



MATERIAL SAFETY DATA SHEET (MSDS) LIQUID NITROGEN

(Please ensure that this MSDS is received by an appropriate person)

DATE: Nov 2018 Version 4

Ref. No.: MS006

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name LIQUID NITROGEN

Chemical Formula N₂

Company Identification Les Gaz Industriels Ltd
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G.R.N.W. Republic of
Mauritius
Tel. No: (+230) 212-8306
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2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name Nitrogen

Chemical Family Inert gas

Chemical Abstract Service Number (CAS No.) 7727-37-9

United Nations Number (UN No.) 1977

Emergency Response Guide Number (ERG No.) 120

Hazchem Warning 2.2 Non- flammable gases

3. HAZARDS IDENTIFICATION

Main Hazards: Extremely cold liquid (-196°C) can cause severe frostbite and cold burns. Nitrogen gas can act as an asphyxiant as it dilutes the concentration of oxygen in air below the levels necessary to support life. Rescue workers may require self-contained breathing apparatus and protective clothing.

Adverse Health Effects: Inhalation of nitrogen in excessive concentrations can result in dizziness, nausea, vomiting, loss of consciousness, rapid breathing, asphyxiation without warning and death.

Skin and Eye Contact: May cause severe cold burns and frostbite.

Biological Hazards: Contact between the skin and liquid Nitrogen or uninsulated piping or vessel containing it, can cause severe cold burn injuries.

Environmental Hazard: No known effects to the environment, but in confined space ensure adequate ventilation.

Chemical Hazards. Nitrogen is relatively inert to most materials under ordinary conditions. It becomes more reactive at elevated temperatures when it combines with hydrogen, oxygen and some metals.

3.1. Label elements

- Labelling pictograms



- **Signal word:** Warning

- **Hazard Statements:**

H281 Contains refrigerated gas: may cause cryogenic burns or injury

- **Precautionary Statements**

P282 Wear insulating gloves/face shield/eye protection.

P336+P315

Thaw frosted parts with lukewarm water.

Do not rub affected area. Get immediate medical examination

P403

Store in well ventilated place.

4 FIRST AID MEASURES

Skin/Eye Contact: Immediately flush with large quantities of tepid water for at least 15 minutes.

In case of frostbite, spray with tepid water for at least 15 minutes. Apply a sterile dressing, and obtain medical assistance.

If water is not available or impractical to use, wrap the affected part gently with blankets. Keep victim warm and quiet, and obtain medical assistance

Ingestion or Swallowing: Ingestion is not considered a potential route of exposure

Inhalation: In high concentration may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Remove victim to fresh air wearing self-contained breathing apparatus. Apply artificial respiration if victim is not breathing. Obtain medical assistance.

5 FIRE FIGHTING MEASURES

Special hazards: Exposure to fire may cause containers or vessels to rupture/explode. Nitrogen is non-flammable.

Extinguishing media As Nitrogen is an inert gas; it does not contribute to a fire, but could help with the extinguishing by reducing the oxygen content of the air by dilution to below the level to support combustion. Keep the PCC, bulk tank or tanker cool by spraying with water if exposed to fire.

Special protective equipment for fire fighters: In confined space use self-contained breathing apparatus.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions Do not enter any area where nitrogen has been spilled or a serious leak has occurred unless tests have shown that it is safe to do so. If the area must be entered by the emergency personnel, self-contained breathing apparatus, leather gloves, and appropriate foot and leg protection should be worn.

Environmental Protection Liquid nitrogen poses no harm to the environment.

Small spills Shut off the source of escaping nitrogen. Ventilate the area.

Large spills Evacuate the area. Shut off the source of the spill/leak if this can be done without risk. Prevent liquid nitrogen from entering sewers, basements and work pits. If tanker has overturned, do not attempt to right or move it. CONTACT THE NEAREST AFROX BRANCH. Restrict access to the area until is fully ventilated. Ventilate the area using forced-draught if necessary. Monitor the surrounding area for Oxygen level. Oxygen must be at least 19.5% before personnel may be allowed into the area without self-contained breathing apparatus. Large spills can also be dispersed using a water fog spray.

7 HANDLING AND STORAGE

Safe handling When Liquid nitrogen is held in any closed vessel or space, there must be an appropriate pressure relief device because of the large pressure increases that can occur as the liquid nitrogen is vaporised. Use only containers designed for cryogenic liquids. Do not use any stopper or other device that will interfere with venting of gas. Unauthorised



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modification to these liquid containers is forbidden.

Storage Store in a cool and well-ventilated area. If containers are stored outside, provide shelter to protect against extreme weather conditions. Excessive exposure to any heat could cause the internal pressure to increase significantly with the consequent loss of liquid product that has vaporised. Keep out of reach of children.

Personal Protective Equipment Wear face shield; leather gloves and leather apron when using or decanting liquid nitrogen. Do not put hands (even in the best gloves) in the cryogenic liquid. Wear safety boots and overalls.

unless entering with self-contained breathing apparatus. Only enter once testing has proved the atmosphere to be safe.

Engineering Control Measures Engineering control measures are preferred to reduce exposure to oxygen-depleted atmospheres. General methods include forced-draught or exhaust ventilation systems. Ensure that sufficient fresh air enters at, or near, floor level.

Personal Protection Face shield, leather gloves, leather apron and Safety shoes, or boots, should be worn when handling containers.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Hazards As nitrogen is a simple asphyxiant, avoid any areas where spillage has taken place



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9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

| | |
|---|-------------------------|
| Chemical Symbol | N ₂ |
| Molecular Weight | 28,01 |
| Boiling point @ 101,325 kPa | -195,8°C |
| Density, liquid @ boiling point | 803,6 kg/m ³ |
| Relative density (Air = 1) @ 101,325 kPa | 0,967 |
| Latent heat of vaporisation @ boiling point | 199,1 kJ/kg |
| Colour | None |
| Taste | None |
| Odour | None |

10 STABILITY AND REACTIVITY

Conditions to avoid The dilution of the oxygen concentration in the atmosphere to levels which cannot support life.

Incompatible At the temperature of liquid nitrogen ordinary carbon steels, and most alloy steels lose their ductility, and are therefore considered to be unsatisfactory.

Materials Metals and alloys that have satisfactory ductility include austenitic stainless steel (i.e. types, 304 and 316), and nickel-chromium alloys, nickel, Monel 400, copper, brasses, bronze and aluminium.

Hazardous Decomposition Products None

11 TOXICOLOGICAL INFORMATION

Acute Toxicity None
Skin & eye contact none
Carcinogenicity Severe cold burns could result in cancerous growth.

Reproductive Hazards No known effect
For further information see Section 3. (**Adverse Health Effects**).

12 ECOLOGICAL INFORMATION

It does not pose a hazard to the ecology but it can cause frost damage to vegetation

13 DISPOSAL CONSIDERATIONS

Disposal Methods Small amounts may be allowed to evaporate to atmosphere under controlled conditions. Large amounts should only be handled by the gas supplier.

Disposal of packaging The disposal of containers must only be handled by the gas supplier.

14 TRANSPORT INFORMATION

ROAD TRANSPORTATION

| | |
|------------------------------------|-------------------------|
| United Nations Number (UN No.) | 1977 |
| Emergency Response Guide (ERG No.) | 120 |
| Hazchem warning | 2.2 Non-flammable gases |

SEA TRANSPORTATION

IMDG 1977

| | |
|-----------------|-------------------|
| Class | 2.2 |
| Packaging group | |
| Label | Non-flammable gas |

AIR TRANSPORTATION

| | |
|--------------------------|--------|
| ICAO/IATA Code | 1977 |
| Class | 2.2 |
| Packaging group | |
| Packaging instructions | |
| - Cargo | 202 |
| - Passenger | 202 |
| Maximum quantity allowed | |
| - Cargo | 500 kg |
| - Passenger | 50 kg |

15 REGULATORY INFORMATION

| Risk Phrase | Description | Safety Phrase | Description |
|-------------|--|---------------|--|
| R 35 | Cause severe burns | S 2 | Keep out of reach of children |
| R 41 | Risk of serious damage to eyes | S9 | Keep container in a well-ventilated area |
| R 44 | Risk of explosion heated under confinement | S12 | Do not keep the container sealed |
| R45 | May cause cancer | S15 | Keep away from heat |
| | | S36 | Wear suitable protective clothing |
| | | S51 | Use only in well-ventilated areas |

Refer to SANS 10234 for explanation of the above.

16 OTHER INFORMATION

This MSDS has been compiled using the following sources of information;
Compressed Gas Association, Arlington, Virginia
Handbook of Compressed Gases - 3rd Edition
Matheson. Matheson Gas Data Book - 6th Edition
SANS 10234 – Globally Harmonised System of classification and labelling of chemical substances
SANS 11014-1- Safety Data Sheet for chemical products.

Emergency Response Handbook SABS – Annex A of SABS 0232-3

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