1.1 Product identifier

**Product Name**
- Nitrogen (Liquid)

**Synonyms**
- Cryogenic Liquid Nitrogen; LIN; N2; Nitrogen; Nitrogen NF; Refrigerated Liquid

**CAS Number**
- 7727-37-9

**Product Code**
- MSDS No. 10071

**EC Number**
- 231-783-9

**Molecular Formula**
- :N 2:

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified use(s)
- Medical, food freezing, inerting and for general analytical/synthetic chemical uses.

1.3 Details of the supplier of the safety data sheet

**Manufacturer**
- Air Liquide
  
  2700 Post Oak Blvd.
  
  Houston, TX 77056
  
  United States
  
  www.us.airliquide.com
  
  sds@airliquide.com

  **Telephone (Technical)**
  - 713-896-2896

  **Telephone (Technical)**
  - 800-819-1704

1.4 Emergency telephone number

**Manufacturer**
- 800-424-9300 - CHEMTREC

**Manufacturer**
- +1 703-527-3887 - Outside United States

---

**Section 2: Hazards Identification**

**EU/EEC**

According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

**CLP**
- Refrigerated Liquefied Gas - H281

**DSD/DPD**
- Not classified

2.2 Label Elements

**CLP**

WARNING
United States (US)
According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture
OSHA HCS 2012 • Refrigerated Liquefied Gas - H281
Simple Asphyxiant
Hazards Not Otherwise Classified - Health Hazard - Frostbite

2.2 Label elements
OSHA HCS 2012

2.3 Other hazards
OSHA HCS 2012 • Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite. Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada
According to WHMIS

Hazard statements • Contains refrigerated gas; may cause cryogenic burns or injury - H281
May displace oxygen and cause rapid suffocation.

Precautionary statements
Prevention • Wear cold insulating gloves, face shield and/or eye protection. - P282
Response • Thaw frosted parts with lukewarm water. Do not rub affected area. - P336
Get immediate medical advice/attention. - P315
Storage/Disposal • Store in a well-ventilated place. - P403

2.3 Other hazards
OSHA HCS 2012 • Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite. Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.
2.1 Classification of the substance or mixture

**WHMIS**
- Compressed Gas - A

2.2 Label elements

**WHMIS**
- Compressed Gas - A

2.3 Other hazards

**WHMIS**
- Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite. This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces. In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

---

Section 3 - Composition/Information on Ingredients

3.1 Substances

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Identifiers</th>
<th>%</th>
<th>LD50/LC50</th>
<th>Classifications According to Regulation/Directive</th>
<th>Comments</th>
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</table>

3.2 Mixtures

- Material does not meet the criteria of a mixture in accordance with Regulation (EC) No 1272/2008.

See Section 16 for full text of H-statements and R-phrases.

---

Section 4 - First Aid Measures

4.1 Description of first aid measures

**Inhalation**
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.

**Skin**
- If frostbite has occurred, seek medical attention immediately; do NOT rub the affected area(s) or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing from frostbitten areas. If frostbite has not occurred, immediately and thoroughly wash contaminated skin with soap and water.

**Eye**
- If eye tissue is frozen, seek medical attention immediately; if tissue is not frozen, immediately and thoroughly flush the eyes with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation, pain, swelling, lacrimation or photophobia persist, get medical attention as soon as possible.

**Ingestion**
- If frostbite has occurred, seek medical attention immediately; do NOT rub the affected
area(s) or flush them with water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

**Notes to Physician**
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

4.4 Other information

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. RESCUEERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO GASES WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

---

**Section 5 - Firefighting Measures**

5.1 Extinguishing media

**Suitable Extinguishing Media**
- Use extinguishing agent suitable for type of surrounding fire. 
  SMALL FIRES: Dry chemical or CO₂. 
  LARGE FIRES: Water spray or fog.

**Unsuitable Extinguishing Media**
- No data available

**Firefighting Procedures**
- Always wear thermal protective clothing when handling refrigerated/cryogenic liquids or solids (DS)

Cryogenic liquids can be particularly dangerous during fires because of their potential to rapidly freeze water. Careless use of water may cause heavy icing. Furthermore, the relatively warm water greatly increases the evaporation rate of Nitrogen.

5.2 Special hazards arising from the substance or mixture

**Unusual Fire and Explosion Hazards**
- Containers may explode when heated. 
  Ruptured cylinders may rocket. 
  Liquid Nitrogen when accidentally released will vaporize rapidly, forming an oxygen deficient vapor cloud. Evacuate this vapor cloud area. 
  Visibility may be obscured in its vapor cloud.

**Hazardous Combustion Products**
- No data available

5.3 Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
- Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.
- Wear positive pressure self-contained breathing apparatus (SCBA).
- Move containers from fire area if you can do it without risk.
- FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. 
  FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. 
  FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well after fire is out. 
  FIRE INVOLVING TANKS: Do not direct water at source of leak or safety devices; icing may occur. 
  FIRE INVOLVING TANKS: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire.

**Section 6 - Accidental Release Measures**

**6.1 Personal precautions, protective equipment and emergency procedures**

**Personal Precautions**
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not touch or walk through spilled material. Ventilate the area before entry.

**Emergency Procedures**
- Stop leak if you can do it without risk. Keep unauthorized personnel away. Keep out of low areas. Stay upwind. Do not direct water at spill or source of leak. LARGE SPILL: Consider initial downwind evacuation for at least 500 meters (1/3 mile)

**6.2 Environmental precautions**
- No data available

**6.3 Methods and material for containment and cleaning up**

**Containment/Clean-up Measures**
- Stop leak if you can do it without risk. Do not direct water at spill or source of leak. Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container. If possible, turn leaking containers so that gas escapes rather than liquid. Isolate area until gas has dispersed. Ventilate the area. Allow substance to evaporate.

**6.4 Reference to other sections**
- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

**Section 7 - Handling and Storage**

**7.1 Precautions for safe handling**

**Handling**
- Use only with adequate ventilation. Ventilate closed spaces before entering. Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Cylinders should be firmly secured to prevent falling or being knocked-over. Do not attempt to repair, adjust, or in any other way modify cylinders. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Empty containers retain product residue and can be hazardous. Do not cut, weld, puncture or incinerate container.

**7.2 Conditions for safe storage, including any incompatibilities**

**Storage**
- Store in a cool, dry, well-ventilated place. Protect cylinders against physical damage. Cylinders should be firmly secured to prevent falling or being knocked-over.

**7.3 Specific end use(s)**
- Refer to Section 1.2 - Relevant identified uses.

**Section 8 - Exposure Controls/Personal Protection**

**8.1 Control parameters**

**Exposure Limits/Guidelines**
- Currently there are no applicable exposure limits established for this material.

**8.2 Exposure controls**

**Engineering Measures/Controls**
- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits.
If exposure limits have not been established, maintain airborne levels to an acceptable level. Use explosion-proof - electrical, ventilating and/or lighting equipment.

Personal Protective Equipment

Respiratory
- No data available

Eye/Face
- Wear safety glasses.

Skin/Body
- Wear leather gloves when handling cylinders.

Environmental Exposure
- Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

<table>
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<th>Material Description</th>
<th>Appearance/Description</th>
<th>Colorless, cryogenic liquid with no odor.</th>
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<tr>
<td>Color</td>
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<td>Odor</td>
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<tr>
<td>Odor Threshold</td>
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</tbody>
</table>

General Properties

- Boiling Point: -195.8 °C (-320.44 °F)
- Melting Point: -210 °C (-346 °F)
- Decomposition Temperature: Data lacking
- pH: Not relevant
- Specific Gravity/Relative Density: Data lacking
- Density: 0.072 lb(s)/ft³ @ 0 °C(32 °F)
- Bulk Density: Data lacking
- Water Solubility: 0.023 % @ 0 °C(32 °F)
- Viscosity: 0.0002 Poise (P, Ps) or dyne-second/cm²
- Explosive Properties: Not explosive.

Oxidizing Properties: Not an oxidizing gas.

Volatile

- Vapor Pressure: Not relevant
- Vapor Density: 0.906 Air=1
- Evaporation Rate: Not relevant

Flammability

- Flash Point: Not relevant
- UEL: Not relevant
- LEL: Not relevant
- Autoignition: Not relevant
- Flammability (solid, gas): Not flammable.

Environmental

- Octanol/Water Partition coefficient: Data lacking

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

- Normally stable in gaseous state. Liquid Nitrogen contaminated with oxygen may present the same hazards as Liquid Oxygen and could react violently with organic materials, such as oil and grease.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization will not occur.
10.4 Conditions to avoid
- Excess heat, sparks, open flame. Incompatible materials.

10.5 Incompatible materials
- Titanium is the only element that will burn in Nitrogen. Lithium reacts slowly with Nitrogen at ambient temperatures. Also, use of Liquid Nitrogen in cryogenic grinding of fatty materials can lead to an explosion. A mixture of magnesium powder and Liquid Nitrogen reacts very violently when lit with a fuse, forming magnesium nitride. Liquid Nitrogen is not corrosive to metals, but the extreme cold can make some metals brittle.

10.6 Hazardous decomposition products
- None

Section 11 - Toxicological Information

11.1 Information on toxicological effects

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<th>Classification</th>
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<td>Toxicity for Reproduction</td>
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</table>

Potential Health Effects

Inhalation
- Acute (Immediate) • This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces.
- Chronic (Delayed) • No data available

Skin
Nitrogen (Liquid)

Acute (Immediate)  ● Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite.
Chronic (Delayed)   ● No data available

Eye
Acute (Immediate)  ● Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite.
Chronic (Delayed)   ● No data available

Ingestion
Acute (Immediate)  ● Ingestion is not anticipated to be a likely route of exposure to this product. If this product is swallowed, it may irritate cause burns to the mouth, throat, esophagus, and other tissues of the digestive system.
Chronic (Delayed)   ● No data available

Section 12 - Ecological Information

12.1 Toxicity
● As an inert gas, this product would have no effect on aquatic life.

12.2 Persistence and degradability
● Nitrogen occurs naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas.

12.3 Bioaccumulative potential
● Material data lacking.

12.4 Mobility in Soil
● Material data lacking.

12.5 Results of PBT and vPvB assessment
● PBT and vPvB assessment has not been conducted for this material.

12.6 Other adverse effects

Section 13 - Disposal Considerations

13.1 Waste treatment methods
Product waste       ● Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.
Packaging waste     ● Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

|DOT| UN1977| Nitrogen, refrigerated liquid| 2.2| NDA| NDA|
|TDG| UN1977| NITROGEN, REFRIGERATED LIQUID| 2.2| NDA| NDA|
|IMO/IMDG| UN1977| NITROGEN, REFRIGERATED LIQUID| 2.2| NDA| NDA|
|IATA/ICAO| UN1977| Nitrogen, refrigerated liquid| 2.2| NDA| NDA|
14.6 Special precautions for user

- Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

- Not relevant.

Section 15 - Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications

- Pressure(Sudden Release of)

**Australia**

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**Europe**

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<td>U.S. - EPA - Designated Generic Categories - Pesticides and Other</td>
<td>Nitrogen (Liquid)</td>
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<tr>
<td>U.S. - EPA - Designated Generic Categories - Polychlorinated Alkanes</td>
<td>Nitrogen (Liquid)</td>
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<tr>
<td>U.S. - EPA - Designated Generic Categories - Polycyclic Aromatic</td>
<td>Nitrogen (Liquid)</td>
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<tr>
<td>U.S. - EPA - Designated Generic Categories - Strychnine and Salts</td>
<td>Nitrogen (Liquid)</td>
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<tr>
<td>U.S. - EPA - Designated Generic Categories - Warfarin and Salts</td>
<td>Nitrogen (Liquid)</td>
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<tr>
<td>U.S. - RCRA (Resource Conservation &amp; Recovery Act) - Basis for Listing</td>
<td>Nitrogen (Liquid)</td>
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<tr>
<td>U.S. - RCRA (Resource Conservation &amp; Recovery Act) - Constituents for</td>
<td>Nitrogen (Liquid)</td>
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<tr>
<td>U.S. - RCRA (Resource Conservation &amp; Recovery Act) - D Series Wastes -</td>
<td>Nitrogen (Liquid)</td>
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<tr>
<td>U.S. - RCRA (Resource Conservation &amp; Recovery Act) - F Series Wastes -</td>
<td>Nitrogen (Liquid)</td>
</tr>
<tr>
<td>U.S. - RCRA (Resource Conservation &amp; Recovery Act) - Hazardous</td>
<td>Nitrogen (Liquid)</td>
</tr>
</tbody>
</table>
U.S. - RCRA (Resource Conservation & Recovery Act) - List for Hazardous Constituents

- Nitrogen (Liquid) 7727-37-9 Not Listed

U.S. - RCRA (Resource Conservation & Recovery Act) - P Series Wastes - Acutely Toxic Wastes

- Nitrogen (Liquid) 7727-37-9 Not Listed

U.S. - RCRA (Resource Conservation & Recovery Act) - Part 268 Appendix III - Halogenated Organic Compounds (HOCs)

- Nitrogen (Liquid) 7727-37-9 Not Listed

U.S. - RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards

- Nitrogen (Liquid) 7727-37-9 Not Listed

U.S. - RCRA (Resource Conservation & Recovery Act) - TSD Facilities Ground Water Monitoring

- Nitrogen (Liquid) 7727-37-9 Not Listed

U.S. - RCRA (Resource Conservation & Recovery Act) - U Series Wastes - Acutely Toxic Wastes & Other Hazardous Characteristics

- Nitrogen (Liquid) 7727-37-9 Not Listed

U.S. - RCRA (Resource Conservation & Recovery Act) - Waste Minimization Priority Chemicals

- Nitrogen (Liquid) 7727-37-9 Not Listed

United States - California

Environment

- U.S. - California - Proposition 65 - Carcinogens List
  - Nitrogen (Liquid) 7727-37-9 Not Listed

- U.S. - California - Proposition 65 - Developmental Toxicity
  - Nitrogen (Liquid) 7727-37-9 Not Listed

- U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)
  - Nitrogen (Liquid) 7727-37-9 Not Listed

- U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)
  - Nitrogen (Liquid) 7727-37-9 Not Listed

- U.S. - California - Proposition 65 - Reproductive Toxicity - Female
  - Nitrogen (Liquid) 7727-37-9 Not Listed

- U.S. - California - Proposition 65 - Reproductive Toxicity - Male
  - Nitrogen (Liquid) 7727-37-9 Not Listed

United States - Pennsylvania

Labor

- U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
  - Nitrogen (Liquid) 7727-37-9 Not Listed

- U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances
  - Nitrogen (Liquid) 7727-37-9 Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.
Section 16 - Other Information

- Last Revision Date: 03/September/2014
- Preparation Date: 03/September/2014
- Disclaimer/Statement of Liability:
  - To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this 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 this gas mixture 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.