



MATERIAL SAFETY DATA SHEET

PRODUCT NAME: HYDROGEN CHLORIDE

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 Falbourn 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: HYDROGEN CHLORIDE
CHEMICAL NAME: Hydrochloric Acid
COMMON NAMES/SYNONYMS: Anhydrous Hydrochloric Acid, Muriatic Acid
TDG (Canada) CLASSIFICATION: 2.3 (8)
WHMIS CLASSIFICATION: A, D1A, D2B, E

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 LIMITS¹:

INGREDIENT	% VOLUME	PEL-OSHA ²	TLV-ACGIH ³	LD ₅₀ or LC ₅₀ Route/Species
Hydrogen Chloride FORMULA: HCl CAS: 7647-01-0 RTECS #: MW4025000	>99.0	5 ppm Ceiling	2 ppm Ceiling	LC ₅₀ : 3120 ppm inhalation/rat (1H)

¹ Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.
² As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)
³ 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
Colorless, poison, corrosive gas with sharp pungent odor. Corrosive and irritating to the eyes, skin and mucous membranes. Inhalation may result in chemical pneumonitis, pulmonary edema, and death. Contents under pressure. Use and store below 125 °F.

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ROUTE OF ENTRY:

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
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HEALTH EFFECTS:

Exposure Limits Yes	Irritant Yes	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No
Synergistic Effects Other agents that irritate the respiratory system		

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

EYE EFFECTS: Corrosive and irritating to the eyes. Contact may cause painful burns and ulcerations. Burns to the eyes result in lesions and possible loss of vision.

SKIN EFFECTS: Corrosive and irritating to the skin and all living tissue. It reacts with water very rapidly yielding hydrochloric acid. Skin burns and mucosal irritation are like that from exposure to volatile inorganic acids. Hydrogen chloride burns exhibit severe pain, redness, possible swelling and early necrosis.

INGESTION EFFECTS: Ingestion is unlikely. Contact will cause irritation or burns.

INHALATION EFFECTS: Corrosive and irritating to the upper and lower respiratory tract and all mucosal tissue. Symptoms include lacrimation, cough, labored breathing, and excessive salivary and sputum formation. Excessive irritation of the lungs causes acute pneumonitis and pulmonary edema, which could be fatal. Residual pulmonary malfunction may also occur. Chemical pneumonitis and pulmonary edema may result from exposure to the lower respiratory tract and deep lung.

CHRONIC: Repeated or prolonged exposure to low concentrations may cause dermatitis or erosion of exposed teeth.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Irritant properties may aggravate pre-existing eye, skin, and respiratory disorders.

POTENTIAL ENVIRONMENTAL EFFECTS: A 24-hour LC₁₀₀ in the trout has been cited as 10 mg/L and a LC₅₀ of 178 mg/L (1-2 H survival time) has been cited for the *Carassius auratus* (goldfish)

4. First Aid Measures

EYES:

PERSONS WITH POTENTIAL EXPOSURE SHOULD NOT WEAR CONTACT LENSES. Flush contaminated eye(s) with copious quantities of water. Part eyelids to assure complete flushing. Continue for a minimum of 30 minutes while obtaining immediate medical attention.

SKIN:

Remove contaminated clothing as rapidly as possible. Flush affected area with copious quantities of water. Seek immediate medical attention.

INGESTION:

Seek immediate medical attention.

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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. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. If breathing is difficult, administer oxygen. Unconscious persons should be moved to an uncontaminated area and given artificial resuscitation and supplemental oxygen. Assure that mucus or vomited material does not obstruct the airway by use of positional drainage. Delayed pulmonary edema may occur. Keep the patient under medical observation for at least 24 hours.

5. Fire Fighting Measures

Conditions of Flammability: Not flammable		
Flash point: None	Method: Not Applicable	Autoignition 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. Aqueous hydrochloric acid solutions react with many metals in a corrosive manner liberating flammable hydrogen gas. It reacts with many organic materials with liberation of heat. Cylinder may vent rapidly or rupture violently from pressure when involved in a fire situation.

EXTINGUISHING MEDIA: Use media suitable for surrounding materials. Stop flow of gas. Use water spray to knock down vapors and cool surrounding containers. Highly soluble in water – will react to yield dense, acrid HCl fumes.

FIRE FIGHTING INSTRUCTIONS: Firefighters should wear respiratory protection (SCBA) and full turnout or Bunker gear with additional chemical protective clothing as necessary to prevent exposure. Continue to cool fire-exposed cylinders until well after flames are extinguished. Dike corrosive runoff waters from fighting fire for later disposal.

6. Accidental Release Measures

Immediately evacuate all personnel from affected area. Deny entry to unauthorized or unprotected individuals. 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. Approach release from upwind. Use water fog or spray to knock down vapors. Runoff waters from clean-up are corrosive. Prevent runoff waters from entering waterways and sewers. Consult a HAZMAT specialist and the appropriate emergency telephone number in Section 1 or your closest BOC location. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs.

7. Handling and Storage

Electrical classification: Nonhazardous.

Many metals corrode rapidly with wet hydrogen chloride.

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

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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 rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into 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 areas of non-combustible construction away from alkalis, oxidizing materials, organics, 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. Full & empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time.

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. For additional storage recommendations, consult Compressed Gas Association's Pamphlet P-1.

8. Exposure Controls, Personal Protection

ENGINEERING CONTROLS: Use enclosures and local exhaust ventilation as necessary to limit exposure below the ceiling limit. Exhaust gas should be vented to a gas treatment system.

EYE/FACE PROTECTION: Full faceshield with safety goggles or full facepiece respirator.

SKIN PROTECTION: Appropriate protective and chemical-resistant gloves, clothing and splash protection, or fully encapsulating vapor protective clothing to prevent exposure. For materials of construction, consult protective clothing manufacturer's specific data.

RESPIRATORY PROTECTION: For emergency release and conditions with exposures above the applicable exposure limits 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, safety shower, eyewash "fountain"

9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure at 70 °F	: 627.7	psia
Vapor density at 70 °F (Air = 1)	: 1.27	
Evaporation point	: Not Available	
Boiling point	: -120.9	°F
	: -84.9	°C
Freezing point	: -173	°F
	: -114	°C
PH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H ₂ O)	: Very Soluble	
Odor threshold	: Not Available	
Odor and appearance	: Colorless gas with sharp pungent odor	

10. Stability and Reactivity

STABILITY: Stable

INCOMPATIBLE MATERIALS/CONDITIONS: Reacts with water or moisture in the air yielding dense, acrid HCl fumes. Reacts with fluorine, calcium carbide, cesium carbide, rubidium carbide and lithium silicide. Reacts vigorously with alkalis and many organic materials with liberation of heat. Strong oxidizers cause release of chlorine. Hydrochloric acid solutions react with metals to release flammable hydrogen gas.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrochloric acid on hydrolysis.

HAZARDOUS POLYMERIZATION: Will not occur.

11. Toxicological Information

INHALATION: Studies indicate that hydrogen chloride is immediately irritating to humans at concentrations of 5 ppm or greater. Thirty minute lethal exposures in experimental animals ranged from 2640 ppm to 4700 ppm hydrogen chloride vapor.

SKIN AND EYE: Hydrogen chloride gas will cause skin and eye damage at high concentrations. Direct contact with hydrochloric acid causes immediate burns.

OTHER: Embryo and fetotoxicity has been observed in female rats exposed to maternally toxic levels of hydrogen chloride (302 ppm; 1 hour). Corrosion of the teeth has been reported following long-term exposure.

12. Ecological Information

Does not contain Class I or Class II ozone depleting substances. See Section 3 for ecotoxicity information. Hydrogen chloride is a CERCLA Hazardous Substance with a Reportable Quantity (RQ) of 5,000 pounds and is listed as an Extremely Hazardous Substance (EHS) with a Threshold Planning Quantity (TPQ) of 500 pounds.

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.

14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Hydrogen Chloride, Anhydrous	Hydrogen Chloride, Anhydrous
HAZARD CLASS:	2.3 (8)	2.3 (8)
IDENTIFICATION NUMBER:	UN 1050	UN 1050
SHIPPING LABEL:	POISON GAS, CORROSIVE	TOXIC GAS, CORROSIVE

Additional Marking Requirement: "Inhalation Hazard"

If net weight of product \geq 5000 pounds, the container must be also marked with the letters "RQ".

Additional Shipping Paper Description Requirement: "Poison-Inhalation Hazard, Zone C"

If net weight of product \geq 5000 pounds, shipping papers must be also marked with the letters "RQ".

15. Regulatory Information

SARA TITLE III NOTIFICATIONS AND INFORMATION

SARA TITLE III - HAZARD CLASSES:

Acute Health Hazard
Chronic Health Hazard
Sudden Release of Pressure Hazard
Reactivity Hazard

SARA TITLE III - SECTION 313 SUPPLIER NOTIFICATION:

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

CAS NUMBER	INGREDIENT NAME	PERCENT BY VOLUME
7647-01-0	Hydrogen chloride	> 99.00

This information must be included on all MSDSs that are copied and distributed for this material.

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	HMIS HAZARD CODES	RATINGS SYSTEM
Health: 3	Health: <u> </u> 3	0 = No Hazard
Flammability: 0	Flammability: <u> </u> 0	1 = Slight Hazard
Instability: 1	Physical Hazard: 3	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, 2nd 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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