



Focus Medical Gases
Machines to Molecules

MATERIAL SAFETY DATA SHEET

Prepared to US OSHA, GMA, ANSI and Canadian WHMIS Standards

1. PRODUCT AND COMPANY INFORMATION

CHEMICAL NAME; CLASS: NITROGEN (95-99.9%)

SYNONYMS: Not Applicable

CHEMICAL FAMILY NAME: Inert Gas

FORMULA: N₂

NOTE: Nitrogen (95-99.9%) is produced on-site by membrane technology and supplied to customers for various nitrogen applications.

PRODUCT USE:

Document Number: 10069

Inerting; general analytical or synthetic chemical uses.

**MANUFACTURED/SUPPLIED FOR:
ADDRESS:**



2700 Post Oak Drive
Houston, TX 77056-8229

EMERGENCY PHONE:

CHEMTREC: 1-800-424-9300

BUSINESS PHONE:

General MSDS Information 1-713/896-2896
Fax on Demand: 1-800/231-1366

2. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: Nitrogen (95-99.9%) is a colorless, odorless gas. The main health hazard associated with releases of this gas is asphyxiation, by displacement of oxygen. Nitrogen (95-99.9%) is not flammable or reactive.

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant route of overexposure for Nitrogen (95-99.9%) is by inhalation.

INHALATION: High concentrations of this gas mixture can cause an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. The skin of a victim of overexposure may have a blue color. Under some circumstances of overexposure, death may occur. The effects associated with various levels of oxygen are as follows:

CONCENTRATION

OF OXYGEN

OBSERVED EFFECT

12-16% Oxygen:	Breathing and pulse rate increase, muscular coordination slightly disturbed.
10-14% Oxygen:	Emotional upset, abnormal fatigue, disturbed respiration.
6-10% Oxygen:	Nausea, vomiting, collapse, or loss of consciousness.
Below 6%:	Convulsive movements, possible respiratory collapse, and death.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms: Overexposure to Nitrogen (95-99.9%) may cause the following health effects:

ACUTE: The most significant hazard associated with this gas is inhalation of oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headache, dizziness, indigestion, and nausea. At high concentrations, unconsciousness or death may occur.

CHRONIC: There are currently no known adverse health effects associated with chronic exposure to this gas.

TARGET ORGANS: Respiratory system.

3. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			OTHER
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	
Nitrogen	7727-37-0	95-99.9%	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Oxygen	7782-44-7	Balance	There are no specific exposure limits for Oxygen. Oxygen levels should be maintained above 19.5% and below 23.5%.					

This material is classified as hazardous under OSHA regulations in the United States and the WHMIS in Canada.

NE = Not Established

C = Ceiling Limit

See Section 16 for Definitions of Terms Used.

NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-2004 format.

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO Nitrogen (95-99.9%) WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus

Remove victim(s) to fresh air, as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary.

Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s).

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: Non flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Nitrogen (95-99.9%) does not burn; however, pipes and processing equipment when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive

SPECIAL FIRE-FIGHTING PROCEDURES: Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment.

6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Evacuate immediate area. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. If possible, shut-down generating unit and contact Air Liquide.

Minimum Personal Protective Equipment should be **Level B: Self-Contained Breathing Apparatus**. Locate and seal the source of the leaking gas. Allow the gas to dissipate. Monitor the surrounding area for oxygen. The atmosphere must have at least 19.5 percent oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus.

7. HANDLING AND STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to oxygen deficiency.

STORAGE AND HANDLING PRACTICES: Nitrogen (95-99.9%) is generated on-site via membrane technology. Isolate this gas from other non-compatible chemicals (refer to Section 10, Stability and Reactivity). Consider installation of leak detection and alarm for use areas.

Use a check valve in the discharge line to prevent hazardous backflow. Use a pressure-reducing regulator when connecting gas from a pipeline to lower pressure rated-equipment or systems. If the gas is leaking from valves, piping, or other equipment supplied by Air Liquide, contact Air Liquide immediately.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. Local exhaust ventilation is preferred, because it prevents chemical dispersion into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the level of oxygen.

RESPIRATORY PROTECTION: Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection if oxygen levels are below 19.5% or during emergency response to releases of Nitrogen (95-99.9%). If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), or equivalent State standards.

EYE PROTECTION: Safety glasses.

HAND PROTECTION: Wear glove protection appropriate to the specific operation for which Nitrogen (95-99.9%) is used.

BODY PROTECTION: Use body protection appropriate for task.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for pure Nitrogen.

GAS DENSITY @ 0°C (32°F) and 1 atm: .072 lbs/cu ft (1.153 kg/m³)

BOILING POINT: -195.8°C (-320.4°F)

FREEZING/MELTING POINT (@ 10 psig) -210°C (-345.8°F)

SPECIFIC GRAVITY (air = 1) @ 21.1° (70°F): 0.906

pH: Not applicable.

SOLUBILITY IN WATER vol/vol @ 0°C 32°F) and 1 atm: 0.023

MOLECULAR WEIGHT: 28.01

EVAPORATION RATE (nBuAc = 1): Not applicable.

EXPANSION RATIO: Not applicable.

ODOR THRESHOLD: Not applicable. Odorless.

SPECIFIC VOLUME (ft³/lb): 13.8

VAPOR PRESSURE @ 21.1°C (70°F) psig: Not applicable.

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for Nitrogen (95-99.9%).

APPEARANCE AND COLOR: This is a colorless, odorless gas.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of Nitrogen (95-99.9%). In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

10. STABILITY and REACTIVITY

STABILITY: Normally stable.

DECOMPOSITION PRODUCTS: None; this is an inert gas.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This gas mixture is an inert and is compatible with most substances; titanium are known to react with pure Nitrogen.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials and exposing process lines or equipment to high temperatures or direct flame.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology information is for the components of Nitrogen (95-99.9%).

NITROGEN: Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

SUSPECTED CANCER AGENT: The components of Nitrogen (95-99.9%) are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC; therefore are not considered to be, nor suspected to be cancer causing agents by these agencies.

IRRITANCY OF PRODUCT: Not applicable.

SENSITIZATION OF PRODUCT: The components of Nitrogen (95-99.9%) are not sensitizers.

11. TOXICOLOGICAL INFORMATION (Continued)

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects Nitrogen (95-99.9%) and its components on the human reproductive system.

Mutagenicity: Nitrogen (95-99.9%) is not expected to cause mutagenic effects in humans.

Embryotoxicity: Nitrogen (95-99.9%) is not expected to cause embryotoxic effects in humans.

Teratogenicity: Nitrogen (95-99.9%) is not expected to cause teratogenic effects in humans.

Reproductive Toxicity: Nitrogen (95-99.9%) is not expected to cause adverse reproductive effects in humans.

*A **mutagen** is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An **embryotoxin** is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance which interferes in any way with the reproductive process.*

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing respiratory conditions may be aggravated by overexposure to Nitrogen (95-99.9%).

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce overexposure.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for the components of Nitrogen (95-99.9%).

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The components of Nitrogen (95-99.9%) occur naturally in the atmosphere. The gas mixture will be dissipated rapidly in well-ventilated areas.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Any adverse effect on animals would be related to oxygen deficient environments. No adverse effect is anticipated to occur to plant-life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: In the event of a release, no adverse effect is anticipated to occur to aquatic life.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations.

For emergency disposal, slowly discharge the Nitrogen (95-99.9%) to the atmosphere in a well-ventilated area or outdoors.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

NOTE: Nitrogen (95-99.9%) is produced by on-site generation and is not charged in cylinders or shipped.

MARINE POLLUTANT: The components of Nitrogen (95-99.9%) are not classified by the DOT as Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).

15. REGULATORY INFORMATION

U.S. SARA REPORTING REQUIREMENTS: The components of Nitrogen (95-99.9%) are not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA Threshold Planning Quantity: Not applicable.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

CANADIAN DSL INVENTORY STATUS: The components of this gas mixture are listed on the DSL Inventory.

U.S. TSCA INVENTORY STATUS: The components of Nitrogen (95-99.9%) are listed on the TSCA Inventory.

15. REGULATORY INFORMATION (Continued)

OTHER U.S. FEDERAL REGULATIONS:

- The components of Nitrogen (95-99.9%) are not regulated under OSHA 1910.1000.
- The regulations of the Process Safety Management of Highly Hazardous Chemicals are not applicable to Nitrogen (95-99.9%) (29 CFR 1910.119). The components of Nitrogen (95-99.9%) are not listed in Appendix A of this Standard.
- This gas does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).
- The components of Nitrogen (95-99.9%) are not listed as Regulated Substances, per 40 CFR, Part 58, of the Risk Management for Chemical Releases.

OTHER CANADIAN REGULATIONS: Nitrogen (95-99.9%) is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

STATE REGULATORY INFORMATION: The components of Nitrogen (95-99.9%) are covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: No

California - Permissible Exposure Limits for Chemical Contaminants: Nitrogen.

Florida - Substance List: Oxygen.

Illinois - Toxic Substance List: No.

Kansas - Section 302/313 List: No.

Massachusetts - Substance List: Oxygen.

Michigan - Critical Materials Register: No.

Minnesota - List of Hazardous Substances: No.

Missouri - Employer Information/Toxic Substance List: No.

New Jersey - Right to Know Hazardous Substance List: Oxygen, Nitrogen.

North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.

Pennsylvania - Hazardous Substance List: Oxygen, Nitrogen.

Rhode Island - Hazardous Substance List: Oxygen, Nitrogen.

Texas - Hazardous Substance List: No.

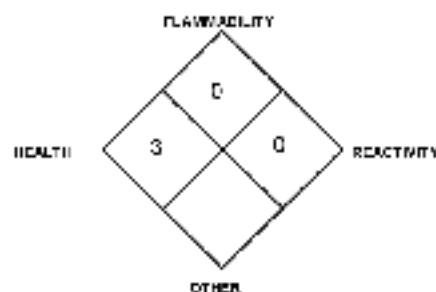
West Virginia - Hazardous Substance List: No.

Wisconsin - Toxic and Hazardous Substances: No.

CALIFORNIA PROPOSITION 65: The components of Nitrogen (95-99.9%) are not on the California Proposition 65 lists.

16. OTHER INFORMATION

NFPA RATING



HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(H311)	3
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FLAMMABILITY HAZARD	(H228)	0
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PHYSICAL HAZARD	(H228)	0
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PROTECTIVE EQUIPMENT

DIE	RESPIRATOR	GLOVES	BOOTS
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See Section 8

For Hazardous Material Use and Handling/Applications

MIXTURES: When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

16. OTHER INFORMATION (Continued)

Further information about Nitrogen can be found in the following pamphlets published by Compressed Gas Association Inc. (CGA), 4221 Walnut Road 5th floor, Chantilly, VA 20151-2923. Telephone: (703) 766-2700.

- G-10.1 "Commodity Specification for Nitrogen"
- P-1 "Safe Handling of Compressed Gases in Containers"
- P-9 "Inert Gases, Argon, Nitrogen and Helium"
- P-14 "Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmospheres"
- SB-2 "Oxygen Deficient Atmospheres"
- AV-1 "Safe Handling and Storage of Compressed Gases"
"Handbook of Compressed Gases"

PREPARED BY:

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619/585-0332

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AIR LIQUIDE

This Material Safety Data Sheet is shown pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to Nitrogen (95-99.9%). To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of the date. However, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If Nitrogen (95-99.9%) is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.