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

Review Date: 25/07/2022 v01 **Emergency: 0860 02 02 02** **Document Number: AFX-SDS-0025**

1. PRODUCT AND COMPANY IDENTIFICATION

Product Synonym	Hydrogen Hydrogen
Chemical Formula	H_2
Trade Name	Hydrogen Technical / MCP N2.5 Hydrogen Baseline N5.0
Colour Coding	Red
Product Code	54-SH / 54-MH15 510203-SH-C / 510203-MH-C
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) - FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Compressed gas)
Emergency Overview	Colour: None Odour: None Taste: None Physical State: Compressed Gas Form: Gas under pressure Extremely flammable
	- All cylinders are portable gas containers and must be regarded as pressure vessels at all times. - Hydrogen does not support life.
Adverse Health Effects	- Asphyxiant
Chemical Hazards	- Flammable
Biological Hazards	- The greatest physiological effect of Hydrogen is to cause asphyxiation.
Vapour Inhalation	- Asphyxiation
GHS Classification	- Gas under pressure
GHS Pictogram	
GHS Signal Words	Danger
GHS Hazard Statements	- Extremely flammable gas. - Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation. Burns with invisible flame. May form explosive mixtures with air.
GHS Precautionary Statements	**Storage:** - P403 : Store in a well-ventilated place. **Prevention:** - P280 : Wear protective gloves/eye protection/face protection. **Response:** - None **Disposal** - None
Other Hazards that do not result in classification	- Asphyxiant in high concentrations

3. COMPOSITION OF INGREDIENTS

Chemical name **Chemical family**	Hydrogen Hydrogen
CAS No	1333-74-0
UN No	1001 (gas)
ERG No	116
Hazard class	Class 2.1
Hazchem Warning	Compressed gas

4. FIRST AID MEASURES

Eye contact	- Seek medical attention
Skin Contact	- In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.
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. Seek medical attention. Apply artificial respiration if breathing stopped

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	- Material will burn. In case of fire in the surroundings: use appropriate extinguishing agent.
Unsuitable extinguishing media:	- None
Specific Hazards	- Extremely flammable gas. Contains gas under pressure; may explode if heated
Special fire fighting procedures:	- 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.
Special protective equipment for firefighters:	- Exposed Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces a self-contained breathing apparatus

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	- WARNING! Gas under pressure. Rapid release of gaseous Hydrogen through a pressure relief device (PRD) or valve can result in a rise of pressure (Inverse Joule Thompson effect). - 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
Environmental Precautions	- Prevent further leakage or spillage if safe to do so
Methods and material for containment and cleaning up:	- Provide adequate ventilation. This gas is lighter than air and will accumulate against the ceiling of the building.

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 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 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.
Conditions for safe storage, including any incompatibilities	- 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.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Occupational Exposure Hazards (HCS)	- Not specified
Engineering Control Measures	- 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. **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) may 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:	- Fire proof overall - Anti-static materials for clothes
Feet	- Wear safety shoes while handling containers. - Anti-static safety boots

9. PHYSICAL AND CHEMICAL PROPERTIES

Chemical Name	**Hydrogen**
Chemical Symbol	H_2
Physical state	Gas
Form:	Gas
Colour:	Colourless
Odour:	Odourless
Odour Threshold:	Not applicable
pH:	No effect in water
Melting Point:	-259.15°C
Boiling Point:	-253°C
Sublimation Point:	NA
Critical Temp. (°C):	-240.15°C
Flash Point:	NA
Evaporation Rate:	Not applicable.
Flammability (gas):	Extremely Flammable
Flammability limit - (%):	-Lower: 4.0%
Flammability limit - (%):	-Upper: 76%
Vapour pressure:	NA
Vapour density (air=1)	0.0783@ 20°C
Gas density:	0.0837@20°C
Solubility(ies)	
Solubility in Water:	0.0182l/kg water @1 bar
Partition coefficient (n-octanol/water):	Not known
Autoignition Temperature:	500 to 571°C
Decomposition Temperature:	Not known.
Viscosity	
Kinematic viscosity:	No data available.
Dynamic viscosity:	Not applicable
Explosive properties:	Explosive in air
Oxidising Properties:	Not applicable
Molecular weight	2.016 g/mole

10. STABILITY AND REACTIVITY

Reactivity	-Extremely flammable
Chemical stability	- Stable under normal conditions.
Possibility of hazardous reactions	- Extremely flammable and explosive
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.
Incompatible Materials	Oxidizers
Hazardous Decomposition of Products	Will not produce any hazardous products.

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	Not available
Mobility in soil	Not available
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

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.

14. TRANSPORT INFORMATION

Road Transportation	
UN No.	1049
Shipping Name	Hydrogen
ERG No.	115
Class	2.1
Subsidiary Risk	Flammable, Explosive
Hazchem Warning	Flammable Gas
Sea Transportation	
IMDG	1049
Shipping Name	Hydrogen
ERG No.	115
Class	2.1
Subsidiary Risk	Flammable
Label	Flammable Gas
Air Transportation	
ICAO/IATA Code	1049

Class	2.1
Packing Group:	NA
Packaging instructions	- Cargo: 150kg - Passenger: not allowed

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.
- 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	25/07/2022 v01

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