MATERIAL SAFETY DATA SHEET (MSDS)
LIQUID NITROGEN
(Please ensure that this MSDS is received by an appropriate person)

DATE: March 2023 Version: 2
Ref. No.: MS006

1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION

Product Name	LIQUID NITROGEN
Chemical Formula	N_2
Trade Name	Liquid Nitrogen Cryogenic Nitrogen
Company Identification	Les Gaz Industriels Ltd Pailles Road G.R.N.W. Republic of Mauritius Tel. No: (+230) 212-8306 Fax No: (+230) 212-0235
EMERGENCY NUMBER	**(+230) 800 1133**

2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Nitrogen
Chemical Family	Inert gas
CAS No.	7727-37-9
UN No.	1977
ERG No.	121
Hazchem Warning	2 C Non-flammable Gas

3 HAZARDS IDENTIFICATION

Main Hazards.

All portable Cryogenic Containers (PCC's) containing cryogenic liquids must be regarded as pressure vessels at all times. Excessive exposure to heat could cause the internal pressure to increase significantly with the consequent violent rupturing of the vessel. Due to its extremely low boiling point, -196°C, extreme care must be taken when handling liquid nitrogen, otherwise frostbite can occur. Argon 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.

Adverse health effects. Inhalation of nitrogen in excessive concentrations can result in dizziness, nausea, vomiting, loss of consciousness and death.

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.

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

Vapour Inhalation As gaseous argon acts as a simple asphyxiant, death may result from errors in judgement, confusion, or loss of consciousness which prevents self-rescue. At low oxygen concentrations, unconsciousness and death may occur in seconds without warning.

Eye Contact Can cause severe cold burn injuries.

Skin Contact Frostbite can occur from contact with liquid nitrogen.

Ingestion Severe cold burn injuries would occur.

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

Prompt medical attention is mandatory in all cases of overexposure to Nitrogen. Rescue personnel should be equipped with self-contained breathing apparatus. In case of frostbite from contact with liquid nitrogen, place the frost-bitten part in warm water, about 40 - 42°C. If warm water is not available, or is impractical to use, wrap the affected part gently in blankets. Encourage the patient to exercise the affected part whilst it is being warmed. Do not remove clothing whilst frosted. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be removed to an uncontaminated area, and given mouth-to-mouth resuscitation and supplemental oxygen.

Eye Contact Immediately flush with large quantities of tepid water, or with sterile saline solution. Seek medical attention.

Skin Contact See above for handling frostbite.

Ingestion Seek medical attention.

5 FIRE FIGHTING MEASURES

Extinguishing media As Nitrogen is an inert gas, it does not contribute to the fire, but could help with the extinguishing by reducing the oxygen content of the air by dilution to below the level to support combustion.

Specific Hazards Exposure to fire may cause containers or vessels to rupture/explode. Nitrogen is non-flammable. Nitrogen does not support life. It can act as a simple asphyxiant by diluting the concentration of oxygen in the air below the levels to support life.

Emergency Actions If possible, shut off the source of excess nitrogen. Evacuate area. Prevent liquid argon from entering sewers, basements and workpits. Keep the PCC, tanker or any other cryogenic vessel cool by spraying with water if exposed to a fire, or source of excessive heat. If the tanker has overturned, do not attempt to right or move it. CONTACT LGI.

Protective Clothing Self-contained breathing apparatus. Safety gloves and shoes, or boots, should be worn when handling containers.

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 Les Gaz Industriels Ltd.. 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 modification to these liquid containers is forbidden.

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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.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

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

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

Chemical Symbol	N2
Molecular Weight	28,013
Specific Volume @ 20°C & 101,325 kPa	861,5ml/g
Density, gas @ 101,325 kPa and 20°C	1,25 kg/m3
Relative density (Air = 1) @ 101,325 kPa	0,967
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 Materials. At the temperature of liquid nitrogen ordinary carbon steels, and most alloy steels lose their ductility, and are therefore considered to be unsatisfactory. Metals and alloys that have satisfactory ductility include austinitic 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 blown to the 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

UN No.	1977
ERG No.	120
Hazchem warning	2C Non-flammable gas

SEA TRANSPORTATION

IMDG	1977
Class	
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

EEC Hazard class Non-flammable
National legislation: OHSact & Regulations (85 of 1993)
SANS 10234 and its supplement

16 OTHER INFORMATION

Bibliography
Compressed Gas Association, Arlington, Virginia
Handbook of Compressed Gases - 3rd Edition
Matheson. Matheson Gas Data Book - 6th Edition
SABS 0265 - Labelling of Dangerous Substances

17 EXCLUSION OF LIABILITY