CUBRITE 2000

BRIGHT ACID COPPER FOR DECORATIVE PLATING

INTRODUCTION

Cubrite 2000 produces brilliant mirror bright copper deposits with excellent levelling over a wide current density range. Cubrite 2000 is formulated for decorative applications including plating on plastics. Base metals such as mild steel, tin/lead or zinc can also be plated providing they are first flash coated with a cyanide copper or nickel deposit. The solution is easy to control using three liquid additives plus a wetting agent to control surface tension.

BENEFITS

- Dye-based providing superior leveling
- Mirror bright deposits with extended range
- No pitting
- Separate functioning additives for maximum performance

SOLUTION MAKE–UP

Copper Base Solution	Make Up: Copper sulfate pentahydrate – 200 g/L Sulfuric acid (SG 1.84) – 3.5% v/v (64.8 g/L) Hydrochloric acid – for 90 ppm chloride content (see below)
Cubrite 2000 Carrier	10 ml/L
Cubrite 2000 Brightener	1.0 ml/L
Cubrite 2000 Leveler	0.5 ml/L
Cubrite 2000 Wetter	0.33 ml/L
DI Water	To volume

OPERATING DATA

Copper Sulfate	160 – 220 g/L
Sulfuric Acid	40 – 70 g/L
Chloride	60 – 120 ppm
Temperature	64 – 104°F
Current density	15 – 80 ASF
Agitation	Air

EQUIPMENT

Tanks	Polypropylene, PVC, Lined steel tanks
Heaters	PTFE or titanium clad electric immersion heaters
Cooling	May be required in high throughput tanks. Use chilled water running through titanium tubes or wide-bore PTFE coils. Under no circumstances should cooling coils be attached directly to main water supplies.
Filtration	Continuous through 1 to 5 micron. A minimum of three solution turn-overs per hour is recommended.
Anodes	0.03 - 0.08% Phosphorized copper with titanium hooks or copper pieces in titanium anode baskets.
Ventilation	Required

INSTALLATION

It is essential that the equipment to be used for Cubrite 2000 Bright Acid Copper is cleaned and leached thoroughly before any product is added.

If there is any doubt as to the cleaning procedure contact Automated Chemical Solutions.

1. Fill tank ¾ full the with DI water.
2. Slowly add the required amount of sulfuric acid while stirring continuously or using mild air agitation. *Use personal protective equipment*. Note: The solution will get warm.
3. Add the correct weight of copper sulfate crystals and agitate until dissolved completely.
4. Allow solution to cool to 77°F.
5. Add the required amount of hydrochloric acid for 90 ppm chloride. (2.4 ml/100 L solution = 10 ppm)
6. Clean the anodes by scrubbing or wash in detergent. Rinse thoroughly. Place in clean, leached anode bags and place in tank.

INSTALLATION (cont.)

7. Make up to working volume with DI water.
8. Electrolyze the solution for a minimum of 2 hours with mild air agitation at approximately 10 ASF using a large area of corrugated thin metal sheet which has been appropriately cleaned and given a cyanide copper flash. Check the anodes periodically to ensure they have developed a thin chocolate brown or black film.
9. Add separately the Cubrite 2000 Carrier, Brightener and Leveler and mix thoroughly between each addition.
10. Analyze for chloride ion concentration. Add 2.4 ml of 1.18 S.G. hydrochloric acid (37% wt/v) per 100 liters of solution per every 10 ppm chloride ion required.
11. Apply vigorous air agitation and commence plating.

MAINTENANCE AND CONTROL

The solution should be regularly analyzed for copper, sulfuric acid and chloride. (See Analysis Methods) ***Do not pre-mix additives***. Excess Leveler may require carbon treatment. Additives are extremely concentrated. A small amount of chloride is required in the bath for proper action of the additives.

<u>The additives are replenished on an Amp Hour basis:</u>

Cubrite 2000 Brightener	25-45 ml per 1000 amp hours (1 gal per 84 – 150,000 AH)
Cubrite 2000 Carrier	40-60 ml per 1000 amp hours (2 gal per 1 – 2 gals Brightener)
Cubrite 2000 Leveler	20-40 ml per 1000 amp hours (1 gal per 1 gallon Brightener)
Cubrite 2000 Wetter	5-15 ml per 1000 amp hours (1 gal per 2 – 5 gals Brightener)

ANALYSIS METHODS

Sulfuric acid

Reagents

1. 0.1N Sodium hydroxide
2. Methyl orange indicator

Method

1. Pipette 2 ml of plating solution into a 500 ml Erlenmeyer flask.
2. Add 150 mls of DI water.
3. Add 3-4 drops of methyl orange indicator and mix
4. Titrate with 0.1N sodium hydroxide to a yellow endpoint.

Calculation

Sulfuric acid (g/L) = mls of 0.1N sodium hydroxide X 2.452

Replenishment

For every 1 g/L low add 0.54 ml/L sulfuric acid (93% or 66°Be)

ANALYSIS METHODS (cont.)

Copper sulfate

Reagents

1. 0.1N Sodium thiosulfate
2. Starch Indicator
3. Glacial acetic acid (99%)
4. Potassium Iodide (KI)

Method

1. Pipette 5 ml of the plating solution into a 500 ml Erlenmeyer flask.
2. Add 200 mls DI water.
3. Add 7 grams of potassium iodide.
4. Add 20 mls of glacial acetic acid
5. Start titrating with 0.1N sodium thiosulfate to a straw yellow color and add small amount of starch indicator
6. Continue titrating with 0.1N sodium thiosulfate to a pinkish-white endpoint.

Calculation

Copper sulfate (g/L) = mls of 0.1 N sodium thiosulfate X 4.99

Chloride

Reagents

1. 50% nitric acid
2. 0.1N silver nitrate
3. 0.01N mercuric nitrate. (Dissolve exactly 1.083g mercuric oxide in 5 ml of 1:1 nitric acid and dilute to 1 liter. This solution need not be standardized).

Method

1. Pipette 50 ml of plating solution into a 200 ml tall beaker.
2. Add 30 ml of water and 20 ml of 50% nitric acid.
3. Add enough 0.1N silver nitrate to produce turbidity (usually 3 drops) and immediately titrate with standard 0.01N mercuric nitrate by drop additions with constant stirring until the turbidity just clears.

Calculation

Chloride ion (ppm) = mls of 0.01N mercuric nitrate X 7.1

Replenishment

For every 10 ppm low add 0.024 ml/L concentrated HCl (SG 1.18)

STORAGE

Store in original containers above 40°F

SAFETY

CAUTION! Cubrite 2000 working solutions contain strong acidic ingredients. Avoid contact with eyes, skin and clothing. Wear chemical handler's gloves, goggles and protective clothing when handling. Read and understand Material Safety Data Sheet before using this product.

PRODUCT GROUPS

The following products are referred to in this data sheet.

PRODUCT NAME	PRODUCT NUMBER
Cubrite 2000 Carrier	567025
Cubrite 2000 Brightener	567027
Cubrite 2000 Leveler	567026
Cubrite 2000 Wetter	567028

NOTICE

The information and recommendations of PMD (UK), Ltd. and Automated Chemical Solutions, Inc., and its representatives, regarding this product are, to the best of our knowledge, true and accurate. We make no guarantee of results because the conditions of actual use are beyond our control. We assume no liability for damages or penalties resulting from the use of this product or following our recommendations. Our recommendations and suggestions for use of this product are not intended to grant license to operate under or infringe any patent.