CATO Research Chemicals Inc.
3/F,Building B,No.179 BASIGO, Guangpu Rd East,Huangpu Dist,Guangzhou
Web: www.cato-chem.com
Tel: +86-20-81960175 Fax: +86-20-81717260 E-mail: info@cato-chem.com

SAFETY DATA SHEETS

According to the UN GHS revision 10

Version: 1.1
Creation Date: July 15, 2024
Revision Date: February 01, 2025

SECTION 1: Identification

1.1 GHS Product identifier

Product name Reference Material for Hydrochloric Acid in Methanol Titration Solution

1.2 Other means of identification

Product number CPRM5309
Other names -

1.3 Recommended use of the chemical and restrictions on use

Identified uses For laboratory and Industrial use only.
Uses advised against no data available

1.4 Supplier's details

Company CATO Research Chemicals Inc.
Address 3/F,Building B,No.179 BASIGO, Guangpu Rd East,Huangpu Dist,Guangzhou
Telephone +86-20-81960175

1.5 Emergency phone number

Emergency phone number +86-20-81960175
Service hours 'Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

Gases under pressure: Liquefied gas
Skin corrosion, Sub-category 1A
Acute toxicity - Category 3, Inhalation

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word Danger
Hazard statement(s) H314 Causes severe skin burns and eye damage
H331 Toxic if inhaled

Precautionary statement(s)
Prevention P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P264 Wash ... thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.
Response P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P363 Wash contaminated clothing before reuse.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P316 Get emergency medical help immediately.
P321 Specific treatment (see ... on this label).
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Storage P410+P403 Protect from sunlight. Store in a well-ventilated place.
P405 Store locked up.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
Disposal P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.3 Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Reference Material for Hydrochloric Acid in Methanol Titration Solution	Hydrogen chloride	7647-01-0	231-595-7	≈ 99%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer immediately for medical attention.

Following skin contact

Wear protective gloves when administering first aid. First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again. Refer immediately for medical attention.

Following eye contact

Rinse with plenty of water for several minutes (remove contact lenses if easily possible). Refer immediately for medical attention.

Following ingestion

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

4.2 Most important symptoms/effects, acute and delayed

Inhalation of fumes results in coughing and choking sensation, and irritation of nose and lungs. Liquid causes burns. (USCG, 1999)
Gas concentrations of 50 to 100 ppm are tolerable for 1 hour. Concentrations of 1,000 to 2,000 ppm are dangerous, even for brief exposures. More severe exposures will result in serious respiratory distress and prolonged exposures will result in death. Mists of hydrochloric acid are considered less harmful than anhydrous hydrochloric acid, because droplets have no dehydrating action. Individuals with respiratory problems and digestive diseases may be adversely affected by low level exposures to the gas or mist. (EPA, 1998)
Excerpt from ERG Guide 125 [Gases - Corrosive]: TOXIC; may be fatal if inhaled, ingested or absorbed through skin. Vapors are extremely irritating and corrosive. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite. Fire will produce irritating, corrosive and/or toxic gases. Runoff from fire control may cause pollution. (ERG, 2016)
SYMPTOMS: Symptoms of exposure to this compound include mild irritation of the skin and eyes, diarrhea and gastrointestinal irritation. It may also cause nausea, pulmonary edema and coma. Gastrointestinal disturbances may occur. ACUTE/CHRONIC HAZARDS: This compound is a mild irritant of the skin and eyes. When heated to decomposition it emits toxic fumes of nitrogen oxides, sulfur oxides and ammonia. (NTP, 1992)

4.3 Indication of immediate medical attention and special treatment needed, if necessary

PREHOSPITAL/ Consult with the base station physician or the regional poison control center for advice regarding triage of multiple victims. Patients with evidence of significant exposure such as skin or eye irritation, pain, or breathing difficulties should be transported to a medical facility for evaluation. Others may be discharged from the scene after their names, addresses, and telephone numbers are recorded. Those discharged should be advised to seek medical care promptly if symptoms develop

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Specific hazards arising from the chemical

Special Hazards of Combustion Products: Toxic and irritating vapors are generated when heated. (USCG, 1999)
Fire may produce irritating or poisonous gases. Containers may explode in heat of fire. At high temperatures, it decomposes into hydrogen and chlorine. The following materials should be avoided: Mercuric sulfate -- violent reaction with gaseous hydrochloric acid at 250F. Sodium -- reacts vigorously with gaseous hydrochloric acid. Acetic anhydride, 2-aminoethanol, ammonium hydroxide, chlorosulfonic acid, ethylene diamine, ethyleneimine, oleum, propiolactone, sodium hydroxide, sulfuric acid, and vinyl acetate -- increase in temperature and pressure when mixed with hydrochloric acid. Calcium phosphide -- energetic reaction with hydrochloric acid. Silver perchlorate and carbon tetrachloride -- when mixed in combination with hydrochloric acid forms a compound that detonates at 105F. Formaldehyde -- when mixed with hydrochloric acid forms a human carcinogen. Material reacts violently with bases and is corrosive with the generation of heat. Reacts with base metals, forming combustible gas (hydrogen). Reacts violently with strong oxidants forming toxic gas (chlorine). Avoid heat; at high temperatures it will decompose into hydrogen and chlorine. (EPA, 1998)
Excerpt from ERG Guide 125 [Gases - Corrosive]: Some may burn but none ignite readily. Vapors from liquefied gas are initially heavier than air and spread along ground. Some of these materials may react violently with water. Cylinders exposed to fire may vent and release toxic and/or corrosive gas through pressure relief devices. Containers may explode when heated. Ruptured cylinders may rocket. For UN1005: Anhydrous ammonia, at high concentrations in confined spaces, presents a flammability risk if a source of ignition is introduced. (ERG, 2016)
This chemical is probably combustible. (NTP, 1992)

5.3 Special protective actions for fire-fighters

In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep cylinder cool by spraying with water. Combat

fire from a sheltered position.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Ventilation. Remove gas with fine water spray.

6.2 Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Ventilation. Remove gas with fine water spray.

6.3 Methods and materials for containment and cleaning up

Accidental release measures. Personal precautions, protective equipment and emergency procedures: Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.; Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains.; Methods and materials for containment and cleaning up: Clean up promptly by sweeping or vacuum.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

Cool. Fireproof if in building. Separated from food and feedstuffs and incompatible materials. See Chemical Dangers. Keep in a well-ventilated room.Keep container tightly closed in a dry and well-ventilated place. Storage class (TRGS 510): Gases

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

TLV: 2 ppm as STEL; A4 (not classifiable as a human carcinogen).MAK: 3.0 mg/m3, 2 ppm; peak limitation category: I(2); pregnancy risk group: C.EU-OEL: 8 mg/m3, 5 ppm as TWA; 15 mg/m3, 10 ppm as STEL

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Cold-insulating gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Hydrochloric acid, solution is a colorless watery liquid with a sharp, irritating odor. Consists of hydrogen chloride, a gas, dissolved in water. Sinks and mixes with water. Produces irritating vapor. (USCG, 1999)
Colour	Colorless gas
Odour	Pungent, irritating odor
Melting point/freezing point	-38°C(lit.)
Boiling point or initial boiling point and boiling range	100°C(lit.)
Flammability	Nonflammable Gas
Lower and upper explosion limit/flammability limit	no data available
Flash point	17°C

Auto-ignition temperature	Not flammable (USCG, 1999)
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	0.405 cP (liquid at 118.16 K); 0.0131 cP (vapor at 273.06 K); 0.0253 cP (vapor at 523.2 K)
Solubility	82.3 g/100 g at 32° F (NTP, 1992)
Partition coefficient n-octanol/water	0.25
Vapour pressure	613 psi (21.1 °C)
Density and/or relative density	1.2g/mLat 25°C(lit.)
Relative vapour density	1.3 (vs air)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

The solution in water is a strong acid. It reacts violently with bases and is corrosive. Reacts violently with oxidants. This produces toxic gas (chlorine - see ICSC 0126). Attacks many metals in the presence of water. This produces flammable/explosive gas (hydrogen - see ICSC 0001).

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

The gas is heavier than air and may accumulate in lowered spaces causing a deficiency of oxygen.HYDROCHLORIC ACID is an aqueous solution of hydrogen chloride, an acidic gas. Reacts exothermically with organic bases (amines, amides) and inorganic bases (oxides and hydroxides of metals). Reacts exothermically with carbonates (including limestone and building materials containing limestone) and hydrogen carbonates to generate carbon dioxide. Reacts with sulfides, carbides, borides, and phosphides to generate toxic or flammable gases. Reacts with many metals (including aluminum, zinc, calcium, magnesium, iron, tin and all of the alkali metals) to generate flammable hydrogen gas. Reacts violently with acetic anhydride, 2-aminoethanol, ammonium hydroxide, calcium phosphide, chlorosulfonic acid, 1,1-difluoroethylene, ethylenediamine, ethyleneimine, oleum, perchloric acid, b-propiolactone, propylene oxide, silver perchlorate/carbon tetrachloride mixture, sodium hydroxide, uranium(IV) phosphide, vinyl acetate, calcium carbide, rubidium carbide, cesium acetylide, rubidium acetylide, magnesium boride, mercury(II) sulfate [Lewis]. Mixtures with concentrated sulfuric acid can evolve toxic hydrogen chloride gas at a dangerous rate. Undergoes a very energetic reaction with calcium phosphide [Mellor 8:841(1946-1947)].

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

The aqueous solution is a strong acid. Corrosive fumes emitted on contact with air. Reacts violently with bases, oxidizers forming toxic chlorine gas. Reacts, often violently, with acetic anhydride, active metals, aliphatic amines, alkanolamines, alkylene oxides, aromatic amines, amides, 2-aminoethanol, ammonia, ammonium hydroxide, calcium phosphide, chlorosulfonic acid, ethylene diamine, ethyleneimine, epichlorohydrin, isocyanates, metal acetylides, oleum, organic anhydrides, perchloric acid, 3-propiolactone, uranium phosphide, sulfuric acid, vinyl acetate, vinylidene fluoride. Highly corrosive to most metals, forming flammable hydrogen gas. Attacks some plastics, rubber, and coatings.

10.6 Hazardous decomposition products

When heated to decomp it emits toxic fumes of Cl- /Hydrochloric acid/.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 Rabbit oral 900 mg/kg
- Inhalation: LC50 Rat inhalation 3124 ppm/1 hr
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Evaluation: There is inadequate evidence for the carcinogenicity in humans of hydrochloric acid. There is inadequate evidence for the carcinogenicity in experimental animals of hydrochloric acid. Overall evaluation: Hydrochloric acid is not classifiable as to its carcinogenicity to humans (Group 3).

Reproductive toxicity

No information is available on the reproductive or developmental effects of hydrochloric acid in humans. In rats exposed to hydrochloric acid by inhalation, severe dyspnea, cyanosis, and altered estrus cycles have been reported in dams, and increased fetal mortality and decreased fetal weight have been reported in the offspring.

STOT-single exposure

Rapid evaporation of the liquid may cause frostbite. The substance is corrosive to the eyes, skin and respiratory tract. Inhalation of this gas may cause asthma-like reactions (RADS). Exposure could cause asphyxiation due to swelling in the throat. Inhalation of high concentrations may cause lung oedema, but only after initial corrosive effects on the eyes and the upper respiratory tract have become manifest. Inhalation of high concentrations may cause pneumonitis. See Notes.

STOT-repeated exposure

Repeated or prolonged inhalation may cause effects on the teeth. This may result in tooth erosion. The substance may have effects on the upper respiratory tract and lungs. This may result in chronic inflammation of the respiratory tract and reduced lung function . Mists of this strong inorganic acid are carcinogenic to humans. See Notes.

Aspiration hazard

A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: LC50; Species: Lepomis macrochirus (Blue gill); Conditions: artificial water, flow-through, 20 +/ -1 deg C, dissolved oxygen 5-9 mg/L; Concentration: 24.6 mg/L for 96 hr for small and medium size fish; 30.9 mg/L for 96 hr for large size fish.
- Toxicity to daphnia and other aquatic invertebrates: no data available
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

Hydrogen chloride dissociates readily in water to chloride and hydronium ions(1). Therefore, hydrogen chloride does not accumulate in the aquatic organisms(1,2).

12.4 Mobility in soil

Hydrogen chloride dissociates into chloride and hydronium ions in moist soil(1).

12.5 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

14.1 UN Number

ADR/RID: UN2186 (For reference only, please check.)	IMDG: UN2186 (For reference only, please check.)	IATA: UN2186 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: HYDROGEN CHLORIDE, REFRIGERATED LIQUID (For reference only, please check.)	IMDG: HYDROGEN CHLORIDE, REFRIGERATED LIQUID (For reference only, please check.)	IATA: HYDROGEN CHLORIDE, REFRIGERATED LIQUID (For reference only, please check.)

14.3 Transport hazard class(es)

ADR/RID: 2.3 (For reference only, please check.)	IMDG: 2.3 (For reference only, please check.)	IATA: 2.3 (For reference only, please check.)

14.4 Packing group, if applicable

ADR/RID: (For reference only, please check.) IMDG: (For reference only, please check.) IATA: (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: No IMDG: No IATA: No

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Hydrogen chloride	Hydrogen chloride	7647-01-0	231-595-7
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

SECTION 16: Other information

Information on revision

Creation Date July 15, 2024
Revision Date February 01, 2025

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home
- HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
- IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple
- ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg
- Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp
- ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Other Information

The occupational exposure limit value should not be exceeded during any part of the working exposure.The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.IARC considers mists of strong inorganic acid to be carcinogenic (group 1). However there is no information available on the carcinogenicity of other physical forms of this substance. Therefore no classification for carcinogenicity under GHS has been applied.Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.Other UN number(s) 2186 (refridgerated liquid) hazard class: 2.3; subsidiary hazard: 8; 1789 (hydrochloric acid) hazard class: 8, pack group II or III.Aqueous solutions may contain up to 38% hydrogen chloride.

Any questions regarding this SDS, Please send your inquiry to info@cato-chem.com

Disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. We as supplier shall not be held liable for any

damage resulting from handling or from contact with the above product.