

GC Electronics
1801 Morgan Street
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Product Name: PC Board Etching Solution

MSDS Number: 306
Revision Date: 10/13/11
Supersedes Date: 2/16/08

MATERIAL SAFETY DATA SHEET

Complies with OSHA Hazard Communication Standard 29 CFR 1910.1200

Product Type: PC Developing Etching **Emergency Contact: Chemtrec**
Product Name: **PC Board Etching Solution** **Phone: (800) 424-9300**
Part Number(s): **22-239**

Section 1 – Identification of Product

Common Name: PC Board Etching Solution
Chemical Name Synonyms: Iron (III) Chloride Solutions
CAS #: Mixture
Chemical Family: Inorganic Salt Solution
Formula: FeCl₃
Product Name: Ferric Chloride Sol'N Photo Engraving Grade
HMIS Ratings: NFPA Least 0
Health: 3* Health: 3 Slight 1
Flammability: 0 Flammability 0 Moderate 2
Reactivity: 0 Reactivity: 0 High 3
* = Chronic Health Hazard Special Hazard: None Extreme 4
Gloves, Safety Glasses B

Section 2 – Hazardous Ingredients

<u>Component</u>	<u>CAS #</u>	<u>% by Weight</u>	<u>OSHA PEL</u>	<u>OSHA STEL/C</u>	<u>ACGIH TWA</u>	<u>ACGIH STEL/C</u>
Ferric Chloride	7705-08-0	37- 42	* 1 mg/m ³ +	Not Established	* 1 mg/m ³	Not Established
Hydrochloric Acid	7647-01-0	0 – 1%	Not Established	C 5 ppm	Not Established	C 2 ppm

NOTE *Exposure Limit for Iron Salts, soluble, as Fe. + Vacated 1989 OSHA PEL(s). C = Denotes Ceiling Limit.

EMERGENCY OVERVIEW: DANGER! Corrosive to most metals. Harmful or fatal if swallowed. Causes eye and skin irritation or burns. Harmful if inhaled. May react with certain metals to form explosive/flammable Hydrogen gas.

Section 3 – Physical Data

Physical State Liquid
Boiling Point (deg F): 223 - 230
Specific Gravity: 1.40 @ 25C
Freezing Point (deg F): N.D.
Melting Point (deg.F) N.D.
Percent Volatile (wt%): N.D.
Vapor Pressure (mm hg) Negligible
Vapor Density (air=1) N.A.
Evaporation Rate (nBuAc=1): N.A.
Solubility in Water: Complete
pH: <2.0 (as is)
Appearance and Odor: Clear to slightly hazy. Dark red-brown. / Sharp odor.
VOC (wt %) 0
VOC (lbs/gal) 0

For information on flash point, flammability, oxidizing properties, autoflammability, and explosive properties, please see Section 4.

Section 4 – Fire and Explosion Hazard Data

Flammability:	Product not flammable
Flash Point (TCC method used):	Not applicable
Oxidizing Properties:	Data not available
Autoflammability:	Not applicable
Autoignition Temperature:	Not applicable
Flammable Limits:	LEL: NA UEL: NA
Extinguishing Media:	Not combustible. For fires in area use appropriate media. For example: Water spray. Water fog. Carbon dioxide. Dry chemical. Foam.
Fire Fighting Instructions:	Evacuate area of unprotected personnel. Wear protective clothing including NIOSH-approved self-contained breathing apparatus. Remain upwind of fire to avoid hazardous vapors and decomposition products. Use water spray to cool fire-exposed containers.
Fire and Explosion Hazards:	Residue may burn if heated to dryness. Heat can cause evolution of gaseous Hydrogen Chloride. This product may react with certain metals to produce flammable Hydrogen Gas.
Hazardous Combustion Products:	Thermal decomposition may release: Hydrogen Chloride gas. Phosgene Gas.

Section 5 – Health Hazard Data

Threshold Limit Value:	* 1 mg/m ³ (OSHA 29 CFR 1910.134 and ANSI Z88.2) Exposure limits for iron soluble salts, as Fe.
Routes of Exposure:	Eyes. Ingestion. Inhalation. Skin.
Target Organs:	Eyes. Liver. Respiratory System. Skin. Gastrointestinal Tract.

Effects of Overexposure

Eye Contact:	Causes: irritation. May cause: tearing, tissue discoloration, burns loss of vision.
Skin Contact:	Causes: irritation. Contact may cause: drying, discomfort, rash, burns, sensitization.
Skin Absorption:	No Data Available
Inhalation:	Vapors or mists may irritate or burn: respiratory tract. Harmful if inhaled.
Ingestion:	May cause sever damage to the: kidneys, liver. May be fatal if swallowed.
Medical Conditions Aggravated by Exposure:	None known.
Carcinogens (NTP, IARC, or OSHA):	This product does not contain 0.1% or more of the known or potential carcinogens listed in NTP, IARC or OSHA.
Potential Environmental Effects:	See Section 11

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Emergency and First Aid Procedures

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids open during this flushing with water. Tilt head to avoid contaminating unaffected eye. Call a physician immediately.

Skin Contact: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately.

Ingestion: If fully conscious, drink a quart of water. DO NOT induce vomiting. CALL A PHYSICIAN IMMEDIATELY. If unconscious or in convulsions, take immediately to a hospital or a physician. NEVER induce vomiting or give anything by mouth to an unconscious victim. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs.

Inhalation: Remove victim to fresh air. If not breathing, perform artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. **Get medical attention immediately.**

Note To Physicians: Effects of exposure (inhalation, ingestion or skin contact) may be delayed.

Section 6 – Reactivity Data

Stability: Stable under normal conditions.

Conditions to Avoid: Avoid elevated temperatures

Incompatible Materials: Metals, Bases, Alkalies. Strong reducing agents, Alkali metals.

Hazardous Decomposition Products: Hydrogen chloride gas. Hydrogen gas.

Hazardous Polymerization: Will not occur under normal conditions. May release hydrogen chloride gas at elevated temperatures. May react with certain metals to produce flammable hydrogen gas.

Section 7 – Spill or Leak Procedures

Steps to be taken in case material is released or spilled: CORROSIVE MATERIAL. Evacuate unprotected personnel from area. Maintain adequate ventilation. Follow personal protective equipment recommendations found in Section 8. Never exceed any occupational exposure limit. Contain spill, place into drums for proper disposal. Flush remaining area with water and neutralize with Soda Ash, Lime or Limestone and dispose of properly. Adequate ventilation is required if soda ash is used because of the consequent release of carbon dioxide gas. Avoid direct discharge to sewers and surface waters. Spills of 1000 pounds (454 kilograms) or more must be reported to the **National Response Center, (800) 424-8802**. If water pollution occurs, notify the appropriate authorities.

Waste disposal method: Observe all local, state and federal regulations. Dispose of at approved Waste Treatment Facility following all State, Local and Federal Regulations. Since emptied containers retain product residue, follow label warnings even after container is emptied. DO NOT pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks or other sources of ignition.

Hazardous Waste Number: D002

Section 8 – Special Protection Information

Exposure Guidelines:	See Section 2
Engineering Controls:	General room ventilation is required. To keep exposure below established limits, local exhaust may be necessary. Avoid creating dust or mist. Maintain adequate ventilation. Do not use in closed or confined spaces. Keep levels below exposure limits. To determine exposure levels, monitoring should be performed regularly.
Eye/Face Protection:	Wear chemical safety goggles while handling this product. Wear additional eye protection such as a face shield when the possibility exists for eye contact with splashing or spraying liquid or airborne material. Do not wear contact lenses.
Skin Protection:	Prevent contact with this product. Wear gloves and protective clothing depending on condition of use.
Protective Gloves:	Impervious. Neoprene. Rubber.
Respiratory Protection:	Respiratory protection must be worn if ventilation does not eliminate symptoms or keep levels below recommended exposure limits. If exposure limits are exceeded wear: NIOSH approved full face-piece respirator with: Acid gas cartridge. DO NOT exceed limits established by the respirator manufacturer. All respiratory protection programs must comply with OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements and must be followed whenever workplace conditions require a respirator's use.
Other Protective Equipment:	Eyewash station. Safety shower. Rubber apron. Rubber boots. Protective clothing.
Work/Hygienic Practices:	Wash with soap and water before meal times and at the end of each work shift.

Section 9 – Special Precautions

Handling:	Avoid contact with eyes, skin and clothing. Use with adequate ventilation. Do not swallow. Avoid breathing vapors, mists or dust. Do not eat, drink or smoke in work area. Wash thoroughly after handling. Ferric chloride will permanently stain clothing and temporarily stain skin.
Storage:	CORROSIVE MATERIAL. Store in a cool, well ventilated area, out of direct sunlight. Store in a dry location away from heat. Keep away from incompatible materials. Keep containers tightly closed. Do not store in unlabeled or mislabeled containers. Highly corrosive to most metals with evolution of hydrogen gas.

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Section 10 – Regulatory Information

Carcinogen Content (% ingredient): None
IARC, NTP, OSHA:

U. S. Federal Regulations:

TSCA Inventory Status: All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements

OSHA: This product is hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

LD50 Oral: Rat: 450 mg/kg (ferric chloride anhydrous)
LD50 Skin: No Data
LD50 Inhalation: No Data

This product or all components of this product are listed on the EPA/TSCA Inventory of Chemical Substances.

SARA Title III Section 311/312 Category:

Immediate (Acute) Health Hazard: Yes
Delayed (Chronic) Health Hazard: Yes
Fire Hazard: No
Sudden Release of Pressure Hazard: No
Reactive Hazard: No

SARA Section 302/304/313 HAP:

<u>Component</u>	<u>CERCLA RQ</u>	<u>SARA RQ</u>	<u>SARA TPQ</u>	<u>SARA 313</u>	<u>U.S. HAP</u>
Ferric Chloride	1000	N.A.	N.A.	NO	NO
Hydrogen Chloride	5000	5000	500	YES	YES

Notification to the Response Center, Washington, D.C. (1-800-424-8802) is required if any of the above RQ's are exceeded.

Note: RQ, TPQ, Section 313 reporting requirements are dependent upon individual ingredients. Hydrogen Chloride (gas and aerosol forms only) is on the Extremely Hazardous Substance List. In liquid form, Hydrogen Chloride (Hydrochloric Acid) is not required to be reported as an Extremely Hazardous Substance, but is subject to SARA 311 and 312 reporting requirements. Hydrochloric Acid also appears on the Section 313 list; however, the listing only applies to the gas and aerosol forms of Hydrochloric Acid.

U.S. STATE REGULATIONS:

California: The following components are listed under Proposition 65: No Data

Wisconsin: The following components are listed as a Wisconsin HAP: Iron Salt, soluble, as Fe. Hydrogen Chloride.

RCRA: If discarded in its purchased form, this product would be a hazardous waste by characteristic. Under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste.

This product contains no Class I or Class II ozone Depleting Chemicals.

DOT: Please see Section 11.

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

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Section 11- Other Information

DOT (Department of Transportation):

Chemical Name Synonyms:	Iron Chloride Solution
Chemical Family:	Inorganic Salt Solution
Formula:	FeCl ₃
DOT Proper Shipping Name:	Ferric Chloride, Solution
DOT Hazard Class:	8 (corrosive material)
DOT Identification #:	UN2582
Packing Group:	III
DOT Label Required:	CORROSIVE
Reportable Quantity (RQ):	1000# (Ferric Chloride); 5000# (Hydrogen Chloride)

Emergency Responses Guide Book Number 60

Toxicological Information:

Immediate Effects:	Can cause severe liver and/or kidney damage if swallowed, and may even be fatal. See Section 5 for other immediate health hazards.
Chemical Fate Information:	No data available.

MSDS Abbreviations:

N.A.= Not applicable
N.D.= Not determined
HAP= Hazardous Air Pollutant
VOC= Volatile Organic Compound
C = Ceiling Limit
N.E. / Not Estab = Not Established

Disclaimer

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