Hydrogen chloride

Safety Data Sheet P-4606


Issue date: 01/01/1984  Revision date: 01/25/2021  Supersedes: 10/17/2016 Version: 1.0

SECTION: 1. Product and company identification

1.1. Product identifier

Product form: Substance
Substance name: Hydrogen chloride
Chemical name: Hydrogen chloride
CAS-No.: 7647-01-0
Formula: HCl
Other means of identification: Anhydrous hydrochloric acid

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture: Industrial use; Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
10 Riverview Drive
Danbury, CT 06810-6268 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number: Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS US classification
Press. Gas (Liq.) H280
Acute Tox. 3 (Inhalation: gas) H331
Skin Corr. 1A H314
Eye Dam. 1 H318
Aquatic Acute 2 H401

2.2. Label elements

GHS US labeling
Hazard pictograms (GHS US): GHS04 GHS05 GHS06

Signal word (GHS US): Danger
Hazard statements (GHS US): H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
H314 - CAUSES SEVERE SKIN BURNS AND EYE DAMAGE
H331 - TOXIC IF INHALED
CGA-HG22 - CORROSIVE TO THE RESPIRATORY TRACT
CGA-HG01 - MAY CAUSE FROSTBITE.

Precautionary statements (GHS US): P202 - Do not handle until all safety precautions have been read and understood.
P260 - Do not breathe gas/vapors
P262 - Do not get in eyes, on skin, or on clothing.
P264 - Wash exposed skin thoroughly after handling

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P271+P403 - Use and store only outdoors or in a well-ventilated place.
P273 - Avoid release to the environment.
P280+P284 - Wear protective gloves, protective clothing, eye protection, respiratory protection, and/or face protection.
P405 - Store locked up.
P501 - Dispose of contents/container Dispose in a safe manner in accordance with local/national regulations
P303+P361+P353 - IF ON SKIN OR (HAIR): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P336 - Thaw frosted parts with lukewarm water. Do not rub affected area.
P363 - Wash contaminated clothing before reuse.
P310 - Immediately call a poison center or doctor/physician.
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P311 - Call a poison center or doctor.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 - If exposed or concerned: Get medical advice/attention.
CGA-PG05 - Use a back flow preventive device in the piping.
CGA-PG06 - Close valve after each use and when empty.
CGA-PG20+CGA-PG10 - Use only with equipment of compatible materials of construction and rated for cylinder pressure.
CGA-PG12 - Do not open valve until connected to equipment prepared for use.
CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug.
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).

2.3. Other hazards
Other hazards which do not result in classification : None.

2.4. Unknown acute toxicity (GHS US)
No data available

SECTION 3: Composition/Information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen chloride (Main constituent)</td>
<td>(CAS-No.) 7647-01-0</td>
<td>100</td>
</tr>
</tbody>
</table>

3.2. Mixtures
Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician. WARNING: To avoid possible chemical burns, the rescuer should avoid breathing any exhaled air from the victim.

First-aid measures after skin contact : In case of contact, immediately flush affected areas with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Discard contaminated shoes.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed
No additional information available

4.3. Indication of any immediate medical attention and special treatment needed
Obtain medical assistance.
SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: Does not burn. Use extinguishing agents compatible with acid and appropriate for the burning material.

5.2. Special hazards arising from the substance or mixture

Reactivity: No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions: DANGER! Toxic, corrosive, liquefied gas.

Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Special protective equipment for fire fighters: Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Danger: Toxic. Corrosive. Wear a self-contained breathing apparatus and appropriate personal protective equipment (PPE). (gas tight, chemical-protective) Evacuate personnel to a safe area. Approach suspected leak area with caution. Remove all sources of ignition. Toxic, corrosive vapor can spread from spill. Ventilate area or move container to a well-ventilated area. Before entering the area, especially a confined area, check the atmosphere with an appropriate device.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Try to stop release. Reduce vapor with fog or fine water spray. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling: Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only where temperature will not exceed 125°F (52°C). Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Hydrogen chloride (7647-01-0)</th>
<th>ACGIH OEL Ceiling [ppm]</th>
<th>2 ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA OSHA</td>
<td>OSHA PEL (Ceiling)</td>
<td>7 mg/m³</td>
</tr>
<tr>
<td>USA OSHA</td>
<td>OSHA PEL C [ppm]</td>
<td>5 ppm</td>
</tr>
<tr>
<td>USA IDLH</td>
<td>IDLH [ppm]</td>
<td>50 ppm</td>
</tr>
<tr>
<td>ACGIH</td>
<td>Not established</td>
<td></td>
</tr>
</tbody>
</table>

8.2. Exposure controls

Appropriate engineering controls: Use a corrosion-resistant local exhaust ventilation system with sufficient air flow velocity to maintain concentration below all applicable exposure limits in the worker's breathing zone. A canopy-type, forced-draft fume hood is preferred.

Hand protection: Neoprene rubber (HNBR) /.

Eye protection: Provide readily accessible eye wash stations and safety showers. Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection: Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.

Respiratory protection: When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection: Wear cold insulating gloves when transfilling or breaking transfer connections.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state: Gas
Appearance: Colorless gas.
Molecular mass: 36.5 g/mol
Color: Colorless. Gives off white fumes in moist air.
Odor: Pungent.
Odor threshold: No data available
pH: Not applicable.
Relative evaporation rate (butyl acetate=1): No data available
Relative evaporation rate (ether=1): Not applicable.
Melting point: -114 °C
Freezing point: No data available
Boiling point: -85 °C
Flash point: Not applicable.
Critical temperature: 51.4 °C
Auto-ignition temperature: Not applicable.
Decomposition temperature: No data available
Flammability (solid, gas): Not Applicable
Vapor pressure: 4260 kPa
Critical pressure: 8310 kPa
Relative vapor density at 20 °C: No data available
Relative density: 1.2
Density: 1.161 – 1.19 g/cm³ (at 20 °C)
Relative gas density: 1.3
Solubility: Water: 720000 mg/l
Partition coefficient n-octanol/water (Log Pow): Not applicable.
Partition coefficient n-octanol/water (Log Kow): Not applicable.
Viscosity, kinematic: 0.092 cSt Not applicable.
Viscosity, dynamic: Not applicable.
Explosive properties: Not applicable.
Oxidizing properties: None.
Explosion limits: Non flammable.

9.2. Other information
Gas group: Press. Gas (Liq.)
Additional information: Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity
No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
May occur.

10.4. Conditions to avoid
Avoid moisture in installation systems.

10.5. Incompatible materials

10.6. Hazardous decomposition products
SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity

Hydrogen chloride (7647-01-0)

- LD50 oral rat: 238 – 277 mg/kg
- LD50 dermal rabbit: > 5010 mg/kg
- LC50 Inhalation - Rat [ppm]: 2810 ppm/1h
- ATE US (oral): 238 mg/kg body weight
- ATE US (gases): 1405 ppmV/4h

Skin corrosion/irritation: Causes severe skin burns.
- pH: Not applicable.

Serious eye damage/irritation: CAUSES SERIOUS EYE DAMAGE.
- pH: Not applicable.

Respiratory or skin sensitization: Not classified

Germ cell mutagenicity: Not classified

Carcinogenicity: Not classified

Hydrogen chloride (7647-01-0)

- IARC group: 3 - Not classifiable

Reproductive toxicity: Not classified

STOT-single exposure: Not classified

STOT-repeated exposure: Not classified

Aspiration hazard: Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general: No known ecological damage caused by this product.

12.2. Persistence and degradability

Hydrogen chloride (7647-01-0)

- Persistence and degradability: Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Hydrogen chloride (7647-01-0)

- Partition coefficient n-octanol/water (Log Pow): Not applicable.
- Partition coefficient n-octanol/water (Log Kow): Not applicable.
- Bioaccumulative potential: No data available.

12.4. Mobility in soil

Hydrogen chloride (7647-01-0)

- Mobility in soil: No data available.
- Ecology - soil: Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Other adverse effects: May cause pH changes in aqueous ecological systems.

Effect on ozone layer: None.

Effect on the global warming: No known effects from this product.
SECTION 13: Disposal considerations

13.1. Waste treatment methods
Product/Packaging disposal recommendations: Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

In accordance with DOT
Transport document description (DOT) : UN1050 Hydrogen chloride, anhydrous, 2.3
UN-No.(DOT) : UN1050
Proper Shipping Name (DOT) : Hydrogen chloride, anhydrous
Class (DOT) : 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115
Hazard labels (DOT) : Poison Gas
2.3 - Poison gas
8 - Corrosive

DOT Special Provisions (49 CFR 172.102) : 3 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone C (see 173.116(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.
N86 - UN pressure receptacles made of aluminum alloy are not authorized.
N89 - When steel UN pressure receptacles are used, only those bearing the "H" mark are authorized.

Additional information
Emergency Response Guide (ERG) Number : 125 (UN1050); 157 (UN1789)
Other information : No supplementary information available.
Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers:
- Ensure there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

Transport by sea
UN-No. (IMDG) : 1050
Proper Shipping Name (IMDG) : HYDROGEN CHLORIDE, ANHYDROUS
Class (IMDG) : 2 - Gases
Division (IMDG) : 2.3 - Toxic gases
MFAG-No : 125

Air transport
UN-No. (IATA) : 1050
Proper Shipping Name (IATA) : Hydrogen chloride, anhydrous
Class (IATA) : 2
Civil Aeronautics Law : Gases under pressure/Gases toxic under pressure
SECTION 15: Regulatory information

15.1. US Federal regulations

Hydrogen chloride (7647-01-0)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Listed on the United States SARA Section 302

Subject to reporting requirements of United States SARA Section 313

<table>
<thead>
<tr>
<th>CERCLA RQ</th>
<th>5000 lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>SARA Section 302 Threshold Planning Quantity (TPQ)</td>
<td>500 lb (gas only)</td>
</tr>
<tr>
<td>SARA Section 313 - Emission Reporting</td>
<td>1 % (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)</td>
</tr>
</tbody>
</table>

All components of this product are listed on the Toxic Substances Control Act (TSCA) inventory.

15.2. International regulations

CANADA

Hydrogen chloride (7647-01-0)

Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Hydrogen chloride (7647-01-0)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

15.2.2. National regulations

Hydrogen chloride (7647-01-0)

Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on KECL/KECI (Korean Existing Chemicals Inventory)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the Japanese Poisonous and Deleterious Substances Control Law
Listed on the Canadian IDL (Ingredient Disclosure List)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on EPA Hazardous Air Pollutant (HAPS)
Listed on the TCSI (Taiwan Chemical Substance Inventory)

15.3. US State regulations

Hydrogen chloride (7647-01-0)

<table>
<thead>
<tr>
<th>U.S. - California - Proposition 65 - Carcinogens List</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. - California - Proposition 65 - Developmental Toxicity</td>
<td>No</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Female</td>
<td>No</td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Male</td>
<td>No</td>
</tr>
</tbody>
</table>
## Hydrogen chloride (7647-01-0)

<table>
<thead>
<tr>
<th>State or local regulations</th>
<th>U.S. - Massachusetts - Right To Know List</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U.S. - New Jersey - Right to Know Hazardous Substance List</td>
</tr>
<tr>
<td></td>
<td>U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List</td>
</tr>
<tr>
<td></td>
<td>U.S. - Pennsylvania - RTK (Right to Know) List</td>
</tr>
</tbody>
</table>
SECTION 16: Other information

Other information: When you mix two or more chemicals, you can 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 evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Linde asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Linde Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Linde Inc, it is the user's obligation to determine the conditions of safe use of the product.

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Revision date: 01/25/2021

NFPA health hazard: 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

NFPA fire hazard: 0 - Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.

NFPA instability: 1 - Materials that in themselves are normally stable but can become unstable at elevated temperatures and pressures.

SDS US GHS DUAL BRANDED LINDE->PRAXAIR

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.