Ferric Chloride
415 Technical Data Sheet

415-Liquid

Description

The 415 *Ferric Chloride* is an etchant solution for printed circuit board and photoengraving processes.

Benefits and Features

- **Photoengraving Grade—42° Baume**
- **Ready to use without dilution**

ENVIRONMENT
RoHS Compliant
No-VOC

Usage Parameters

Properties	*Value*
Shelf Life	3 y

Temperature Ranges

Properties	*Value*
Storage Temperature Limits [a)]	-16 to 27 °C [60 to 80 °F]

a) Cool, dry, and well ventilated area recommended.

Properties of 415

Properties	*Value*
Shelf Life	3 y
Color	Dark orange-brown
Odor	Mild acidic/iron
pH	<1
Percent (wt/wt) of Ferric Chloride ($FeCl_3$)	≥38.4%
Ferrous Chloride ($FeCl_2$)	<1.5%
Hydrochloric Acid (HCl)	<0.8%
Insolubles	<0.5%
Specific Gravity @20 °C [68 °F]	1.4 g/mL
Boiling Point	106 °C [222 °F]
Freezing Point	0 °C [32 °F]

Compatibility

Chemical—Ferric chloride reacts strongly with metals.

Storage

Store between 16 and 27 °C [60 and 80 °F] in dry area. Store in plastic container. Do NOT store in metal containers.

Date: 26 September 2016 / Ver. 1.00

Health, Safety, and Environmental Awareness

Please see the 415 **Safety Data Sheet** (SDS) for greater details on transportation, storage, handling and other security guidelines.

Environmental Impact:

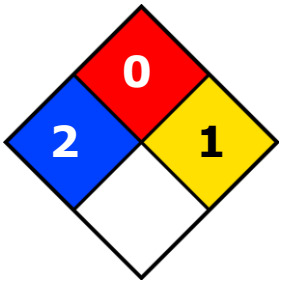
This product meets the European Directive
2011/65/EU Annex II (ROHS);
recasting 2002/95/EC.

Health and Safety: The solution causes serious eye damage and skin irritation. May be corrosive to metals. Wear eye protection/face protection/gloves. Avoid release to the environment.

HMIS® RATING

HEALTH:	* 2
FLAMMABILITY:	0
PHYSICAL HAZARD:	1
PERSONAL PROTECTION:	

NFPA® 704 CODES



Approximate HMIS and NFPA Risk Ratings Legend:
0 (Low or none); 1 (Slight); 2 (Moderate); 3 (Serious); 4 (Severe)

Application Instructions

Follow the procedure below for best results. If further directions for etching or making a printed circuit board (PCB), consult the photofabrication process guide available free from your dealer.

1. Fully immerse copper board in solution.
2. Agitate until etching action is complete.

To speed up etching

- Warm the ferric chloride solution between 35 to 55 °C [95 to 131 °F].

ATTENTION! Do NOT heat ferric chloride solution above 55 °C [131 °F].

NOTE: Dilution is not recommended.

Packaging and Supporting Products

Cat. No.	*Packaging*	*Net Volume*		*Net Weight*		*Packaging Weight*	
415-500ML	Bottle	475 mL	1 pt	665 g	23.4 oz	7.5 kg [a)]	16.5 lb [a)]
415-1L	Bottle	945 mL	1.99 pt	1.32 kg	2.91 lb	9 kg [b)]	19.8 lb [b)]
415-4L	Bottle	4 L	1.06 gal	5.58 kg	12.3 lb	6.12 kg	13.4 lb
415-20L	Bottle	20 L	5.3 gal	27.9 kg	61.6 lb	28.3 kg	62.3 lb

Related Products and Etching Kits

- *Economy Etching Kit*: Cat. No. 416-ES
- *Photofabrication Kit*: Cat. No. 416-K
- *Professional Etching Kit*: Cat. No. 416-E

Technical Support

Contact us regarding any questions, improvement suggestions, or problems with this product. Application notes, instructions, and FAQs are located at www.mgchemicals.com.

Email: support@mgchemicals.com

Phone: +(1) 800-340-0772 (Canada, Mexico & USA)
+(1) 905-331-1396 (International)
Fax: +(1) 905-331-2862 or +(1) 800-340-0773

Mailing address:

Manufacturing & Support
1210 Corporate Drive
Burlington, Ontario, Canada
L7L 5R6

Head Office
9347–193rd Street
Surrey, British Columbia, Canada
V4N 4E7

Warranty

M.G. Chemicals Ltd. warranties this product for 12 months from the date of purchase by the end user. *M.G. Chemicals Ltd.* makes no claims as to shelf life of this product for the warranty. The liability of *M.G. Chemicals Ltd.* whether based on its warranty, contracts, or otherwise shall in no case include incidental or consequential damage.

Disclaimer

This information is believed to be accurate. It is intended for professional end users having the skills to evaluate and use the data properly. *M.G. Chemicals Ltd.* does not guarantee the accuracy of the data and assumes no liability in connection with damages incurred while using it.