

Taiwan Chlorine Industries Ltd.
SAFETY DATA SHEET (SDS)

SDS-TCI-Rev.5

I. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: 32% Hydrochloric Acid
Synonyms: Muriatic Acid; Hydrogen Chloride Solution
Recommended use and restrictions on use: 1. Chemical intermediates, food processing, pickling or cleaning of metal, water treatment. 2. Reacting with metal will generate flammable hydrogen gas and lead to explosion.
Names, addresses, and phone numbers of the manufacturer or supplier: Taiwan Chlorine Industries Ltd. 25 Chung Chih Street, Hsiao Kang District, Kaohsiung, Taiwan Tel. (07) 8715171
Emergency contact phone numbers/fax numbers: Tel: 07-8716923 Fax: 07-8717289

II. HAZARD IDENTIFICATION

A. Product Hazard Class: Acute Toxicity: Acute toxic substances Level 4 (swallowing), acute toxic substances Level 3 (inhalation), metal corrosion Level 1, corrosion / irritation of skin substances Level 1, severe damage / irritation of the eyes substances Level 1.
B. Labeling Information: Hazard Symbols:  Warnings: Danger Hazard Warnings: Harmful if swallowed. Toxic by inhalation. May be corrosive to metals. Cause severe skin burns and eye damage. Cause serious eye damage. PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORAGE: 1. Wear appropriate personal protective equipment when handling this product. 2. Avoid contacting with eyes or skin. In case of eye/skin contact, rinse with plenty of water and seek medical attention immediately. 3. Spray water fog cooling HCl container exposed to fire to prevent the container burst, and hydrochloric acid gas leak which cause equipment damage and environmental pollution. 4. Neutralize the spill with diluted caustic (NaOH, NH ₄ OH, Na ₂ CO ₃) solution and flush into waste water system. Use water curtain to absorb fume and reduce air pollution.
Other Hazards: Major Symptoms: Irritation, choking, coughing, burning, ulcers, pulmonary edema, skin inflammation, blindness, tooth discoloration, chronic bronchitis.

III. COMPOSITION, INFORMATION ON INGREDIENTS

Pure material:

Chinese and English name: 32% 鹽酸 / 32% Hydrochloric Acid
Synonyms: Aqueous Hydrogen Chloride, Muriatic acid, Spirits of salt

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Chemical Abstract Service No. (CAS NO.: 7647-01-0)

The hazardous ingredient (% of the content): 32%

IV. FIRST AID MEASURES

The first aid measures for different exposure routes:

A. INHALATION:

1. Remove the pollutant or move casualty to fresh air.
2. If breathing is difficult, provide oxygen.
3. Maintain casualty's temperature and keep at rest.
4. Get medical attention immediately.

B. SKIN/EYE CONTACT:

1. Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing (wear contact lenses must first remove).
2. Do not interrupt the wash.
3. Contaminated clothing must be washed before reuse or discard.
4. Get medical attention immediately.

C. INGESTION:

1. If casualty is unconscious or convulsing, do not feed anything by mouth.
2. Let casualty wash out mouth with water; do not induce vomiting.
3. Allow casualty to drink 240 to 300 ml of water; can drink milk after water.
4. If casualty is spontaneous vomiting, leaning forward so as not to let the inhalation of vomit, rinse repeatedly.
5. Get medical attention immediately.

The most important symptoms and hazardous effects:

Highly corrosive; inhalation may cause pulmonary edema; eye contact may cause burns and even blindness.

For protection of emergency personnel: should wear C level protective clothing and do the first aid in the safe area.

Physician's Tip: When inhaled, consider giving oxygen to support; avoid gastric lavage and induce vomiting

V. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media: Product is not flammable. Use appropriate media for adjacent fire.

Specific hazards may be encountered during fire-fighting: Material can react with metals to produce flammable hydrogen gas.

Special fire-fighting methods:

1. Water fog to cool containers exposed to fire to prevent bursting of the container, and thus reduce or disperse vapors.
2. Do not spray water directly on leak.

Special protective equipment and precautions for firefighters:

Firefighters should wear full body chemical protective clothing and breathing apparatus (wear a flash fire plus anti-coated aluminum jacket when it is necessary).

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VI. ACCIDENTAL RELEASE MEASURES

Personal Precautions:

1. No one is allowed to access to the spilled area until it is cleaned.
2. Only the trained people are responsible for cleaning up.
3. Only the personnel who wear appropriate personal protective equipment are allowed to enter the danger area from the upwind place.

Environmental Precautions:

1. Isolate hazardous area.
2. Only the trained personnel who wear positive pressure self-contained breathing apparatus (SCBA) and protective clothing and equipment are responsible to handle the clean-up.
3. Report to the related occupational health and safety and environmental protection units.
4. Consider evacuating people live in downwind places.

Steps to be taken if material is released or spilled:

1. Do not touch the spillage.
2. Prevent spillage from entering drains, sewers or confined spaces.
3. Try to prevent or reduce spillage under safety permit conditions.
4. Use sand, earth or other non-reactive absorbing substances to block the spills.
5. The contaminated absorbing substances have the same hazards, so they shall be stamped or sealed and placed in labeled containers.
6. Water and dilute the spilled area or spray water fog to stop the vapors.
7. Do not put water directly into the container; arrange the vacuum pump trucks to collect waste water.
8. Contact and ask firefighting units and government authorities for assistance.

VII. HANDLING AND STORAGE

Handling:

1. Keep good ventilation in the workplace that will avoid gathering hydrogen generated from vapor, mist or pickling.
2. When diluting solution, the acid should be added to the water slowly to avoid splashing.
3. The container should be labeled, tightly closed to avoid damage when not in use.

Storage :

1. Store in a cool, dry, ventilated area, away from direct sunlight or heat sources.
2. Storage containers should be checked regularly.
3. The storage area should use corrosion-resistant building materials, lighting and ventilation equipment.
4. The storage tank should have an absorb/exhaust equipment and build a dike spill.
5. Install leak detection alarm system in the storage area.

VIII. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Control:

Install an exhaust system inside the workplace.

Control Parameters:

1. 8-hour Time-Weighted Average (TWA): -
2. Short-Term Exposure Limit (STEL): -
3. Maximum exposure limits (CEILING): 5 ppm
4. Biological indicators BEIs: --

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<p>Personal Protective Equipment: Respiratory Protection:</p> <ol style="list-style-type: none"> 1. Below 50 ppm: Use anti-HCl canister containing the respiratory protective equipment, self-contained breathing apparatus. 2. Unknown concentrations: Positive pressure self-contained breathing apparatus, gas-pressurized comprehensive respirator. 3. Escape: Use respirator with anti-acid gas canister. <p>Hand Protection: It had better use impervious gloves that made with butyl rubber, nitrile rubber, Telfon, Barricade, Responder.</p> <p>Eye Protection: Wear chemical safety glasses with a face shield for splash protection.</p> <p>Skin and Body Protection: Long sleeved splash-proof apron or full body protective clothing and boots.</p>
<p>Hygiene Measures:</p> <ol style="list-style-type: none"> 1. Smoking or eating is prohibited in workplace. Wash hands thoroughly after handling of this chemical. 2. Remove contaminated clothing after work, wash before wear or discarded, and make sure the laundry staff are informed of the dangers of pollutants. 3. Maintain the workplace clean.

IX. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Colorless or light yellow liquid smoke	Odor: Pungent, irritating.
Odor threshold: 1~5ppm (detected)	Melting point: --
pH value: 1.1 (0.1N solution)	Boiling point/Boiling point range: 108°C
Flammability (solid / gas): --	Flashing point: Noncombustible
Decomposition temperature: --	Test method: <input type="checkbox"/> open cup <input type="checkbox"/> closed Cup
Auto-ignition temperature: /	Explosive limits: -
Vapor pressure: 38.9 mmHg@ 25°C	Vapor density (air=1): 1.268
Specific Gravity (Water=1): 1.16 @ 20°C	Solubility: complete
Partition coefficient: n-Octanol / water: (log/Kow)--	Evaporation rate: /

X. STABILITY AND REACTIVITY

<p>Stability: Stable at normal condition.</p> <p>Possible hazardous reactions under specific conditions:</p> <ol style="list-style-type: none"> 1. It is not polymerized, but when contacting certain incompatible materials (e.g., epoxide), the polymerization reaction occurs. 2. With metal: generate flammable hydrogen gas. 3. With Alkali (such as sodium hydroxide, amines): vigorous reaction heat and pressure. 4. With aldehydes, epoxides: may cause violent polymerization, generating heat and pressure. 5. With reductant: may release heat that cause fire and release flammable hydrogen gas. 6. With oxidant: may react and emit heat and corrosive and toxic chlorine gas. 7. With acetylide, borides, carbides, silicides: may generate flammable gases (such as acetylene). 8. With cyanides, sulfides: may produce toxic gas (hydrogen cyanide or sulfide). 9. With phosphide: may emit toxic and flammable phosphine.

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Conditions to avoid:

1. Avoid contacting metal oxides, organic compounds, and alkaline substances that will produce quick response.
2. Contact with bleach water, sulfuric acid, and cyanide will release toxic gases.

Materials to avoid: metal, alkali (such as sodium hydroxide, amines), aldehydes, epoxides, reducing agents, oxidizing agents, explosives, acetylene compounds, borides, carbides, silicides, cyanides, sulfides, phosphorus compounds.

Hazardous decomposition products: --

XI. TOXICOLOGICAL INFORMATION

Routes of exposure: inhalation, ingestion, skin contact, eye contact

Symptoms: Stimulating sensation, coughing, choking sensation, burns, ulcers, pulmonary edema, dermatitis, discoloration of the teeth, blindness, chronic bronchitis.

Acute toxicity:

Skin:

Can cause severe irritation, swelling and pain, corrosion damage and permanent scars.

Inhalation :

1. Inhalation of mists can cause corrosive action on mucous membranes. Symptoms include burning, choking, coughing, wheezing, laryngitis, shortness of breath, headache or nausea.
2. (50 ~ 100ppm): If exposure time is too long, it can cause nose and throat burns and ulcers.
3. 1000 ~ 2000ppm: It will cause fatal pulmonary edema in few minutes. But its symptoms (such as shortness of breath) may occur after several hours.

Ingestion:

Severe and rapid corrosive burns of the mouth, gullet and gastrointestinal tract will result if swallowed. Its symptoms include difficulty swallowing, nausea, vomiting, diarrhea, or even collapse or death if ingest too much.

Eye:

1. The vapor or mist with low concentration (10 ~ 35ppm) will immediately make eye redness.
2. Splashing or exposure to vapor or mist with high concentrations will cause severe irritation, burns and even blindness.

LD50 (Test animals, absorption means): 900 mg/kg (Rat, Ingestion)

LC50 (Test animals, absorption means): 3124 ppm/H (Rat, Inhaled)

5mg/30S (rabbit, Eye): Cause mild irritation.

Chronic Toxicity or Long-term Toxicity:

1. Exposure to low concentrations will make teeth become brown, skin redness, pain, cause skin inflammation and may cause nose and gum bleeding or chronic bronchitis and gastritis.
2. Exposure to high concentrations can cause dental erosion.

450 mg / m³ / hr (1-day pregnant female rats, inhalation) caused by poisoning and embryonic development is not normal.

IARC to be ranked as Group 3: Unable to determine carcinogenic to humans.

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XII. ECOLOGICAL INFORMATION

Ecotoxicological: LC50(fish): 0.282mg/L/96H EC50(Aquatic invertebrates): -- BCF: --
Persistence and Degradability: Half-life (air): -- Half-life (water surface): -- Half-life (groundwater): -- Half-life (soil): --
Bioaccumulative potential: Does not accumulate in the body.
Mobility in soil: It will penetrate the soil, and dissolve the materials in the soil, especially the carbonate materials.
Other adverse effects: --

XIII. DISPOSAL CONSIDERATIONS

Methods of Waste Disposal: 1. The waste treatment should appoint a qualified vendor to perform clearance and disposal of waste. 2. It is prohibited to dump the waste into the gutters.

XIV. TRANSPORT INFORMATION

UN Number: 1789
UN Proper Shipping Name: Hydrochloric Acid Solution
Transport Hazard Class: 8 (Corrosive)
Packing Group: II
Marine Pollutant (Y/N): N
Specific transportation measures and precautionary conditions: Road Traffic Safety Rule 84.

XV. REGULATORY INFORMATION

Applicable Regulations:	
1. Occupational Safety and Health Act	4. Rules of DG and Hazardous material labeling and identification
2. Specific chemical hazard prevention standards	5. Permissible Exposure standards in the workplace
3. Road safety rules	6. Storage and disposal regulations for industrial wastes

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XVI. OTHER INFORMATION

Literature reference	ITRI Serial No.: 298 Hydrochloric Acid SDS	
Organization that prepared the MSDS	Company: Taiwan Chlorine Industries Ltd.	
	Address / Tel.: 25 Chung Chih Street, Hsiao Kang District Kaohsiung / (07) 8715171	
Person	Title: QA and Logistic Manager	Name: M.S. Liu
Date issued	Revised on Jan. 15, 2018	
Remarks	The above-mentioned symbol "--" means "The information is not available."	

This SDS comes from Taiwan Chlorine Industries Ltd. and refers to the proper information and documents. It is for reference only.