

PRODUCT NAME: LIQUID NITROGEN
1. Chemical Product and Company Identification

**Linde Gas Middle East LLC,
 11th Floor, CI Tower, 32nd Road,
 P. O Box 109155, Abu Dhabi, United Arab Emirates.
 Direct Line: +971.2.6140200,
 Fax Line: +971.2.6140219,
 Website: www.linde-gas.ae**

 PRODUCT NAME: **NITROGEN, REFRIGERATED LIQUID**

CHEMICAL NAME: Nitrogen

COMMON NAMES/SYNONYMS: Nitrogen, liquid

2. Composition, Information on Ingredients

Ingredient	% Volume	TLV-ACGIH ²
Nitrogen Formula: N ₂	99.995%	Simple Asphyxiant

3. Hazards Identification
EMERGENCY OVERVIEW

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 freeze burns in exposed tissues. Nonflammable.

ROUTE OF ENTRY:

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion Yes
----------------------------	------------------------------	---------------------------	--------------------------	-------------------------

HEALTH EFFECTS:

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

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.

PRODUCT NAME: LIQUID NITROGEN
INHALATION EFFECTS:

Product is a non-toxic simple Asphyxiant. Effects of oxygen deficiency resulting from simple Asphyxiant may include: rapid breathing, diminished mental alertness, impaired muscular coordination, and faulty judgment, 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.

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

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. Open eyelids wide to allow liquid to evaporate. If pain is present, refer the victim to an ophthalmologist for treatment and follow up. If the victim cannot tolerate light, protect the eyes with a light bandage.

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 the cryogenic "burn" has resulted in blistering of the dermal surface or 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.

5. Fire Fighting Measures

Conditions of Flammability	Flash Point	Method
Not flammable	None	Not applicable
Auto-ignition Temperature	LEL %	UEL %
None	None	None
Hazardous combustion products	Sensitivity to mechanical shock	Sensitivity to static discharge
None	None	None

FIRE AND EXPLOSION HAZARDS:

None. Nonflammable

EXTINGUISHING MEDIA:

None required. Use as appropriate for surrounding materials.

6. Accidental Release Measures

Equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate person in **Linde Gas Middle East LLC.**

PRODUCT NAME: LIQUID NITROGEN

7. Handling and Storage

Use only in well-

Must ALWAYS be kept upright. Specialized trucks are needed for their movement. Do not drag, slide or roll cylinders. Stationary customer site vessels should be operated in accordance with the manufacturer.

Vessels-

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 **Linde Gas Middle East LLC** immediately for assistance.

Vacuum-

Due to the extremely cold liquid, uninsulated transfer lines may condense air. The liquefied air may flash of 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 o K (-271 o C): 0.146 Kg/l.

8. Exposure Controls, Personal Protection

EXPOSURE LIMITS¹:

Ingredient	% Volume	TLV-ACGIH ²
Nitrogen Formula: N ₂	99.995%	Simple Asphyxiant

ENGINEERING CONTROLS:

Local exhaust to prevent accumulation of high concentrations so as to reduce the oxygen level in the air to less than 19.5%.

EYE/FACE PROTECTION:

Safety goggles or glasses as appropriate for the job. Face-shield recommended when handling cryogenic liquid material.

SKIN PROTECTION:

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

RESPIRATORY PROTECTION:

Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

OTHER/GENERAL PROTECTION:

Safety shoes or other footwear as appropriate for the job.

PRODUCT NAME: LIQUID NITROGEN

9. Physical and Chemical Properties

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

10. Stability and Reactivity

STABILITY:

Stable

INCOMPATIBLE MATERIALS:

None

HAZARDOUS POLYMERIZATION:

Does not occur

11. Toxicological Information

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

12. Ecological Information

No data given.

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 **Linde Gas Middle East LLC** or authorized distributor for proper disposal.

14. Transport Information

Parameter	United States DOT
Proper Shipping Name	Nitrogen, refrigerated liquid
Hazard Class	2.2
Identification Number	UN 1977
Shipping Label	Non Flammable Gas



PRODUCT NAME: LIQUID NITROGEN

15. Hazard Classes

Sudden Release of Pressure Hazard

16. Other Information

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).