

ZINCOBRITE AZ

INTRODUCTION

Zincobrite AZ has been developed to meet the stringent environmental requirements of today. The basic electrolyte contains no complexants or ammonia and the organic additive system contains no VOC solvents.

Zincobrite AZ can be used for rack and barrel plating.

BENEFITS

Mirror-bright, levelled deposits.

Wide current density range.

VOC free.

Wide operating temperature window.

Economical in use.

Easy to control.

SOLUTION MAKE-UP

Zinc chloride	40-100g/L (see Maintenance and Control)
Potassium chloride	200g/L
Boric acid	20g/L
Zincobrite AZ Carrier	30ml/L
Zincobrite AZ Brightener	1ml/L

OPERATING DATA

Zinc	20-50g/L
Total chloride	110-160g/L
Boric acid	20-32g/L
Temperature	20-40°C, optimum 25-30° C
pH	5.0 – 5.5

Cathode current density:

Rack	2.0 – 10.0 A/sq.dm
Barrel	0.5 – 1.5 A/sq.dm.
Agitation	Air or solution agitation
Extraction	Recommended

EQUIPMENT

Tank	Hard rubber-lined steel polypropylene or PVC.
Heating	PTFE immersion with thermostatic control.
Cooling	Should not be necessary but titanium, PTFE or polypropylene heat exchangers or cooling coils should be used.
Filtration	Continuous recommended, all plastic construction pump. Should give 2-3 bath turn overs per hour.
Agitation	Air agitation or solution movement to provide mild agitation for rack plating.
Anodes	High purity zinc (99.95%) with titanium hooks or in titanium baskets, with polypropylene anode bags.

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INSTALLATION

It is essential that the tanks to be used for Zincobrite AZ are thoroughly cleaned and leached before any product is introduced.

If in any doubt as to the cleaning procedure please contact PMD (UK) Limited Technical Department.

1. Clean the process tank with water and leach the tank with 10% v/v hydrochloric acid pumping through all the filters, pumps and pipework. Allow to stand overnight, then thoroughly clean with water.
2. Half fill process tank with water (normal tap water is usually satisfactory) and heat to 50°C.
3. Add required amount of zinc chloride, 200g/L potassium chloride and 20g/L boric acid and stir to dissolve.
4. Allow the solution to cool to 25-30°C then add 30ml/L Zincobrite AZ Carrier.
5. Top up tank to working volume and filter thoroughly. Adjust pH to 5.0-5.5.
6. Plate out at 1-2A/dm² for 6-8 hours.
7. Add 1ml/L Zincobrite AZ Brightener and mix thoroughly.
8. The solution is now ready to use.

MAINTENANCE AND CONTROL

The zinc, chloride and boric acid concentration should be analysed regularly using the methods detailed in the Data Sheet and adjusted accordingly:-

Zinc (g/l)	20	30	40	50
Chloride (g/l)	110 - 130	110 - 130	130 - 150	140 – 160
Boric acid (g/l)	20 - 32	20 - 25	20 - 25	20 – 25

Zincobrite AZ Brightener -

The consumption of Brightener will vary with temperature, drag-out etc. but as a guide 150 – 200 ml should be added every 1000 amp. hours.

Zincobrite AZ Carrier -

This is usually consumed by drag-out only and additions can be linked to the chloride analysis and addition e.g.

Nominal chloride conc: 120g/l
Nominal carrier conc: 30ml/l

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2. Chloride

Reagents

0.1N silver nitrate (standard volumetric solution)
Sodium chromate indicator – 20g/l sodium chromate (aqueous)

Method

1. Pipette 10ml of the plating solution into a 250ml volumetric flask and make up to the mark with DI water.
2. Pipette 10ml of the diluted sample into a 500ml conical flask and add approximately 100ml DI water.
3. Add approximately 2ml of indicator solution and titrate with 0.1N silver nitrate. During titration a white precipitate of silver chloride will be seen immediately. The end point is when the solution/precipitate becomes reddish brown.
4. Record titre = t mls.

Calculation

$t \times 8.875 = \text{g/l chloride.}$

Replenishment

For every 1g/l low add 2.1g/l potassium chloride and 0.25ml/L Zincobrite AZ Carrier.

3. Boric acid

Reagents

Mannitol
Bromocresol purple indicator
0.1N sodium hydroxide solution (standard volumetric solution)

Method

1. Pipette 5ml of the plating solution into a 500ml conical flask.
2. Add mannitol to make a slurry, then add a few drops of bromocresol purple indicator.
3. Titrate with 0.1N sodium hydroxide to a purple end point.
4. Record titre t mls.

Calculation

$t \times 1.24 = \text{g/l boric acid.}$

Replenishment

For every 1g/L low add 1g/L boric acid

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TROUBLE SHOOTING GUIDE

Contamination with foreign materials should be avoided. Copper, lead, cadmium, arsenic and antimony can cause problems with loss of brightness, dark deposits or poor colour. They can usually be removed by plating out or by zinc dust treatment.

Iron contamination should not exceed 80-100ppm. Iron can be removed by additions of 100 vol hydrogen peroxide (1-2ml/l).

Problem	Reason	Remedy
Insufficient brightening and levelling	Low Brightener	Add 0.3-0.5ml/L Brightener
	Low current density	Increase current density
Streaks at high current density	Low Carrier	Add 2-4ml/L Carrier
Poor coverage at low current density	Low chloride	Correct as per analysis
	Low Carrier	Add 2-4ml/L Carrier
High current density burning	Low temperature	Heat solution
	Low zinc	Add zinc chloride as per analysis
	Excessive current density	Reduce
	Organic contamination	Carbon treat
Roughness, pitting	pH too high	Reduce pH
	Suspended solids	Filter
Dark deposit	pH too high	Reduce pH
	Iron (II) contamination	Add 1ml/L hydrogen peroxide (100vol) for every gm/L iron (II) and filter
Deposit will not passivate easily	Low Carrier	Add 2-4ml/L carrier
	Excessive concentration of additive decomposition products	Carbon treat
Barrel hole "burning"	Low temperature	Heat solution
	Low chloride	Correct as per analysis
	Iron (II) contamination	Add hydrogen peroxide
	Decomposition products	Carbon treat
Spots developing during passivation	Low carrier	Add 2-4ml/L Carrier
	Poor rinsing after zinc	Improve rinsing

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Cloudy solution which does not clear with filtration, accompanied by burning and/or loss of brightness	Decomposition product	Carbon treat
Cloudy solution which does not clear with filtration, but plating generally is satisfactory	Contamination, probably iron	Add hydrogen peroxide and filter

DISPOSAL

Dispose of in accordance with Local Authority requirements.

PRODUCT FAMILIES

The following products are referred to in this data sheet.

<u>Product Name</u>	<u>Product Number</u>
Zincobrite AZ Carrier	584002
Zincobrite AZ Brightener	584001
Zinc chloride	M166
Potassium chloride	M319
Boric acid	M132

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