



## **MATERIAL SAFETY DATA SHEET**

**PRODUCT NAME: HELIUM, REFRIGERATED LIQUID**

### **1. Product and Company Identification**

**BOC Gases,  
Division of,  
The BOC Group, Inc.  
575 Mountain Avenue  
Murray Hill, NJ 07974**

**BOC Gases  
Division of  
BOC Canada Limited  
5975 Falbourne Street, Unit 2  
Mississauga, Ontario L5R 3W6**

**TELEPHONE NUMBER: (908) 464-8100**

**24-HOUR EMERGENCY TELEPHONE NUMBER:  
CHEMTREC (800) 424-9300**

**TELEPHONE NUMBER: (905) 501-1700**

**24-HOUR EMERGENCY TELEPHONE NUMBER:  
(905) 501-0802**

**EMERGENCY RESPONSE PLAN NO: 2-0101**

**PRODUCT NAME: HELIUM, REFRIGERATED LIQUID**

**CHEMICAL NAME: Helium**

**COMMON NAMES/SYNONYMS: Helium, liquid**

**TDG (Canada) CLASSIFICATION: 2.2**

**WHMIS CLASSIFICATION: A**

**PREPARED BY: Loss Control (908)464-8100/(905)501-1700**

**PREPARATION DATE: 6/1/95**

**REVIEW DATES: 06/18/04**

### **2. Composition, Information on Ingredients**

#### **EXPOSURE LIMITS<sup>1</sup>:**

| <b>INGREDIENT</b>   | <b>% VOLUME</b> | <b>PEL-OSHA<sup>2</sup></b> | <b>TLV-ACGIH<sup>3</sup></b> | <b>LD<sub>50</sub> or LC<sub>50</sub><br/>Route/Species</b> |
|---|-----------------|-----------------------------|------------------------------|---|
| Helium<br>FORMULA: He<br>CAS: 7440-59-7<br>RTECS #: MH6520000 | 100.0           | None Established            | Simple Asphyxiant            | Not Available   |

<sup>1</sup> Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.

<sup>2</sup> As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

<sup>3</sup> As stated in the ACGIH 2004 Threshold Limit Values for Chemical Substances and Physical Agents.

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.

### **3. Hazards Identification**

#### **EMERGENCY OVERVIEW**

Odorless, colorless, non-flammable liquefied gas. 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 freezing burns in exposed tissues. Contents under pressure. Use and store below 125 °F.

**MSDS: G-98**

**Revised: 06/18/04**

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**ROUTE OF ENTRY:**

|                     |                       |                    |                   |                 |
|---------------------|-----------------------|--------------------|-------------------|-----------------|
| Skin Contact<br>Yes | Skin Absorption<br>No | Eye Contact<br>Yes | Inhalation<br>Yes | Ingestion<br>No |
|---------------------|-----------------------|--------------------|-------------------|-----------------|

**HEALTH EFFECTS:**

|                                      |                           |                     |
|--------------------------------------|---------------------------|---------------------|
| Exposure Limits<br>No                | Irritant<br>No            | Sensitization<br>No |
| Teratogen<br>No                      | Reproductive Hazard<br>No | Mutagen<br>No       |
| Synergistic Effects<br>None reported |                           |                     |

Carcinogenicity: -- NTP: No IARC: No OSHA: No

**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.

**INHALATION EFFECTS:** Product is a simple asphyxiant. Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgement, 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.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** None known.

**POTENTIAL ENVIRONMENTAL EFFECTS:** Not expected to be toxic to fish and wildlife.

#### 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. For contact with small amounts of liquid, open the eyelids wide to allow the liquid to evaporate. For contact with large amounts, rinse with a low pressure stream of cool water for 15 minutes. Refer the victim to an ophthalmologist for treatment and follow up. If the victim cannot tolerate light, protect the eyes with dark glasses. The use of bandages is not recommended as keeping the eyelids closed or exerting pressure on the eyelid may cause further damage.

**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 contact with the product has resulted in blistering of the dermal surface, frostbite, or in deep tissue freezing.

**INGESTION:** A physician should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing.

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**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: Nonflammable |                           |                                   |
| Flash point:<br>None                     | Method:<br>Not Applicable | Autoignition<br>Temperature: None |
| LEL(%): None                             |                           | UEL(%): None                      |
| Hazardous combustion products: None      |                           |                                   |
| Sensitivity to mechanical shock: None    |                           |                                   |
| Sensitivity to static discharge: None    |                           |                                   |

### **FIRE AND EXPLOSION HAZARDS:**

Nonflammable. Cylinder may vent rapidly or rupture violently from pressure when involved in a fire situation.

### **EXTINGUISHING MEDIA:**

None required. Use as appropriate for surrounding materials.

**FIRE FIGHTING INSTRUCTIONS:** Firefighters should wear respiratory protection (SCBA) and full turnout or Bunker gear. Continue to cool fire-exposed containers until well after flames are extinguished.

## 6. Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment (See Section 8). Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. Ventilate enclosed areas. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

## 7. Handling and Storage

**Electrical classification:** Non-hazardous.

This liquefied gas is noncorrosive and may be used with all common structural materials. Some metals (i.e.: carbon steel) will become brittle at low temperatures and easily fracture.

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Use only in well-ventilated areas in accordance with manufacturer's and BOC instructions. Do not tip, drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. If user experiences any difficulty operating container valve discontinue use and contact supplier. Do not insert any object (i.e.: screwdriver) into valve cap openings as this can damage the valve causing leakage.

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Use a pressure reducing regulator when connecting cylinder to lower pressure piping or systems. Do not heat containers by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the system.

Protect containers from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Containers should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full containers being stored for excessive periods of time.

Never allow any unprotected part of the body to touch uninsulated pipes or vessels containing cryogenic fluids. The extremely cold metal will cause the flesh to stick and tear when you attempt to remove it.

Stationary customer site vessels should be operated in accordance with the manufacturer's and BOC's instructions. 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 closest BOC location immediately for assistance.

Due to the extremely cold liquid, uninsulated transfer lines may condense air. The liquefied air may flash off 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.

Liquid helium is delivered into stationary vacuum jacketed vessels at the customer's location or in portable vacuum-jacketed "liquid" cylinders requiring special handling methods. Consult manufacturer's instructions. Vessels for liquid helium are designed specifically for helium service. Vessels and associated structures are not designed to support higher density fluids. Density, liquid at saturation pressure at 2.17 °K (-271 °C) : 0.146 Kg/l.

For additional recommendations, consult Compressed Gas Association Pamphlets P-9, P-9.1, P-12, P-14, P-18, and Safety Bulletin SB-2.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

## **8. Exposure Controls, Personal Protection**

**ENGINEERING CONTROLS:** Use local exhaust in combination with general ventilation as necessary to prevent accumulation of high concentrations and maintain an air oxygen level at or above 19.5%.

**EYE/FACE PROTECTION:** Wear chemical goggles with faceshields where contact with liquid is possible.

**SKIN PROTECTION:** Insulated gloves recommended when handling cryogenic liquid material.

**RESPIRATORY PROTECTION:** For emergency release use a positive pressure NIOSH approved air-supplying respirator systems (SCBA or airline/escape bottle) using a full-face mask and at a minimum Grade D air.

**OTHER/GENERAL PROTECTION:** Safety shoes or other footwear as appropriate for the job, emergency eyewash stations.

## 9. Physical and Chemical Properties

| PARAMETER                           | VALUE                     | UNITS |
|-------------------------------------|---------------------------|-------|
| Physical state (gas, liquid, solid) | : Gas                     |       |
| Vapor pressure                      | : Above critical temp.    |       |
| Vapor density (Air = 1)             | : 0.14 (Gas)              |       |
| Evaporation point                   | : Not Available           |       |
| Boiling point                       | : -452.1                  | °F    |
|                                     | : -268.9                  | °C    |
| Freezing point                      | : -456.5                  | °F    |
|                                     | : -271.3                  | °C    |
| pH                                  | : Not Applicable          |       |
| Specific gravity                    | : Not Available           |       |
| Oil/water partition coefficient     | : Not Available           |       |
| Solubility (H <sub>2</sub> O)       | : Negligible              |       |
| Odor threshold                      | : Not Applicable          |       |
| Odor and appearance                 | : Colorless, odorless gas |       |

## 10. Stability and Reactivity

**STABILITY:** Stable

**INCOMPATIBLE MATERIALS/CONDITIONS:** None

**HAZARDOUS POLYMERIZATION:** Does not occur

## 11. Toxicological Information

**SKIN AND EYE:** Adverse effects are not expected.

**INHALATION:** Product is a simple asphyxiant. Maintain atmospheric oxygen at or above 19.5%.

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

## 12. Ecological Information

Product does not contain Class I or Class II ozone depleting substances. Not toxic. Will not bioconcentrate.

## 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 BOC Gases or authorized distributor for proper disposal.

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## 14. Transport Information

| PARAMETER              | United States DOT           | Canada TDG                  |
|------------------------|-----------------------------|-----------------------------|
| PROPER SHIPPING NAME:  | Helium, refrigerated liquid | Helium, refrigerated liquid |
| HAZARD CLASS:          | 2.2                         | 2.2                         |
| IDENTIFICATION NUMBER: | UN 1963                     | UN 1963                     |
| SHIPPING LABEL:        | NONFLAMMABLE GAS            | NONFLAMMABLE GAS            |

## 15. Regulatory Information

### SARA TITLE III - HAZARD CLASSES:

Acute Health Hazard

Sudden Release of Pressure Hazard

### SARA TITLE III - SECTION 313 SUPPLIER NOTIFICATION:

This product does not contain toxic chemicals subject to reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372.

**U.S. TSCA/Canadian DSL:** All ingredients are listed on the U.S. Toxic Substances Control Act (TSCA) inventory or exempt from listing and on the Canadian Domestic Substance List (DSL).

**California Proposition 65:** This product does not contain ingredient(s) known to the State of California to cause cancer or reproductive toxicity.

**Canadian Controlled Products Regulations (CPR):** This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

## 16. Other Information

### NFPA HAZARD CODES

Health: 3  
Flammability: 0  
Instability: 0

### HMIS HAZARD CODES

Health: 3  
Flammability: 0  
Physical Hazard: 2

### RATINGS SYSTEM

0 = No Hazard  
1 = Slight Hazard  
2 = Moderate Hazard  
3 = Serious Hazard  
4 = Severe Hazard

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2004, *CGA Recommended Hazard Ratings for Compressed Gases, 2<sup>nd</sup> Edition*.

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| ACGIH | American Conference of Governmental Industrial Hygienists |
| DOT   | Department of Transportation                              |
| IARC  | International Agency for Research on Cancer               |
| NTP   | National Toxicology Program                               |
| OSHA  | Occupational Safety and Health Administration             |
| PEL   | Permissible Exposure Limit                                |
| SARA  | Superfund Amendments and Reauthorization Act              |
| STEL  | Short Term Exposure Limit                                 |
| TDG   | Transportation of Dangerous Goods                         |
| TLV   | Threshold Limit Value                                     |
| WHMIS | Workplace Hazardous Materials Information System          |

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

**DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:**

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