

CUBRITE 220

BRIGHT ACID COPPER

INTRODUCTION

CUBRITE 220 Acid Copper is designed to produce hard (200-210Hv), level and bright copper deposits. It is ideal for the plating of printing cylinders used in polygraphic, textile and other printing applications.

BENEFITS

- Excellent levelling
- Bright deposits
- Consistent hardness of 200-210Hv
- Dye free

SOLUTION MAKE-UP

It is essential that the tanks to be used for CUBRITE 220 are thoroughly cleaned and leached before any chemistry is introduced. If in any doubt as to the cleaning procedure please contact PMD (UK) Technical Department.

Deionised water	To volume
Copper sulphate pentahydrate	200g/L
Sulphuric acid (pure Sg1.84)	20ml/L
Sodium chloride or hydrochloric	
To a chloride content of	30ppm
CUBRITE 220 ADDITIVE	6ml/L

1. Three quarters fill the off line tank with deionised water.
2. Slowly add the sulphuric acid while stirring continuously or using mild air agitation. Wear safety goggles and protective clothing. The solution will get warm.
3. Add the correct weight of copper sulphate crystals and agitate until dissolved completely.
4. Add 4g/L of activated carbon and stir solution for one hour.
5. Filter solution to remove carbon.
6. Transfer to the plating tank through filter. Allow solution to cool to 25°C
7. Clean the anodes by scrubbing or wash in detergent. Rinse thoroughly. Place in clean, leached anode bags and place in tank.
8. Make up to working volume with deionised water.
9. Add the required chloride and CUBRITE 220 Additive.
10. Electrolyse the solution for a minimum of 2 hours with mild air agitation at approximately 1.0 A/dm² (10A/ft²) 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.

OPERATING DATA

Copper sulphate	200 – 300g/L
Sulphuric acid (SG1.84)	35 – 40g/L
Chloride	30 – 60ppm
Temperature	22 – 27°C
Current density	0.5 – 2.0 ASD (5 – 20 A/ft ²)
Agitation	Work movement or air
Extraction	Recommended

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 mains water supplies.
Agitation	Mechanical work movement or vigorous low pressure air through plastic agitation pipes.
Filtration	Continuous through 0.5 micron. A minimum of three solution turn-overs per hour is recommended.
Anodes	0.03 - 0.08% Phosphorised copper with titanium hooks or copper pieces in titanium anode baskets. Polypropylene or Terylene woven anode bags which have been thoroughly leached in hot water should be used. Note that other types of anode material can cause dull deposits and very high brightener consumption.

MAINTENANCE AND CONTROL

The solution should be regularly analysed for copper, sulphuric acid and chloride. See analysis methods.

Brightener

CUBRITE 220 Additive should be added at 300 ml per 1000 amp-hours.



ANALYSIS METHODS

1. Free acid

Reagents

1N sodium hydroxide (standard volumetric solution)

Method

1. Pipette 10 ml of plating solution into a 450 ml conical flask.
2. Add 150 ml of deionised water.
3. Titrate slowly with 1N sodium hydroxide solution until the first signs of permanent turbidity are apparent in the liquid.
4. Record titre = t mls

Calculation

$t \times 4.9 = \text{g/l sulphuric acid}$

Replenishment

For every 1g/L low add 0.54ml/L sulphuric acid SG 1.84

2. Copper

Reagents

0.1M E.D.T.A. (standard volumetric solution)

PAN indicator.

Sodium acetate/acetic acid buffer solution - pH 4.3 (105g and 100ml respectively to 1 litre with de-ionised water).

Method

1. Pipette 2ml of the plating solution into a 250ml flask and add 10ml deionised water.
2. Add sufficient buffer to turn the solution to a light bluish-green colour.
3. Add 8 drops of the PAN indicator and titrate with 0.1 M E.D.T.A. to a green end-point.
4. Record titre = t mls

Calculation

$t \times 3.177 = \text{g/L copper}$

$t \times 12.476 = \text{g/L copper sulphate}$

Replenishment

For every 1g/L low in Copper Sulphate add 1g/L copper sulphate

3. Chloride

Reagents

50% nitric acid

0.1N silver nitrate (standard volumetric solution)

0.01N mercuric nitrate. (Dissolve exactly 1.083g mercuric oxide in 5 ml of 1:1 nitric acid and dilute to 1 litre. This solution need not be standardised).

Method

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

Calculation

$t \times 7.1 = \text{ppm of chloride ion}$

Replenishment

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

DISPOSAL

Dispose of in accordance with local authority requirements

PRODUCT FAMILIES

The following products are referred to in this data sheet.

PRODUCT NAME	PRODUCT NUMBER
CUBRITE 220 ADDITIVE	564014

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