Section 1: Identification

MANUFACTURER: PACE Technologies
3601 E. 34th St.
Tucson, AZ 85713

INFORMATION PHONE: 520-882-6598

EMERGENCY PHONE: CHEMTREC 800-424-9300 (US) Day or night

Customer No. 16568

TRADE NAME: Copper Etchant No. 2 (Hydrochloric acid, ferric chloride mixture water)

CHEMICAL FAMILY: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (HYDROCHLORIC ACID, FERRIC CHLORIDE MIXTURE)

HMIS RATING: HEALTH: 3 FLAMMABILITY: 3 REACTIVITY: 2

HAZARD RATING:

LEAST: 0 SLIGHT: 1 MODERATE: 2 HIGH: 3 EXTREME: 4

Section 2: Hazard(s) Identification

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)	Corrosive to metals (Category 1), H290 Acute toxicity, Oral (Category 4), H302 Skin corrosion (Category 1B), H314 Serious eye damage (Category 1), H318 Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335 Acute aquatic toxicity (Category 2), H401
PICTOGRAM(s):	
SIGNAL WORD:	Danger
HAZARD STATEMENTS:	**Hazard Statement(s):** H290- May be corrosive to metals H302- Harmful if swallowed H314- Causes severe skin burns and eye damage

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	H318- Causes serious eye damage H335- May cause respiratory irritation H401- Toxic to aquatic life
PRECAUTIONARY STATEMENTS:	**Precautionary Statement(s):** **Preventions:** P234- Keep only in original container. P260- Do not breathe dust/fume/gas/mist/vapors/spray. P261- Avoid breathing dust/fume/gas/mist/vapors/spray. P264- Wash skin thoroughly after handling. P270- Do not eat, drink or smoke when using this product. P271- Use only outdoors or in a well-ventilated area. P273- Avoid release to the environment. P280- Wear protective gloves/protective clothing/eye protection/face protection. **Response:** P301+P312- IF SWALLOWED: call a POISON CENTER or doctor/physician IF you feel unwell. P301+P330+P331- IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P303+P361+P353- IF ON SKIN (or hair): Remove/Take off Immediately all contaminated clothing. Rinse SKIN with water/shower. P304+P340- IF INHALED: Remove victim to fresh air and Keep at rest in a position comfortable for breathing. P305+P351+P338- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310- Immediately call a POISON CENTER or doctor/physician. P312- Call a POISON CENTER or doctor/physician if you feel unwell. P321- Specific treatment (see Section 4 SDS). P330- Rinse mouth. P363- Wash contaminated clothing before reuse. P390- Absorb spillage to prevent material damage. **Storage:** P403+P233- Store in a well-ventilated place. Keep container tightly closed. P404- Store in a closed container. P405- Store locked up. **Disposal:** P501- Dispose of contents/container to Federal, State and Local Regulations.

Hazards not otherwise classified (HNOC) or not covered by GHS

Explosive when dry.

Emergency Overview

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None

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Emergency phone number (CHEMTREC 800-424-9300)

Reactivity Rating: 2 - Moderate
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Inhalation:
Corrosive! Inhalation of vapors can cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract, and in severe cases, pulmonary edema, circulatory failure, and death.
Ingestion:
Corrosive! Swallowing can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. May cause nausea, vomiting, and diarrhea, and in severe cases, death. Repeated ingestion may cause liver damage.
Skin Contact:
Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and discolor skin.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth. Long term exposures seldom occur due to the corrosive properties of the acid.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye disease may be more susceptible to the effects of this substance.

Section 3: Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Hydrogen Chloride	7647-01-0	10 - 15%	Yes
Ferric Chloride	7705-08-0	5 - 10%	Yes
Water	7732-18-5	67 - 85%	No

Section 4: First-Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give

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oxygen. Get medical attention immediately.

Ingestion:

DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Section 5: Fire-Fighting Measures

Fire:

Not considered to be a fire hazard. May react with metals or heat to release flammable hydrogen gas.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Water or water spray. Neutralize with soda ash or slaked lime.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving hydrochloric acid. Stay away from ends of tanks. Cool tanks with water spray until well after fire is out.

Section 6: Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

Section 7: Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect

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from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. When opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

Section 8: Exposure Controls/ Personal Protection

Airborne Exposure Limits:
For Hydrochloric acid:
- OSHA Permissible Exposure Limit (PEL):
5 ppm (Ceiling)
- ACGIH Threshold Limit Value (TLV):
2 ppm (Ceiling), A4 Not classifiable as a human carcinogen

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Section 9: Physical and Chemical Properties

Appearance:
Clear, dark orange solution that may become cloudy over time.

Odor:

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Pungent odor.
Solubility:
Infinitely soluble.
Density:
1.05 @ 15 C (59 F)
pH:
For HCL solutions: 0.1 (1.0 N), 1.1 (0.1 N), 2.02 (0.01 N)
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
101 - 103C (214 - 217F)
Melting Point:
No information found.
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

Section 10: Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
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 fumes and explosive hydrogen gas.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Metals, allyl chloride, sodium, potassium. Strong mineral acid, concentrated hydrochloric acid is highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. Incompatible with materials such as cyanides, sulfides, sulfites, and formaldehyde.
Conditions to Avoid:
Heat, direct sunlight and incompatibiles.

Section 11: Toxicological Information

Hydrochloric acid: Inhalation rat LC50: 3124 ppm/1H; Oral rabbit LD50: 900 mg/kg. Investigated as a tumorigen, mutagen, reproductive effector.

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--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Hydrogen Chloride (7647-01-0)	No	No	3
Ferric Chloride (7705-08-0)	No	No	None
Water (7732-18-5)	No	No	None

Section 12: Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater.
Environmental Toxicity:
This material is expected to be toxic to aquatic life.

Section 13: Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

Section 14: Transportation Information

Domestic (Land, D.O.T.)

Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (HYDROCHLORIC ACID, FERRIC CHLORIDE MIXTURE)
Hazard Class: 8
UN/NA: UN3264
Packing Group: II
Limited Quantity Shipments <1 L

International (Water, I.M.O.)

Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (HYDROCHLORIC ACID, FERRIC CHLORIDE, MIXTURE)
Hazard Class: 8
UN/NA: UN3264
Packing Group: II

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Information reported for product/size: 1L

Section 15: Regulatory Information

-------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Hydrogen Chloride (7647-01-0)	Yes	Yes	Yes	Yes
Ferric Chloride (7705-08-0)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

-------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Hydrogen Chloride (7647-01-0)	Yes	Yes	No	Yes
Ferric Chloride (7705-08-0)	No	No	No	No
Water (7732-18-5)	Yes	Yes	No	Yes

-------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Hydrogen Chloride (7647-01-0)	5000	500*	Yes	No
Ferric Chloride (7705-08-0)	No	No	No	No
Water (7732-18-5)	No	No	No	No

-------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Hydrogen Chloride (7647-01-0)	5000	No	No
Ferric Chloride (7705-08-0)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 2R
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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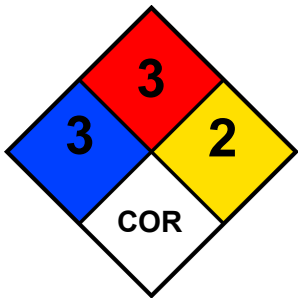
Section 16: Other Information

16.1 NFPA 704



Top, Flammability: 3 – Severe Hazard

Left, Health Hazard: 3 – Severe Hazard

Right, Reactivity: 2 – Moderate Hazard

Bottom, Special Notice: COR – Corrosive

Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

Product Use:
Laboratory Reagent.

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