



### Operation

After normal cleaning and rinsing, the printed circuit boards are simply immersed in the Microetch 6075 operating solution for the necessary period. Longer immersion times will be necessary when the solution is operated at the lower end of the temperature range. Increased temperatures will reduce the time. Do not operate the solution above the recommended limit.

### Equipment

PVC, Polyethylene, fiberglass, or rubber lined tanks.

### Solution maintenance

The operating solution should be maintained at a concentration of 8-12 oz/Gal for daily usage. Specific timetables for additions will be suggested based on total workload per shift.

## **Titration Method**

### Microetch 6075 Concentration

Reagents required:

- A. 0.1N Potassium Permanganate (KMNO<sub>4</sub>)
- B. 0.2N Ferrous Ammonium Sulfate (FESO<sub>4</sub> (NH<sub>4</sub>) SO<sub>4</sub> - 6 H<sub>2</sub>O)  
 preparing Ferrous Ammonium Sulfate solution  
 78.5 gm Ferrous Ammonium Sulfate  
 5.0 mL concentrated Sulfuric Acid  
 distilled water-make one liter
- C. 25% (vol) sulfuric acid solution  
 slowly add 100 mL sulfuric acid to 600 mL distilled water

Procedure:

1. Pipette a 1 mL sample into a 250 mL Erlenmeyer flask.
2. Add 25 mL of DI water.
3. Pipette 10 mL of 0.2N ferrous ammonium sulfate into the flask and wait one minute.
4. Pipette 5 mL of 25% H<sub>2</sub>SO<sub>4</sub> into the flask.
5. Titrate with 0.1N KMNO<sub>4</sub> to a light pink endpoint.
6. Record the number of mL of KMNO<sub>4</sub> used as "a" mL.
7. Perform the same analysis on a blank solution. (i.e. run through steps 2-5)
8. Record number of mL of KMNO<sub>4</sub> used as "b" mL.

Calculation

$$\text{Concentration (oz/Gal)} = (b-a) \times 1.65$$

### Sulfuric Acid Concentration

1. Pipette 10 mL of working solution into a 250 mL Erlenmeyer flask and add about 100 mL DI water.
2. Add 2 - 3 drops of Methyl Orange indicator
3. Titrate with a 1.0N Sodium Hydroxide solution to a yellow-green endpoint.
4. Record mL used.

Calculation

$$\text{Concentration (\%/vol)} = \text{mL } 1.0\text{N NaOH} \times 0.28$$

## Waste Disposal

Spent solutions must be adjusted to a pH of 7.0 to 10.0 in order to remove the copper metal prior to disposal. Dilute sodium hydroxide (caustic soda) solutions are recommended for this procedure. Consult local authorities for specific regulations concerning discarding of spent material.

## Caution

Use only sulfuric acid when making up the operating solution. Use of Hydrochloric Acid will liberate chlorine gas; nitric acid will liberate nitric oxide and nitrogen dioxide gas.

Microetch 6075 and its operating solution are acidic and oxidizing in nature. Avoid contact with reducing agents, alkalis, and solvents, or organic materials such as paper, wood, cloth or sulfur. Avoid all acids other than sulfuric.

Wear rubber gloves, aprons, and safety glasses when handling Microetch 6075 and the working solution. Do not inhale the dust of the Microetch 6075 powder. Wear respirator when handling. In case of contact with the skin or eyes, flush with cold water for 15 minutes and obtain medical attention.



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