

SAFETY DATA SHEET (SDS)

Ethylene

Please ensure that this SDS is received by the appropriate persons


Review Date: 20/07/2023 v01

Emergency: 0860 02 02 02

Document Number: AFX-SDS-0041

1. PRODUCT AND COMPANY IDENTIFICATION	
Product Synonym	Ethylene Ethylene
Chemical Formula	C ₂ H ₄
Trade Name	Ethylene
Colour Coding	Purple with red shoulder lime green valve guard
Product Code	804450-SO-A
Company Identification	African Oxygen Limited Grayston Office Park Building 7 128 Peter Road Sandown, Sandton, 2196 Tel. No: (011) 490-0400 Fax No: (011) 490-0530 Email: customer.service@afrox.linde.com www.afrox.com
Emergency Numbers	0860 02 02 02 (Afrox)

2. HAZARD IDENTIFICATION	
Classification	- Classification under South African Hazardous Chemical Substances Regulations subsequently amended. (HCS) - Classification under the Globally Harmonized System of classification and labelling of chemicals (GHS) - FLAMMABLE GASES - Category 1 - GASES UNDER PRESSURE - Liquefied gas - SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
Emergency Overview	Colour: Colourless Odour: Faint, Sweet, Musty. Taste: None Physical State: Compressed Gas Form: Gas under pressure
Main Hazards	- All cylinders are portable gas containers and must be regarded as pressure vessels at all times. Contains gas under pressure; may explode if heated - The hazardous properties of Ethylene are its flammability, and its potential to cause asphyxia by displacement of air, with the resultant lowering of the oxygen content below that necessary to support life.. - Extremely flammable gas - May cause drowsiness or dizziness - May cause frostbite - May displace oxygen and cause rapid suffocation - May form explosive mixtures with air
Adverse Health Effects	- Asphyxiant - Direct contact with liquid form can cause burns similar to frostbite - Prolonged inhalation of substantial concentrations results in unconsciousness;

	light and moderate anaesthesia is attained, and deep anaesthesia seldom occurs - 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.
Chemical Hazards	- Extremely Flammable
Biological Hazards	- The greatest physiological effect of Ethylene is to cause asphyxiation - No deleterious action by Ethylene on circulatory, respiratory, or other systems or organs has been observed. Exhalation eliminates the major portion of Ethylene within minutes, although complete de-saturation from body fat takes several hours
Vapour Inhalation	- Asphyxiation - Effects of oxygen deficiency resulting from simple asphyxiants may include rapid breathing, diminished mental alertness, impaired muscular co-ordination, faulty judgement, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death
GHS Classification	- Gas under pressure – Liquefied gas - Extremely flammable – Category 1 - Specific target organ toxicity (single exposure) - Category 3
GHS Pictogram	
GHS Signal Words	Danger
GHS Hazard Statements	- H220: Extremely flammable gas. - H280: Contains gas under pressure; may explode if heated - H336: May cause drowsiness or dizziness
GHS Precautionary Statements	Prevention: - P210: Keep away from heat/sparks/open flame/ /hot surfaces. No smoking - P261: Avoid breathing dust/fume/gas/mist/ vapours/spray - P271: Use only outdoors or in a well ventilated area. - P280 : Wear protective gloves/eye protection/face protection Response: - P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely - P381: Eliminate all ignition sources if safe to do so

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	<ul style="list-style-type: none"> - P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P312 Call a POISON CENTRE/doctor if you feel unwell - Storage: - P410 + 403: Protect from sunlight. Store in a well-ventilated place - P233: Keep container tightly closed - P405 Store locked up - Disposal - P501 Dispose of contents in accordance with local/regional/national/international regulations. - Return unused content and container to supplier for safe disposal
Other Hazards that do not result in classification	<ul style="list-style-type: none"> - Liquid can cause burns similar to frostbite

Inhalation	<ul style="list-style-type: none"> - In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. - Remove victim to uncontaminated area wearing self-contained breathing apparatus. - Administer oxygen if breathing is difficult - Keep victim warm and rested. Seek medical attention. Apply artificial respiration if breathing stopped
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5. FIRE-FIGHTING MEASURES	
Suitable extinguishing media	<ul style="list-style-type: none"> - Material will burn. In case of fire in the surroundings - Carbon dioxide, dry chemical or water spray
Unsuitable extinguishing media:	<ul style="list-style-type: none"> - None
Specific Hazards	<ul style="list-style-type: none"> - Extremely flammable gas. Contains gas under pressure; may explode if heated. - May form explosive gas mixtures with air. Is a simple asphyxiant
Special fire fighting procedures:	<ul style="list-style-type: none"> - In case of fire: Stop leak if safe to do so. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire - If possible, shut off gas flow at source. Evacuate area. Post warnings to prevent persons from approaching with lit cigarettes or open flames. Using water, keep all cylinders in the vicinity of the fire cool. Remove cylinders from the vicinity of the fire if possible. - May polymerize explosively when heated or involved in a fire
Special protective equipment for firefighters:	<ul style="list-style-type: none"> - Exposed Firefighters must use standard protective equipment including flame retardant suite, helmet with face shield, gloves, rubber boots, and in enclosed spaces a self-contained breathing apparatus

3. COMPOSITION OF INGREDIENTS	
Chemical name	Ethylene
Chemical family	Ethylene
CAS No	74-85-1
UN No	1962
ERG No	116 P
Hazard class	Class 2.1
Hazchem Warning	2SE Flammable gas

4. FIRST AID MEASURES	
<p>Prompt medical attention is mandatory in all cases of overexposure to Ethylene. Rescue personnel should be equipped with self-contained breathing apparatus. Victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. If breathing has stopped administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive. Keep patient warm and quiet.</p>	
Eye contact	<ul style="list-style-type: none"> - In case of cryogenic burns caused by evaporating liquid, do not apply ointment or oil into the eyes without medical advice. - Do not wash the eyes with hot or even tepid water. Remove victim from the source of contamination. - Open eyelids wide to allow liquid to evaporate. - If pain is present, refer the victim to an ophthalmologist for treatment and follow up - If the patient cannot tolerate light, protect the eyes with a light bandage
Skin Contact	<ul style="list-style-type: none"> - For dermal contact or frostbite, flush affected area with lukewarm water. Do not use hot water. A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface, or deep tissue freezing. - Do not remove clothing if adhering to skin
Ingestion	<ul style="list-style-type: none"> - Ingestion is not considered a potential route of exposure.

6. ACCIDENTAL RELEASE MEASURES	
Personal precautions, protective equipment and emergency procedures:	<ul style="list-style-type: none"> - WARNING! Liquid and gas under pressure. Rapid release of gaseous Ethylene through a pressure relief device (PRD) or valve can result is very cold and can cause frostbite. - Evacuate area - Provide adequate ventilation - Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe - In an enclosed or non-ventilated space, a self-contained breathing apparatus must be used

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Environmental Precautions	<ul style="list-style-type: none"> - Prevent further leakage or spillage if safe to do so - Ethylene does not pose a hazard to the environment. An explosive gas-air mixture could be formed when leaks occur, so eliminate all forms of ignition - Prevent spreading of vapors through sewers, ventilation systems and confined areas
Methods and material for containment and cleaning up:	<ul style="list-style-type: none"> - Provide adequate ventilation. <p>Small spills: Small leaks should be extinguished by shutting off the source of supply, e.g. closing the valve on the cylinder, or tightening the gland nut where appropriate. If unable to stop small leaks the cylinder should be moved into the open, well away from any source of ignition. Should a small leak have ignited, use a multi-purpose dry powder or carbon dioxide extinguisher should there be no extinguisher available, a welder's glove or heavy cloth, soaked in water, may be used to extinguish the flame.</p> <p>Large spills: Stop the source if it can be done without risk. Eliminate all sources of ignition and static discharges. Restrict access to the area until completion of the clean-up procedure. Post-relevant warning signs. Wear adequate protective clothing when working near the source of the leak. Ventilate the area using forced draught if necessary. Ensure that all equipment is flameproof.</p>

	<p>electrical heating devices to raise the pressure of a container. 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. Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps were supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminants particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place.</p>
Conditions for safe storage, including any incompatibilities	<p>-Containers should not be stored in conditions likely to encourage corrosion. Keep away from food, drink and animal feeding stuffs. Stored containers should be periodically checked for general conditions 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 pressure containers away from combustible material.</p>

7. HANDLING AND STORAGE

Safe Handling	<p>-Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or</p>
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8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Occupational Exposure Hazards (HCS)	<p>-ACGIH TLV -200ppm TWA</p>
Engineering Control Measures	<p>Engineering control measures are preferred to reduce exposures. General methods include mechanical ventilation, process or personal enclosure, and control of process conditions. Administrative controls and personal protective equipment may also be required. Use a suitable flameproof ventilation system separate from other exhaust ventilation systems. Exhaust direct to outside supply sufficient replacement air to make up for air removed by exhaust system.</p> <p>Local exhaust ventilation to prevent accumulation of high concentrations and maintain air-oxygen levels at or above 19.5%. Explosion proof ventilation systems. Oxygen detectors should be used when asphyxiating gases may be released. Consider installation of leak detection systems in areas of use and storage. Systems under pressure should be regularly checked for leakages. Showers. Eyewash stations.</p>

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	A Risk assessment should be conducted to evaluate the suitability of PPE to the task being performed
Personal Protection	- When allowed by a risk assessment Respiratory Protective Equipment (RPE) should be used. The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD. Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres
Eyes	- Wear safety glasses
Hands	- Guideline: Protective gloves against mechanical risks - Additional Information: Wear working gloves while handling containers
Body protection:	- Flame retardant overall - Anti-static materials for clothes
Feet	- Wear safety shoes while handling containers - Anti-static safety boots

Explosive properties:	Not applicable
Oxidising Properties:	Not applicable
Molecular weight	28.054 g/mole

10. STABILITY AND REACTIVITY	
Reactivity	Extremely flammable
Chemical stability	Stable under normal conditions
Possibility of hazardous reactions	Extremely flammable and explosive Sensitivity to Static Discharge
Conditions to avoid	Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition Overheating of cylinders. Keep sparks and flames away from cylinder, and under no circumstances allow a torch flame to come into contact with any part of the cylinder. Never test for leaks with a flame. Use soapy water when testing for leaks. Never use cylinders as rollers or supports, or for any other purposes other than the storing of Ethylene May form explosive mixtures with air. May decompose violently at high temperature and/or pressure or in the presence of a catalyst. Explosive reaction with trifluoromethyl hypofluoride in the absence of nitrogen and tetrafluoroethylene in the presence of heat and trace oxygen.
Incompatible Materials	Oxidizers Ethylene is non-corrosive and may be contained in ambient temperatures by most common metals used in installations designed to have sufficient strength for the working pressures involved
Hazardous Decomposition of Products	Carbon monoxide. Carbon dioxide. No hazardous compounds are formed when Ethylene/air mixtures are completely combusted

9. PHYSICAL AND CHEMICAL PROPERTIES	
Chemical Name	Ethylene
Chemical Symbol	C ₂ H ₄
Physical state	Gas
Form:	Gas
Colour:	Colourless
Odour:	Faint, Sweet, Musty
Odour Threshold:	No information available
pH:	No effect in water
Melting Point:	-169.4°C
Boiling Point:	-103.8C
Sublimation Point:	Not applicable
Critical Temp. (°C):	9.9°C
Flash Point:	-104°C/ -136
Evaporation Rate:	Not applicable
Flammability (gas):	Extremely Flammable
Flammability limit - lower (%):	2.7 %
Flammability limit - upper(%):	36%
Vapour pressure:	41 bar@20°C
Vapour density (air=1)	1.17 @ 20°C
Relative density:	1.04 @ 20 °C)
Solubility(ies)	Not available
Solubility in Water:	0.120l/kg water @1 bar
Partition coefficient (n-octanol/water):	1.09
Auto-ignition Temperature:	450°C
Decomposition Temperature:	Not known
Viscosity	
Kinematic viscosity:	No data available.
Dynamic viscosity:	No data available

11. TOXOLOGICAL INFORMATION	
Acute Toxicity	Not available
Skin & eye contact	Not available
Chronic Toxicity	Not available
Carcinogenicity	Not available
Mutagenicity	Not available
Reproductive Hazards	Not available

12. ECOLOGICAL INFORMATION	
Toxicity	Not available
Persistence and degradability	Not available
Bioaccumulative Potential Product	Will not bioconcentrate Partition coefficient 0.053
Mobility in soil	Not available

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Results of PBT and vPvB assessment	Not available
Other adverse effects	Not available
Effect on ozone layer	Not available
Effect on the global warming (CO₂=1)	Not available

- Ensure users and relevant persons understand the flammable and explosive hazard	
- Regularly check supplier's information sources for updated versions of SDS's	
Revision Date	20/07/2023 v01

13. DISPOSAL CONSIDERATIONS

Disposal Methods	- Do not discharge into any place where its accumulation could be dangerous. Vent to atmosphere in a well-ventilated place
Disposal of Packaging	- The container is the property of the supplier, and the disposal of the containers must only be handled by the supplier

Bibliography	
Compressed Gas Association, Arlington, Virginia Handbook of Compressed Gases - 3rd Edition	
Matheson Gas Data Book - 6th Edition	
SANS 11014 - Safety data sheet for chemical products: Content and order of sections	
SANS 10234 - List of classification and labelling of chemicals in accordance with the Globally Harmonized System (GHS)	
SANS 10265 – Classification and Labelling of Dangerous Substances	

EXCLUSION OF LIABILITY

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14. TRANSPORT INFORMATION

Road Transportation

UN No.	1962
Shipping Name	Ethylene
ERG No.	116 P
Class	2.1
Subsidiary Risk	Flammable
Hazchem Warning	2SE Flammable Gas

Sea Transportation

IMDG	1962
Shipping Name	Ethylene
ERG No.	116 P
Class	2.1
Subsidiary Risk	Flammable
Label	Flammable Gas

Air Transportation

ICAO/IATA Code	1035
Class	2.1
Packing Group:	NA
Packaging instructions	- Cargo: 150kg - Passenger: Forbidden

15. REGULATORY INFORMATION

EEC Hazard class: Toxic, Corrosive gas. National legislation OHSact and Regulations 85 of 1993.	
SANS 11014:2010 Edition 1	Safety data sheet for chemical products - Content and order of sections
SANS 10228:2012 Edition 6	The identification and classification of dangerous goods for transport by road and rail modes
SANS 10234:2019 Edition 2	Globally Harmonized System of classification and labelling of chemicals (GHS)
SUPPLEMENT TO SANS 10234 Edition 1	List of classification and labelling of chemicals in accordance with the Globally Harmonized System (GHS)

16. OTHER INFORMATION

- Ensure all national/local regulations are observed.