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. RESCUERS 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 Controls
- 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

Material Description			
Physical Form	Gas	Appearance/Description	Colorless, cryogenic liquid with no odor.
Color	Colorless	Odor	Odorless
Odor Threshold	Not relevant		
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.		
Volatility			
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

GHS Properties	Classification
Acute toxicity	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Aspiration Hazard	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Carcinogenicity	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Germ Cell Mutagenicity	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Skin corrosion/Irritation	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Skin sensitization	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
STOT-RE	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
STOT-SE	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Toxicity for Reproduction	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Respiratory sensitization	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Serious eye damage/Irritation	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met

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

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

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
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

Labor

Australia - Work Health and Safety Regulations - Hazardous Substances Requiring Health Monitoring

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

Australia - High Volume Industrial Chemicals List

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

Australia - List of Designated Hazardous Substances - Classification

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

Environment

Australia - National Pollutant Inventory (NPI) Substance List

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

Australia - Ozone Protection Act - Scheduled Substances

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

Australia - Priority Existing Chemical Program

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

Canada

Labor

Canada - WHMIS - Classifications of Substances

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

Canada - WHMIS - Ingredient Disclosure List

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

Environment

Canada - CEPA - Priority Substances List

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

Europe

Other

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Classification

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

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Concentration Limits

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

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Labelling

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

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Notes - Substances and Preparations

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

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Safety Phrases

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

Mexico

Other

Mexico - Hazard Classifications

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

Mexico - Regulated Substances

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

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

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

U.S. - OSHA - Specifically Regulated Chemicals

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

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

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

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

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

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

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

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

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

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

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

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

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

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

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

U.S. - EPA - Designated Generic Categories - Aqueous Ammonia

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

U.S. - EPA - Designated Generic Categories - Certain Glycol Ethers

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

U.S. - EPA - Designated Generic Categories - Chlorophenols

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

U.S. - EPA - Designated Generic Categories - Dioxins and Dioxin-like Compounds

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

U.S. - EPA - Designated Generic Categories - Ethylenebisdithiocarbamic Acid, Salts and Esters

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

U.S. - EPA - Designated Generic Categories - Lead and Lead Compounds

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

U.S. - EPA - Designated Generic Categories - Nicotine and Salts

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

U.S. - EPA - Designated Generic Categories - Nitrate Compounds

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

U.S. - EPA - Designated Generic Categories - Pesticides and Other PBTs

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

U.S. - EPA - Designated Generic Categories - Polychlorinated Alkanes

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

U.S. - EPA - Designated Generic Categories - Polycyclic Aromatic Compounds

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

U.S. - EPA - Designated Generic Categories - Strychnine and Salts

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

U.S. - EPA - Designated Generic Categories - Warfarin and Salts

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

U.S. - RCRA (Resource Conservation & Recovery Act) - Basis for Listing - Appendix VII

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

U.S. - RCRA (Resource Conservation & Recovery Act) - Constituents for Detection Monitoring

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

U.S. - RCRA (Resource Conservation & Recovery Act) - D Series Wastes - Max Conc of Contaminants for the Tox Characteristic

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

U.S. - RCRA (Resource Conservation & Recovery Act) - F Series Wastes - Wastes from Nonspecific Sources

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

U.S. - RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261

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

U.S. - RCRA (Resource Conservation & Recovery Act) - K Series Wastes - Wastes from Specified Sources

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

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
- 15/January/2020

Preparation Date
- 03/September/2014

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