



# EB-660 Neutralizer

## DESCRIPTION

**EB-660** is a post-etch back neutralizer solution designed to neutralize and clean permanganate residue out of the holes of printed circuit boards. It insures a well-conditioned hole wall surface that allows for subsequent electroless copper coverage.

When used with GE-77, a mild glass frost to glass etch will occur. **EB-660** contains no ammonium compounds, which makes it easy to waste treat the spent solutions. It does not contain any chloride compounds, thereby helping to prevent pink ring formation.

## OPERATING PARAMETERS

Make-Up	10% <b>EB-660</b> by volume 84% De-ionized Water 6% Sulfuric Acid (98%)
Temperature	110 to 120°F (43 to 49°C)
Immersion Time	4 to 6 minutes
Process	Batch Tank
Agitation	Will speed activity
Ventilation	Advised
Tanks	Polypropylene, Polyethylene
Racks/Baskets	Stainless Steel, Platisol Covered Steel
Heaters	Stainless Steel, Titanium, Teflon Coils

## PHYSICAL PROPERTIES

Specific gravity	1.08 – 1.12
Appearance	Clear liquid
pH(1% solution)	NA
Odor	NA
Flash Point	>200F



## CONTROL PROCEDURES

Replenishment additions are made to **EB-660**. The preferred method of analysis is a simple bench analysis. An active **EB-660** bath should be maintained between 8% to 11%.

The EB660 bath should be replaced when the total additions made to the bath reaches the normal makeup quantity. The bath should also be replaced if the copper concentration exceeds four grams per liter.

## ANALYSIS

### EB-660 Concentration

#### Reagents and equipment needed

Saturated Ferric Ammonium Sulfate Solution (198g/L in 1% v/v Sulfuric Acid)  
0.1 Normal Potassium Permanganate Solution  
50% v/v sulfuric acid (98%)  
85% phosphoric acid  
2 ml pipet  
50 ml buret

#### PROCEDURE

1. Pipet 2 ml of the working solution into a 250 ml Erlenmeyer Flask and dilute to 30 ml with de-ionized water.
2. Add 5 ml of the Ferric Ammonium Sulfate Solution and 5 ml of the sulfuric acid solution.
3. Boil on a hot plate for 5 minutes, remove and cool. Dilute to 150 ml with de-ionized water.
4. Add 5 ml of phosphoric acid and mix.
5. Titrate with 0.1 Normal Potassium Permanganate to a pink endpoint lasting 15 seconds or more.
6. CALCULATION:

$$\% \text{ EB-660} = (\text{ml KMnO}_4) \times (\text{Normality of KMnO}_4) \times 8.0$$

Maintain concentration of **EB-660** between 8% to 11%

### SULFURIC ACID

#### Reagents and equipment

1.0 N Sodium Hydroxide  
Bromophenol Blue  
250 ml Erlenmeyer Flask  
50 ml buret  
5 ml pipet

#### PROCEDURE

1. Pipet 5 ml of the working solution and add 50 ml of DI water into the Erlenmeyer Flask.
2. Add 3-5 drops of bromophenol blue indicator.
3. While stirring the solution, titrate with 1.0 N base to a blue-violet endpoint.
4. CALCULATIONS:

$$\% \text{ Sulfuric Acid} = (\text{ml base}) \times (\text{Normality of base}) \times 0.56$$

Maintain Sulfuric Acid (98%) concentration between 4% and 8%.

## SAFETY AND STORAGE

**EB-660** is an acidic solution containing a corrosive reducing agent. It contains organic surface conditioners. Avoid breathing vapors. Use in a well-ventilated area. When handling concentrate or working solution, wear protective clothing, gloves and chemical safety goggles. In case of skin contact, remove contaminated clothing and flush affected area with plenty of cold water. In case of eye contact, flush immediately with plenty of cold water and seek medical attention immediately. Store **EB-660** in its original container. Keep away from direct sunlight and temperature extremes. Protect from freezing.

## WASTE TREATMENT

**EB-660** working solution contains sulfuric acid. In the process of neutralizing permanganate, some copper is removed from the copper clad material and dissolved in solution. The spent working solution of **EB-660** contains dissolved copper salts. It may be treated by pH adjusting the solution to a pH above 12 with dilute caustic soda, allowing the precipitate to settle. Filter the solution. Then lower the pH to between 6 and 8 with dilute sulfuric acid before sending the spent solution to the sewer. Consult with local officials for further waste disposal regulations. Please ask a Florida CirTech technical sales rep. for more information regarding waste treatment of this chemistry and our complete line of waste treatment line if additional help or information is desired.

## MISCELLANEOUS

Available in 5-gallon pails and 55 gallon drums. Consult MSDS for additional information.