

ZINCOBRITE ALK PLUS

ALKALINE ZINC

INTRODUCTION

Zincobrite ALK Plus is a unique additive system that exhibits excellent brightness across a range of current densities at low and high temperatures with tolerance to high impurity levels, from a cyanide-free, alkaline solution. Zincobrite ALK Plus can be used for Rack and Barrel applications.

The ALK Plus additive package gives superior distribution of up to 15% higher thickness across the range of current densities when compared with standard Alkali Zinc processes. A further feature of ALK plus is the minimal deviation seen in thickness from low to high current density areas, enabling tighter production controls and low cost in use.

The process does not contain complexing agents and rinse water can therefore be treated by simple neutralisation and precipitation, at pH 8-9. Alternatively, with suitable cascade rinsing, rinse water can be returned to the plating solution, as the process forms no detrimental decomposition products.

BENEFITS

- High tolerance to impurities
- High temperature resistance
- Hyper concentrated Additives
- Excellent brightness
- Excellent deposit distribution
- Wide current density range
- Ductile deposits
- Recyclable rinses – zero zinc discharge
- Ease of control

SOLUTION MAKE -UP

For rack and barrel

Zinc oxide	15g/L
Sodium hydroxide	150/L
Zincobrite ALK Plus Brightener	17ml/L
Zincobrite ALK Plus Booster	3.0ml/L
Zincobrite ALK Plus Purifier	4.0ml/L

1. Clean the process tank with water then leach with a 50g/L solution of sodium hydroxide overnight, pumping through all filters, pumps and pipework. Pump out and rise thoroughly with water.
2. Fill the tank approximately one quarter full with deionised water. Add the required amount of sodium hydroxide carefully with stirring.
3. While the solution is hot (80-90°C) add zinc oxide gradually and stir until dissolved. The hotter the solution the easier the dissolution.
4. Top up with deionised water to just short of final volume.
5. Cool the solution to approximately 30°C then add the calculated quantities of organic additives.
6. Electrolyse the solution at 1-2 A/sq.dm. for approximately 2 amp. hours/L.

OPERATING DATA

Zinc	10-15g/L (optimum 12g/L)	
Sodium hydroxide	130-170g/L (optimum 150g/L)	
Cathode current density (ASD)	2.0-4.0	
Anode to Cathode Area	2:1	
Temperature	15-40°C	
Deposition rate	Depends on current density etc (See NOTES)	

EQUIPMENT

Tanks	Polypropylene or polypropylene lined steel.
Heaters	PTFE or mild steel immersion with thermostatic control.
Cooling	Mild steel heat exchanger or cooling coil.
Filtration	Continuous recommended.
Agitation	Solution or work movement recommended for rack plating.
Anodes	a) high purity zinc balls in mild steel cages, with polypropylene anode bags. b) mild steel, in conjunction with an external zinc dissolving cell.

MAINTENANCE AND CONTROL

The solution should be analysed regularly and replenished as necessary. (See analysis methods).

Zincobrite ALK Plus Brightener is a primary brightener for make-up and replenishment.
Zincobrite ALK Plus Booster is a secondary brightener for make-up and replenishment.

The addition rates for the organic additives will vary depending on the required brightness, drag-out etc, but the following can be used as a guide:-

Zincobrite ALK Plus Brightener (optimum 170ml)	Rack – 140 -200ml / 1000 amp hours Barrel -140– 200ml / 1000 amp hours
(optimum 170ml) Zincobrite ALK Plus Booster 60ml)	Rack - 50-70ml/1000 amp hours (optimum Barrel - 35- 55/ 1000 amp hours (optimum 45ml)

Zincobrite ALK Plus Purifier As required.

NOTES OF THE USE OF ZINCOBRITE ALK PLUS

Zinc content	Zinc anodes should be removed when the solution is idle for extended periods (e.g. weekends) as chemical dissolution will occur. Where mild steel anodes are used zinc content is maintained by holding some of the electrolyte in a reserve tank and dissolving zinc chemically from anode balls.
Temperature	For heavily worked baths cooling may be necessary.
Deposition rate	Depending on current density and zinc concentration the cathode efficiency can vary between 50 and 90%. Lower zinc concentrations give reduced efficiency but better distribution. As a guide, at a zinc concentration of 8g/L zinc and current density of 2 A/sq.dm. 0.5 µm will be deposited per minute.

ANALYSIS METHODS

1. Zinc

Reagents

0.1M EDTA

Eriochrome Black T indicator

Chloral hydrate

Ammonium chloride buffer solution - dissolve 54gm ammonium chloride in 500ml deionised water. Add 350ml 0.88 S.G. ammonia and make up to 1 litre.

Method

1. Pipette a 5ml sample of the plating solution into a 500ml conical flask.
2. Add 25ml buffer solution and 25ml DI water.
3. Add a trace Eriochrome Black T indicator and 1gm chloral hydrate.
4. Titrate with 0.1M EDTA to a blue end point.
5. Record titre = t mls.

Calculation

$$t \times 1.308 = \text{g/L zinc}$$

Replenishment

For every 1g/L zinc required add 1.24g/L zinc oxide.

2. Sodium hydroxide

Reagents

1.0N hydrochloric acid
11-13 indicator

Method

1. Pipette a 5ml sample of the plating solution into a 500ml conical flask.
2. Add 50ml deionised water and a few drops 11-13 indicator.
3. Titrate with 1.0N hydrochloric acid to a yellow end point.
4. Record titre = t mls.

Calculation

$$t \times 8.0 = \text{g/L sodium hydroxide}$$

TROUBLE SHOOTING GUIDE

PROBLEM	REASON	REMEDY
Generally dull deposit	Lack of Brightener	Add 0.5-1.0ml/L Brightener
	Temperature too high	Cool solution
	Excess Brightener	Work out Brightener, add 1-2ml/L Purifier
	Solution Contamination	Add 1-2ml/L Purifier or 10ml/L sodium hypochlorite solution (12% active)
Bright dark deposits	Low Purifier	Add 0.25ml/L increments of Purifier
	Metallic impurities	Plate out solution at 1-2 A/Sqdm

	Low sodium hydroxide	Analyse and correct
Poor bright throwing power	Low sodium hydroxide	Analyse and correct
	Low Brightener	Add 0.2ml/L increments of Brightener
	Zinc too high	Plate down zinc content
Poor zinc anode solubility	Anode C.D. too high	Increase zinc anode area
	Low sodium hydroxide	Analyse and correct
	Excessive use of Purifier	Reduce additions. Do not pour directly over anode.

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 ALK Plus Brightener	581023
Zincobrite ALK Plus Booster	581024
Zincobrite ALK Plus Purifier	585019
Zinc oxide	MC129

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