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| MATERIAL SAFETY DATA SHEET |
| Title: LIQUID NITROGEN MATERIAL SAFETY DATA SHEET |
| Date of Issue: 1 October 2021 |
| Date of Review: 1 October 2026 |

MATERIAL SAFETY DATA SHEET NITROGEN REFRIDGERATED LIQUID



IDENTIFICATION:

Chemical Name: Nitrogen,
Synonyms: LIN, Liquid Nitrogen
UN Number: 1977
Use: Inert gas widely used in chemical, food and beverage, petrochemical and metal industries.

HAZARDS IDENTIFICATION:

Dangerous Goods Class and Subsidiary Risk: 2.2

HSNO Classification: Not Hazardous

Hazard Statement:
 Refrigerated Liquid. May cause cryogenic burns or injury.

Precautionary Statements:
 Read label before use.
 Read Safety Data Sheet before use..
 Wear full body protection
 Wear cold insulating gloves/face shield/eye protection.
 Thaw frosted parts with lukewarm water. Do not rub affected area.
 Get immediate medical advice/attention.
 Store in a well-ventilated place.
 Product is a simple asphyxiant.

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| COMPOSITION / INGREDIENTS: |
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| Chemical Entity | CAS Number | Proportion |
|------------------------|-------------------|-------------------|
| Nitrogen | 7727-37-9 | 100% |

Contains no other components or impurities that will influence the classification of the product.

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| FIRST AID MEASURES: |
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Health Effects

Acute

Swallowed: Can cause cold burn if swallowed.

Eye: Can cause severe cold burn if brought in contact with eye.

Skin: Can cause severe cold burn if brought in contact with skin.

Inhaled: Nitrogen is non-toxic. When nitrogen evaporates, it can dilute the oxygen concentration in air below the level necessary to support life, it can act as an asphyxiant.

Effects of oxygen deficiency are:

16%: breathing and pulse rate increased, impaired thinking and attention, reduced coordination;

14%: Abnormal fatigue upon exertion, emotional upset, faulty coordination, poor judgement;

12.5%: Very poor judgement and coordination, impaired respiration that can cause permanent hear damage, nausea and vomiting;

below 10%: Inability to perform various movements, loss of consciousness, convulsions, and death.

Chronic

Long term exposure to nitrogen has no known health effects. Prolonged exposure to an oxygen deficient atmosphere (below 19% oxygen in air) may affect the heart and nervous system.

Exposure to liquid nitrogen can result in cold burns, which need immediate medical attention. Frozen tissue can die (frostbite).

First Aid

Inhalation:

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness.

Remove victim to uncontaminated area whilst wearing self-contained breathing apparatus.

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Victim may not be aware of asphyxiation.
 Keep victim warm and rested.
 Call a doctor.
 Apply artificial respiration if breathing stopped.
 Continued treatment should be symptomatic and supportive.

Swallowed:

Seek medical attention immediately.
 Drink large quantities of water (not hot) to help thaw affected areas.

Eye Contact:

Immediately flush eyes thoroughly with unheated tap water for at least 15 minutes.
 Obtain medical assistance.

Skin Contact:

Liquid Nitrogen can cause severe cold burn upon contact with skin.

In case of cold burn move the victim to a warm place (about 22°C) but do not apply direct heat. **Never use dry heat.**

Do not rub frozen parts, as tissue damage may result.

Gently, flush the affected areas of the skin with large quantities of unheated tap water. **Do not use hot water or any other form of direct heat.**

The skin should gradually change colour, via blue, back to pink.

Loosen any clothing that might restrict the circulation to the affected area but take care not to remove any clothing frozen to flesh.

Apply DRY, sterile, non-adhering dressing with a large bulky protective covering to protect the wounds

Do not apply dry sterile dressing too tightly in case it restricts blood circulation.

Keep the affected body part at rest. It will become swollen, painful and prone to infection when thawed.

Treat the person for shock.

Do not give person alcohol to drink or tobacco to smoke. Both will restrict blood flow to the wound and retard recovery.

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Obtain medical assistance immediately.

Advice to Doctor

The thawing process, depending on the degree of exposure, can be painful and it can be necessary to administer drugs to control pain.

Thawing takes from 15 – 60 minutes.

Administer a tetanus booster after hospitalisation.

Advise doctor that victim has been exposed to an oxygen deficient atmosphere. Specialist advice for treatment of cryogenic burns is available at a Burns Unit.

General:

Low air temperature due to close proximity of liquefied atmosphere gases can cause hypothermia and all persons at risk should be warmly clad.

Avoid liquid spillage as cryogenic liquids embrittle many materials on contact.

When liquid nitrogen evaporates, it can dilute the oxygen concentration in the air. Rescuers should not enter an oxygen deficient atmosphere without using self-contained full face positive pressure breathing equipment.

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| FIRE FIGHTING MEASURES: |
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Flammability:

Non Flammable.

Fire/Explosion Hazard:

Non-flammable, however exposure to fire may cause container to rupture/explode. Cylinders involved in a fire/explosion may rocket. Move cylinders from vicinity of fire if safe to do so.

Cool cylinders by spraying flooding quantities of water from a protected location. If unable to keep cylinders cool, evacuate area, minimum distance 200 meters.

Extinguishing Media:

Use appropriate media to extinguish source of surrounding fire. Cool cylinders with water if possible.

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Hazchem Code: 2 T

Recommended Protective Clothing:

Breathing apparatus should be worn in confined space.
Thermal protection from cryogenic temperatures required.

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| ACCIDENTAL RELEASE MEASURES: |
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Personal Protection::

Personnel handling liquid nitrogen shall be provided with full overalls, safety footwear, safety glasses and leather or PVC gloves.

In areas where equipment failure may cause an immediate high concentration of nitrogen, ensure adequate ventilation and have approved self-contained, full face respiratory equipment readily available for emergencies.

Spills and Disposal:

Ventilate area. Stop leak if it can be done without risk. Allow gas to dissipate to atmosphere. Cold vapours are heavier than air. In case of large spillage evacuate nearby trenches, excavations, pits and the like.

Reference Guide:

Standard SNZ HB 76:2008 Dangerous Goods – Initial Emergency Response Guide.
AS/NZS 1337 – Eye Protection for Industrial Applications
AS/NZS 2161.1 – Occupational Protective Gloves – Selection, use and maintenance
AS/NZS 1715 – Selection, Use and Maintenance of Respiratory Protective Devices
AS/NZS 1716 – Respiratory Protective Devices

General:

Low air temperature due to close proximity of liquefied atmosphere gases can cause hypothermia and all persons at risk should be warmly clad. Avoid liquid spillage as cryogenic liquids embrittle many materials on contact.

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| HANDLING AND STORAGE: |
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Handling

Flammability:

Non Flammable.

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General:

Low air temperature due to close proximity of liquefied atmosphere gases can cause hypothermia and all persons at risk should be warmly clad.

Avoid liquid spillage as cryogenic liquids embrittle many materials on contact.

Only experienced and properly instructed personnel should handle liquefied gases.

Approved Handlers:

Approved handlers are not required, non-hazardous gas (HSNO).

Approved Fillers:

Approved fillers are required when transferring liquid nitrogen to other storage containers.

Storage

Separation:

Supplied in portable cryogenic liquid containers or by bulk road tanker to cryogenic storage vessels installed at users' premises.

Spills and Disposal:

Ventilate area. Stop leak if it can be done without risk. Allow gas to dissipate to atmosphere.

Cold vapours are heavier than air. In case of large spillage evacuate nearby trenches, excavations, pits and the like.

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| EXPOSURE CONTROLS / PERSONAL PROTECTION: |
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Exposure Standards:

Nitrogen is a simple asphyxiant. Ensure adequate ventilation. Liquid Nitrogen is extremely cold and additional care should be taken to avoid cryogenic burns

Engineering Controls:

Provide adequate local exhaust and dilution (general) ventilation and supply sufficient replacement air to maintain oxygen concentration above 19%. Cryogenic liquids embrittle many materials on contact.

Thermal insulation of components in direct contact with liquid nitrogen.

Personal Protection:

Personnel handling liquid argon shall be provided with full overalls, safety footwear, safety glasses and leather or PVC gloves. In areas where equipment failure may cause an immediate

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high concentration of nitrogen ensure adequate ventilation and have approved self-contained, full face respiratory equipment readily available for emergencies.

Reference Guide:

AS/NZS 1337 – Eye Protection for Industrial Applications
 AS/NZS 2161.1 – Occupational Protective Gloves – Selection, use and maintenance
 AS/NZS 1715 – Selection, Use and Maintenance of Respiratory Protective Devices
 AS/NZS 1716 – Respiratory Protective Devices

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| PHYSICAL AND CHEMICAL PROPERTIES: |
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Physical Properties

Appearance: Colourless, Odourless, Tasteless Flashpoint: Non Flammable

Boiling Point: -195.8°C

Flammability Limits: Non Flammable

Vapour Pressure: Not Applicable

Solubility in Water (at 0°C): 0.0235 m³ vol/vol

Other Properties

Relative Density: (Air = 1): 0.967
 Density of Liquid: (101.3 kPa, 15°C): 808.6 kg/m³
 Molecular Weight: 28.013
 Critical Temperature: -146.95 °C

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| STABILITY AND REACTIVITY: |
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Flammability:

Nitrogen is non- flammable.

Materials Compatibility: Not applicable. Liquid spillages can cause embrittlement.

Stability: Stable under normal conditions

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| TOXICOLOGY INFORMATION: |
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No known toxicological effects from this product.

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| ECOLOGICAL INFORMATION: |
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May cause frost bite to plants and vegetation.

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| DISPOSAL CONSIDERATIONS: |
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Do not discharge into any place where its accumulation could be dangerous. To atmosphere in a well-ventilated place.

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| TRANSPORT INFORMATION: |
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UN Number: 1977

Proper Shipping Name: NITROGEN, REFRIDGERATED LIQUID

Dangerous Goods Class and Subsidiary Risk: 2.2

Packing Group: Not applicabLE

Hazchem Code: 2 T

Other Information:

Avoid transport on vehicles where the load is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.

Before transporting product containers:

Ensure that containers are firmly secured.
Ensure cylinder valve is closed and not leaking.
Ensure there is adequate ventilation.
Compliance with applicable regulations.

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| REGULATORY INFORMATION: |
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Environmental Protection Agency Register Approval No: HSR001027

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HSNO Controls:

Hazardous Substances (Compressed Gases) Regulations 2004.
 Hazardous Substances (Tank Wagon and Transportable Containers) Regulations 2004.

Approved Handlers: Approved handlers are not required, non-hazardous gas (HSNO).

Approved Fillers: Approved fillers are required when transferring liquid Nitrogen to other storage containers.

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| OTHER INFORMATION: |
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Liquid Nitrogen is supplied in cryogenic dewars.

References:

- NZS 5433:2007 Transport of Dangerous Goods on Land
- EPA Website – Approvals Register – www.epa.govt.nz
- SNZ HB76:2008 Dangerous Goods – Initial Emergency Response Guide
- AS1678 2C1 Emergency Procedure Guide – Transport – Non-Flammable, Compressed Gas
- AS 4484-2004 - Gas Cylinders for Industrial, Scientific, medical and refrigerant use - Labelling and colour coding
- AS 2473.2-2007 - Valves for compressed gas outlets - Part 2 Outlet connections (threaded) and stem (inlet) threads
- AS 2473.3-2007 - Valves for compressed gas outlets - Part 3 Outlet connections for medical gases (including pin-indexed yoke connections)
- Operators Handbook for the Transport of Dangerous Goods by Road – NZ Road Transport & Logistics Industry Training Organisation
- NZCIC Code of Practice – Preparation of Safety Data Sheets

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| MSDS SUMMARY: |
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This MSDS summarises to our best knowledge, at the date of issue, the health and safety hazard information regarding this product and general guidance on how to safely handle the product in the workplace. All due care has been taken to include accurate and up-to-date information in this MSDS.

Each user should read this MSDS and consider the information in the context of how the product will be handled and used in the workplace in conjunction with other products. If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact Southern Gas Services Limited.

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As far as lawfully possible, no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this MSDS can be accepted.

Our responsibility for products sold is subject to our standard terms and conditions, a copy of which is available on request.

This MSDS has been prepared in accordance with NZCIC Code of Practice – Preparation of Safety Data Sheets.

This MSDS is subject to change without notice.

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