



MATERIAL SAFETY DATA SHEET

PRODUCT NAME: NITROGEN, REFRIGERATED LIQUID

1. Product and Company Identification

**BOC Gases,
Division of,
The BOC Group, Inc.
575 Mountain Avenue
Murray Hill, NJ 07974**

**BOC Gases
Division of
BOC Canada Limited
5975 Falbourne Street, Unit 2
Mississauga, Ontario L5R 3W6**

**TELEPHONE NUMBER: (908) 464-8100
24-HOUR EMERGENCY TELEPHONE NUMBER:
CHEMTREC (800) 424-9300**

**TELEPHONE NUMBER: (905) 501-1700
24-HOUR EMERGENCY TELEPHONE NUMBER:
(905) 501-0802
EMERGENCY RESPONSE PLAN NO: 2-0101**

**PRODUCT NAME: NITROGEN, REFRIGERATED LIQUID
CHEMICAL NAME: Nitrogen
COMMON NAMES/SYNONYMS: Nitrogen, liquid
TDG (Canada) CLASSIFICATION: 2.2
WHMIS CLASSIFICATION: A**

**PREPARED BY: Loss Control (908)464-8100/(905)501-1700
PREPARATION DATE: 6/1/95
REVIEW DATE: 06/18/04**

2. Composition, Information on Ingredient

EXPOSURE LIMITS¹:

INGREDIENT	% VOLUME	PEL-OSHA²	TLV-ACGIH³	LD₅₀ or OC₅₀ Route/Species
Nitrogen FORMULA: N ₂ CAS: 7727-37-9 RTECS #: QW9700000	99.995 to 99.999	None Established	Simple Asphyxiant	Not Available

¹ Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.

² As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993).

³ As stated in the ACGIH 2004 Threshold Limit Values for Chemical Substances and Physical Agents.

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.

3. Hazards Identification

EMERGENCY OVERVIEW
Odorless, colorless, non-flammable liquefied gas. Simple Asphyxiant - This product does not contain oxygen and may cause asphyxia if released in a confined area. Maintain oxygen levels above 19.5%. Contact with product may cause frostbite or freezing burns in exposed tissues. Contents under pressure. Use and store below 125 °F.

PRODUCT NAME: NITROGEN, REFRIGERATED LIQUID

ROUTE OF ENTRY:

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
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HEALTH EFFECTS:

Exposure Limits No	Irritant No	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No
Synergistic Effects: None reported		

Carcinogenicity: -- NTP: No IARC: No OSHA: No

EYE EFFECTS: Contact with evaporating liquid may cause tissue freezing.

SKIN EFFECTS: Contact with rapidly evaporating liquid can cause cryogenic "burns" or frostbite. Frostbite effects are a change in color of the skin to gray or white, possibly followed by blistering.

INGESTION EFFECTS: Ingestion is unlikely. Contact with product may cause tissue freezing.

INHALATION EFFECTS: Product is a simple asphyxiant. Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgement, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.

POTENTIAL ENVIRONMENTAL EFFECTS: Not expected to be toxic to fish and wildlife.

4. First Aid Measures

EYES: Never introduce ointment or oil into the eyes without medical advice! In case of freezing or cryogenic "burns" caused by rapidly evaporating liquid, DO NOT WASH THE EYES WITH HOT OR EVEN TEPID WATER! Remove victim from the source of contamination. For contact with small amounts of liquid, open the eyelids wide to allow the liquid to evaporate. For contact with large amounts, rinse with a low pressure stream of cool water for 15 minutes. Refer the victim to an ophthalmologist for treatment and follow up. If the victim cannot tolerate light, protect the eyes with dark glasses. The use of bandages is not recommended as keeping the eyelids closed or exerting pressure on the eyelid may cause further damage.

SKIN: For dermal contact or frostbite: Remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing.

INGESTION: A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface or deep tissue freezing.

INHALATION: PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Victims 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, and if breathing has stopped, administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

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5. Fire Fighting Measures

Conditions of Flammability: Nonflammable		
Flash point: None	Method: Not Applicable	Autoignition Temperature: None
LEL(%): None		UEL(%): None
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

FIRE AND EXPLOSION HAZARDS: Nonflammable. Cylinder may vent rapidly or rupture violently from pressure when involved in a fire situation.

EXTINGUISHING MEDIA: None required. Use as appropriate for surrounding materials.

FIRE FIGHTING INSTRUCTIONS: Firefighters should wear respiratory protection (SCBA) and full turnout or Bunker gear. Continue to cool fire-exposed containers until well after flames are extinguished.

6. Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment (See Section 8). Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. Ventilate enclosed areas. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

7. Handling and Storage

Electrical classification: Non-hazardous.

This liquefied gas is noncorrosive and may be used with all common structural materials. Some metals (i.e.: carbon steel) will become brittle at low temperatures and easily fracture.

Use only in well-ventilated areas in accordance with manufacturer's and BOC instructions. Valve protection caps must remain in place unless container is secured with valve protection outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. If user experiences any difficulty operating container valve, discontinue use and contact supplier. Do not insert any object (i.e.: screwdriver) into valve cap openings as this can damage the valve causing leakage.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

Stationary customer site vessels should be operated in accordance with the manufacturer's and BOC'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 operations problem with the vessel, contact the closest BOC location immediately for assistance.

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Liquid nitrogen is delivered into stationary vacuum jacketed vessels at the customer's location or in portable vacuum-jacketed "liquid" cylinders requiring special handling methods. Consult manufacturer's instructions.

Due to the extremely cold liquid, uninsulated transfer lines may condense air. The liquefied air may flash off nitrogen, leaving an oxygen enriched liquid. Do not allow the liquefied air to contact oils, greases, or other combustible materials such as asphalt and motor oil. Vessels for liquid nitrogen are designed specifically for nitrogen service. Vessels and associated structures are not designed to support higher density fluids. Density, liquid at saturation pressure at 2.17 °K (-271 °C) : 0.146 Kg/l.

Never allow any unprotected part of the body to touch uninsulated pipes or vessels containing cryogenic fluids. The extremely cold metal will cause the flesh to stick and tear when you attempt to remove it.

For additional recommendations, consult Compressed Gas Association Pamphlets G-10.1, AV-8, CGA-341, G10.1, P-1, P-9, P-12, P-14 and P-18.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

8. Exposure Controls, Personal Protection

ENGINEERING CONTROLS: Use general ventilation in combination with local exhaust as necessary to prevent accumulation of high concentrations and maintain air oxygen levels at 19.5%.

EYE/FACE PROTECTION: Safety goggles with faceshield where contact with liquid is possible.

SKIN PROTECTION: Protective gloves of material appropriate for the job. Insulated gloves recommended when handling cryogenic liquid material.

RESPIRATORY PROTECTION: For emergency release use a positive pressure NIOSH approved air-supplying respirator systems (SCBA or airline/escape bottle) using a full-face mask and at a minimum Grade D air.

OTHER/GENERAL PROTECTION: Safety shoes or other footwear as appropriate for the job, eyewash station

9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure	: Above critical temp.	
Vapor density (Air = 1)	: 0.967	@ 70 °F; 1 atm.
Evaporation point	: Gas	
Boiling point	: -320.4	°F
	: -195.8	°C
Freezing point	: -345.9	°F
	: -209.9	°C
pH	: Not Applicable	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H ₂ O)	: 0.023	Vol./Vol. @ 32 °F; 1 atm
Odor threshold	: Not Applicable	
Odor and appearance	: Colorless, odorless liquid	

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10. Stability and Reactivity

STABILITY: Stable.

INCOMPATIBLE MATERIALS/CONDITIONS: None.

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION: Does not occur

11. Toxicological Information

SKIN AND EYE: Adverse effects are not expected.

INHALATION: Product is a simple asphyxiant. Maintain atmospheric oxygen at or above 19.5%.

OTHER: Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

12. Ecological Information

Product does not contain Class I or Class II ozone depleting substances. Not toxic. Will not bioconcentrate.

13. Disposal Considerations

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to BOC Gases or authorized distributor for proper disposal.

14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Nitrogen, refrigerated liquid	Nitrogen, refrigerated liquid
HAZARD CLASS:	2.2	2.2
IDENTIFICATION NUMBER:	UN 1977	UN 1977
SHIPPING LABEL:	NONFLAMMABLE GAS	NONFLAMMABLE GAS

15. Regulatory Information

SARA TITLE III NOTIFICATIONS AND INFORMATION

SARA TITLE III - HAZARD CLASSES:

Acute Health Hazard

Sudden Release of Pressure Hazard

SARA TITLE III - SECTION 313 SUPPLIER NOTIFICATION:

This product does not contain toxic chemicals subject to reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372.

U.S. TSCA/Canadian DSL: All ingredients are listed on the U.S. Toxic Substances Control Act (TSCA) inventory or exempt from listing and on the Canadian Domestic Substance List (DSL).

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California Proposition 65: This product does not contain ingredient(s) known to the State of California to cause cancer or reproductive toxicity.

Canadian Controlled Products Regulations (CPR): This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

16. Other Information

NFPA HAZARD CODES	HMIS HAZARD CODES	RATINGS SYSTEM
Health: 3	Health: 3	0 = No Hazard
Flammability: 0	Flammability: 0	1 = Slight Hazard
Instability: 0	Physical Hazard: 2	2 = Moderate Hazard
		3 = Serious Hazard
		4 = Severe Hazard

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2004, *CGA Recommended Hazard Ratings for Compressed Gases, 2nd Edition*.

ACGIH	American Conference of Governmental Industrial Hygienists
DOT	Department of Transportation
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
STEL	Short Term Exposure Limit
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
WHMIS	Workplace Hazardous Materials Information System

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

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