

Hydrochloric Acid 36%

Date of Preparation: September 2003

Revision: 2

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: Hydrochloric Acid**Chemical Formula:** HCl**Other Designations:** Aqueous hydrogen chloride; Hydrochloric acid; Hydrochloric acid gas; Hydrochloride; Muriatic Acid.**General Use:** Electronic grade for etching semiconductor crystals, pickling and heavy duty cleaning of metal parts, rust and scale removal.**Manufacturer:** Kanto Corporation, 13424 N. Woodrush Way, Portland, OR 97203**Non-Emergency Contact:** Customer Service, Phone (503) 283-0405, FAX (503) 240-0409

For All Transportation Emergencies Call CHEMTREC at 1-800-424-9300

Section 2 - Composition / Information on Ingredients

Ingredient Name	CAS Number	% vol
Hydrogen chloride	7647-01-0	36
De-Ionized Water	7732-18-5	64

Occupational Exposure Limits

Ingredient	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH
	TWA	STEL	TWA	STEL	TWA	STEL	IDLH
Hydrochloric Acid	None Established	5 ppm 7 mg/m ³ (Ceiling)	None Established	5 ppm 7 mg/m ³ (Ceiling)	None Established	5 ppm 7 mg/m ³ (Ceiling)	50 ppm

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Corrosive. Can cause severe burns to eyes, skin, and respiratory tract. Chronic exposure can erode teeth and cause bronchitis. Characteristic pungent odor. Contact with metals can release flammable hydrogen gas. Decomposition can release toxic chlorine gas.

HMIS
H 2
F 0
R 1

PPE[†]
[†]Sec. 8

Potential Health Effects

Primary Entry Routes: Inhalation, skin and eye contact.**Target Organs:** Eyes, skin, and respiratory system.**Acute Effects**

Inhalation: Extremely discomforting vapor may cause severe mucous membrane damage, spasms, extreme irritation of larynx and bronchi, chemical pneumonia and pulmonary edema, coughing and choking; bleeding of nose, inflammation and occasionally ulceration of the nose, throat and larynx. Fluid on the lungs followed by generalized lung damage may follow. Hazard is increased at higher temperatures. Continued severe exposure can result in pulmonary edema and corrosion of tissues in the nose and throat.

Eye: Extremely painful contact and may cause rapid corneal damage. Liquid and vapor are extremely corrosive to the eyes and is capable of causing severe damage with loss of sight.

Skin: Corrosive and may cause chemical burns. Toxic effects may result from skin absorption.

Ingestion: Extremely corrosive if swallowed and capable of causing burns to mouth, throat, and esophagus, with extreme discomfort, pain, nausea, abdominal irritation. May be fatal if swallowed in quantity.

Carcinogenicity: IARC Group 3 carcinogen.

Medical Conditions Aggravated by Long-Term Exposure: Asthma and inflammatory or fibrotic pulmonary edema, atelectasis and emphysema and damage to the pulmonary blood vessels and liver; pre-existing skin conditions.

Chronic Effects: Chronic exposure may cause discoloration or erosion of the teeth, bleeding of the nose and gums and ulceration of the nasal mucous membranes. Repeated or prolonged exposure to dilute solutions may cause dermatitis. Repeated exposure to low vapor concentrations can cause skin tenderness, bleeding of the nose and gums, chronic bronchitis, gastritis.

Section 4 - First Aid Measures

Eye Contact: Gently lift eyelids and flush immediately and continuously with copious amounts of water for at least 15 minutes. Do not allow the victim to rub or keep eyes tightly shut. Consult an ophthalmologist immediately.

Skin Contact: Rinse with flooding amounts of water, while removing contaminated clothing, for at least 15 minutes. Wash with soap and water. Seek medical attention immediately. Wash clothing before reuse.

Ingestion: If the victim is conscious, give large amounts of water. Seek medical attention immediately. Never give anything by mouth to an unconscious or convulsing person.

Inhalation: Remove exposed person to an uncontaminated atmosphere and support breathing. If not breathing, give artificial respiration. Seek medical attention immediately.

After first aid, seek appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to strong acids:

1. Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
2. Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling.
3. Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
4. Strong acids produce a coagulation necrosis characterized by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

Section 5 - Fire-Fighting Measures

Flash Point: Nonflammable

Auto ignition Temperature: Not applicable

LEL: Not applicable

UEL: Not applicable

Extinguishing Media: Water spray, dry chemical, carbon dioxide, or foam.

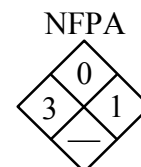
General Fire Hazards: Noncombustible liquid, but heat produces highly toxic chlorine fumes and vapors.

Hazardous Combustion Products: Heating may cause expansion or decomposition leading to violent rupture of containers. Reacts with metals producing flammable and explosive hydrogen gas. Contact with moisture or water may generate heat-causing ignition. Moderate fire hazard when in contact with reducing agents.

Fire Incompatibility: Reacts with metals producing flammable and explosive hydrogen gas.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard. Wear full body protective clothing with breathing apparatus. Prevent spillage from entering drains and waterways. Consider evacuation. Cool fire-exposed containers with water spray from a protected location. Water spray or fog may be used to disperse vapor. If safe to do so, remove containers from path of fire. Equipment should be thoroughly decontaminated after use.

Fire-Fighting Equipment: Because fire produces toxic thermal oxidation products, wear self-contained breathing apparatus (SCBA) with full-face piece operated in pressure-demand or positive-pressure mode.



Section 6 - Accidental Release Measures

Small Spills: Clean up spills immediately. Clear area of personnel. Wear fully protective clothing and breathing apparatus. Avoid breathing vapors and contact with skin and eyes. Contain and absorb spill with sand, earth, inert material or vermiculite. Use soda ash or slaked lime to neutralize. Collect residues and place in labeled plastic containers with vented lids. Water spray or fog may be used to disperse vapor.

Large Spills: Contact fire department and tell them location and nature of hazard. Clear area of personnel and move upwind. Wear full body protective clothing with breathing apparatus. Prevent spillage from entering drains or waterways if possible. Shut off all possible sources of ignition and increase ventilation. Water spray or fog may be used to disperse vapor. Use soda ash or slaked lime to neutralize. Collect and seal in labeled drums for disposal. Wash spill area with large quantities of water. If contamination of drains or waterways occurs, advise emergency services. After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and reusing.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid generating and breathing mist and vapor, and contact with skin and eyes. Use in a well-ventilated area. Wear protective clothing and gloves when handling containers. Handle and open container with care. Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. Local exhaust ventilation may be required for safe working. Avoid sources of heat.

Recommended Storage Methods: Packaging as recommended by manufacturer. Check that containers are clearly labeled. Ensure the use of compatible materials of construction.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls

Ventilation: Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or non-routine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA.

Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance and Odor: Clear to light yellow with sharp suffocating odor.

Odor Threshold: 1-5ppm

Vapor Pressure: 160 mmHg

Vapor Density (Air=1): >1

Formula Weight: 36.46

Density: ~1.1

pH: <1

Water Solubility: Miscible

Boiling Point: 85°C (185°F)

Freezing: -15°C (-5°F)

Viscosity: No information available

% Volatile: >90

Evaporation Rate(Butyl Acetate=1): 2

Specific Gravity (H₂O=1, at 4 °C): 1.18 at 20°C

Section 10 - Stability and Reactivity

Stability: Product is considered stable under normal handling conditions.

Polymerization: Hazardous polymerization will not occur.

Chemical Incompatibilities: Alkalis, oxidizing agents and chemicals readily decomposed by acids. Avoid storage with metals, metal oxides, hydroxides, amines, carbonates, alkaline materials, acetic anhydride, cyanides, sulphides, sulphites, phosphides, acetylides, borides, carbides, silicides, vinyl acetate, formaldehyde and potassium permanganate. Reacts with zinc, brass, galvanized iron, aluminum, copper and copper alloys. May generate sufficient heat to ignite combustible materials.

Conditions to Avoid: Heat, sunlight, and incompatible materials.

Hazardous Decomposition Products: May release toxic chlorine gas and flammable and explosive hydrogen gas.

Section 11- Toxicological Information***Toxicity**

Inhalation, human, LC_{L0}: 1300 ppm/30 m

Inhalation, human, LC_{L0}: 3000 ppm/5 m

Inhalation, rat, LC₅₀: 3124 ppm/60 m

Oral, rabbit, LD₅₀: 900mg/kg

Irritation

Eye (rabbit): 5mg/30 s – mild

Chronic Effects: Dermatitis, erosion of teeth and gums, bronchitis, and gastritis.

Carcinogenicity: IARC Group 3

Mutagenicity: Sex chromosome loss and disjunction.

Reproductive: Rat, inhalation: Fetotoxicity, developmental homeostasis.

*See NIOSH, RTECS (MW4025000), for additional toxicity data.

Section 12 - Ecological Information

Ecotoxicity: Mosquito fish, 282 ppm/96 hr/fresh water. Bluegill sunfish: 3.6 mg/1 / 48 hr. Goldfish: 178mg/1 (1 to 2 hour survival time).

Environmental Fate: Atmospheric releases will be removed by rainfall. In water, hydrochloric acid dissociates into chloride and hydronium ions, which lowers the pH of the water. In soil, hydrochloric acid will either evaporate or dissociate into chloride and hydronium ions. Hydrogen chloride does not accumulate in the food chain.

Section 13 - Disposal Considerations

Disposal: Recycle wherever possible. Consult manufacturer for recycling options. Treat and neutralize at an effluent treatment plant. Bury residue in an authorized landfill. Decontaminate empty containers with lime slurry. Return empty containers to supplier or bury empty containers at an authorized landfill.

Disposal Regulatory Requirements: See Federal, state and local regulations for applicable disposal requirements.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

Shipping Name: Hydrochloric acid

Hazard Class: 8

ID No.: UN 1789

Packing Group: II

Label: 8

Special Provisions: A3, A6, B3, B15, IB2, N41, T8, TP2, TP12

Packaging Authorizations

Exceptions: 173.154

Non-bulk Packaging: 173.202

Bulk Packaging: 173.242

Quantity Limitations

Passenger, Aircraft, or Railcar: 1L

Cargo Aircraft Only: 30L

Vessel Stowage Requirements

Vessel Stowage: C

Emergency Response Guidebook #157

Section 15 - Regulatory Information

EPA Regulations:

RCRA Hazardous Waste Number (40 CFR 261.22): D002

RCRA Hazardous Waste Classification (40 CFR 261.21): Characteristics of Corrosivity

CERCLA Hazardous Substance (40 CFR 302.4) listed specific per RCRA, Sec. 3001; CWA, Sec. 311 (b)(4); CWA, Sec. 307(a), CAA, Sec. 112

CERCLA Reportable Quantity (RQ): 5000 lb (2268 kg)

SARA 311/312 Codes: Acute, Chronic

SARA Toxic Chemical (40 CFR 372.65): Listed

SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not listed

TSCA: Listed

OSHA Regulations:

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): Listed

Section 16 - Other Information

Revision Notes: Revision to Sections 4, 9, 14, and 15.

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