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TECHNICAL BULLETIN ENIG PC300 Cleaner

I. Description

The ENIG PC300 Cleaner is the first step in the Electroless Nickel Immersion Gold process. This cleaner is specially formulated for printed circuit boards. It will remove soils and fingerprints, and insure complete and uniform plating. PC300 will also remove metallic residues left behind from copper etching.

II. Operating Parameters

Make-Up	See section IV. Control Procedures
Temperature	90 – 120°F (32 – 49°C)
Immersion Time	3 - 5 min
Process	Batch tank
Agitation	Recommended
Circulation	Panel agitation, and pump circulation at 3-5 turnovers/hr
Filtration	Not required
Ventilation	Recommended
Tanks	Polypropylene, Polyethylene, or stainless steel
Racks, Baskets	Plastic coated stainless steel; use polypro or Halar
Heaters	PTFE coated

Please refer to our ENIG Process Flow for more details on recommended dwell times, temperatures at each stage.

III. Physical Properties

	PC300
Specific gravity	0.99 – 1.01
Appearance	Clear liquid
Odor	None
PH	6.0 – 8.0
Contents	Surfactants

IV. Control Procedures

Bath Makeup

The makeup quantities are shown below. Follow the order given in the table for additions, and mix well after each step.

Bath Makeup Step	ENIG PC300 Cleaner
Step 1	Add about 50% by volume of DI water
Step 2	Slowly add 10% by volume of sulfuric acid, reagent grade, 94 - 98%
Step 3	Add 3% by volume of PC300

Step 4	Bring tank to level with DI water
Step 5	Heat the bath to 120° F

Warning: sulfuric acid addition will generate heat. Allow time for cooling.

Additions

PC300 additions are based on sulfuric acid additions. Sulfuric acid content is controlled by analysis and replenishment. Whenever sulfuric acid is added to the bath, PC300 should be added as well. Add PC300 at the rate of 1/3 the amount sulfuric acid. For example, if analysis shows that an addition of 9 gallons of sulfuric acid is required, then about 3 gallons of PC300 should be added as well.

Bath Replacement

The cleaner bath should be replaced based on square footage of work processed. Discard and remake the solution after 15 square feet of copper area is processed per working gallon of bath (37.5 dm² per liter). Assuming about 10% copper area on an 18"x24" panel, each panel has about 0.6 square feet of copper area. Approximately 25 panels can be processed per working gallon (7 panels per working liter), before the bath needs to be replaced. If full body ENIG plating is done, then the copper area processed is significantly increased. In, this case, the cleaner will need to be replaced more often.

The PC300 bath should be replaced at least every 4 months, regardless of square footage processed. This will ensure proper cleaning prior to nickel and gold plating.

V. Analysis Procedures

Sulfuric Acid Concentration

1. Pipet 5.0 ml of the working solution into a 250 ml Erlenmeyer flask.
2. Add ~75 ml of DI water and 3 - 4 drops of bromophenol blue indicator solution.
3. Titrate with 1.0 N sodium hydroxide from yellow to the blue violet endpoint.
4. Calculation:

$$\text{Sulfuric acid content (\% by vol)} = (\text{mLs of base}) \times (\text{Normality of base}) \times 0.56$$

Maintain the sulfuric acid content between 8 and 10% by volume through additions. Reagent grade sulfuric acid, 94 – 98% should be used.

Whenever sulfuric acid is added, add about 1/3 that volume of PC300 as well. For example, if an addition of 9 gallons of sulfuric acid is required, then add 3 gallons of PC300.

VI. Safety and Handling

- Reference the MSDS sheets for detailed information.

Bath components are corrosive, acidic solutions. 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 components in their original containers. Keep away from direct sunlight and temperature extremes. Protect from freezing.

VII. Waste Treatment

- Consult with federal, state, and local authorities for regulations regarding disposal of solutions.

The spent bath contains sulfuric acid and copper salts. A suggested waste treatment process is listed below. Consult with FCT Water Treatment personnel for more details.

1. Neutralize the spent solution with caustic soda.
2. Add a coagulant like WT431, WT520, or WT528.
3. Precipitate out the copper metal using WT660, WT676, or WT679.
4. Add a polymer like WT231 or WT235.
5. Dispose of the precipitated metals in accordance with regulations.
6. PH adjust the liquid effluent, and dispose of in accordance with regulations.

VIII. Miscellaneous

- Components are available in 1 gallon, 5 gallon, 55 gallon drums.

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