

MATERIAL SAFETY DATA SHEET

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COPPER ETCHANT TYPE 100/200 TIN OXIDE ETCHANT TE-100

SECTION I: PRODUCT IDENTIFICATION

Revised 7/02

Emergency # Chemtrec: 1-800-424-9300

Product Name: Copper Etchant 100/200 - Tin Oxide Etchant TE-100

Formula: HCl/FeCl₃ in H₂O

CAS No.: mixture see below

Product Codes: CE-100/200

Synonyms: ITO Etchant

PRECAUTIONARY LABELING

BAKER SAF-T-DATA SYSTEM

HEALTH	FLAMMABILITY	REACTIVITY	CONTACT
3	0	2	3
SEVERE	NONE	MODERATE	SEVERE

Laboratory Protective Equipment: Goggles & Shield, Lab Coat & Apron, Vent Hood, Proper Gloves.

Precautionary Label Statements: POISON! DANGER! CAUSES BURNS!

MAY BE FATAL IF SWALLOWED OR INHALED Do not get in eyes, on skin, on clothing. Do not breathe vapor. Keep in tightly closed container. Use with adequate ventilation. Wash thoroughly after handling.

SECTION II- HAZARDOUS COMPONENTS

Components:	%	CAS#
Ferric Chloride FeCl ₃ :	25-30%	7705-08-0
Hydrogen Chloride:	1-5%	7647-01-0

SECTION III- PHYSICAL DATA

- **Boiling Point:** N/A **Melting Point:** N/A
- **Vapor Pressure (mmHg):** N/A **Vapor Density(air=1):** 1.3
- **Specific Gravity (H₂O=1):** 1.19
- **Evaporation Rate:** N/A
- **Solubility (H₂O):** Complete (in all portions)
- **% Volatiles by Volume:** 100

- **Appearance & Odor:** Colorless liquid with hydrogen chloride odor.

SECTION IV- FIRE AND EXPLOSION HAZARD DATA

- **Flash Point:** N/A **NFPA 704M Rating:** 3-0-0
- **Flammable Limits:** Upper - N/A% Lower- N/A%
- **Fire Extinguishing Media:** Use extinguishing media appropriate for surrounding fire.
- **Special Fire Fighting Procedures:** Firefighters should wear proper protective equipment and self-contained (positive pressure if available) breathing apparatus with full-face piece. Move exposed containers from fire area, if it can be done without risk. Use water to keep exposed containers cool; do not get water inside containers.
- **Unusual Fire & Explosion Hazards:** Closed containers exposed to heat may explode.
- **Toxic Gases Produced:** Hydrogen chloride, hydrogen gas.

SECTION V- HEALTH HAZARD DATA:

PEL and TLV listed denote ceiling limit.

- **Ferric Chloride (TLV/TWA)** 900 mg/m³ (FeCl₃)
 - **Hydrochloric Acid (TLV/TWA)** 7 mg/m³ (5ppm) (HCl)
 - **Permissible Exposure Limit (PEL):** 7 mg/m³ (5ppm) (HCl)
 - **Toxicity:** LD₅₀ (ipr-mouse) (mg/kg) 40 (HCl)
LD₅₀ (oral-rabbit) (mg/kg) 900 (HCl)
LC₅₀ (inhl-rat-IH) (ppm) 3124 (HCl)
 - **Carcinogenicity:** NTP: No IARC: No Z List: No OSHA reg: No
 - **Effects of Overexposure:** Inhalation of vapors may cause pulmonary edema, circulatory system collapse, damage to upper respiratory system, collapse. Inhalation of vapors may cause coughing and difficult breathing. Liquid may cause severe burns to skin and eyes.
 - **Effects of Ingestion:** Ingestion is harmful and may be fatal. May cause severe burning to mouth and stomach. May cause nausea and vomiting.
 - **Medical Conditions Generally Aggravated By Exposure:** None identified.
 - **Routes of Entry:** Ingestion, inhalation, skin contact and eye contact.
 - **Emergency and First Aid Procedures:** CALL A PHYSICIAN. If swallowed do not induce vomiting; If conscious, give water, milk or milk of magnesia.
 - 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 while removing contaminated clothing and shoes. Wash clothing before re-use.
- Toxicity test results and safety and health effects are based on the solute.**

SECTION VI- REACTIVITY DATA:

- **Stability:** Stable **Hazardous Polymerization:** Will not occur
- **Incompatibles:** Most common metals, strong bases, metal oxides, amines and carbonates.
- **Decomposition Products:** Hydrogen chloride.

SECTION VII- SPILL AND DISPOSAL PROCEDURES:

- **Steps to be taken in event of spill or discharge:** Wear self-contained breathing apparatus and full protective clothing. Stop leak if you can do so without risk. Ventilate area. Neutralize spill with soda ash or lime. With clean shovel, carefully place material into clean, dry container and cover; remove from area. Flush spill area with water.
- **Disposal Procedure:** Dispose in accordance with all applicable federal, state and local environmental regulations. EPA Hazardous waste number: D002 (corrosive waste).

SECTION VIII: INDUSTRIAL PROTECTIVE EQUIPMENT

- **Ventilation:** Use general or local exhaust ventilation to meet TLV requirements.
- **Respiratory Protection:** Respiratory required if airborne concentration exceeds TLU. Pt concentrations up to 100 ppm, a chemical cartridge respirator with acid cartridge is recommended. Above this level, a self-contained breathing apparatus is recommended.
- **Eye/Skin Protection:** Safety goggles and face shield, uniform, protective suit and acid-resistant gloves are recommended.

SECTION IX- STORAGE AND HANDLING PRECAUTIONS

- **SAF-T-DATA™ Storage Color Code:** White
- **Special Precautions:** Keep container tightly closed. Store on corrosion-proof area.

SECTION X- TRANSPORTATION DATA AND ADDITIONAL INFORMATION DOMESTIC D.O.T.

- **Proper Shipping Name:** Ferric Chloride Solution
- **Hazard Class:** 8
- **UN/NA:** UN2582
- **Labels:** Corrosive
- **Reportable Quantity:** 5000 lbs.

INTERNATIONAL (I.M.O.)

- **Proper Shipping Name:** Ferric Chloride Solution
- **Hazard Class:** 8
- **UN/NA:** UN 2582
- **Labels:** Corrosive

N/A- Not Applicable or Not Available

The information published in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the user's responsibility to determine the suitability of this information for the adoption of necessary safety precautions. We reserve the right to revise Material Safety Data Sheets periodically as new information becomes available.

M.E. Hecht July 2002

**Addendum to Material Safety Data Sheet
Regulatory Status**

This addendum must not be detached from the MSDS. Identifies SARA 313 substances(s). Any copying or redistribution of the MSDS must include a copy of this addendum.

Hazard Categories for SARA
Section 311/312 Reporting
Acute Chronic Fire Pressure Reactive

Products or Components of product.	SARA EHS Sect.302		SARA Section 313 Chemicals		CERCLA Sec.103	RCRA
	RQ (lbs.)	Tpq (lbs.)	Name List	Chemical Category	RQ (lbs.)	Sec 261.33
Hydrochloric Acid (7647-01-0)	5000	500	Yes	No	5000	No

Applicable Products:

PC Copper Etchant (CE-100, CE-200),
CRE-473, Iron Oxide Mask Etchant, TFP,
TFTN, Electroless Nickel Plating Strike,
PC Electroless Copper D, Bright Electroless
Tin Part B, TE-100

SARA Section 302 EHS RQ: Reportable Quantity of Extremely Hazardous Substance, listed at 40 CFR 355

SARA Section 302 EHS TPQ: Threshold Planning Quantity of Extremely Hazardous Substance. An asterisk (*) following a Threshold Planning Quantity signifies that if the material is a solid and has a particle size equal to or larger than 100 micrometers, the Threshold Planning Quantity=10000 lbs.

SARA Section 313 Chemicals: Toxic Substances subject to annual release reporting requirements listed at 40 CFR 372.65.

CERCLA Sec. 103: Comprehensive Environmental Response, Compensation and Liability Act (Superfund). Releases to air, land or water of these hazardous Substances which exceed the Reportable Quantity (RQ) must be reported to the National Response Center, (800-424-8802); Listed at 40 CFR 302.4

RCRA: Resource Conservation and Reclamation Act. Commercial chemical product wastes designated as acute hazards and toxic under 40 CFR 261.33