



ZINCOBRITE ALS

ACID ZINC

INTRODUCTION

ZINCOBRITE ALS is an acid zinc process producing bright, highly levelled deposits.

ZINCOBRITE ALS can be used for rack or barrel plating with ammonium or potassium based systems.

BENEFITS

- Mirror bright, levelled deposits
- Wide current density range
- Easy to control
- Economical in use
- Good adhesion of passivate

SOLUTION MAKE -UP

Zinc chloride	40-60g/L (see Maintenance and Control)
Ammonium chloride	100g/L or
Potassium chloride	200g/L
Boric acid (potassium system only)	20g/L
Zincobrite ALS Carrier	35ml/L
Zincobrite ALS Brightener	2ml/L

OPERATING DATA

Zinc	20 – 30g/L
Chloride	105 – 203g/L
pH	4.5 – 5.8 (ammonia), 5.0-5.5 (potassium)
Temperature	15 - 40°C
Current density rack	2.0 – 4.0 asd
barrel	0.5 – 1.5 asd

EQUIPMENT

Tanks	Hard rubber-lined steel, polypropylene or PVC.
Heaters	PTFE immersion with thermostatic control
Cooling	Titanium, PTFE or polypropylene heat exchangers or cooling coils should be used if required.



Filtration	Continuous recommended, all plastic construction pump. Should give 2-3 bath turnovers per hour.
Agitation	Air or solution movement to provide mild agitation for rack plating.
Anodes	High purity zinc (99.95%) with titanium hooks or in titanium baskets, with anode bags.

INSTALLATION

It is essential that the tanks to be used for ZINCOBRITE ALS are thoroughly cleaned and leached before any product is introduced. For new tanks or linings extended warm leaching is required.

If in any doubt as to the cleaning procedure please contact PMD (UK) technical department.

1. Clean the process tank with water and leach 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 tank with water (normal tap water is usually satisfactory) and heat to 50°C.
3. Add the appropriate amount of zinc chloride, 100g/L ammonium chloride or 200g/L potassium chloride, 20g/L boric acid (potassium only) and stir to dissolve.
4. Allow to cool to 20-30°C then add 35ml/L Zincobrite ALS Carrier.
5. Filter the solution thoroughly and adjust the pH to 4.5-5.8 (ammonia) 5.0-5.5 (potassium).
6. Top up to volume and add 2 ml/L Zincobrite ALS Brightener and mix thoroughly.
7. The solution is now ready to use.

MAINTENANCE AND CONTROL

The zinc and chloride concentration should be analysed regularly using the methods detailed in analysis methods and adjusted accordingly.

ZINCOBRITE ALS Brightener. The consumption of Brightener will vary with drag-out etc. but as a guide add 75 – 250ml/1000amp. hours.

ZINCOBRITE ALS 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: 35ml/l

Chloride conc. by analysis 102g/l
Chloride addition = 18g/l (15% of nominal)
Carrier addition = 5.3ml/l (15% of nominal)

Alternatively add 50-100ml/1000 amp hours.

pH. Keep within range with hydrochloric acid 50% v/v to lower and either 10% w/v solution of potassium hydroxide or ammonia to raise. During normal operation the pH will tend to rise.

Zinc concentration. This can vary between 20 and 30g/l depending on requirements. For higher current densities use higher zinc concentrations.

Deposition rate. This depends on current density. At 3A.sq.dm. the current efficiency is 95% and deposition speed is 0.75µm/minute.

ANALYSIS METHODS

1. Zinc

Reagents

0.1M EDTA (standard volumetric solution)

Eriochrome Black T indicator

Ammonium chloride buffer solution (40g/L ammonium chloride, 200ml/L ammonium hydroxide, Deionised water to 1 litre)

Method

1. Pipette 2 ml of the plating solution into a 500ml conical flask.
1. Add 50ml buffer solution and 50ml DI water.
2. Add a trace of Eriochrome Black T indicator.
3. Titrate with 0.1M EDTA to a blue end-point.
4. Record titre = t mls.

Calculation

$t \times 3.27 = \text{g/l zinc.}$

Replenishment

For every 1g/L low add 2.1g/L zinc chloride.

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 1.5g/L ammonium chloride or 2.1g/L potassium chloride.

3. Boric acid (Potassium only)

Reagents

Mannitol
Bromocresol purple indicator
0.1M 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

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

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 hydrogen peroxide (1-2ml/l).

Problem	Reason	Remedy
Insufficient brightening and levelling. Low CD blue colouration.	Low Brightener	Add 0.3-2.0ml/L Brightener
	Low current density	Increase current density
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

Problem	Reason	Remedy
	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 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
Solution milky or oil on surface	Excess Carrier or Brightener	Add Zincobrite ALS Solubiliser 5-20ml/L

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
Zincobrite ALS Carrier	584004
Zincobrite ALS Brightener	584003
Zincobrite ALS Solubiliser	584011
Ammonium chloride	MC106
Zinc chloride	MC166

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