AFROX
A Member of The Linde Group

SAFETY DATA SHEET (SDS)
REFRIGERANT R134a
Please ensure that this SDS is received by the appropriate persons

Review Date: 29/10/2021 v01 **Emergency: 0860 02 02 02** **Document Number: AFX-SDS-0060**

1. PRODUCT AND COMPANY IDENTIFICATION

Product	R134a
Chemical Formula	$C_2H_2F_4$
Trade Name	R134a
Colour Coding	Cornflower Blue (NCS1746-R89B) body with a Light Blue (S 0530-B) shoulder and guard. Bulk container Grey
Product Code	W341045 578013-LG-N 578013-TC-N 578013-LC-N
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)

Emergency Overview
Colour: Colourless
Odour: Slightly ethereal
Taste: Not applicable
Physical State: Gas
Form: Gas under pressure

Main Hazards
- All cylinders are portable gas containers and must be always regarded as pressure vessels. R134a does not support life. It can act as a simple asphyxiant by diluting the concentration of oxygen in air to below the levels necessary to support life
- Vapourised Butane does not support life.
- It can act as a simple asphyxiant by diluting the concentration of oxygen in air to below levels necessary to support life.
- Exposure to the liquid phase could result in serious cold burns.

Adverse Health Effects
- The inhalation of high concentrations of R134a vapour may cause temporary central nervous system depression, with narcosis, lethargy and anesthetic effects
- Continued breathing of high concentrations of R134a vapours may produce cardiac irregularities, unconsciousness and death

Chemical Hazards
- R134a vapours decompose when exposed to high temperatures with the formation of toxic and irritating compounds such as hydrofluoric acid, carbon monoxide and carbonyl fluoride

Biological Hazards
- Contact with the liquid phase could cause freeze burns

Vapour Inhalation
- Inhalation of small amounts of R134a vapour does not damage the respiratory organs. (For additional information see “Adverse ` Health Effects” above)

Eye Contact
- Vapour phase: No Known
- Liquid Phase: Serious cold burns could result

Skin Contact
- Liquid: Frostbite
- Gas: No Known

Ingestion
Liquid: Serious cold burns could result

GHS Classification
Gas under pressure (Liquefied gas)

GHS Pictogram

GHS Signal Words
Warning

GHS Hazard Statements
- H280: Contains gas under pressure, may explode if heated

GHS Precautionary Statements

Storage:
- P410+P403 : Protect from sunlight and store in a well-ventilated place.

Prevention:
- None

Response:
- None

Disposal
- None

Other Hazards that do not result in classification
- Liquid can cause burns similar to frostbite
- May displace oxygen and cause rapid suffocation
- Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials.
- Contains fluorinated greenhouse gases

3. COMPOSITION OF INGREDIENTS

Chemical name	1,1,1,2 - Tetrafluoroethane
CAS No	811-97-2
UN No	3159
ERG No	126
Hazard class	2.2
Hazchem Warning	2C non-flammable gas

4. FIRST AID

Eye contact
- Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15

	minutes. Seek immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes. Seek Medical advice as soon as possible.
Skin Contact	- Contact with evaporating liquid may cause frostbite or freezing of skin. Spray with lukewarm water for at least 15 minutes.
Ingestion	- Ingestion is not considered a potential route of exposure.
Inhalation	- 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. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
Most important symptoms and effects, both acute and delayed	- Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

5. FIRE-FIGHTING

Suitable extinguishing media	- As R134a is non-flammable, use extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media:	- None
Specific Hazards	- Fire or excessive heat may produce hazardous decomposition products. - Heat may cause the containers to explode.
Special fire fighting procedures:	- Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove containers from area of fire if safe to do so.
Special protective equipment for firefighters:	- Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, Self-contained Breathing Apparatus.

6. ACCIDENTAL RELEASE

Personal precautions, protective equipment and emergency procedures:	- Evacuate area. Provide adequate ventilation. Prevent from entering sewers, basements and work pits, or any place where its accumulation can be dangerous. - Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Environmental Precautions	- Prevent further leakage or spillage if safe to do so.
Methods and material for containment and cleaning up:	- Provide adequate ventilation.

7. HANDLING AND STORAGE

Safe Handling	- 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 back feed into the container. Avoid suck back of water, acid and alkalis. Keep container below 50°C in a well-ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with. Never use direct flame or 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 contaminates 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.
Conditions for safe storage,	- Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically

including any incompatibilities	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 away from combustible material. - Do not allow cylinders to slide or come into contact with sharp edges. R134a cylinders should be stacked vertically at all times and should be firmly secured in order to prevent them from being knocked over. Use a "first in - first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Keep out of reach of children

8. EXPOSURE CONTROLS

Occupational Exposure Hazards	- TWA 1000 ppm - As R134a is a simple asphyxiant, avoid exposure hazards any areas where spillage has taken place Only enter once testing has proved the atmosphere to be safe, and remember that the gas is heavier than air
Engineering Control Measures	- Engineering control measures are preferred to reduce oxygen depleted atmospheres. General methods include forced-draught ventilation, separate from other exhaust ventilation systems. Ensure that sufficient fresh air enters at, or near, floor level
Personal Protection	- A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk.
Eyes	- Wear eye protection to EN 166 when using gases.
Hands	- Wear working gloves while handling containers
Body protection:	- No special precautions.
Feet	- Wear safety shoes while handling containers

9. PHYSICAL AND CHEMICAL PROPERTIES

Name	**R134a**
Chemical Symbol	C2H2F4
Physical state	Gas
Form:	Liquefied gas
Colour:	Colourless
Odour:	faint ethereal
Odour Threshold:	Odour threshold is subjective and is inadequate to warn of over-exposure.
pH:	Not applicable.
Melting Point:	-108 °C Experimental result, Supporting study
Boiling Point:	-26 °C (101.3 kPa) Experimental result, Supporting study kPa) Other, Key study
Sublimation Point:	Not applicable.
Critical Temp. (°C):	101 °C
Flash Point:	Not applicable
Evaporation Rate:	Not applicable.
Flammability (solid, gas):	Non-flammable Gas
Flammability limit - upper (%):	Not applicable.
Flammability limit - lower(%):	Not applicable.
Vapour pressure:	5.74 bar (20 °C) Experimental result, Key study
Vapour density (air=1)	3.6 AIR=1
Relative density:	No data available.
Solubility(ies)	
Solubility in Water:	67 mg/l (25 °C)
Partition coefficient (n-octanol/water):	1.274
Autoignition Temperature:	> 743 °C Experimental result, Key study
Decomposition Temperature:	No data available
Viscosity	
Kinematic viscosity:	No data available.
Dynamic viscosity:	0.012 mPa.s (18 °C)
Explosive properties:	Not applicable
Oxidising Properties:	Not applicable
Molecular weight	102.03 g/mol

10. STABILITY AND REACTIVITY

Reactivity	- No reactivity hazard other than the effects described in sub-sections below.
Chemical stability	- Stable under normal conditions.
Possibility of hazardous reactions	- None.
Conditions to avoid	- Overheating of cylinders. Never use cylinders as rollers or supports; or for any other purpose than the storage..

Incompatible Materials	- Aluminum. Carbon dioxide > 1000°C. Alloys with >2% magnesium in the presence of water
Hazardous Decomposition of Products	- Under normal conditions of storage and use, hazardous decomposition products should not be produced. - Thermal decomposition may produce : Fluorine. Carbonyl fluoride.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity	TWA 1000 ppm
Skin & eye contact	No known effect
Chronic Toxicity	No known effect
Carcinogenicity	No known effect
Mutagenicity	No known effect
Reproductive Hazards	No known effect
Other Relevant Toxicity Information	Cardiac sensitisation threshold limit
Norflurane	40000 ppm Beagle (dog)NOAEC Cardiac sensitisation threshold limit 80000 ppm Beagle (dog)LOAEC Light hydrocarbons like this one have been associated with cardiac sensitisation in abuse situations. Hypoxia or the injection of adrenaline-like substances enhances these effects. May produce irregular heart beat and nervous symptoms.

12. ECOLOGICAL INFORMATION

Toxicity	- No known ecological damage caused by this product.
Persistence and degradability	- Not applicable to gases and gas mixtures.
Mobility in soil	- No information available
Ecology - soil	- Because of its high volatility, the product is unlikely to cause ground or water pollution.
Results of PBT and vPvB assessment	- Not classified as persistent, bioaccumulating and toxic (PBT). - Not classified as persistent, very persistent and very bioaccumulating (vPvB).
Other adverse effects	- May cause pH changes in aqueous ecological systems.
Effect on ozone layer	- None
Effect on the global warming	- Global warming potential: 1,430 - Contains Fluorinated greenhouse gases covered by the Kyoto protocol. - When discharged in large quantities may contribute to the greenhouse effect.

13. DISPOSAL CONSIDERATIONS

Disposal Methods	- Do not attempt to dispose of residual or unused quantities
Disposal of Packaging	- Return container to supplier.

14. TRANSPORT INFORMATION

Road Transportation

UN No.	3159
Shipping Name	1,1,1,2 Tetrafluoroethane
ERG No.	126
Class	2A
Subsidiary Risk	2.2
Hazchem Warning	2 C Non-flammable gas

Sea Transportation

IMDG	3159
Shipping Name	1,1,1,2 Tetrafluoroethane
ERG No.	126
Class	2A
Subsidiary Risk	2.2
Label	Non-flammable gas

Air Transportation

ICAO/IATA Code	3159
Class	2A
Subsidiary risk	2.2
Packaging instructions	- Cargo: 200 - Passenger: 200
Maximum quantity allowed	- Cargo: 150 kg - Passenger: 75 kg

15. REGULATORY INFORMATION

	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.
- Ensure users and relevant persons understand the asphyxiation hazard
- Regularly check supplier's information sources for updated versions of SDS's
- SANS 10234-Globally Harmonized System of Classification and Labelling of Chemicals and Matheson Gas data book

Revision Date 29/10/2021 v01

Bibliography

Showa Denko K.K. Gaseous Products Division. Technical information on R134a. March 1992
IATA Dangerous Goods Regulations 1996

EXCLUSION OF LIABILITY