

ALEKOS AZ

ACID ZINC

INTRODUCTION

Alekos AZ is an ammonium based process producing bright, highly levelled deposits.

Alekos AZ can be used for rack or barrel plating.

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
Alekos AZW Starter	35ml/L
Alekos AZ Brightener	2ml/L

OPERATING DATA

Zinc	20 – 30g/L
Chloride	105 – 203g/L
pH	4.5 – 5.8
Temperature	15 - 35°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 Alekos AZ 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 and stir to dissolve.
4. Allow to cool to 20-30°C then add 35ml/L Alekos AZW Starter.
5. Filter the solution thoroughly and adjust the pH to 4.5-5.8.
6. Top up to volume and add 2 ml/L Alekos AZ 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.

Alekos AZ Brightener - The consumption of Brightener will vary with drag-out etc. but as a guide add 200 – 250ml/1000amp.hours.

Alekos AZW Starter - 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 a range of 4.5 – 5.8 using hydrochloric acid 50% v/v to lower or 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 0.75µ/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.
2. Add 50ml buffer solution and 50ml DI water.
3. Add a trace of Eriochrome Black T indicator.
4. Titrate with 0.1M EDTA to a blue end-point.
5. 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.

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 Starter	Add 2-4ml/L Starter
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 for every gm/L iron (II) and filter
Deposit will not passivate easily.	Low Starter	Add 2-4ml/L Starter
	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 Starter	Add 2-4ml/L Starter
	Poor rinsing after zinc	Improve rinsing
Solution milky or oil on surface	Excess Starter or Brightener	Add Alekos AZ Emulsifier or 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
Alekos AZW Starter	584006
Alekos AZ Brightener	584005
Alekos AZ Emulsifier	584007
Alekos AZ Solubiliser	584008
Ammonium chloride	MC106
Zinc chloride	MC166

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