



Ferric Chloride Liquid User Guide

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1. About Lionkem Ferric Chloride Liquid

Ferric Chloride is an orange to brown-black solid that is slightly soluble in water and is non-combustible.

It is widely used in water purification, sewage treatment and as an etching agent for manufacturing **Printed Circuit Boards** for hobbyists.

Chemical Safety				
	Corrosive	Irritant	Health Hazard	Environmental Hazard
				
	Toxic			
Molecular formula	$FeCl_3$			
Density	2.90 g/cm ³ (Anhydrous)			
Melting point	307.6°C			
Boiling point	316°C			
Synonyms	Ferric Chloride Iron (III) Chloride Iron trichloride			
Molecular Weight	162.20 g/mol			
Concentration	40% w/v			

2. Procedure for PCB etching

2.1. Getting Ready

The first step is to get the circuit layout transferred to the copper clad board (toner transferred or laser engraved) and the necessary equipment ready, including:

No	Component	Quantity
1	Lionkem Ferric Chloride Liquid	1
2	Measuring cup*	1
3	Latex Gloves*	1 pair
4	Safety goggles*	1
5	Lab Coat or Raincoat*	1
6	Dust mask or Face Shield or Respirator*	1
7	Etching Tray (Plastic or glass) *	1
8	Plastic or any other non-metallic rod*	1
9	Tongs or Tweezers (Plastic/Glass/Stainless Steel) *	1
10	Litmus Paper*	-
11	Towel*	1
12	Water*	-
13	Newspapers or Old Cloth*	-
14	Isopropyl alcohol (surgical spirit) *	1

***These items should be purchased separately.**

2.2. How to use Ferric Chloride Solution

2.2.1. Immerse the copper clad board into the Ferric Chloride Solution and agitate the solution gently to ensure even etching. This process can take anywhere from **10 to 30 minutes**.

2.2.2. Once the unwanted copper is etched away, remove the board from the solution and rinse it thoroughly with water. Dry the board completely.

3. Disposal Method

3.1. Neutralizing the Ferric Chloride Solution

Mix the Ferric Chloride with **Sodium Bicarbonate (Baking Soda)** or **Sodium Carbonate (Washing Soda)** until a **pH level of 7 to 8** is achieved.

3.2. Separate the solid from the solution.

3.3. Once you are done mixing, the copper sludge settles at the bottom and a clear liquid at the top. Pour off the clear liquid into the drain with the water running. Dry the sludge and store it in a bag for hazardous waste disposal.

CAUTION - Do not breathe the dust of the dry Copper sludge. Make sure you always wear your protective gear (Gloves, Safety goggles, etc.)

4. Safety measures

- Wash thoroughly after handling the solution.
- Make sure to wear gloves to cover your hands up to the elbow and a facemask or face shield to cover the entire face including eyes, nose, mouth, neck, and ears.
- Wear a lab coat or a raincoat that is long enough to cover the body as used inside a scientific laboratory and wear boots to cover up to a few inches below the knees.
- Make sure to work in a place with enough ventilation and avoid breathing concentrated air.
- Keep out of reach of children. If drink or eat by accident, immediately seek medical attention.
- If in your eyes, rinse cautiously with water for several minutes and immediately seek medical attention.
- If on your skin, remove all contaminated clothes and footwear immediately. Drench the affected skin with running water for 10 minutes or longer and if substance is still on skin. Consult a doctor.

