

# MATERIAL SAFETY DATA SHEET

*Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards*

## 1. PRODUCT IDENTIFICATION

**CHEMICAL NAME; CLASS: NON-FLAMMABLE GAS MIXTURE**  
**Containing the Following Component in Nitrogen Balance Gas:**  
**Hydrogen Chloride: 0.0001 - 0.02%**

**SYNONYMS:** Not Applicable

**CHEMICAL FAMILY NAME:** Not Applicable

**FORMULA:** Not Applicable

**Document Number:** 50025

**Note:** The Material Safety Data Sheet is for this gas mixture supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). This MSDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 2 (Composition and Information on Ingredients). Refer to the product label for information on the actual composition of the product.

<b>PRODUCT USE:</b>	Calibration of Monitoring and Research Equipment
<b>SUPPLIER/MANUFACTURER'S NAME:</b>	AIR LIQUIDE AMERICA CORPORATION
<b>ADDRESS:</b>	821 Chesapeake Drive Cambridge, MD 21613
<b>EMERGENCY PHONE:</b>	CHEMTREC: 1-800-424-9300
<b>BUSINESS PHONE:</b>	1-410-228-6400
	General MSDS Information 1-713/868-0440 Fax on Demand: 1-800/231-1366

## 2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH IDLH ppm	OTHER ppm
			TWA ppm	STEL ppm	TWA ppm	STEL ppm		
Hydrogen Chloride	7647-01-0	0.0001-0.02%	NE	5 (ceiling) NIC = 2 (ceiling)	NE	5 (ceiling)	50	NIOSH REL: STEL = 5 (ceiling) DFG MAKs: TWA = 5 PEAK = 1•MAK 15 min., average value, 1 hr interval DFG MAK Pregnancy Risk Classification: C Carcinogen: IARC-3, NIC = TLV-A4
Nitrogen	7727-37-9	Balance	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					

NE = Not Established.      NIC = Notice of Intended Change      See Section 16 for Definitions of Terms Used.  
 NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This gas mixture has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

## 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** This clear, pungent-smelling, yellowish-green gas mixture is severely irritating. Persons who respond to releases must protect themselves from inhalation of the product due to Hydrogen Chloride, the corrosive component of this gas mixture, especially in areas which are downwind of the release. Another significant health hazard associated with this gas mixture is the potential for exposure to oxygen-deficient atmospheres. Extreme caution must be used when responding to spills.

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** The most significant route of over-exposure for this gas mixture is by inhalation.

**INHALATION:** Due to the small size of an individual cylinder of this gas mixture, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. If this gas mixture is released in a small, poorly-ventilated area (i.e. an enclosed or confined space), over-exposure to Hydrogen Chloride or oxygen-deficient environment may occur.

Inhalation of Hydrogen Chloride, a component of this gas mixture, may lead to irritation of the nose and throat. Additionally, over-exposures to Hydrogen Chloride can cause the following health effects: coughing, labored breathing, sore throat, and potentially fatal lung disorders (chemical pneumonitis and pulmonary edema). Repeated Hydrogen Chloride-overexposures by inhalation can result in emphysema and erosion of teeth. The symptoms associated with specific Hydrogen Chloride concentrations are as follows:

**CONCENTRATION**

**OF HYDROGEN CHLORIDE    OBSERVED EFFECT**

< 1 ppm 10 - 50 ppm  50 - 100 ppm	Odor Threshold Irritation of the eyes and mucous membranes, which can be tolerated or several hours. Immediate irritation of the throat, which may be tolerated for an hour.
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1000 - 1300 ppm > 1300 ppm NOTE:	A dangerous health hazard, even for short periods of time. Exposure to concentrations in excess of 1300 ppm may cause laryngeal spasms, resulting in death. This gas mixture contains 1-200 ppm Hydrogen Chloride. Data pertinent to higher concentrations of Hydrogen Chloride are provided to give complete information on effects observed in humans after over-exposures have occurred.
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Additionally, if this gas mixture is released in a confined space or other poorly-ventilated area, an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The effects associated with various levels of oxygen are as follows:

**CONCENTRATION OF OXYGEN**

12-16% Oxygen: 10-14% Oxygen: 6-10% Oxygen: Below 6%:	<b>OBSERVED EFFECT</b> Breathing and pulse rate increased, muscular coordination slightly disturbed. Emotional upset, abnormal fatigue, disturbed respiration. Nausea, vomiting, collapse, or loss of consciousness. Convulsive movements, possible respiratory collapse, and death.
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HAZARDOUS MATERIAL IDENTIFICATION SYSTEM		
<b>HEALTH HAZARD</b>	(BLUE)	3
<b>FLAMMABILITY HAZARD</b>	(RED)	0
<b>PHYSICAL HAZARD</b>	(YELLOW)	0
<b>PROTECTIVE EQUIPMENT</b>		
EYES	RESPIRATORY	HANDS      BODY
See Section 8		
For Routine Industrial Use and Handling Applications		

### 3. HAZARD IDENTIFICATION (Continued)

**CONTACT WITH SKIN or EYES:** Due to the presence of Hydrogen Chloride in this gas mixture, skin over-exposures to this gas mixture may lead to burns or dermatitis (red, cracked, irritated skin), depending upon concentration and duration of exposure. Contact of the product with the eyes can cause pain, redness, and prolonged exposure could cause blindness.

**HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms.** Over-exposure to this gas mixture may cause the health effects described on the following page.

**ACUTE:** Due to the small size of the individual cylinder of this gas mixture, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. This gas mixture is severely irritating and may redden and damage eyes, skin, mucous membranes, and any other exposed tissue. If this gas mixture is inhaled, irritation of the respiratory system may occur, with coughing, breathing difficulty, and the development of lung disorders. Another significant health hazard associated with this gas mixture is the potential for exposure to oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, nausea, unconsciousness, and death. The skin of a victim of over-exposure may have a blue color.

**CHRONIC:** Persistent irritation may result from repeated exposures to this gas mixture. Repeated Hydrogen Chloride-overexposures by inhalation can result in emphysema and erosion of tooth enamel. Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

**TARGET ORGANS:** ACUTE: Respiratory system, skin, and eyes.

CHRONIC: Skin, respiratory system, teeth, heart, central nervous system.

### 4. FIRST-AID MEASURES

**RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS MIXTURE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn.**

No unusual health effects are anticipated after exposure to this gas mixture, due to the small cylinder size. If any adverse symptom develops after over-exposure to this gas mixture, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary. 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).

**SKIN EXPOSURE:** If irritation of the skin develops after exposure to this gas mixture, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention.

**EYE EXPOSURE:** If irritation of the eye develops after exposure to this gas mixture, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Seek medical assistance immediately, preferably an ophthalmologist.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms; eliminate exposure. Be observant for signs of pulmonary edema.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Pre-existing dermatitis and respiratory conditions may be aggravated by over-exposure to this gas mixture.

### 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not applicable.

**AUTOIGNITION TEMPERATURE:** Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):**

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

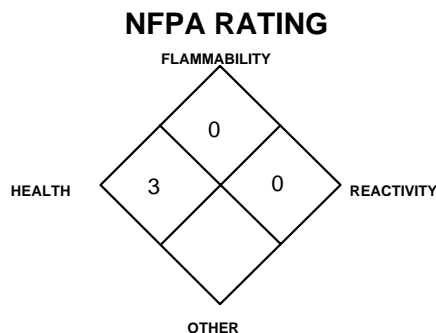
**FIRE EXTINGUISHING MATERIALS:** Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** The Hydrogen Chloride component of this gas mixture can produce severe irritation and health effects at low concentrations; therefore, this gas mixture presents significant health hazards to firefighters. This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.



### 6. ACCIDENTAL RELEASE MEASURES

**LEAK RESPONSE:** Due to the small size and content of the cylinder, an accidental release of this gas mixture presents significantly less risk of over-exposure to Hydrogen Chloride, the toxic component of this gas mixture, and other safety hazards related to the remaining components of this gas mixture, than a similar release from a larger cylinder. However, as with any chemical release, extreme caution must be used during emergency response procedures. In the event of a release in which the atmosphere is unknown, and in which other chemicals are potentially involved, evacuate immediate area. Such releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel. Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for levels of Hydrogen Chloride and Oxygen. The level of Hydrogen Chloride must be at acceptable levels (see Section 2, Composition on Information on Ingredients) and the atmosphere must have at least 19.5 percent oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus.

If leaking incidentally from the cylinder, contact your supplier.

### 7. HANDLING and USE

**WORK PRACTICES AND HYGIENE PRACTICES:** All work practices should minimize the release of this gas mixture. Eye wash stations/safety showers should be near areas where this gas mixture is used or stored. All work operations should be monitored in such a way that emergency personnel can be immediately contacted in the event of a release. Do not attempt to repair, adjust, or in any other way modify the cylinders containing this gas mixture. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.

**STORAGE AND HANDLING PRACTICES:** Cylinders should be firmly secured to prevent falling or being knocked-over. Cylinders must be protected from the environment, and preferably kept at room temperature (approximately 21°C [70°F]). Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage.

Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. These cylinders are not refillable. **WARNING! Do not refill DOT 39 cylinders. To do so may cause personal injury or property damage.**

**SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: WARNING!** Compressed gases can present significant safety hazards. During cylinder use, use equipment designed for these specific cylinders. Ensure all lines and equipment are rated for proper service pressure.

**PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT:** Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

### 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

**VENTILATION AND ENGINEERING CONTROLS:** No special ventilation systems or engineering controls are needed under normal circumstances of use. As with all chemicals, use this gas mixture in well-ventilated areas. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of Hydrogen Chloride and oxygen.

**RESPIRATORY PROTECTION:** No special respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if Hydrogen Chloride level exceeds the exposure limits presented in Section 2 (Composition and Information on Ingredients), or if Hydrogen Chloride levels are unknown or during emergency response to a release of this gas mixture. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.16.33% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

**RESPIRATORY PROTECTION (continued):** The following NIOSH respirator recommendations are in place for the Hydrogen Chloride component of this gas mixture.

### HYDROGEN CHLORIDE CONCENTRATION

Up to 50 ppm:

### RESPIRATORY PROTECTION

Any Chemical Cartridge Respirator with cartridge(s) providing protection against Hydrochloric Acid, or any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against Hydrochloric Acid, or any Powered, Air-Purifying Respirator (PAPR) with cartridge(s) providing protection against Hydrochloric Acid, or any Supplied-Air Respirator (SAR), or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

Escape: Any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister, or any appropriate escape-type, SCBA.

**EYE PROTECTION:** Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

**HAND PROTECTION:** Wear leather gloves when handling cylinders. Chemically resistant gloves should be worn when using this gas mixture. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

**BODY PROTECTION:** No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

## 9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for Nitrogen, the main component of this gas mixture.

**GAS DENSITY @ 32°F (0°C) and 1 atm:** .072 lbs/ft<sup>3</sup> (1.153 kg/m<sup>3</sup>)

**FREEZING/MELTING POINT @ 10 psig:** -345.8°F (-210°C)

**SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C):** 0.906

**SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm:** 0.023

**EVAPORATION RATE (nBuAc = 1):** Not applicable.

**VAPOR PRESSURE @ 70°F (21.1°C) (psig):** Not applicable.

**COEFFICIENT WATER/OIL DISTRIBUTION:** Not applicable.

**BOILING POINT:** -320.4°F (-195.8°C)

**pH:** Not applicable.

**MOLECULAR WEIGHT:** 28.01

**EXPANSION RATIO:** Not applicable.

**SPECIFIC VOLUME (ft<sup>3</sup>/lb):** 13.8

The following information is for this gas mixture.

**APPEARANCE, ODOR AND COLOR:** This gas mixture is a greenish-yellow gas mixture with a pungent odor.

**HOW TO DETECT THIS SUBSTANCE (warning properties):** The odor and color of this gas mixture are distinctive warning properties associated with this gas mixture.

## 10. STABILITY and REACTIVITY

**STABILITY:** Normally stable in gaseous state.

**DECOMPOSITION PRODUCTS:** The components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of a fire.

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Titanium will burn in Nitrogen (the main component of this gas mixture). Lithium reacts slowly with Nitrogen at ambient temperatures. The Hydrogen Chloride other component of this gas mixture is not compatible with most metals, alcohols, potassium permanganate, sodium metal, fluorine, metal acetylides or carbides.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

## 11. TOXICOLOGICAL INFORMATION

**TOXICITY DATA:** The following toxicology data are available for the components of this gas mixture:

<b>HYDROCHLORIC CHLORIDE GAS:</b>	<b>ACID/HYDROGEN</b>	<b>HYDROCHLORIC CHLORIDE GAS (continued):</b>	<b>ACID/HYDROGEN</b>	<b>HYDROCHLORIC CHLORIDE GAS (continued):</b>	<b>ACID/HYDROGEN</b>
Rinsed with Water (Eye-Rabbit) 5 mg/30 seconds: Mild	LCLo (Inhalation-Human) 1300 ppm/30 minutes	LC <sub>50</sub> (Inhalation-Mouse) 1108 ppm/1 hour: Sense Organs and Special Senses (Eye): effect, not otherwise specified; Lungs, Thorax, or Respiration: respiratory stimulation; Skin and Appendages: dermatitis, other (after systemic exposure)	LCLo (Inhalation-Human) 3000 ppm/5 minutes	LD <sub>50</sub> (Oral-Rabbit) 900 mg/kg	LCLo (Inhalation-Guinea Pig) 4413 ppm/30 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema; other changes; Liver: other changes
LDLo (Oral-Man) 2857 µg/kg: Vascular: BP lowering not characterized in autonomic section; Lungs, Thorax, or Respiration: respiratory depression; Gastrointestinal: changes in structure or function of esophagus	LDLo (Oral-Woman) 420 µL/kg: Behavioral: excitement; Cardiac: pulse rate; Kidney, Ureter, Bladder: hematuria	LD <sub>50</sub> (Intraperitoneal-Mouse) 40142 µg/kg	LDLo (Unreported-Man) 81 mg/kg	LD <sub>50</sub> (Inhalation-Rat) 685 µg/m <sup>3</sup> /24 hours/84 days-continuous: Behavioral: muscle contraction or spasticity; Kidney, Ureter, Bladder: other changes in urine composition; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase	LCLo (Inhalation-Rabbit) 4413 ppm/30 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema, other changes; Liver: fatty liver degeneration
LC <sub>50</sub> (Inhalation-Rat) 3124 ppm/1 hour: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Sense Organs and Special Senses (Eye): iritis		LCLo (Inhalation-Rat) 450 mg/m <sup>3</sup> /1 hour: female 1 day(s) pre-mating: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: homeostasis		DNA Repair (Bacteria- <i>Escherichia coli</i> ) 25 µg/well/81	DNA Repair (Bacteria- <i>Escherichia coli</i> ) 25 µg/well/81
				Sex Chromosome Loss and Nondisjunction (Inhalation- <i>Drosophila melanogaster</i> ) 100 ppm/24 hours	Sex Chromosome Loss and Nondisjunction (Inhalation- <i>Drosophila melanogaster</i> ) 100 ppm
				Sex Chromosome Loss and Nondisjunction (Oral- <i>Drosophila melanogaster</i> ) 100 ppm	Sex Chromosome Loss and Nondisjunction (Oral- <i>Drosophila melanogaster</i> ) 100 ppm
				Cytogenetic Analysis (Parenteral-grasshopper) 20 mg	Cytogenetic Analysis (Parenteral-grasshopper) 20 mg
				Cytogenetic Analysis (Hamster-Lung) 30 mmol/L	Cytogenetic Analysis (Hamster-Lung) 30 mmol/L
				Cytogenetic Analysis (Hamster-Ovary) 8 mmol/L	Cytogenetic Analysis (Hamster-Ovary) 8 mmol/L
				<b>NITROGEN:</b> There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.	<b>NITROGEN:</b> There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

**SUSPECTED CANCER AGENT:** The components of this gas mixture are listed by agencies tracking the carcinogenic potential of chemical compounds as follows:

**Hydrogen Chloride:** IARC-3 (Unclassifiable as to Carcinogenicity in Humans); Notice of Intended Change: ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen)

The remaining components of this gas mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

**IRRITANCY OF PRODUCT:** Hydrogen Chloride, a component of this gas mixture, is severely irritating to contaminated tissue.

**SENSITIZATION TO THE PRODUCT:** The components of this gas mixture are not known to cause skin or respiratory sensitization in humans.

**REPRODUCTIVE TOXICITY INFORMATION:** Listed below is information concerning the effects of this gas mixture and its components on the human reproductive system.

**Mutagenicity:** No mutagenicity effects have been described for this gas mixture. There are mutagenic data for the Hydrogen Chloride component in micro-organisms and in animal tests involving high doses and specific animal tissues.

**Embryotoxicity:** No embryotoxic effects have been described for this gas mixture.

**Teratogenicity:** No teratogenicity effects have been described for this gas mixture. The Hydrogen Chloride component of this gas mixture has been reported to cause teratogenic effects in research animals at very high doses, but not in humans.

**Reproductive Toxicity:** No reproductive toxicity effects have been described for gas mixture.

A **mutagen** is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An **embryotoxin** is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance which interferes in any way with the reproductive process.

**BIOLOGICAL EXPOSURE INDICES (BEIs):** Currently, Biological Exposure Indices (BEIs) are not applicable for the components of this gas mixture.

## 12. ECOLOGICAL INFORMATION

**ENVIRONMENTAL STABILITY:** The components of this gas mixture occur naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this gas mixture.

**HYDROGEN CHLORIDE/HYDROCHLORIC ACID:**

**Terrestrial Fate:** When Hydrochloric Acid is spilled onto the soil, it will begin to infiltrate. The presence of water in the soil will influence the rate of chemical movement in the soil. During transport through the soil, Hydrochloric Acid will dissolve some of the soil material, in particular those of a carbonate base. The acid will be neutralized to some degree. However, significant amounts of acid are expected to remain for transport.

**Aquatic Fate:** Hydrochloric Acid in water dissociates almost completely, with the hydrogen ion captured by the water molecules to form the hydronium ion.

**NITROGEN:** Water Solubility = 2.4 volumes Nitrogen/100 volumes water at 0°C. 1.6 volumes Nitrogen/100 volumes water at 20°C.

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** Due to the presence of Hydrogen Chloride in this gas mixture, animals exposed to this gas mixture may be adversely affected. Plants contaminated with this gas mixture may be adversely affected or destroyed.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** No evidence is currently available on this gas mixture's effects on aquatic life. The following environmental data are available for the components of this gas mixture. The following environmental data are available for the components of this gas mixture.

**HYDROGEN CHLORIDE:**

TLm (*Gambusia affinis* mosquito fish) 96 hours = 282 ppm, fresh water

LC<sub>50</sub> (shrimp) 48 hours = 100–330 ppm, Salt Water

LC<sub>50</sub> (Starfish) 48 hours = 100 to 330 mg/L, conditions of bioassay not specified

LC<sub>50</sub> (Cockle) 48 hours = 330 to 1,000 mg/L, conditions of bioassay not specified

LC<sub>50</sub> (*Carassius auratus* goldfish) 1-2 hours survival time = 178 mg/L (1 to 2 hr survival time), conditions of bioassay not specified

**HYDROGEN CHLORIDE (continued):**

LC<sub>50</sub> (Shore crab) 48 hours = 240 mg/L, conditions of bioassay not specified

LC<sub>100</sub> (Trout) 24 hours = 10 mg/L

Lethal (*Lepomis macrochirus* bluegill sunfish) 48 hours = 3.6 mg/L, conditions of bioassay not specified.....[p.87] Environment Canada; Tech Info for Problem Spills: Hydrochloric acid (Draft) (1981)

Lethal (*Lepomis macrochirus* bluegill sunfish) 48 hours, at pH between 3.5 and 3.0, hydrogen ion concentration, conditions of bioassay not specified

## 13. DISPOSAL CONSIDERATIONS

**PREPARING WASTES FOR DISPOSAL PREPARING WASTES FOR DISPOSAL:** Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Cylinders with undesired residual product may be safely vented outdoors with the proper regulator. For further information, refer to Section 16 (Other Information).

## 14. TRANSPORTATION INFORMATION

**THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.**

**PROPER SHIPPING NAME:** Compressed gases, n.o.s. (Hydrogen Chloride, Nitrogen)

**HAZARD CLASS NUMBER and DESCRIPTION:** 2.2 (Non-Flammable Gas)

**UN IDENTIFICATION NUMBER:** UN 1956

**PACKING GROUP:** Not applicable.

**DOT LABEL(S) REQUIRED:** Non-Flammable Gas

**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000):** 126

**MARINE POLLUTANT:** The components of this gas mixture are not classified by the DOT as Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).

**SPECIAL SHIPPING INFORMATION:** 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.

**Note:** DOT 39 Cylinders ship in a strong outer carton (overpack). Pertinent shipping information goes on the outside of the overpack. DOT 39 Cylinders do not have transportation information on the cylinder itself.

**TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:** This gas is considered as Dangerous Goods, per regulations of Transport Canada.

**PROPER SHIPPING NAME:** Compressed gases, n.o.s. (Hydrogen Chloride, Nitrogen)

**HAZARD CLASS NUMBER and DESCRIPTION:** 2.2 (Non-Flammable Gas)

**UN IDENTIFICATION NUMBER:** UN 1956

**PACKING GROUP:** Not Applicable

**HAZARD LABEL:** Class 2.2 (Non-Flammable Gas)

**SPECIAL PROVISIONS:** None

**EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX:** 0.12

**ERAP INDEX:** None

**PASSENGER CARRYING SHIP INDEX:** None

**PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX:** 75

**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000):** 121

**NOTE:** Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992).

## 15. REGULATORY INFORMATION

**ADDITIONAL U.S. REGULATIONS:**

**U.S. SARA REPORTING REQUIREMENTS:** This gas mixture is subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Hydrogen Chloride	YES	YES	YES

**U.S. SARA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE THRESHOLD PLANNING QUANTITY:** Hydrogen Chloride = 500 lb (227 kg)

**U.S. SARA SECTION 304 EXTREMELY HAZARDOUS SUBSTANCE REPORTABLE QUANTITY:** Hydrogen Chloride = 5000 lb (2270 kg)

**U.S. SARA THRESHOLD PLANNING QUANTITY:** Hydrogen Chloride = 500 lb (227 kg).

**U.S.TSCA INVENTORY STATUS:** The components of this gas mixture are listed on the TSCA Inventory.

**U.S. CERCLA REPORTABLE QUANTITY (RQ):** Hydrogen Chloride = 5000 lb (2270 kg)

**OTHER U.S. FEDERAL REGULATIONS:**

- Hydrogen Chloride is subject to the reporting requirements of CFR 29 1910.1000. Hydrogen Chloride is listed on Table Z.1.
- Depending on specific operations involving the use of Hydrogen Chloride, the regulations of the Process Safety Management of Highly Hazardous Chemicals may be applicable (29 CFR 1910.119). Hydrogen Chloride is listed in Appendix A of this regulation. The threshold quantity for Hydrogen Chloride under this regulation is 5000 lbs (2270 kg). Due to the small size of the cylinder for this mixture, this regulation should not apply.
- Hydrogen Chloride is subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for this gas is 5,000 lb (2270 kg). Due to the small size of the cylinder for this mixture, this regulation should not apply.
- This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).
- Nitrogen is not listed as a Regulated Substance, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Hydrogen Chloride is listed under this regulation in Table 1 as a Regulated Substance (Toxic Substance), in quantities of 5000 lbs or greater. Due to the small size of the cylinder for this mixture, this regulation should not apply.

## 15. REGULATORY INFORMATION (Continued)

### ADDITIONAL U.S. REGULATIONS (continued):

**U.S. STATE REGULATORY INFORMATION:** The components of this gas mixture are covered under the following specific State regulations:

**Alaska - Designated Toxic and Hazardous Substances:** Hydrogen Chloride.

**California - Permissible Exposure Limits for Chemical Contaminants:** Nitrogen, Hydrogen Chloride.

**Florida - Substance List:** Hydrogen Chloride.

**Illinois - Toxic Substance List:** Hydrogen Chloride.

**Kansas - Section 302/313 List:** Hydrogen Chloride.

**Massachusetts - Substance List:** Hydrogen Chloride.

**Michigan - Critical Materials Register:** No.

**Minnesota - List of Hazardous Substances:** Hydrogen Chloride.

**Missouri - Employer Information/Toxic Substance List:** Hydrogen Chloride.

**New Jersey - Right to Know Hazardous Substance List:** Nitrogen, Hydrogen Chloride.

**North Dakota - List of Hazardous Chemicals, Reportable Quantities:** Hydrogen Chloride.

**Pennsylvania - Hazardous Substance List:** Nitrogen, Hydrogen Chloride.

**Rhode Island - Hazardous Substance List:** Nitrogen, Hydrogen Chloride.

**Texas - Hazardous Substance List:** Hydrogen Chloride.

**West Virginia - Hazardous Substance List:** Hydrogen Chloride.

**Wisconsin - Toxic and Hazardous Substances:** Hydrogen Chloride.

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):** No component of this gas mixture is on the California Proposition 65 lists.

### ADDITIONAL CANADIAN REGULATIONS:

**CANADIAN DSL/NDSL INVENTORY STATUS:** The components of this gas mixture are listed on the DSL Inventory.

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:** The components of this gas mixture are not on the CEPA Priorities Substances Lists.

**CANADIAN WHMIS CLASSIFICATION:** This gas mixture is categorized as a Controlled Product, Hazard Classes A and D2B, as per the Controlled Product Regulations.

## 16. OTHER INFORMATION

### INFORMATION ABOUT DOT-39 NRC (Non-Refillable Cylinder) PRODUCTS

DOT 39 cylinders ship as hazardous materials when full. Once the cylinders are relieved of pressure (empty) they are not considered hazardous material or waste. Residual gas in this type of cylinder is not an issue because toxic gas mixtures are prohibited. Calibration gas mixtures typically packaged in these cylinders are Nonflammable n.o.s., UN 1956. A small percentage of calibration gases packaged in DOT 39 cylinders are flammable or oxidizing gas mixtures.

For disposal of used DOT-39 cylinders, it is acceptable to place them in a landfill if local laws permit. Their disposal is no different than that employed with other DOT containers such as spray paint cans, household aerosols, or disposable cylinders of propane (for camping, torch etc.). When feasible, we recommended recycling for scrap metal content. Air Liquide America will do this for any customer that wishes to return cylinders to us prepaid. All that is required is a phone call to make arrangements so we may anticipate arrival. Scrapping cylinders involves some preparation before the metal dealer may accept them. We perform this operation as a service to valued customers who want to participate.

**MIXTURES:** When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about the handling of compressed gases can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Telephone: (703) 412-0900.

P-1 "Safe Handling of Compressed Gases in Containers"  
AV-1 "Safe Handling and Storage of Compressed Gases"  
"Handbook of Compressed Gases"

**PREPARED BY:** CHEMICAL SAFETY ASSOCIATES, Inc.  
PO Box 3519, La Mesa, CA 91944-3519  
619/670-0609

Fax on Demand: 1-800/231-1366



This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this gas mixture. To the best of Air Liquide America Corporation'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.