

**PRODUCT NAME: HYDROGEN (> 5.7%) IN NITROGEN MIXTURE****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

TELEPHONE NUMBER: (905) 501-1700

24-HOUR EMERGENCY TELEPHONE NUMBER:  
CHEMTREC (800) 424-930024-HOUR EMERGENCY TELEPHONE NUMBER:  
(905) 501-0802

EMERGENCY RESPONSE PLAN NO: 2-0101

**PRODUCT NAME:** HYDROGEN IN NITROGEN MIXTURE (> 5.7%)**CHEMICAL NAME:** Hydrogen in Nitrogen (Flammable)**COMMON NAMES/SYNONYMS:** None**TDG (Canada) CLASSIFICATION:** 2.1**WHMIS CLASSIFICATION:** A, B1**PREPARED BY:** Loss Control (908)464-8100/(905)501-1700**PREPARATION DATE:** 6/1/95**REVIEW DATES:** 11/11/03**2. Composition, Information on Ingredients****EXPOSURE LIMITS<sup>1</sup>:**

INGREDIENT	% VOLUME	PEL-OSHA <sup>2</sup>	TLV-ACGIH <sup>3</sup>	LD <sub>50</sub> or LC <sub>50</sub> Route/Species
Nitrogen FORMULA: N <sub>2</sub> CAS: 7727-37-9 RTECS #: QW9700000	≤ 94.3	None Established	Simple Asphyxiant	Not Available
Hydrogen FORMULA: H <sub>2</sub> CAS: 1333-74-0 RTECS #: MW8900000	> 5.7	None Established	Simple Asphyxiant	Not Available

<sup>1</sup> As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)<sup>2</sup> Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.<sup>3</sup> As stated in the ACGIH 2003 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 highly flammable gas. Concentrations of hydrogen > 5.7% in nitrogen are flammable. Dangerous fire and explosion mixture. Avoid heat, sparks, and flames. Simple Asphyxiant - This product does not contain oxygen and may cause asphyxia if released in a confined area. Maintain oxygen levels above 19.5%. Contents under pressure. Use and store below 125 °F.

**PRODUCT NAME: HYDROGEN (> 5.7%) IN NITROGEN MIXTURE**

**ROUTE OF ENTRY:**

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

**HEALTH EFFECTS:**

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

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

**EYE EFFECTS:**

None known.

**SKIN EFFECTS:**

None known.

**INGESTION EFFECTS:**

None known. Ingestion is unlikely as product is gas at room temperature.

**INHALATION EFFECTS:**

Product is a non-toxic simple asphyxiant. High concentrations may exclude an adequate supply of oxygen to the lungs. 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.

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

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

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

#### **4. First Aid Measures**

**EYES:** None required.

**SKIN:** None required.

**INGESTION:** None required

**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.

PRODUCT NAME: HYDROGEN (> 5.7%) IN NITROGEN MIXTURE

## 5. Fire Fighting Measures

Conditions of Flammability: Flammable		
Flash point: Not Available	Method: Not Applicable	Autoignition Temperature: 1058 °F (570 °C)
LEL(%): 4 (Hydrogen)	UEL(%): 75 (Hydrogen)	
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: Not Available		

### FIRE AND EXPLOSION HAZARDS:

Mixtures of hydrogen in nitrogen become flammable at hydrogen concentrations above 5.7% (CGA P-23, 1995). Releases may ignite with no apparent ignition source possibly via static electricity. Rapid flame propagation and flashback possible. Hydrogen is very light and may collect in the upper portions of storage areas. Hydrogen burns with an almost invisible flame. Cylinder may rupture violently from pressure when involved in a fire situation.

### EXTINGUISHING MEDIA:

Water, Dry chemical, Carbon dioxide.

### FIRE FIGHTING INSTRUCTIONS:

Firefighters should wear respiratory protection (SCBA) and full turnout or Bunker gear. Continue to cool fire-exposed cylinders until well after flames are extinguished.

If possible, stop the flow of gas. Inerting the atmosphere to reduce oxygen levels may extinguish flame, allowing capping of leaking container. Do not attempt this unless specifically trained. Reduce the rate of flow and inject an inert gas, if possible, before completely stopping the flow to prevent flashback. Do not extinguish the fire until the supply is shut off as otherwise an explosive re-ignition may occur.

If the fire is extinguished and the flow of gas continues, increase ventilation to prevent a buildup of hydrogen gas. A water fog may be used to create ventilation. Ventilation fans must be explosion proof. Use non-sparking tools to close container valves. Use caution to determine if the flame has been extinguished. Do not detect leaks with hands or open flame.

Use water spray to cool surrounding containers. Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers. Direct 500 GPM water stream onto containers above liquid level with remote monitors. Limit the number of personnel in proximity of fire and evacuate surrounding areas in all directions.

## 6. Accidental Release Measures

Immediately extinguish all ignition sources and provide maximum explosion-proof ventilation. Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. No smoking, flares, flames, or sparks in hazard area. Do not use flame or open hand to detect leaks. Evacuate all personnel from affected area. Deny entry to unauthorized and unprotected individuals. All personnel in hazard area should be aware of fire and explosion hazards associated with gas mixture. Use appropriate protective equipment (See Section 8). 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:** Class I, Group B (as hydrogen)

Earth-ground and bond all lines and equipment associated with gas mixture. All equipment should be non-sparking and explosion proof. Post "NO SMOKING" signs in use and storage areas. There should be no sources of ignition in areas where this product is being used or stored. Outside or detached storage is preferred.

This gas mixture is noncorrosive and may be used with all common structural materials.

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve protection outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement.

Use a pressure-reducing regulator when connecting cylinder to lower pressure piping or systems. Do not heat cylinder 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 cylinder. Do not insert any object (i.e.: screwdriver) into valve cap openings as this can damage the valve causing leakage.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

For additional recommendations, consult Compressed Gas Association Pamphlets P-1, P-14, 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 and general ventilation systems to prevent build-up of flammable concentrations. Small quantities can be handled in forced ventilation hoods. If product is handled routinely where the potential for leaks exists, all electrical equipment must be rated for use in potentially flammable atmospheres. Consult the National Electrical Code for details.

**EYE/FACE PROTECTION:** Safety goggles or glasses as appropriate for the job.

**SKIN PROTECTION:** Protective gloves of material appropriate for the job. Cotton clothing is recommended to prevent static build-up.

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

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

**PRODUCT NAME: HYDROGEN (> 5.7%) IN NITROGEN MIXTURE**

## 14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Compressed gas, flammable, n.o.s. (Hydrogen in Nitrogen)	Compressed gas, flammable n.o.s. (Hydrogen)
HAZARD CLASS:	2.1	2.1
IDENTIFICATION NUMBER:	UN 1954	UN 1954
SHIPPING LABEL:	FLAMMABLE GAS	FLAMMABLE GAS

## 15. Regulatory Information

Hydrogen is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

### SARA TITLE III NOTIFICATIONS AND INFORMATION

#### 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.

#### SARA TITLE III - HAZARD CLASSES:

Fire Hazard

Sudden Release of Pressure Hazard

**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: 0  
Flammability: 4  
Instability: 0

### HMIS HAZARD CODES

Health: 0  
Flammability: 4  
Reactivity: 0

### RATINGS SYSTEM

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

Note: The Reactivity Hazard Rating is based on the 2<sup>nd</sup> Edition of the National Paint and Coatings Association's (NPCA's) Hazardous Materials Identification System (HMIS®). Hazard ratings were based on the best available information at the time of the review. Ratings will be re-assigned in accordance with Compressed Gas Association (CGA) guidelines as published in the future edition of CGA Pamphlet P-19.

PRODUCT NAME: HYDROGEN (> 5.7%) IN NITROGEN MIXTURE

### 14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Compressed gas, flammable, n.o.s. (Hydrogen in Nitrogen)	Compressed gas, flammable n.o.s. (Hydrogen)
HAZARD CLASS:	2.1	2.1
IDENTIFICATION NUMBER:	UN 1954	UN 1954
SHIPPING LABEL:	FLAMMABLE GAS	FLAMMABLE GAS

### 15. Regulatory Information

Hydrogen is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

#### SARA TITLE III NOTIFICATIONS AND INFORMATION

##### 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.

##### SARA TITLE III - HAZARD CLASSES:

Fire Hazard  
Sudden Release of Pressure Hazard

**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: 0  
Flammability: 4  
Instability: 0

#### HMIS HAZARD CODES

Health: 0  
Flammability: 4  
Reactivity: 0

#### RATINGS SYSTEM

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

Note: The Reactivity Hazard Rating is based on the 2<sup>nd</sup> Edition of the National Paint and Coatings Association's (NPCA's) Hazardous Materials Identification System (HMIS<sup>®</sup>). Hazard ratings were based on the best available information at the time of the review. Ratings will be re-assigned in accordance with Compressed Gas Association (CGA) guidelines as published in the future edition of CGA Pamphlet P-19.

**PRODUCT NAME: HYDROGEN (> 5.7%) IN NITROGEN MIXTURE**

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:**

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 no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).