


SAFETY DATA SHEET

Material Name: Nitrogen, Refrigerated Liquid
SDS ID: UIG-N2-L01-R0

Section 1 – Product and Company Identification	
Product Identifier:	Nitrogen, Refrigerated Liquid
Other means of identification:	Liquid Nitrogen, LIN (Liquid Nitrogen), Cryogenic Nitrogen, N2, Refrigerated Nitrogen, Food Grade Nitrogen, Nitrogen NF
Product Uses:	Industrial manufacturing and processing including chilling, cooling, food freezing, inerting, etc.
Supplier Details:	Universal Industrial Gases, Inc 3001 Emrick Blvd, Suite 320 Bethlehem, PA 18020 USA
Emergency Phone Number:	(610) 559-7967

Section 2 – Hazards Identification	
Classification in accordance with paragraph (d) of §1910.1200	Gas under pressure – Refrigerated liquefied gas Simple asphyxiant
Signal word	Warning
Hazard statement(s)	Direct contact may cause cryogenic burns, frostbite, or injury Liquid may be under pressure, may burst if piping or container is heated or warms up especially as liquid evaporates into a gas May displace oxygen and cause rapid suffocation
Symbol	
Precautionary statements	Read completely and follow all Safety Data Sheets before use Colorless, odorless liquid or gas Wear insulating gloves, face and eye protection. Never enter an area where nitrogen may have caused an oxygen deficiency Ensure proper ventilation Use equipment and materials rated for service Protect containers from sunlight, store in ventilated area Rapid release of liquid or compressed gas may cause frostbite if contacted
Hazards not otherwise classified	None
Toxicity	Non-toxic but may displace oxygen which can cause dizziness, unconsciousness and death by asphyxiation.

Section 3 – Compositions / Information of Ingredients	
Chemical Name & Formula	Nitrogen, Refrigerated Liquid; N2
Common Name and Synonyms	Liquid Nitrogen, LIN (Liquid Nitrogen), Cryogenic Nitrogen, N2, Refrigerated Nitrogen, Food Grade Nitrogen, Nitrogen NF
CAS Number	7727-37-9
Purity	Nominally 100%, typically provided >99%, by volume

Section 4 – First Aid Measures	
Inhalation	Simple asphyxiant, may cause acute effects including dizziness, drowsiness, nausea, rapid breathing, unconsciousness, and death. Immediately remove victim to fresh air containing sufficient oxygen. If not breathing provide artificial respiration or oxygen by trained personnel, get immediate medical attention. Rescuers must not enter an oxygen deficient area without self-contained breathing apparatus.
Skin Contact	In the event of frostbite or freezing, gently warm effected area by flushing with lukewarm water and remove any clothing, seek medical attention. No adverse effects expected from gas at normal temperature.
Eye Contact	Flush with lukewarm water, seek immediate attention of tissue is frozen. No adverse effects normally expected from gas. Remove contact lenses.
Ingestion	Not an expected route of exposure, but if swallowed seek immediate medical attention. Refer to inhalation section above.
Most important symptoms, effects, acute and delayed	Contact with liquid causing frostbite, frozen body tissues, cryogenic burns; refer to asphyxiation acute effects as per inhalation above.
Immediate medical attention and special treatment needed	If symptoms occur, seek medical advice and attention.

Section 5 – Fire Fighting Measures	
Suitable extinguishing media	Nitrogen is not flammable, will not burn. Use appropriate extinguishing media for surrounding fire.
Special hazards arising (e.g. nature of any hazardous combustion process)	If product under pressure in closed contained, heat from fire may cause liquid to vaporize and gas pressure to rise and container to burst. Liquid product released or spilled will vaporize rapidly and could form an oxygen deficient atmosphere and create a vapor cloud reducing visibility. Do not spray water directly on leaking product which can cause freezing of water.
Special protective equipment and precautions for firefighters	Wear appropriate protective gear and self-contained breathing apparatus. Never attempt to rescue a suspected asphyxiation victim without proper precautions, training and equipment to also avoid exposure to oxygen deficient conditions.

Section 6 – Accidental Release Measures	
Personal precautions, protective equipment, emergency procedures	First responders should ensure oxygen concentration in area is safe (>19.5%) or be trained and use self-contained breathing apparatus before attempting to rescue a victim. Evacuate personnel to safe area, do not allow personnel to walk or drive in area that is potentially oxygen deficient. Wear protective insulating gloves and face/eye protection. Use oxygen monitors to ensure adequate oxygen levels. Never enter suspected oxygen deficient area without being properly trained and wearing a self-contained breathing apparatus. Avoid liquid or cold vapor from entering ventilation systems, sewers, or confined areas.

Methods and materials for containment and clean up	Isolate/stop any leaking sources if it can be done safely. Ventilate the area if possible.
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Section 7 – Handling and Storage	
Precautions for safe handling	<p>Protect system components against physical damage.</p> <p>Use adequate ventilation.</p> <p>Avoid inhalation and potential confined space areas, use oxygen monitors where appropriate.</p> <p>Never work on a pressurized system.</p> <p>Wear insulating gloves and face/eye protection</p> <p>Safety glasses always recommended when working with compressed gases.</p> <p>Refer to CGA Pamphlet P-12, “Safe Handling of Cryogenic Liquids”, and Safety Bulletin SB-2 “Oxygen Deficient Atmospheres” for additional recommendations.</p>
Conditions for safe storage, including any incompatibilities	<p>Avoid bodily contact with product or surfaces cooled by product such as uninsulated piping or vessels.</p> <p>Use storage containers, piping, valves and fittings designed for storage and distribution of gaseous nitrogen.</p> <p>Cryogenic liquids can cause embrittlement and rupture of non-compatible materials such as carbon steel, use adequate design and temperature monitoring of any incompatible piping and vessel materials which could be exposed to cold liquid or gas.</p> <p>All liquid storage containers and piping must be adequately protected from rupturing via evaporation into a gas through the use of properly size relief valves.</p> <p>Any piping section which can be isolated with trapped liquid must be protected with relief valves.</p> <p>Protect cylinders against physical damage. Store in cool, dry, well-ventilated, fireproof area, away from flammable materials and corrosive atmospheres. Store away from heat and ignition sources and out of direct sunlight. Do not store near elevators, corridors or loading docks. Do not allow area where cylinders are stored to exceed 52°C (125°F).</p> <p>Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly.</p> <p>Use designated CGA fittings and other support equipment. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Use check valve or trap in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.</p>

Section 8 – Exposure Controls / Personal Protection	
Permissible exposure limits	There are no exposure limits for this product. Avoid any direct contact of liquid or cold gas product with unprotected bodily surfaces. Oxygen levels should be kept above 19.5% for all personnel.
Appropriate Engineering Controls	Adequate ventilation. Relief valves for liquid storage and piping. Avoid exposure to and use of incompatible materials which can embrittle at low temperatures and rupture under pressure. Low Oxygen monitors and alarms in areas where oxygen deficiency is possible. Pressurized systems to have relief valves properly sized, calibrated and vented.
Individual protection measures / personal protective equipment	Use self-contained breathing apparatus for entering any suspected oxygen deficient area. Use personnel oxygen monitors. Gloves and safety shoes for handling containers/cylinders. Safety glasses / face protection if exposure to discharged gases, eye wash station. Check systems regularly for leaks.

Section 9 – Physical and Chemical Properties			
Property	Value	Property	Value
Appearance	Colorless	Vapor Pressure	NA
Odor	Odorless	Vapor Density	0.0725 lb/ft ³ @ 70°F 1.16 kg/m ³ @ 21.1°C
Odor Threshold	NA	Specific Volume (Gas)	13.80 ft ³ /lb @ 70°F 0.861 m ³ /kg @ 21.1 °C
Molecular Weight	28.01 g/mol	Relative Density to Air (=1)	0.97
pH	NA	Liquid Density (2 BP)	50.46 lb/ft ³ 808 kg/m ³
Melting / Freezing Point	-346°F / -210°C	Relative Density to Water (=1)	0.81 (@ BP)
Boiling Point	-321°F / -196°C	Solubility	Slight in water
Flash Point	NA	Partition Coefficient: n-octanol / water	NA
Evaporation Rate	NA	Auto Ignition Temperature	NA
Flammability	Non-flammable	Decomposition Temperature	NA
Upper/Lower Explosive Limit	NA	Viscosity (dynamic)	0.0165 centipoise @70°F

Section 10 – Stability and Reactivity	
Reactivity	Not reactive under normal conditions
Chemical Stability	Stable at normal temperatures and pressures
Possibility of Hazardous Reactions	Vaporization of liquid to a gas can cause containment to rupture
Conditions to Avoid	Embrittlement of materials that are not compatible with very cold temperatures High concentrations causing oxygen deficiency atmosphere leading to asphyxiation effects (see sections 4, 6, 7 & 8)
Incompatible Materials	None known chemically Any materials that can become embrittled at very low temperatures, i.e. carbon steel
Hazardous Decomposition Products	None

Section 11 Toxicology Information	
Information on likely routes of exposure	No chemical toxicity Inhalation – simple asphyxiant Ingestion – not an expected route, but will cause cryogenic burn, frostbite, internal damage Skin – liquid and cold gas may cause cryogenic burn, frostbite Eye – liquid and cold gas may cause cryogenic burn, frostbite
Symptoms related to physical, chemical, toxicological characteristics	Liquid or very cold gas in contact with body tissue can cause cryogenic burns, frostbite. As a simple asphyxiant, the presence of high concentrations of vapor causing an oxygen deficiency in air has symptoms which include dizziness, drowsiness, nausea, unconsciousness, and death.
Immediate, delayed, chronic effects from short and long term exposure	Cryogenic burns, frostbite from contact with liquid or very cold gas. As a simple asphyxiant, the immediate effects of high concentrations causing oxygen deficiency in air include dizziness, drowsiness, nausea, unconsciousness, and death.
Numerical measures of toxicity	LD50 / LC50 – not available
Carcinogen Listing	Not carcinogenic

Section 12 – Ecological Information	
Ecotoxicity	None
Persistence and degradability	Not applicable. Normal air is approximately 78% nitrogen by volume.
Bio-accumulative potential	No information available
Mobility in Soil	No information available
Other Adverse effects	No known significant effects, may cause frost damage to vegetation

Section 13 – Disposal Considerations	
Waste residues and disposal guidelines	Product will normally vaporize and dissipate in air. Ensure liquid or vaporized products including cold gas do not accumulate to cause an oxygen deficient atmosphere in the vicinity of personnel. Dispose of any contents or containers in accordance with applicable regulations. Cylinders should be returned in original shipping container/method with any valves closed and protective plugs or caps securely in place.

Section 14 – Transport Information	
US DOT UN ID Number	UN1977
UN Proper Shipping Name	Nitrogen, refrigerated liquid
DOT Transportation Hazard Class	DOT Class 2.2 (Non-Flammable compressed gas) Emergency Response Guide No. 120
Packing Group	Not Applicable
Environmental Hazards	None
Transport Bulk Codes	Not Applicable



Special Precautions	<p>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.</p> <p>Liquid spillage and vaporizing gas can cause oxygen deficiency, with cold gas spreading along the ground.</p> <p>Isolate area to avoid personnel exposure or other vehicles entering the area</p> <p>Contact with liquid or cold gas can cause cryogenic burns, frostbite.</p> <p>High pressure gas cylinders should have outlet valves closed, with plugs/valve caps secured in place.</p> <p>Load space must be separated from driver compartment.</p> <p>Cylinders should be firmly secured from moving or falling during transport.</p>
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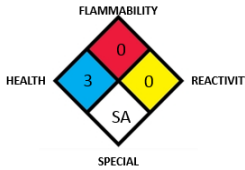
Section 15 - Regulatory Information

US Federal TSCA (toxic Substance Control Act) - exempted
 US EPA SARA Title III Section 312 hazard Category: Sudden release of pressure hazard
 US States Right-To-Know Lists: Massachusetts, New Jersey, Pennsylvania

Section 16 – Other Information

US Nation Fire Protection Agency (NFPA) hazard ratings:
 (Scale of 0 to 4, with 0 = lowest increasing to 4 = highest hazard, refer to NFPA for details related to the relative rating for each category)

Health:	3
Fire:	0
Reactivity:	0
Special:	SA (Simple Asphyxiant)



US Hazardous Material Information System (HMIS) ratings:
 (Scale: 0 = minimal, 1 = slight, 2 = moderate, 3 = serious, 4 = severe)

HEALTH		3
FLAMMABILITY		0
PHYSICAL HAZARDS		2

New SDS: 29 June 2018 Rev 0

USE OF THIS INFORMATION:

Universal Industrial Gases, Inc. offers this information to promote the safe use of this product through awareness of hazards and safety information. Those who use or transport or sell this product to others should:

- 1) Disseminate this information internally to all workplace areas, employees, agents and contractors likely to encounter this product
- 2) Provide supplemental hazards awareness, safety information, operation and maintenance procedures to the workplace areas and employees, agents and contractors likely to encounter this product
- 3) Furnish this information to all their customers who purchase this product
- 4) Ask each purchaser or user of the product to notify its employees and customers of the product hazards and safety information.

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