IDENTITY
Hydrochloric Acid, All Grades

Section I - Product Information

<table>
<thead>
<tr>
<th>Product Name</th>
<th>CAS #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochloric Acid</td>
<td>7647-01-0</td>
</tr>
<tr>
<td>Synonym</td>
<td>Chemical Formul</td>
</tr>
<tr>
<td>Muriatic Acid</td>
<td>HCl</td>
</tr>
<tr>
<td>Chemical Name</td>
<td>Chemical Famil</td>
</tr>
<tr>
<td>Hydrochloric Acid Solution</td>
<td>Inorganic Aqueous Acid</td>
</tr>
</tbody>
</table>

Section II - Manufacturers Information

<table>
<thead>
<tr>
<th>Manufacturers Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reagent Chemical &amp; Research, Inc.</td>
<td>115 US Hwy 202 Ringoes, NJ 08551</td>
</tr>
<tr>
<td>Emergency Contact</td>
<td>Country</td>
</tr>
<tr>
<td>Robert Dritschel</td>
<td>United States</td>
</tr>
<tr>
<td>Emergency Telephone</td>
<td></td>
</tr>
<tr>
<td>1-409-899-3400</td>
<td>Emergency Telephone #: CHEMTREC 1-800-424-9300</td>
</tr>
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</table>

Section III - Ingredients/Regulatory Information

<table>
<thead>
<tr>
<th>Substance Description</th>
<th>Percent</th>
<th>CAS #</th>
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</thead>
<tbody>
<tr>
<td>Hydrogen Chloride</td>
<td>10.00 - 36.90</td>
<td>7647-01-0</td>
</tr>
<tr>
<td>Water</td>
<td>63.10 - 90.00</td>
<td>7732-18-5</td>
</tr>
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</table>

EXPOSURE LIMITS/REGULATORY INFORMATION

<table>
<thead>
<tr>
<th>Substance</th>
<th>PEL</th>
<th>TLV</th>
<th>STEL</th>
<th>TWA</th>
<th>CEILING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Chloride</td>
<td>C-7 mg/m3</td>
<td>C-5 ppm</td>
<td>50 ppm</td>
<td>N/D</td>
<td>5 ppm</td>
</tr>
<tr>
<td>Water</td>
<td>N/D</td>
<td>N/D</td>
<td>N/D</td>
<td>N/D</td>
<td>N/D</td>
</tr>
</tbody>
</table>

N/D - Not Determined  C = Ceiling Level

Section IV - Hazards Identification

Appearance & Odor: Clear/Pale Yellow Liquid/Pungent Odor

Statement of Hazards: Severe and painful burns upon contact

Primary Route of Exposure:
Skin, eye and inhalation contact are the primary routes of exposure to this product.

Inhalation Acute Exposure Effects:
Inhalation of excessive concentrations of Hydrogen Chloride vapors immediately produces severe irritation of the upper respiratory tract; resulting in coughing, burning of the throat, and a choking sensation. Reactions encountered in man have usually been limited to inflammation occasional ulceration of the nose, throat and larynx. If inhaled deeply, edema of the lungs may occur.

Skin Contact Acute Exposure Effects:
Concentrated solutions are destructive to clothing and on contact with skin, cause severe burns unless promptly washed off. Repeated skin contact with dilute solutions may lead to the development of dermatitis. Exposure to the concentrated vapors of Hydrogen Chloride may also result in burns and dermatitis.
Section IV - Hazards Identification (continued)

Eye Contact Acute Exposure Effect:
Contact of the eyes with Hydrogen Chloride, either as a gas or in solution, rapidly causes severe irritation and painful burns of the eyes and eyelids. If the acid is not quickly removed by thorough irrigation with water, there may be prolonged or permanent visual impairment or total loss of sight.

Ingestion Acute Exposure Effect:
When concentrated Hydrochloric Acid is swallowed, it causes severe burns of the mucous membranes of the mouth, esophagus and stomach. The lips and mouth usually turn white, and later brown. There is pain in the throat and stomach, difficulty in swallowing, intense thirst, nausea and in severe cases, collapse and unconsciousness.

Fire and Explosion Hazard:
Non-flammable, but Hydrochloric Acid reacts with all metals, except gold and platinum, with rapid evolution of Hydrogen which is flammable and explosive in air. Firefighters exposed to Hydrochloric Acid vapors should wear Scott Air-Pak, or equivalent. Hydrogen Chloride vapors are extremely irritating to the respiratory tract and may cause breathing difficulty.

Carcinogenicity
IARC ...No OSHA ...No ACGIH ...No

Section V - First Aid Measures

General
It a known exposure occurs or is suspected, immediately initiate the recommended procedures below. Simultaneously contact a physician, or the nearest Poison Control Center. Inform the person contacted of the type and extent of exposure, describe the victim's symptoms and follow the advice given. For additional information, call day or night, Reagent Chemical (409) 962-5769 or Chemtrec (800) 424-9300.

Inhalation:
Remove from contaminated atmosphere. If breathing has ceased, clear the victim's airway and start mouth-to-mouth artificial respiration, which may be supplemented by the use of a bag-mask respirator, or a manually-triggered, oxygen supply capable of delivering 1 liter/second or more. If the victim is breathing, oxygen may be administered from a demand-type or continuous-flow inhalator, preferably with a physician's advice. Contact a physician immediately.

Eye Contact:
Immediately flush the eyes with large quantities of running water for 15 minutes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eyes and lids with water. DO NOT attempt to neutralize with chemical agents. Obtain medical attention as soon as possible. Oils or ointments should not be used. Continue the flushing for an additional 15 minutes if the physician is not available.
Section V - First Aid Measures (continued)

**Skin Contact**
Immediately remove contaminated clothing under a safety shower. Flush affected areas with large amounts of water for 15 minutes. DO NOT attempt to neutralize with chemical agents. Obtain medical advice.

**Ingestion**
DO NOT induce vomiting. Immediately give large quantities of water or milk, if available. If vomiting does occur, give fluids again. Never give anything by mouth to an unconscious person. Call a physician of the nearest Poison Control Center.

**Medical Conditions Generally Aggravated by Exposure**
Hydrogen Chloride will aggravate breathing disorders

**Note to Physician**
Attending Physician should treat exposed patients symptomatically.

Section VI - Fire Fighting Measures

<table>
<thead>
<tr>
<th>Flash Point</th>
<th>Flash Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.A.</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

**Extinguishing Method**
Not Applicable

**Unusual Fire and Explosion Hazard**
Non-flammable, but Hydrochloric Acid reacts with metals.

**Special Firefighting Procedures**
Non-flammable, but Hydrochloric Acid reacts with all metals, except gold and platinum, with rapid evolution of Hydrogen which is flammable and explosive in air.

Firefighters exposed to Hydrochloric Acid vapors should wear Scott Air-Pak, or equivalent. Hydrogen Chloride vapors are extremely irritating to the respiratory tract and may cause breathing difficulty.

Section VII - Accidental Release Measures

**Steps to be Taken in Case Material is Released or Spilled**
Spills or discharges into the environment involving large quantities of Hydrochloric Acid should be controlled and cleaned-up according to a pre-determined, affirmative written Spill Prevention and Control Program. For assistance in developing a SPCP, contact your nearest Reagent Sales Office.

Spills should be handled immediately by neutralization and dilution of the spilled product by the use of Soda Ash (Sodium Carbonate), Lime (Calcium Hydroxide), or Limestone (Calcium Carbonate) with large amounts of water. For an interior (inside a closed space) spill be aware that the use of Soda Ash, Lime and Limestone will evolve heat and carbon dioxide and that ample ventilation must be provided.

**Waste Disposal**
Under Federal RCRA, it is the responsibility of the user of products to determine, at the time of disposal, whether the product falls under RCRA as a hazardous waste. This is because product uses, transformations, mixtures, etc. may render the resulting end-product hazardous.

**Container Disposal**
Containers should be cleaned of residual product before disposal. Empty containers should be disposed of in accordance with all applicable laws and regulations.
Section VII - Accidental Release Measures (continued)
Precautions to be Taken in Handling and Storage
Make sure all personnel involved in housekeeping and spill clean-up follow good
Industrial Hygiene practices and wear proper protective equipment.

Section VIII - Handling/Storage/Transportation

Handling
Chemical goggles and full face shield must be worn at all times by personne.
exposed to or handling Hydrochloric Acid. The use of a NIOSH approved cartridge
respirator or a Scott Air-Pak should be used by all personnel exposed.

Storage
Store containers in a cool, dry location away from direct sunlight, sources o:
intense heat, or where freezing may occur. Store material in acid-proof container
Keep container tightly closed when not in use. Keep container away from incompatible
materials. All loading, unloading, and storage equipment must be inspected prior t:
any transfer operations are initiated.

General Comments
Impervious clothing, gloves, footwear and head gear must be worn at all times:
by personnel exposed to or handling Hydrochloric Acid.

Section IX - Exposure Controls/Personal Protection

Respiratory Protection (Specify Type
Maintain airborne contaminate levels below listed guidelines. Use with adequate
ventilation. Use a mechanical fan or vent area to scrubber.

<table>
<thead>
<tr>
<th>Ventilation</th>
<th>Local Exhaust</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>If PEL exceeded</td>
<td>Vent fumes to appropriate scrubber</td>
<td></td>
</tr>
</tbody>
</table>

Skin Protection
Wear neoprene rubber gloves to minimize skin contact.

Eye Protection
Splash goggles or safety glasses. Face shields are recommended.

Other Protection
Use body protection appropriate for task. An apron or other impermeable body
protection is suggested. Full body chemical protection is recommended fo:

emergency response procedures.

Applicable Exposure Limit:
Other than any exposure limits which may be displayed in Section 3, there are no othe:
known exposure limits applicable to this product or its components.

Section X - Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point</td>
<td>230°F</td>
</tr>
<tr>
<td>Specific Gravity (H₂O = 1°)</td>
<td>1.01 - 1.25</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg)</td>
<td>50 - 60 mm</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>-12°F to -63°F</td>
</tr>
<tr>
<td>Vapor Density (AIR = 1°)</td>
<td>N.A. Density</td>
</tr>
<tr>
<td>Density</td>
<td>8.50 - 9.85</td>
</tr>
</tbody>
</table>

Solubility in Water
miscible

Appearance and Odor
Clear/Slightly yellow with a sharp pungent odor

Section XI - Stability and Reactivity

Stability
<table>
<thead>
<tr>
<th>Condition</th>
<th>Unstable</th>
<th>Stable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditions to Avoid</td>
<td>Hydrochloric Acid is extremely reactive. Avoid contact with metal surfaces and oxidizing agents.</td>
<td></td>
</tr>
</tbody>
</table>
Section XI - Stability and Reactivity (continued)

Incompatibility (Materials to Avoid)
Hydrochloric Acid is chemically stable when properly contained and handled. It is a strong mineral acid and reacts with many metals and metal oxides and hydroxide to form the equivalent metal chloride. It reacts with zeolites and other siliciou compounds to form Hydrosilicic Acid; it reacts with carbonates to form Carbor
Dioxide and Water. It is oxidized by Oxygen or electrolysis to form Chlorine, a lethal, poisonous gas. It reacts with aklaline compounds to form a neutral salt. It is a hydrolyzing agent for carbohydrates, esters and other compounds.

Its reaction with most metals will produce Hydrogen, an explosive gas. Violent reactions will result when Hydrochloric Acid Reacts with acetic anhydride,
2-aminoethanol, ammonium hydroxide, calcium phosphide, chlorosulfonic acid,
ethylene diamine, ethylene imine, olem (tuming suituric acid), perchloric acid,
beta propiolactone, propylene oxide, sodium hydroxide, suituric acid, uranium phospide and vinyl acetate. This listing is not all-inclusive.

Hazardous Decomposition or By-products
Extreme heat may cause the product to decompose, producing toxic fumes which may include chlorine compounds.

<table>
<thead>
<tr>
<th>Hazardous Polymerization</th>
<th>May Occur</th>
<th>Conditions to Avoid</th>
<th>Will Not Occur</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Extreme heat and contact with incompatible materials</td>
<td>X</td>
</tr>
</tbody>
</table>

Section XII - Toxicological Information

Route(s) of Entry: Inhalation? Skin? Ingestion?
Yes Yes Yes

Health Hazards (Acute and Chronic)
Hydrochloric Acid, both as a gas and in a solution as Hydrochloric Acid, is a corrosive substance and can cause severe and painful burns on contact with any part of the body or if taken internally. The mucous membranes of the eyes and the upper respiratory tract are especially susceptible to the irritating effects of high atmospheric concentrations of Hydrogen Chloride. The gas or vapor is sc penetrative and pungent that when high concentrations do occur, those exposed should immediately leave the contaminated area.

Carcinogenicity NTP? IARC Monographs? OSHA Regulated?
No No No

Signs and Symptoms of Exposure
Exposure to Hydrochloric acid may cause severe burns at the contact point;
Medical Conditions Generally Aggravated by Exposure
Exposure to fumes may aggravate dermatitis and breathing disorders.
Section XII - Toxicological Information (continued)

<table>
<thead>
<tr>
<th>Toxicology</th>
<th>Inhalation Data</th>
<th>Hazard Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Chloride</td>
<td>Human LC50 - 1300 ppm/30 min</td>
<td>Corrosive</td>
</tr>
<tr>
<td></td>
<td>Rat LC50 - 4/01 ppm/30 min</td>
<td></td>
</tr>
<tr>
<td>Oral (rabbit)</td>
<td>LD50 - 900 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Mutagenic Effects</td>
<td>Inhalation: 100 ppm/24 hrs (Chromosome damage)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oral: 100 ppm (Chromosome damage)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parental: 20 mg (Cytogenic effects)</td>
<td></td>
</tr>
</tbody>
</table>

Section XIII - Ecological Information

Ecological Toxicity
Animals exposed to hydrochloric acid solution will experience tissue damage, burns and may be killed. Plants contaminated with hydrochloric acid solutions of low pH may be adversely affected or destroyed. High concentrations have been shown to be detrimental to aquatic life. A release into a body of water will kill fish and other aquatic life should be aimed at eliminating environmental contamination.

Chemical Fate Information
Hydrochloric acid is naturally occurring in the environment.

Other Regulatory Information
No other regulatory information is available on this product.

Section XIV - Transportation Information

Regulated Material
Hydrochloric Acid is defined as hazardous by the US Dot and Transport Canada.

**DOMESTIC SHIPPING INFORMATION**

<table>
<thead>
<tr>
<th>Proper Shipping Name</th>
<th>Hazard Classification</th>
<th>Corrosive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochloric Acid</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UN/NA Identification</th>
<th>Hazard Class</th>
<th>Class 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN 1789</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOT Labels Required</th>
<th>Packaging Group:</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosive</td>
<td></td>
<td></td>
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</tbody>
</table>

**INTERNATIONAL SHIPPING INFORMATION**

<table>
<thead>
<tr>
<th>Proper Shipping Name</th>
<th>Hazard Classification</th>
<th>Corrosive</th>
</tr>
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<tbody>
<tr>
<td>Hydrochloric Acid</td>
<td></td>
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</tr>
</tbody>
</table>

<table>
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<tr>
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<th>Packaging Group:</th>
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<tbody>
<tr>
<td>Corrosive</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Section XV - Other Information

**Created By**

Product Safety - 6/1/98

MSDS Revision Number

Revision # 005 Dated 1/1/2005

Toxic Substances Control Act

TSCA listed /64/-U1-0

Superfund Amendment & Reauthorization Act, Title I

Hazard CategoriesHEALTH: Acute & Chronic

EMERGENCY PLANNING & COMMUNITY RIGHT TO KNOW

EHS - Threshold Quantity: None

PHYSICAL: None

Is product Regulated Under 1990 Clean Air Act

No Does Product Contain, or is Manufactured with, CFC's

Reportable Quantity

RQ - 5000 lbs

NSF Listing

Scale & Corrosion control at maximum 40 mg/l

National Fire Protection Association (NFPA) Ratings:

Health - 3 Flammability - 0 Instability - 0 Other Hazard Information - ACID

Hazardous Material Identification System (HMIS):

Health - 3 Flammability - 0 Physical Hazard - 0 Protective Equipment - X

Is this product Regulated Under the EPA's Risk Management Plan

No, Hydrochloric Acid Solution under 37% is not regulated.

North American Emergency Response Guide Boo

ID # 1789 Guide #157 1996 Revision
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