

Oltrin Solutions, LLC

SAFETY DATA SHEET

1. Identification

Product Identifier

Hydrochloric Acid, 32-36%

Other Means of Identification:

Product Code

507-USA-OLN

Recommended Use

Metal processing, pH adjustment for water treatment

Synonyms

Muriatic Acid, 20-22 Degrees Baumé Muriatic Acid, Aqueous Hydrogen Chloride, HCL

Manufacturer/Importer/Supplier/Distributor information:

Supplier name

Oltrin Solutions, LLC

Address

11 EV Hogan Drive, PO Box 1195
Hamlet, NC, 28345, USA

Telephone

910-419-6589

E-mail

oltrincs@trinitymfg.com

Emergency phone number

**FOR CHEMICAL EMERGENCY (Spill, Leak, Fire, Exposure, or Accident)
Call CHEMTREC Day or Night**

Within USA and Canada: 1-800-424-9300

Outside USA and Canada: +1-703-527-3887 (collect calls accepted)

2. Hazard(s) Identification

Physical Hazards

Corrosive to Metals

Category 1

Health Hazards

Serious Eye Damage

Category 1

Skin Corrosion

Category 1B

Specific Target Organ Toxicity, Single Exposure

Category 2 (Respiratory System)

Specific Target Organ Toxicity, Repeat Exposure

Category 2 (Respiratory System)

Environmental Hazards

Not classified

OSHA Defined Hazards

Not classified

Label Elements



Signal Word

DANGER

Hazard Statements

Causes severe skin burns and eye damage.

May cause allergic or asthmatic symptoms or breathing difficulties if inhaled.

May cause damage to organs (respiratory system) if inhaled.

May cause damage to organs (respiratory system) through prolonged or repeated exposure.

May be corrosive to metals.

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| Prevention | <p>Do not breathe mist/vapors.</p> <p>Wash face, hands, and exposed skin thoroughly after handling.</p> <p>Wear protective gloves, protective clothing, and eye/face protection.</p> <p>In case of inadequate ventilation, wear respiratory protection.</p> <p>Do not eat, drink, or smoke when using this product.</p> <p>Keep only in original container.</p> |
| Response | <p>IF SWALLOWED: Rinse mouth. DO NOT induce vomiting.</p> <p>IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.</p> <p>IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call emergency medical professional or Poison Control Center.</p> <p>Specific Treatment (See Section 4)</p> <p>IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</p> |
| Storage | <p>Absorb spillage to prevent material damage.</p> <p>Store locked up.</p> <p>Store in corrosive resistant container/container with resistant inner liner.</p> |
| Disposal | <p>Dispose of contents/container in accordance with federal and state regulations.</p> |

3. Composition/Information on Ingredients

| Chemical Name | Common Name and Synonyms | CAS Number | % by Weight |
|-------------------|--------------------------|------------|-------------|
| Hydrogen Chloride | Muriatic Acid | 7647-01-0 | 32-36 |
| Water | | 7732-18-5 | Balance |

4. First Aid Measures

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| General Information | Corrosive effects on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures is essential. |
| Eye Contact | Rinse immediately with plenty of water for at least 20 minutes holding eyelids apart. Remove any contact lenses. Get medical attention immediately. |
| Skin Contact | Immediately flush skin with plenty of water for at least 20 minutes while removing contaminated clothing and shoes. If skin is only irritated and symptoms do not persist, wash with a disinfectant soap. If skin is burned, get medical attention immediately. During transport apply compresses of cold water, if available. Wash clothing separately before reuse. Discard heavily contaminated shoes or clothing. |
| Inhalation | Move to fresh air. If breathing is difficult, give oxygen, if available. If not breathing, give artificial respiration. A one-way pocket mask will prevent cross-contamination to the provider. Get medical attention immediately. Symptoms may appear up to 48 hours after exposure. |
| 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 or the nearest Poison Control Center. |
| Notes to Physician | Treat symptomatically and supportively focusing on the respiratory and cardiovascular functions. No specific antidote exists. Symptoms of pulmonary edema, such as shortness of breath, can be delayed for several hours after exposure. |

5. Fire-Fighting Measures

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| Flammability | Not flammable, but reacts with most metals to form flammable Hydrogen gas. |
| Flash Point | Not applicable |
| Flammable/Explosive Range | Not applicable |
| Auto-Ignition Temperature | Not applicable |
| Sensitivity to Mechanical Impact | Not sensitive |

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| Sensitivity to Static Discharge | Not sensitive |
| Decomposition Temperature | This product will not decompose at temperatures below 1500 °C (2730 °F). |
| Suitable Extinguishing Media | Substance is non-flammable so extinguishant should be appropriate for acid and the burning material. For large fires, an all-purpose AFFF foam may be used. For small fires, use dry chemical or carbon dioxide. If only water is available, use it in the form of a fog. Water fog is also effective for controlling vapors. |
| Unsuitable Extinguishing Media | Do not use carbon dioxide if cyanides are involved in a fire. Do NOT use straight streams of water. |
| Protection of Firefighters | |
| Specific Hazards Arising From the Chemical | This product is corrosive, and presents a significant inhalation and contact hazard to firefighters. Irritating and toxic gases or fumes may be released during a fire. |
| Protective Equipment and Precautions for Firefighters | As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH-approved or equivalent, and full protective gear apparatus. |
| Fire Fighting Equipment/Instructions | Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. If possible, prevent run-off water from entering storm drains, bodies of water, or other environmentally sensitive areas. |
| Fire and Explosion Hazards | Reacts with active metals (potassium, sodium, calcium, powdered aluminum, zinc, magnesium) to liberate flammable hydrogen gas which can form explosive mixtures. Explosive concentrations of hydrogen may accumulate inside metal equipment. |
| Combustion and Thermal Decomposition Products | Hydrogen chloride, chlorine, and hydrogen gas. |
| Evacuation | If tank, rail car, or cargo trailer is involved in a fire, isolate for ½ mile in all directions and consider initial evacuation for ½ mile in all directions. |

6. Accidental Release Measures

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| Personal Precautions | Keep unnecessary personnel away until cleanup has been completed. Ensure adequate ventilation. Wear adequate personal protective equipment (PPE). (Section 8 Exposure Controls for Specific PPE information). Do not touch spilled material. |
| Environmental Precautions | All spills on land involving hydrochloric acid should be contained, if possible, to prevent entry into bodies of water or sewer systems and into low lying areas like basements. |
| Methods for Containment | ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if this can be done without risk. Dike the spilled material, where this is possible, using sand, dirt, or similar material. |
| Methods for Cleaning Up | |
| Small Spills | Cover with an inert <u>dry</u> material (earth, sand, or other non-combustible material). Use non-sparking tools to collect material and place in a loosely covered plastic container for later disposal. Do not get water inside container. |
| Large Spills | As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (165 feet). Build dikes far ahead of the spill to contain the liquid for later reclamation or disposal using inert material such as sand, earth, foamed polyurethane, or foamed concrete. Absorb the bulk of the liquid with fly ash or cement powder. Neutralize with recommended materials, taking care to avoid any foaming or splattering that may occur from the neutralizing reaction. Make sure all liquid has been thoroughly contacted and absorbed by the dry materials. Transfer absorbed spill material and contaminated soil to a suitable chemical waste container. Ensure adequate decontamination of tools and equipment following clean up. Washing down of spills with water is not recommended as this tends to spread the contamination and increases the likelihood of percolating the acid down through the soil and/or of uncontrolled flow of acid into sewers, streams, or other waters. Do not allow spill material to contact any acid soluble sulfide wastes (such as in sewers) because of the danger of evolving hydrogen sulfide gas. Do not put water directly on leak or spill area. Use water spray curtain to divert vapor drift that is beyond spill area. Call for assistance on disposal. |

Deactivating Chemicals

Lime, limestone, sodium carbonate (soda ash), sodium bicarbonate. Absorbent materials which have been tested and recommended for concentrated hydrochloric acid are anionic polyacrylamide, nonionic polyacrylamide, and hydroxyethylcellulose.

Waste Disposal

See Section 13 Disposal Considerations.

7. Handling and Storage

Handling

Take precautions to avoid personal contact. Prevent release of vapor or mist. Ensure adequate ventilation in handling areas. Ensure water drenching facilities are close to the handling area. Inspect containers for leaks before handling. Do not allow smoking or food consumption while handling or in storage areas. Wash well after use.

Never add water to this product. When diluting with water, always add acid to water and add it slowly. Avoid mixing with alkalis. Keep away from incompatibles such as oxidizing agents, organic materials, metals, alkalis, moisture. May corrode metallic surfaces. Do not wash down the drain.

Storage

Keep container tightly closed when not in use. Keep away from heat and flame. Do not store in direct sunlight. Store in a cool, dry, well-ventilated area away from incompatible substances such as hydroxides, amines, alkalis, or metals, such as copper, brass, zinc, potassium, and sodium. Restrict access to storage areas.

Hydrogen, a highly flammable gas, can accumulate to explosive concentrations inside metal containers in storage. Metal storage containers should be vented on a regular basis by trained personnel only.

The ideal storage temperature for hydrochloric acid is 10-27 °C (50-80 °F). Do not expose sealed containers to temperatures above 40 °C (104 °F).

For indoor storage, floors should be acid resistant, electrical equipment should be flameproof and protected against corrosive action. Wood and other organic materials should not be used on floors, structural materials, and ventilation systems in the storage areas.

Equipment Compatibility

Storage drums must be coated with an acid resistant material. Rubber-lined steel, PVC/FRP, FRP, Hastelloy C-276, Inconel 625, and tantalum are the most commonly used corrosion-resistant materials of construction at room temperature. Rubber, glass, plastic, and ceramic ware are also resistant to corrosion. Vented containers must be used and must be kept closed when not being used. Containers should have a safety relief valve. Care should be taken to release any internal pressure slowly. Use corrosion-resistant transfer equipment when dispensing.

8. Exposure Controls/Personal Protection

Engineering Controls

Under normal conditions of use, natural ventilation should effectively remove and prevent buildup of any vapor/mist/fume/dust generated from the handling of this product. Indoors, use only in a chemical fume hood. In poorly ventilated outdoor areas, provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value and below irritation levels.

Ensure that eyewash stations and safety showers are readily available in the immediate work area. Do not delay immediately flushing with water upon exposure.

Exposure Guidelines

While exposure limits have been established for hydrogen chloride gas, exposure limits for hydrochloric acid have not been established. Avoid repeated or prolonged exposure to vapor or mist without appropriate respiratory protection. The higher the concentration, the more vapor/mist potential in air.

| CAS # | Chemical Name | OSHA PEL | ACGIH TLV (8-hr TWA) | NIOSH | IDLH |
|-----------|-------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|--------|
| 7647-01-0 | Hydrogen Chloride | 5 ppm (Ceiling) (7 mg/m ³) | 2 ppm (Ceiling) (3 mg/m ³) | 5 ppm (Ceiling) (7 mg/m ³) | 50 ppm |
| 7732-18-5 | Water | None | None | None | None |

ACGIH limit is based on the risk of acute irritation [ACGIH 1991, p. 773]

NIOSH limit is based on the risk of eye, mucous membrane, and skin irritation [NIOSH 1992]

Personal Protective Equipment (PPE)

Eye / Face Protection Wear splash-resistant chemical safety goggles and a full face shield.

Skin Protection Wear impervious protective clothing, including boots, gloves, and lab coat, apron or full body suit, as appropriate, to prevent skin contact. A chemical protective acid-resistant full-body encapsulating suit and respiratory protection may be required in some operations.

Respiratory Protection No personal respiratory protective equipment is normally required.

Up to 50 PPM Use NIOSH-approved respirator with an acid gas cartridge or combination style approved for hydrogen chloride. If aerosol or mist involved, use a filter with the cartridge.

 Gas mask with canister to protect against hydrogen chloride or powered air-purifying respirator with cartridge(s) to protect against hydrogen chloride.

 Supplied Air Respirator (SAR); or full-facepiece self-contained breathing apparatus (SCBA).

EMERGENCY

OR planned entry into unknown concentration or IDLH conditions:

Positive pressure, full facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

ESCAPE

Gas mask with acid gas canister or escape-type SCBA.

Personal Hygiene

If liquid contacts the skin, workers should flush the affected areas immediately with plenty of water, followed by washing with soap and water. Remove contaminated clothing immediately. Keep contaminated clothing in closed containers. Discard or launder before re-wearing. Persons laundering the clothes should be informed of the hazardous properties of hydrochloric acid, particularly its potential for causing irritation.

Workers should not eat, drink, use tobacco products, apply cosmetics, or take medication in areas where a solution containing hydrogen chloride is handled, processed, or stored. A worker who handles hydrochloric acid should thoroughly wash hands, forearms, and face with soap and water before eating, using tobacco products, using toilet facilities, applying cosmetics, or taking medication.

Personal Protection in Case of Small Spill

Face shield with splash goggles or full facepiece respirator equipped with acid gas cartridge for acid vapors.. Impervious clothing, boots, and gloves.

Personal Protection in Case of Large Spill

Full body splash and vapor protection. Impervious boots and gloves. Self-contained breathing apparatus. Suggested protective clothing might not be sufficient; consult a specialist.

Resistance of Materials for Protective Clothing

To evaluate the use of PPE materials with hydrogen chloride, users should consult the best available performance data and manufacturers' recommendations. Significant differences have been demonstrated in the chemical resistance of generically similar PPE materials (e.g., butyl) produced by different manufacturers. In addition, the chemical resistance of a mixture may be significantly different from that of any of its pure components. Breakthrough times are obtained under conditions of continuous contact, generally at room temperature. Evaluate resistance under conditions of use and maintain clothing carefully.

| Material for Hydrogen Chloride | PPE Use | HCl < 30% Recommended Use | HCl 37% Recommended Use | Comments |
|--------------------------------|----------------------|---------------------------|-------------------------|-----------------|
| Butyl Rubber | Gloves, Boots, Suits | > 8 hrs | > 8 hrs | |
| Natural Rubber | Gloves | > 8 hrs | > 4 hrs | Gloves > 0.3 mm |
| Neoprene Rubber | Gloves, Boots, Suits | > 8 hrs | > 4 hrs | Gloves > 0.3 mm |
| Nitrile Rubber | Gloves, Boots, Suits | > 8 hrs | > 4 hrs | Gloves > 0.3 mm |
| Viton™ | Gloves, Suits | > 8 hrs | > 8 hrs | |
| Teflon™ | Gloves, Boots, Suits | > 8 hrs | 4 hrs | |
| Barricade | Suits | > 8 hrs | > 8 hrs | |

(Table continued)

| Material for Hydrogen Chloride | PPE Use | HCl < 30% Recommended Use | HCl 37% Recommended Use | Comments |
|------------------------------------------|----------------------|-------------------------------|------------------------------|-----------------|
| Trellchem™ HPS | Suits | > 4 hrs | > 4 hrs | |
| Trellchem™ VPS | Suits | > 4 hrs | > 4 hrs | |
| Tychem™ SL Saranex™ | Suits | > 8 hrs | > 8 hrs | |
| Tychem™ CPF 3 | Suits | > 8 hrs | > 8 hrs | |
| Tychem™ F | Suits | > 8 hrs | > 8 hrs | |
| Tychem™ BR or LV | Suits | > 8 hrs | > 8 hrs | |
| Tychem™ Responder™ | Suits | > 8 hrs | > 8 hrs | |
| Tychem™ TK | Suits | > 8 hrs | > 8 hrs | |
| Polyvinyl chloride | Gloves, Boots, Suits | >4 hrs | > 4 hrs | Gloves > 0.3 mm |
| Silver Shield/4H™ | Gloves | >4 hrs | > 4 hrs | |
| 4H (Polyethylene/Ethylene Vinyl Alcohol) | Gloves | >4 hrs | > 4 hrs | |
| Polyethylene | Gloves, Boots, Suits | Use for short periods < 4 hrs | Use for short periods < 1 hr | |
| Polyvinyl Alcohol | Gloves | Not Recommended | Not Recommended | |

Community Emergency Planning Emergency Response Planning Guidelines (ERPG):

ERPG 1 = 3 ppm
 ERPG 2 = 20 ppm
 ERPG-3 = 150 ppm

9. Physical and Chemical Properties

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|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Appearance | Clear to light yellow |
| Physical State | Liquid |
| Color | Colorless to light yellow |
| Odor | Pungent, irritating (strong) |
| Odor Threshold | 0.77 ppm is odor detection if person is focused on perceiving it. 5 ppm (7 mg/m ³) - About 50% of population will detect when distracted. |
| pH | Less than 1 |
| Acidity | Very strong acid |
| Molecular Weight | 36.46 |
| Molecular Formula | H-Cl |
| Melting Point / Freezing Point | |
| 32% | -43 °C (-45.4 °F) |
| 36% | ~ -32.22 °C (-26.0 °F) |
| Boiling Point | |
| 32% | 84 °C (183.2 °F) @ 760 mmHg |
| 36% | 61.11-63.33 °C (142-146 °F) |
| Evaporation Rate | Hydrochloric acid solutions of greater than 28% are very volatile and can readily release high concentrations of hydrogen chloride gas. |
| Flash Point | None. See Section 5 |
| Flammability | See Section 5. |
| Flammability Limits (Lower/Upper) | Not applicable |
| Auto-Ignition Temperature | Not applicable |
| Vapor Pressure | Partial Pressure |
| 32% | 23.5 mmHg (3.13 kPa) @ 25 °C |
| 36% | ~76 mmHg @ 20 °C |
| Vapor Density (Air = 1) | 1.267 |
| Volatility by Volume | 100% |
| Volatility Organic Compounds | Zero |

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| Specific Gravity | |
| 32% | 1.1593 @ 20 °C |
| 36% | 1.1828 @ 16 °C |
| Relative Density (lbs/gal) | |
| 32% | 9.657 @ 20 °C |
| 36% | 9.979 @ 20 °C (1.198 kg/m ³) |
| Solubility (in water) | 100% in all proportions |
| Solubility in Other Liquids | Very soluble in ethanol, methanol, dioxane and tetrahydrofuran; insoluble in hydrocarbons, e.g. n-hexane |
| Emulsifiable in Water | Yes |
| Specific Heat | |
| 32% | 2.55 kJ/(kg·K) |
| Partition Coefficient: n-octanol/water | Log P _{oct} = 0.3 (36% hydrochloric acid) |
| Critical Temperature | Not available |
| Viscosity-Dynamic | |
| 30% | 1.71 mPa.s (or centipoises) @ 20 °C |
| 32% | 1.8 mPa.s (or centipoises) @ 20 °C |
| Surface Tension | |
| 17% | 71.75 mN/m (71.75 dynes/cm) |
| 23.7% | 70.55 mN/m (70.55 dynes/cm) |
| Oxidizing Properties | None |
| Dissociation Constant | 6.2 pKa @25 °C |
| Dielectric Constant | Approximately 78.30 @25 °C (77 °F) |
| Henry's Law Constant | Hydrochloric acid water solutions do not obey Henry's law at all measured concentrations; however 2.04 x 10 ⁶ mol/L atm (4.90 x 10 ⁻¹⁰ m ³ atm/mol) has been reported. This means that hydrochloric acid is expected to be essentially non-volatile from water surfaces. |
| Conversion Factor | 1 ppm = 1.49 mg/m ³ ; 1 mg/m ³ = 0.67 ppm @25 °C (760 torr) (calculated) |

10. Stability and Reactivity

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| Chemical Stability | The product is stable under normal conditions of use. |
| Corrosivity | Extremely corrosive in presence of aluminum, copper and its alloys, stainless steel (304), stainless steel (316). Non-corrosive in presence of glass. It attacks nearly all metals (mercury, gold, platinum, tantalum, silver, and certain alloys are exceptions). Severe corrosive effect on brass and bronze. |
| Conditions to Avoid | Avoid heat, flames, sparks and other sources of ignition. Contact with water may produce a strong exothermic reaction with spattering. Contact with metals may evolve flammable hydrogen gas. Hydrogen chloride may react with cyanide, forming lethal concentrations of hydrocyanic acid. Never add water to acid. Acid evaporates creating very corrosive environment. Avoid contact of metal ladders or other metals objects in confined spaces containing product. |
| Incompatible Materials | Highly reactive with aluminum, metals, metal oxides, calcium & sodium hypochlorite, bases, brass, bronze, calcium carbide, amines, carbonates, and alkaline materials. Incompatible with materials such as cyanides, sulfides, sulfites, sulfuric acid, and formaldehyde. |
| Hazardous Decomposition Products | When heated to decomposition emits toxic hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine vapors and flammable hydrogen gas. |
| Polymerization | HCl itself does not polymerize. Reaction of HCl with aldehydes and epoxides can cause polymerization. |
| Possibility of Hazardous Reactions | Reacts with most metals and evolves highly flammable hydrogen. Reacts with oxidizing agents and sulfuric acid liberating toxic Chlorine gas. Reacts violently (moderate reaction with heat of evolution) if water is added to the product. Hydrogen chloride gas is emitted when this product is in contact with sulfuric acid. |

11. Toxicological Information

See Section 2 Hazards Identification for additional health effects information.

Carcinogenicity There is inadequate evidence for the carcinogenicity of hydrochloric acid in humans and in experimental animals.

| Component | IARC | NTP | OSHA | NIOSH | California Prop 65 |
|------------------------------------|--------------------------------------------------------------------|-----|------|-------|--------------------|
| Hydrochloric Acid CAS 7647-01-0 | Group 3 not classifiable as to its carcinogenicity to humans | No | No | No | No |
| Water CAS 7732-18-5 | No | No | No | No | No |

Summary of Human Studies 10 ppm - recognition odor in air and maximal allowable for prolonged exposure.
35 ppm - causes irritation of throat.
50-100 ppm - can be barely tolerated for 1 hr (severe irritation and breathing difficulty occurs).
1,300-2,000 ppm - lethal for brief exposures of a few minutes by causing pulmonary edema.
Workers chronically exposed to hydrogen chloride did not exhibit the pulmonary function changes observed in nine subjects exposed to similar concentrations, which suggests that workers become acclimatized to hydrogen chloride.
Dental discoloration and erosion of exposed incisors may occur on prolonged exposure to low concentrations.

Acute Exposure Effects on Humans

Skin Corrosion/Irritation Corrosive. Contact with aqueous solutions causes burns of the skin and mucous membranes; the severity of the burns depends on the concentration of the solution. Burns may progress to ulcerations and lead to keloid and retractile scarring. Frequent contact of the skin with aqueous solution may cause dermatitis. Exposure to hydrochloric acid can produce burns on the skin and mucous membranes, the severity of which is related to the concentration of the solution. Subsequently, ulceration may occur, followed by keloid and retractile scarring. Contact with the eyes may produce reduced vision or blindness. Frequent contact with aqueous solutions of hydrochloric acid may lead to dermatitis.

Eye Damage/Irritation Corrosive. Contact with aqueous solutions is corrosive to the eyes and can cause severe eye irritation/conjunctivitis, burns, corneal necrosis, reduced vision, irreversible eye injury, or blindness. Vapor or mist may cause irritation and severe burns. May cause painful sensitization to light. Degree of damage is proportional to concentration involved.

Inhalation The greatest impact is on the upper respiratory tract. May cause coughing, hoarseness, inflammation and ulceration of the respiratory tract, chest pain, and pulmonary edema. Irritating and potentially corrosive to the respiratory tract and lungs. Exposure to high concentrations can rapidly lead to swelling and spasm of the throat and suffocation. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation of hydrochloric acid vapors and mists produces nose, throat, and laryngeal burning, and irritation, pain and inflammation, coughing, sneezing, choking sensation, shortness of breath, hoarseness, laryngeal spasms, upper respiratory tract edema, bronchial constriction, bronchitis, chest pains, as well as headache, and palpitations. Inhalation of high concentrations can result in corrosive burns, necrosis of bronchial epithelium, constriction of the larynx and bronchi, nasospetal perforation, glottal closure, occur, particularly if exposure is prolonged. May be fatal if inhaled.

Ingestion May cause severe burns of the mucous membranes, mouth, esophagus, and stomach, with pain, nausea, vomiting, and diarrhea reported in humans. May be fatal if swallowed. Causes irritation and burning, edema of the glottis, ulceration, or perforation of the esophagus and digestive tract and resultant peritonitis, gastric hemorrhage and infection. Can also cause nausea, vomiting (with "coffee ground" emesis), diarrhea, thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, strictures and stenosis (esophageal, gastric, pyloric). May affect behavior (excitement), the cardiovascular system (weak rapid pulse, tachycardia), respiration (shallow respiration), and urinary system (kidneys- renal failure, nephritis).

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| Chronic Effects on Humans | Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation that leads to frequent attacks of bronchial infection and may produce ulceration of the nose, mouth and gum. Acute, repeated exposure via inhalation or ingestion can also cause erosion of tooth enamel. May cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, and circulatory system. |
| Sensitization | May cause painful sensitization to light after repeated or significant exposure. No skin sensitization has been reported. |
| Subchronic Effects | Chronic inhalation exposure caused hyperplasia of the nasal mucosa, larynx, and trachea and lesions in the nasal cavity in rats. |
| Delayed Effects | No data available. |
| Effects on Animals | Acute animal tests in rats, mice, and rabbits, have demonstrated hydrochloric acid to have moderate to high acute toxicity from inhalation and moderate acute toxicity from oral exposure. Pulmonary irritation, lesions of the upper respiratory tract, and laryngeal and pulmonary edema have been reported in rodents acutely exposed by inhalation. |

Acute Toxicity to Humans Data:

| Parameter | Concentration | Exposure Time | Species | Ingredient |
|-----------|---------------|---------------|-------------------|---------------------------------|
| LCLo | 1300 ppm | 0.5 hr | human, inhalation | Hydrochloric Acid, concentrated |
| LDLo | 2857 ug/kg | | human, oral | HCl |

Acute Toxicity to Animals Data:

| Parameter | Concentration | Exposure Time | Species | Ingredient |
|------------------|---------------|---------------|--------------------|---------------------------------|
| LC ₅₀ | 3124 ppm | 1 hr | rat, inhalation | Hydrogen Chloride |
| LC ₅₀ | 1108 ppm | 1 hr | mouse, inhalation | HCl |
| LC ₅₀ | 4701 ppm | 0.5 hr | rat, inhalation | Hydrogen Chloride gas |
| LD ₅₀ | >5010 mg/kg | - | rabbit, dermal | |
| LD ₅₀ | 900 mg/kg | Acute | rabbit, oral | Hydrochloric Acid, concentrated |
| LCLo | 4413 ppm | 0.5 hr | rabbit, inhalation | HCl |

| Test Animal | Results |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rabbit Eye | Hydrochloric acid is injurious only at concentrations having acidity below pH 3. Contact with 0.25N to 1N acid for 20 seconds resulted in some scarring of rabbit corneas. 5 mg for 30 seconds caused mild irritation. |
| Rabbit Skin | 0.5 mL of 17% HCl for 4 hours caused corrosive burns. |

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| Epidemiology | No information available. |
| Mutagenicity | Ames test - negative. Hydrochloric acid has produced mutagenic effects in bacterial and insect test systems, and in one in vitro mammalian cell test (hamster lung cells). HCl was negative in another in vitro mammalian cell test. The significance of the positive reports is questionable since pH (acidity) can influence the results of short-term tests. |
| Reproductive Effects | In rats exposed to hydrochloric acid by inhalation (450 mg/m ³ for 1 hour), 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. |
| Teratogenicity | No information available. |
| Aspiration Hazard | Leads to a pulmonary inflammatory response. |
| Target Organs | Skin, eyes, respiratory tract, lungs, gastrointestinal system, teeth |
| Neurological Effects | No information available. |
| Synergistic Effects | No information available. |
| Other Information | Persons suffering from skin and respiratory diseases should take extra care to avoid exposure to hydrochloric acid. |

12. Ecological Information

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| Ecotoxicity | This material is expected to be toxic to aquatic life. Toxicity is primarily associated with pH. |
| Environmental Effects | No ecological problems are expected when the product is handled and used with due care. Large discharges may cause acidification of water and may be fatal to aquatic organisms, fish and plants. |
| Environmental Fate | The concentration of hydrochloric acid that was found to be injurious to crops (irrigable) is 350 mg/L. When released into the soil, this material is not expected to be biodegrade and may leak into groundwater where it will dissociate almost completely into the hydronium ion. It is not expected to accumulate in the food chain. If released into the water, the water pH will be decreased. |
| Mobility in Soil | Upon transport through the soil, hydrochloric acid will dissolve some of the soil materials (especially those with carbonate bases) and the acid will neutralize to some degree. Significant amounts will transport to the ground water table. |

Aquatic Toxicity

| Parameter | Concentration | Exposure Time | Species | Ingredient |
|-------------------|----------------|---------------|----------------------------|------------|
| TLm | 282 mg/l | 96 hr | mosquito fish, fresh water | HCl |
| LC ₅₀ | 21,900 ug/l | 96 hr | fathead minnow | HCl |
| LC ₅₀ | 10 mg/l | 24 hr | trout | HCl |
| LC ₅₀ | 100 - 330 mg/l | 48 hr | shrimp, saltwater | HCl |
| LC ₅₀ | 178 mg/l | 48 hr | gold fish, saltwater | HCl |
| LC ₅₀ | 240 mg/l | 48 hr | shore crab | HCl |
| LC ₁₀₀ | 10 mg/l | 24 hr | trout | HCl |

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|----------------------------------------|-------------------------------------------|
| Plant Toxicity | Chronic plant toxicity = 100 ppm. |
| Persistence and Degradability | Rapidly hydrolyzes when exposed to water. |
| Partition Coefficient: n-octanol/water | See Section 9. |
| BCF | No information available |

13. Disposal Considerations

| | |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Waste Codes | Test waste material for corrosivity, D002 (Corrosive Waste), prior to disposal. |
| Disposal Instructions | Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. Dispose in accordance with all applicable regulations. |
| Waste from Residues and Unused Products | Reuse or reprocess, if possible. As produced, the product meets the RCRA definition of corrosive with D002 waste code. Processing, use, or contamination of this product may change the waste management options. |
| Contaminated Packaging | Do not re-use empty containers for other substances. Empty containers should be taken to an approved waste handling site for recycling or disposal. |

14. Transport Information



Label



Placard

US DOT / Canadian TDG

| | DOT | CANADA TDG |
|----------------------|------------------------------------------|------------------------------------|
| UN Number | 1789 | 1789 |
| Proper Shipping Name | Hydrochloric Acid, 32-36% | Hydrochloric Acid Solution, 32-36% |
| Hazard Class | 8 | 8 |
| Packing Group | II | II |
| RQ or ERAP | 5,000 lbs (2,270 kg) - about 500 gallons | 3000 L (ERAP) |
| Marine Pollutant | No | No |
| ERG | 157 | |

IMDG (Water)

Basic Shipping Requirements:

| | |
|----------------------|--------------------------------------|
| UN Number | UN1789 |
| Proper Shipping Name | Hydrochloric Acid Solution, (32-36%) |
| Hazard Class | 8 |
| Packing Group | II |
| Marine Pollutant | No |

Additional Information:

| | |
|----------------|-------------------------------------|
| Vessel Stowage | C – On Deck only cargo or passenger |
| EMS | F-A, S-B |

ICAO/IATA (Air)

Basic Shipping Requirements:

| | |
|----------------------|----------------------------|
| UN Number | UN1789 |
| Proper Shipping Name | Hydrochloric Acid (32-36%) |
| Hazard Class | 8 |
| Packing Group | II |

Additional Information:

| | |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Packaging Instruction: | 809 - 1 L passenger 813 - 30 L cargo |
| Excepted Quantities | Y809 (excepted quantities), inner packaging net - 30 mL (1 oz.); outer aggregate – 500 mL (0.1 gal). Documentation: Dangerous Goods in Excepted Quantities and Excepted Quantity mark (label): |
| De Minimus | 1 mL (0.03 oz.) inner packaging net; 100 mL (3.38 oz.) outer aggregate. |



15. Regulatory Information

US FEDERAL REGULATIONS:

| | |
|---------------------------|---------------------------------------------------------------------|
| Clean Air Act 112(r), RMP | No for this product. Applicable for HCl 37% or greater in solution. |
| Clean Air Act | CAS# 7647-01-0 is listed as a hazardous air pollutant (HAP). |
| Class 1 Ozone Depletor | None |
| Class 2 Ozone Depletor | None |
| Clean Water Act | CAS# 7647-01-0 is listed as a Hazardous Substance under the CWA. |
| Priority Pollutants | None |
| Toxic Pollutants | None |

| | |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OSHA PSM (Highly Hazardous) | CAS# 7647-01-0 (Hydrogen Chloride Gas and Hydrochloric Acid, Anhydrous is considered highly hazardous by OSHA with a 5,000 lbs TQ |
| OSHA | This product is known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200 |
| TSCA Inventory 8(b) | Hydrogen Chloride, CAS# 7647-01-0 Water, CAS# 7732-18-5 |
| TSCA H&S Data Reporting List 8(d) | None of the components are on this list. |
| TSCA Proposed Test Rules, 4(a) | CAS# 7647-01-0 (Hydrochloric Acid). |
| TSCA Significant New Use Rule 5(a) | None of the components are on this list. |
| TSCA, Section 12b | None of the components are on this list. |
| CERCLA Reportable Quantity (RQ) | 5000 pounds (2270 kg) for CAS# 7647-01-0 (Hydrochloric Acid) |
| Section 302 - Extremely Hazardous Substance | CAS# 7647-01-0, Hydrogen Chloride gas only, TPQ 500 lbs |
| Section 311 - Hazardous Chemical | Yes (Hydrogen Chloride gas and solution CAS 7647-01-0) |
| SARA Hazard Categories | For Tier II reporting, see Physical and Health hazards listed in Section 2 of this SDS |
| EPCRA Section 313 | This material contains Hydrochloric acid (CAS# 7647-01-0, 32 to 36%) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373, if it is in aerosol form (including mists, vapors, gas, fog, and other airborne forms of any particle size). |

STATE REGULATIONS:

| | |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| State Regulations that Apply | Hydrogen chloride (CAS 7647-01-0) can be found for: California Director's List of Hazardous Substances New Jersey Environmental Hazardous Substance Florida Hazardous Substance List Massachusetts Extraordinarily Hazardous Substance Minnesota Hazardous Substance List Rhode Island Hazardous Substance List |
| State Right-To-Know | Illinois, Massachusetts, New Jersey, Pennsylvania |
| California Prop 65 | This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm. |
| California No Significant Risk Level | No information available. |
| <u>CANADA</u> | This product has been classified in accordance with the hazard criteria of the Controlled Product Regulations and this MSDS contains all required information. |
| DSL/NDSL | CAS# 7647-01-0 (Hydrogen Chloride) is listed on Canada's DSL List. CAS# 7732-18-5 (Water) is listed on Canada's DSL List. |
| Ingredient Disclosure List | CAS# 7647-01-0 (Hydrogen Chloride), meets criteria for disclosure at 1% or greater. |
| European Economic Community (EEC) Information | |
| EINECS | 231-595-7 |

16. Other information, including date of preparation or last revision

| NFPA | Hazard Type | | HMIS | Hazard Type |
|------|--------------|--|------|-----------------|
| 3 | Health | | 3 | Health |
| 0 | Flammability | | 0 | Flammability |
| 1 | Instability | | 1 | Physical Hazard |



NFPA Ratings: 0 – Minimal 1 – Slight 2 – Moderate 3 – Serious 4 – Severe
 HMIS® Rating HMIS® is a registered trade and service mark of the American Coatings Association

ACRONYMS:

| | |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACGIH | American Conference of Governmental Industrial Hygienists |
| BCF | Bioconcentration Factor |
| CAS | Chemical Abstracts Service |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) |
| CFR | Code of Federal Regulations |
| CHEMTREC | Chemical Transportation Emergency Center |
| DOT | Department of Transportation (USA) |
| DSL | Domestic Substances List (Canada) |
| EPCRA | Emergency Planning and Community Right-to-Know |
| ERG | Emergency Response Guidelines |
| ERPG-1 | The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hr without experiencing other than mild transient adverse health effects or perceiving a clearly defined, objectionable odor |
| ERPG-2 | The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action |
| ERPG-3 | The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hr without experiencing or developing life-threatening health effects. |
| IARC | International Agency for Research on Cancer |
| IDLH | Immediately Dangerous to Life and Health - the maximum airborne concentration from which one could escape [within 30 minutes] without any escape-impairing symptoms or any irreversible health effects. |
| IMDG | International Maritime Dangerous Goods |
| LC ₅₀ | Lethal Concentration - median dose at which 50% of test animals die from inhalation |
| LCLo | Lethal Concentration Lowest – lowest concentration in air observed to cause death |
| LD ₅₀ | Lethal Dose - median dose at which 50% test animals die from oral or dermal exposure |
| NDSL | Non-Domestic Substances List (Canada) |
| NIOSH | National Institute of Occupational Safety and Health |
| NTP | National Toxicology Program |
| OSHA | Occupational Health and Safety Administration |
| PEL | Permissible Exposure Limit |
| PPE | Personal Protective Equipment |
| RCRA | Resource Conservation and Recovery Act |
| RMP | Risk Management Plan |
| RQ | Reportable Quantity |
| SARA | US EPA Superfund Amendments and Reauthorization Act |
| TDG | Transport of Dangerous Goods (Canada) |
| TLm | Average threshold limit |
| TLV | Threshold Limit Value |
| TPQ | Threshold Planning Quantity |
| TQ | Threshold Quantity |
| TSCA | Toxic Substances Control Act |
| TWA | Time Weighted Average airborne concentration for a worker in an 8 hour day |
| WHMIS | Workplace Hazardous Materials Identification System (Canada) |

Version 3 Date: February 12, 2018

Revision History:

| | |
|------------|--------------------------------------------------------|
| 06-01-2015 | Initial version |
| 06-02-2016 | Section 2: Revised Health Hazards and Label Statements |
| | Section 15: Revised Regulatory Information |
| | Section 16: Added Acid below NFPA Diamond |
| 02-14-18 | Section 15: Updated SARA Hazard Categories |

WARRANTY

Notice: The information above is believed to be accurate and represents the best information currently available to us. Seller warrants that this product conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with directions under normal conditions of use, but neither this warranty nor any other warranty of merchantability or fitness for a particular purpose, express or implied, extends to the use of this product contrary to label instructions, or under abnormal conditions, or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.