

# Material Safety Data Sheet

## Liquid Nitrogen

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### SECTION I - IDENTIFICATION

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**Issue Date:** March, 1997  
**Last Revision:** January, 2003  
**Manufacturer's Name:** Island Equipment Company  
**Address:** 388 S. Marine Drive  
Tamuning, Guam 96911  
**Emergency Phone No:** CHEMTREC 1-800-424-9300  
GUAM 1-671-565-2485/888-2450  
**Chemical Name and Synonyms:** Liquid Nitrogen  
**Trade Name and Synonyms:** Liquid Nitrogen; LIN; Nitrogen, Refrigerated Liquid;  
Nitrogen, Cryogenic Liquid  
**Chemical Family:** Inert Gas  
**Formula:** Liquid N<sub>2</sub>  
**CAS No:** 7727-37-9  
**Molecular Weight:** 28.013

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### SECTION II - HEALTH HAZARD DATA

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**Time Weighted Average Exposure Limit (TWA):** Nitrogen is defined as a simple asphyxiant. Oxygen levels should be maintained at greater than 18 molar percent at normal atmospheric pressure which is equivalent to a partial pressure of 135 mm Hg.

**Symptoms of Exposure:** Effects of exposure to high concentrations so as to displace the oxygen in air necessary for life may include any, all or none of the following:

- > Loss of Balance or dizziness;
- > Tightness in the frontal area of the forehead;
- > Tingling of the tongue, fingertips or toes;
- > Weakened speech leading to the inability to utter sounds;
- > Rapid reduction in the ability to perform movements;
- > Loss of tactile sensations;
- > Heightened mental activity

It should be recognized that it is possible that none of the above symptoms may occur in nitrogen asphyxia so that there are no definite warning symptoms. Contact with the cryogenic liquid or cold piping containing the liquid can cause tissue freezing or frostbite on dermal contact or if splashed into the eyes. Nitrogen can cause suffocation without warning.

**Toxicological Properties:** Nitrogen is non toxic but the liberation of a large amount in a confined area could displace the amount of oxygen in air necessary to support life.

Frostbite effects are a change in color of the skin to gray or white possibly followed by blistering.

Not listed in National Toxicology Program(NTP) or IARC; not regulated as a carcinogen by OSHA.

**Recommended First Aid Treatment:**

Prompt attention is mandatory in all cases of overexposure to nitrogen. Rescue personnel should be equipped with self-contained breathing apparatus.

**INHALATION:** 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 moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Medical assistance should be sought immediately.

For dermal contact or frostbite, flush affected area with lukewarm water. **DO NOT USE HOT WATER.** A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface or deep tissue freezing.

Note: Except where specified, the health hazard and most of the other data in this material safety data are for gaseous nitrogen. One volume of liquid nitrogen at its boiling point and atmospheric pressure will vaporize into approximately 695 volumes of gaseous nitrogen at 70 F (21.1 C) and 1 atmosphere.

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**SECTION III - PHYSICAL DATA**

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<b>Boiling Point:</b>	-320.445 F (-195.803 C)
<b>Liquid Density @ BP</b>	50.48 lb./cu. ft. (808.607 kg/cu. meter)
<b>Vapor Pressure:</b>	
<b>Gas Density @ 70 F, 1 ATM:</b>	0.07245 lb./cu. ft. ( 1.1605 kg/cu. meter)
<b>Solubility in water:</b>	Bunsen Coefficient = .01557 @ 68 F
<b>Freezing Point:</b>	- 346.004 F (-210.002 C)
<b>Specific Gravity:</b>	0.97 (Air = 1.0) @ 70 F
<b>Appearance and Odor:</b>	Clear, colorless, odorless liquid

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**SECTION IV - FIRE AND EXPLOSION HAZARD DATA**

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<b>Flammable Limit:</b>	Non-Flammable
<b>Electrical Classification:</b>	Non-Hazardous
<b>Special Fire Fighting Procedure:</b>	In case of fire, container should be kept cool to avoid excessive pressure.
<b>Unusual Fire and Explosion Hazard:</b>	Pressure can build up due to heat. Tank may explode if pressure relief devices should fail to relieve pressure.

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## SECTION V - REACTIVITY DATA

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<b>Stability:</b>	Stable
<b>Conditions to avoid:</b>	Excessive heat.
<b>Incompatibility:</b>	None
<b>Hazardous Decomposition Products:</b>	None
<b>Hazardous Polymerization:</b>	Will Not Occur

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## SECTION VI - SPILL OR LEAK PROCEDURE

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**Steps to be taken in case material is released or spilled:**

Liquid Nitrogen is delivered to a customer into stationary vacuum-jacketed vessels at the customer's location or in portable vacuum-jacketed "liquid" cylinders.

Stationary customer-site vessels should be operated in accordance with the manufacturer's and Island Equipment Company's instructions. Do not attempt to repair, adjust or in any other way modify the operation of these vessels. If there is a malfunction or other type of operational problem with the vessel.

Liquid Nitrogen cylinders should be used only in well ventilated areas and in accordance with the manufacturer's and Island Equipment Company's instructions. These cylinders must always be kept in an upright position. Specialized hand trucks are needed for their movement. A "first in - first out" inventory system should be used with these cylinders.

Avoid inhalation of gas. If leak is in container or container valve, stop leak if you can do it without risk or call Island Equipment Company.

**Waste Disposal Method:**

Slowly vent to atmosphere in open air.

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## SECTION VII - SPECIAL PROTECTION INFORMATION

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<b>Respiratory Protection:</b>	Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.
<b>Ventilation:</b> high	Local Exhaust recommended to prevent accumulation of concentrations so as to reduce the oxygen level in the air to less than 18 molar percent.
<b>Protective Gloves:</b>	Loose fitting, insulated
<b>Eye Protection:</b>	Safety goggles or glasses plus face shield
<b>Other protective equipment:</b>	Safety Shoes

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**SECTION VIII - SPECIAL PRECAUTION\***

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- Special Labeling Information:** DOT Shipping Name -- Nitrogen, Refrigerated Liquid  
ID Number ----- UN 1977  
DOT Shipping Label --- Non-Flammable Gas  
DOT Hazard Class ----- 2.2
- Special Handling Recommendations:** ( See Section VI - Spill or Leak Procedure)  
Also see CGA Safety Bulletin SB-2 and CGA pamphlets P-9, P-12 and P-14.  
SB-2 Oxygen Deficient Atmosphere  
P-9 The Inert Gas - Argon, Nitrogen and Helium  
P-12 Safe Handling of Cryogenic Liquids  
P-14 Accident Prevention in oxygen-rich and oxygen-deficient atmospheres.
- Special Storage Recommendations:** ( See Section VI - Spill or Leak Procedure)  
Do not store cylinders in sub-surface or closed (poorly ventilated) areas. Nitrogen gas can cause suffocation without warning.
- Special Packaging Recommendation:** Liquid Nitrogen cannot be handled in carbon or alloy steels. Eighteen-eight and 18-10 stainless steels are acceptable as are copper and its alloys, nickel and its alloys, brass, bronze, silicon alloys, Monel, Inconel and beryllium. Also see CGA Safety Bulletin SB-2, CGA Pamphlet P-9 and P-12.
- Other Recommendation or Precaution:** Liquefied gas cylinders should not be refilled except by qualified producers of these products. Shipment of a compressed gas container which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

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