

Ferric Chloride



415

Copper Etchant

Ready to use solution designed for etching printed circuit boards and other metals. Recommended for use with M.G. Chemicals [Professional Etching Process Kit](#) (416-E) and M.G. [Economy Etching Process Kit](#) (416-ES). **Note: Do not dilute this product with water.**

Directions

Immerse copper board in solution and agitate until etching action is completed. Ferric Chloride can etch up to a maximum of 100g of copper per liter of solution (.33 square meters or 3.5 square feet of 1 oz copper clad board). Etching process can be sped up by heating the solution to a temperature no higher than 55°C (135°F). If you require further directions for etching or making a printed circuit board, consult the positive photofabrication process guide available free from your dealer.

Specifications

Metal	Maximum Impurities
Aluminum	80.1 ppm
Arsenic	< 1.3 ppm
Barium	4.9 ppm
Cadmium	0.13 ppm
Copper	14.0 ppm
Lead	< 0.5 ppm
Mercury	< 0.1 ppm
Magnesium	55.2 ppm
Manganese	400 ppm
Nickel	19.0 ppm
Selenium	7.0 ppm
Silver	1.0 ppm



Tin	< 5.0 ppm
Zinc	1.0 ppm

Available Sizes

Catalog Number	Sizes Available	Description
415-500ML	500ml (17 oz)	Liquid
415-1L	1L (33 oz)	Liquid
415-4L	4L (1 gal)	Liquid
415-20L	20L (5.3 gal)	Liquid

Material Safety Data Sheet

Section 1: Product Identification

MSDS Code: 415 - liquid**Name: Ferric Chloride****Related Part Numbers: 415-500ML; 415-1L; 415-4L; 415-20L**

Use: For etching printed circuits boards.

Section 2: Hazardous Ingredients

CAS#	Chemical Name	Percentage by weight	ACGIH TWA	Osha Pel	Osha Stel
7705-08-0	Ferric Chloride	40%	1mg/m ³	N/e	N/e
7647-01-0	Hydrochloric acid	1%	5ppm	N/e	N/e

Section 3: Hazards Identification

WHMIS Codes: E**NFPA Ratings:** Health 2 Flammability 0 Reactivity 2**HMIS Ratings:** Health 2 Flammability 0 Physical Hazard 2**Eyes:** Corrosive. Contact of liquid will cause severe eye burns, and corneal damage.**Skin:** Corrosive. May cause severe skin irritation with possible burns.**Inhalation:** May cause irritation mucous membranes and respiratory tract.**Ingestion:** May be corrosive to the gastrointestinal tract. May cause chemical burns in the mouth, throat, esophagus, and stomach.**Chronic:** Repeated exposure may cause an increased body load of iron, with possible chronic systemic effects.

Section 4: First Aid Measure

Eyes: Remove contact lenses. Flush with water or saline for 20 minutes. Get medical aid.**Skin:** Wash skin with large quantities of soap and water. Get medical aid if symptoms persist.**Inhalation:** Immediately remove from exposure to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.**Ingestion:** Do not induce vomiting. If conscious, give 1-2 glasses of water. Get medical aid.

Section 5: Fire Fighting Measures

Autoignition Temperature: N/a **Flash Point:** N/a **LEL / UEL:** N/a**Extinguishing Media:** Water spray, foam, dry chemicals and carbon dioxide.**General Information:** Will not burn.

Section 6: Accidental Release Measures

Spill Procedure: Provide adequate ventilation. Wear appropriate personal protection. Sprinkle absorbent compound onto spill, then sweep into a plastic container. Wipe up further residue with paper towel and place into container. Wash spill area with soap and water.

Section 7: Handling and Storage

Handling: Wash thoroughly after handling. Avoid contact with eyes, skin, and clothing. Do not ingest or inhale. Do not expose container to heat or flame.

Storage: Keep from freezing. Store in a cool, dry, well-ventilated area, away from incompatible substances.

Section 8: Exposure Controls

Routes of entry: Eyes, ingestion, inhalation, and skin.

Ventilation: Use adequate general or local exhaust ventilation to keep airborne concentrations below exposure limits.

Personal Protection: Wear appropriate protective eyeglasses or chemical safety goggles. Wear appropriate protective clothing to prevent skin contact. Use a NIOSH approved respirator when necessary.

Section 9: Physical and Chemical Properties

Physical State:	Liquid	Odor:	Slight iron/acid	Solubility:	Soluble in water	Evaporation Rate:	1.00
Boiling Point:	106°C	Specific Gravity:	1.26	Vapor Pressure:	40 @35°C	Vapor Density:	1.00 pH: <1

Section 10: Stability and Reactivity

Stability: Stable at normal temperatures and pressures.

Conditions to avoid: Incompatible materials.

Incompatibilities: Alkalis, oxidizers, corrosive to metals.

Polymerization: Will not occur.

Decomposition: Prolonged contact with metals may produce flammable hydrogen gas.

Section 11: Toxicological Information

Sensitization: (effects of repeated exposure) No

Carcinogenicity: (risk of cancer) No

Teratogenicity: (risk of malformation in an unborn fetus) No

Reproductive Toxicity (risk of sterility): TDLo: 29mg/kg (rat)

Mutagenicity: (risk of heritable genetic effects): No

Lethal Exposure Concentrations:	Ingestion (LD50):	4500 mg/kg (rat)	Inhalation (LC50):	N/e	Skin (LD50):	N/e
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Section 12: Ecological Information

General Information: Avoid runoff into storms and sewers, which lead into waterways. Water runoff can cause environmental damage.

Environmental Impact Data: (percentage by weight)

CFC: 0 **HFC:** 0 **Cl.Solv:** 0 **VOC:** 0 **HCFC:** 0 **ODP:** 0

Section 13: Disposal Information

General Information: Dispose of in accordance with all local, provincial, state, and federal regulations. Water runoff can cause environmental damage.

Section 14: Transportation Information

Ground Canada: (all sizes 4L or smaller)

Classified as **Consumer Commodity**. Refer to **TDG regulations** (Canadian Transportation of Dangerous Goods regulations).

Recommend Shipper be trained and certified.

Ground USA: - (all sizes 4L or smaller)

Classified as **ORM-D**. Refer to USA CFR 49 Regulations.

Recommend Shipper be trained and certified.

Ground Canada and USA: - (all sizes larger than 4L)

Shipper must be trained and certified. Refer to CFR 49 (USA), and TDG regulations (Canada).

Shipping Name: **FERRIC CHLORIDE SOLUTION**, UN number: **2582**, Class: **8**, Packing Group: **III**.

Recommend using original MG Chemicals UN Certified outer cartons. Tape all seams on the carton. Hazard Label required – CORROSIVE. A double arrow orientation label is required and is already printed on the original outer carton.

Air: (all sizes 1L or smaller)

Shipper must be trained and certified. Refer to IATA Dangerous Goods Regulations.

Shipping Name: **FERRIC CHLORIDE SOLUTION**, UN number: **2582**, Class: **8**, Packing Group: **III**.

For IATA, follow packing instructions Y818.

Air: (all sizes 4L and larger)

Shipper must be trained and certified. Refer to IATA Dangerous Goods Regulations.

Recommend: **DO NOT SHIP BY AIR.**

Sea:

Shipper must be trained and certified. Refer to IMDG regulations.

Shipping Name: **FERRIC CHLORIDE SOLUTION**, UN number: **2582**, Class: **8**, Packing Group: **III**.

Section 15: Regulatory Information

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by the Controlled Products Regulations. SARA (Superfund Amendments and Reauthorization Act of 1986, USA, 40 CFR 372.4)

None of the chemicals in this product have a reportable quantity.

EPCRA (Emergency Planning and Right to Know Act, USA, 40 CFR 372.45)

This product does not contain any chemicals subject to the reporting requirements of section 313 Title III of the SARA of 1986 and 40 CFR part 372.

TSCA (Toxic Substances Control Act of 1976, USA)

All substances are TSCA listed.

CAA (Clean Air Act, USA)

This product does not contain any class 1-ozone depleters.