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## **ELECTROLESS COPPER PLATING SYSTEM**

Used to plate a thin layer of copper over non-metallic parts. Easier to use than conductive paints. Provides a more even, consistent copper layer. Also used for small Printed Circuit Boards (PCBs) Thru-Holes.

### ***Part Preparation***

Porous objects such as Baby Shoes, Plants, Wood etc must be sealed before plating. Clean objects fully before sealing.

Plastics should be cleaned with acetone or lacquer thinner to remove any release agents. A light scuff with scotchbrite or sandpaper will improve adhesion of the copper layer. If, during plating, no gassing of the part is observed, cleaning was not sufficient. Remove and clean again or it may be easier to seal the part with the included sealer.

Glass objects should be chemically etched or sandblasted before plating to provide adhesion.

### ***Sealing Porous Parts***

Mix an amount of sealer appropriate to your part. Sealer can be brushed on, or the part can be dipped. Mixing ratio is 2 Parts A to 1 Part B. Use an old margarine tub or similar plastic container. Working life of the epoxy sealer is approx. 15 mins. Make sure the sealer is mixed thoroughly or it won't cure properly.

After applying sealer, wait 12 hours for it to fully cure.

### ***Preparing Plating Solutions***

In your kit, there are four solutions.

1. Electroless Copper Part A
  2. Electroless Copper Part B
  3. Electroless Copper Activator
  4. Electroless Copper Sensitizer
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1. Start by cleaning all plating tanks/beakers with soap and water. Rinse well.
  2. Pour sufficient amounts to solution to cover your part into the containers. Activator and Sensitizer are used as is. Electroless Copper A & B are mixed together in equal amounts.
  3. Fill a fourth container with distilled water for rinsing.
  4. Label your containers. Activator and Sensitizer look very similar.

## ***Plating Procedure***

1. Do not handle parts with bare hands, or oils from your fingers will leave marks or prevent plating in areas. Handle parts with plastic or rubber coated tongs, or rubber gloves.
2. Immerse sealed and/or cleaned part into Sensitizer tank. Leave for 2 minutes. Do not agitate solution. Use at room temperature.
3. Rinse thoroughly in distilled water tank. Do not allow to dry.
4. Immerse part into Activator tank. Leave for 2 minutes. Do not agitate. Use at room temperature.
5. Remove and rinse thoroughly in distilled water tank. Do not allow to dry.
6. OPTIONAL – Immerse in 5% Sulfuric Acid solution for 3-5 minutes, followed by rinsing in the distilled water tank. This step can speed up the copper deposition process, but is not required.
7. Finally, immerse in the Electroless Copper tank. Room temperature is fine, but optimal plating temperature is 100 deg F (40 deg C). Glass beakers can be heated on a hot plate. Plastic tanks would require a glass immersion heater. Do NOT use metal heaters, or any other metal objects in any tank.
8. During the plating step, give the part mild agitation to knock off any bubbles that may form on the part. Use a glass stir stick, plastic stir stick or your gloved fingers to swirl the part gently.
9. Remove and rinse in distilled water.
10. Plating time is 0.0002 inches per hour (0.5 microns).
11. If a heavier layer of copper is required, proceed to Acid Copper electroplating.

## ***Plating PC Board Thru-Holes***

The system can be used to electroless plate thru holes on PC Boards. The process is as follows:

1. Solvent Degrease followed by vigorous water rinse
2. Pumice Powder – Wet or Dry to remove oxides, heavy soils etc, followed by water rinse
3. Alkali Soak – 5 Minutes – 150-180 deg F – Followed by rinse
4. Persulfate Etch – 2 minutes. Ammonium Sulfate 200 gm/L and Sulfuric Acid 10ml/L. Followed by rinse
5. 10% Sulfuric Immersion – 2 minutes (removes residue from step 4)
6. 33% HCL Immersion – 2 Minutes (protects from Drag In)
7. Proceed to Plating Procedure above

## ***Technical Tips***

1. Copper content of bath is 0.5oz/32 fl oz (16gm/L). Useful life is determined by plating time x area being plated. Copper weighs approx. 0.14 oz per square foot at 0.0002” thick.
  - a. Eg. If plating a part that is 2” x 2” x 0.05” thick (8.3 sq inches), for one hour, you would use up 0.08 oz of copper.
2. When the copper bath turns clear, it has depleted and a new batch should be made.
3. Do not make additions to the copper bath. Always make up fresh.
4. After plating, if the bath is still bubbling, small particles of the object being plated have been left in the bath. Sealing was insufficient. If left, they will continue to plate until the bath crashes. To save the bath, you can try filtering through a fine filter.
5. Small craters or pits in the plated layer indicate that bubbles formed on the plate and were plated over. Increased agitation of the part during the plating step will resolve this.