Section 15 for Regulatory Classifications.

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 for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Call for a doctor immediately.
In case of ingestion	Ingestion is not considered a potential route of exposure. Give water to drink if the victim is completely conscious/alert. Do not induce vomiting. Call for a doctor immediately.
Indication of any immediate medical attention and special treatment needed Treatment (Advice to doctor)	Risk of bullous dermatitis on exposure to vapours. Risk of pulmonary oedema. Physical symptoms such redness on the skin, vomiting, and dizziness. Symptoms may not occur immediately and may present after a few hours.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	Foam Dry powder Carbon dioxide Water spray jet or fog
Unsuitable extinguishing media	Full water jet
Special hazards arising from the substance or mixture	DANGER! Cancer and reproductive hazard. DANGER! Toxic, flammable liquefied gas In the case of fire formation of dangerous gases is 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 a breathing apparatus with an independent air supply (isolated). Wear full protective clothing.
Additional information	Cool endangered containers with water spray jets. Exposure to fire may cause containers to rupture/explode. Do not extinguish a leaking gas flame unless necessary.

	Spontaneous/explosive re-ignition may occur. Containers are equipped with a pressure relief device

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	DANGER! Cancer and reproductive hazard. DANGER! Toxic, flammable liquefied gas 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 the flow of product. Eliminate ignition sources. Do not discharge into the drains/surface waters/groundwater. If necessary, secure leaky pressure receptacles in salvage packaging. Suppress gases/vapours/mists with a 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 on safe handling see section 7. Information for on 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 in 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). Prevent cylinders from falling over. Ensure the valve protection device is correctly fitted. Ensure the valve outlet cap nut or plug (where provided) is correctly fitted. Open the valve slowly to avoid pressure shock. Use only properly specified equipment that 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 and 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	The product is combustible.

and explosion	Because of the risk of explosion avoid vapours getting into the 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 them together with animal feedstuffs. Do not store them together with explosives. Do not store them together with infectious substances. Do not store them together with radioactive material. Do not store them together with toxic liquids or toxic solids. Do not store them together with food. Do not store together with oxidizing liquids or oxidizing solids.
Further information on storage conditions	Ensure the valve protection device is correctly fitted. Keep the container tightly closed and store at cool and aired place. Prevent cylinders from falling over. Protect from 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

Control parameters

Ingredients with occupational exposure limits to be monitored

CAS No	Name	Code	[mg/m3]	[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 the 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 a protective face shield.
Skin and body protection	Safety shoes with steel toes. Body covering work clothing, or chemical resistant suit at increased risk.
Thermal hazard protection	Wear cold insulating gloves when transfilling or breaking transfer connections.
Engineering Controls	Use a backflow preventive device in the piping. Use only with equipment of compatible materials of construction and rated for cylinder pressure. Do not open the valve until connected to equipment prepared for use. Close the valve after each use and when empty.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	Gas
Colour	Colourless
Odour	ether-like
Odour threshold	420 – 490 ppm
pH	Not applicable
Relative evaporation rate (butyl acetate=1)	No data available
Relative evaporation rate (ether=1)	Not applicable
Melting point	No data available
Freezing point	No data available
Boiling point	10.5 °C (51.26 °F)
Flash point	-20 °C (-4 °F)
Critical temperature	195.8 °C
Auto-ignition temperature	429 °C (804 °F)
Decomposition temperature	No data available
Flammability (solid, gas)	3 – 100 vol %
Vapor pressure	1.5 bar (22 psia) (at 20°C (68°F))
Relative vapor density at 20 °C	No data available
Relative density	0.87 (Water = 1) (at 4°C (39.2°F))
Density	1.824 kg/m³ (0.1139 lb/ft3) (at 21.1 °C (70 °F))
Relative gas density	1.52 (Air = 1) (at 21.1 °C (70 °F))
Solubility : Water	No data available
Partition coefficient n-octanol/water (Log Pow)	Not applicable
Partition coefficient n-octanol/water (Log Kow)	Not applicable
Viscosity, kinematic	Not applicable

Viscosity, dynamic	Not applicable
Explosive properties	Forms explosive mixtures with air and oxidizing agents
Oxidizing properties	None

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 - the 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	Not determine

SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Acute toxicity:	Not classified
Skin corrosion/irritation:	CAUSES SKIN IRRITATION. pH: not applicable
Serious eye damage/irritation:	CAUSES SERIOUS EYE IRRITATION. pH: not applicable
Respiratory or skin sensitization:	MAY CAUSE AN ALLERGIC SKIN REACTION.
Germ cell mutagenicity:	May cause genetic defects.
Carcinogenicity:	MAY CAUSE CANCER.
Skin corrosion/irritation:	CAUSES SKIN IRRITATION.
Reproductive toxicity:	MAY DAMAGE FERTILITY OR THE UNBORN CHILD.
Specific target organ toxicity-single exposure:	MAY CAUSE RESPIRATORY IRRITATION.
Specific target organ toxicity-repeated exposure:	CAUSES DAMAGE TO ORGANS (NERVOUS SYSTEM, KIDNEYS) THROUGH PROLONGED OR REPEATED EXPOSURE.
Aspiration hazard:	Not classified

INHALATION Exposure	**Threshold**	**Most sensitive study**
Systemic Effects		
Long-term:	(DMEL) 1.8 mg/m³	carcinogenicity
Acute /short term:	(DNEL) 10 mg/m³	neurotoxicity
Local Effects		
Long-term:	(DMEL) 1.8 mg/m³	carcinogenicity
Acute /short term:	High hazard (no threshold derived)	
DERMAL Exposure	**Threshold**	**Most sensitive study**
Systemic Effects		
Long-term:	High hazard (no threshold derived)	
Acute /short term:	High hazard (no threshold derived)	

Local Effects		
Long-term:	High hazard (no threshold derived)	
Acute /short term:	High hazard (no threshold derived)	
EYE Exposure		
Medium hazard (no threshold derived)		

SECTION 12. ECOLOGICAL INFORMATION

Toxicity:	no additional information is available
Bio accumulative potential:	no high bioaccumulation potential (estimated)
Persistence and degradability:	no additional information is available
Mobility in soil:	not determined
Physico-chemical degradability:	not determined
Results of PBT and vPvB assessment:	The substances in this mixture do not meet the PBT/vPvB criteria of REACH, annex XIII.
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
Other adverse effects:	Unknown
General regulation:	Do not allow uncontrolled leakage of product into the environment. The information on ecology refers to the main component.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods:
Waste cod 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
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 in bulk according to IBC – Code

Special transport precautions: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure the 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 there is adequate ventilation.
- Ensure that containers are firmly secured.

- Ensure the cylinder valve is closed and not leaking.
- Ensure the valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure the valve protection device (where provided) is correctly fitted.

SECTION 15. REGULATORY INFORMATION

Safety, health, and environmental regulations/legislation specific to the substance or mixture:
Occupational Health and Safety Act, Hazardous Chemical Agents Regulations
SANS 11014:2010 Edition 1
SANS 10228:2012 Edition 6
SANS 10234:2019 Edition 2
SUPPLEMENT TO SANS 10234 Edition 1
National Road Transport Act
Dangerous Goods Regulations

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

SECTION 16. OTHER INFORMATION

SELECTED BIBLIOGRAPHY

1. Data sheets as supplied by various Suppliers and Manufacturers
2. Emergency Response Handbook - Annex A of SABS 0232-3
3. GHS Purple booklet
4. Handling Chemicals Safety, 2nd. Ed. Dutch Association of Safety Experts, Dutch Chemical Industry Association, Dutch Safety Institute, 1980
5. NIOSH Pocket Guide to Chemical Hazards, NIOSH, June 1990
6. ECHA
7. Occupational Health and Safety Act, Hazardous Chemical Agents Regulations
8. SANS 11014:2010 Edition 1
9. SANS 10228:2012 Edition 6
10. SANS 10234:2019 Edition 2
11. SUPPLEMENT TO SANS 10234 Edition 1
12. National Road Traffic Act
13. Dangerous Goods Regulations

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 (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.

Disclaimer:
This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety, and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.