

### Description

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

### Features and Benefits

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

**ENVIRONMENT**  
RoHS Compliant  
No-VOC

### Usage Parameters

<i>Properties</i>	<i>Value</i>
Shelf Life	3 y

### Temperature Ranges

<i>Properties</i>	<i>Value</i>
Storage Temperature Limits <sup>a)</sup>	16 to 27 °C [60 to 80 °F]

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

### Properties of 415

<i>Properties</i>	<i>Value</i>
Color	Dark red-brown
Odor	Slight iron/acidic
Viscosity for a 40% solution	12 cP
pH	<2
Solution Strength	38 to 42%
Percent (wt/wt) of Hydrochloric Acid (HCl)	<1.0%
Density	41.6% Baume to 45% Baume
Specific Gravity @17.5 °C [63.5 °F]	1.43
Boiling Point	110 °C [230 °F]
Freezing Point	-50 °C [-58 °F]
Crystallization @-26 °C [-15 °F]	37% FeCl <sub>3</sub>
@-12 °C [10 °F]	40% FeCl <sub>3</sub>

### Compatibility

**Chemical**—Ferric chloride reacts strongly with metals.

### Storage

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

## Health and Safety

Please see the 415 **Safety Data Sheet** (SDS) for further details on transportation, storage, handling, safety guidelines, and regulatory compliance.

## Application Instructions

For best results, follow the procedure below. 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

<i>Cat. No.</i>	<i>Packaging</i>	<i>Net Volume</i>		<i>Packaged Weight</i>	
<b>415-500ML</b>	Bottle	475 mL	1 pt	7.5 kg	16.5 lb
<b>415-1L</b>	Bottle	945 mL	1.99 pt	9 kg	19.8 lb
<b>415-4L</b>	Bottle	4 L	1.06 gal	6.12 kg	13.4 lb
<b>415-20L</b>	Pail	20 L	5.3 gal	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



## 415 Technical Data Sheet Ferric Chloride

ISO 9001:2008 Registered Quality System. Burlington, Ontario, CANADA SAI Global File: 004008

415-Liquid

### Technical Support

Please contact us regarding any questions, suggestions for improvements, or problems with this product. Application notes, instructions and FAQs are located at [www.mgchemicals.com](http://www.mgchemicals.com).

Email: [support@mgchemicals.com](mailto:support@mgchemicals.com)

Phone: +(1) 800-340-0772 (Canada, Mexico & USA)

+ (1) 905-331-1396 (International)

+ (44) 1663 362888 (UK & Europe)

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

### Disclaimer

This information is believed to be accurate. It is intended for professional end users who have the skills required 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.