ZINCALLOY ZNI

ALKALINE ZINC/NICKEL

INTRODUCTION

ZINCALLOY ZNI is a new generation of high-efficiency alkaline zinc nickel processes giving an alloy of 12-15% nickel. It offers very high corrosion resistance. The process gives excellent distribution and very high covering power. The deposits obtained show low internal stress and good ductility whatever the current density used. It is suitable for both barrel and rack application.

BENEFITS

- High corrosion resistance, even after thermal shock
- High efficiency - reduced treatment times even in barrel application
- Excellent covering power and uniform thickness distribution
- Bright and ductile deposits
- Simple bath maintenance
- Rack and barrel application

SOLUTION MAKE -UP

	Rack	Barrel
Zinc oxide	9.9g/L	12.4g/L
Sodium hydroxide	125g/L	130g/L
Zincalloy ZNI Make UP	100ml/L	100ml/L
Zincalloy ZNI Brightener	2ml/L	1.5ml/L
Zincalloy ZNI Replenisher	0.7ml/L	-
ZincAlloy ZNI Additive	12ml/L	14ml/L

OPERATING DATA

	Rack		Barrel	
	Range	Optimum	Range	Optimum
Zinc	7 – 10g/L	8g/L	9 – 12g/L	10g/L
Sodium hydroxide	120 – 135g/L	125g/L	120 – 135g/L	130g/L
Nickel	1.0 – 1.8g/L	1.2g/L	1.0 – 1.8g/L	1.4g/L
Zincalloy ZNI Make UP	90 – 110ml/L	100ml/L	90 – 110ml/L	100ml/L
Zincalloy ZNI Brightener	1.5 – 2.5ml/L	2.0ml/L	1.0 – 2.0ml/L	1.5ml/L
Zincalloy ZNI Replenisher	0.5 – 1.0ml/L	0.7ml/L		
Cathode current density	1 – 3 A/dm^2	2 A/dm^2	0.5-1 A/dm^2	0.8 A/dm^2
Anode current density	>4 A/dm^2			
Cathode agitation	4-6m/min		3-4rpm	
Temperature	21-25°C (optimum 23°C)			

EQUIPMENT

Tanks	Polypropylene or polypropylene lined steel.
Anodes	Nickel anodes, minimum 5mm thick. Nickel plated steel is not recommended.
Dissolution	A dissolution tank of 15-20% the working tank volume is recommended to maintain zinc concentration.
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.

INSTALLATION

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 rinse 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 3/4 of final volume.
5. Cool the solution to approximately 25°C then add the calculated quantities of additives. Note The Zincalloy ZNI Additive must be pre-mixed with Zincalloy ZNI Make UP.
6. Top up with deionised water to final volume.

MAINTENANCE AND CONTROL

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

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

ADDITIVE	Rack [ml/KAHr]	Barrel [ml/KAHr]
ZINCALLOY ZNI MAKE UP	200 – 300	250 – 350
ZINCALLOY ZNI REPLENISHER	20 – 100	-
ZINCALLOY ZNI BRIGHTENER	50 – 150	50 – 150
ZINCALLOY ZNI ADDITIVE	800 – 1200	800 – 1200

NOTES - BATH MAINTENANCE

Zinc is adjusted and maintained by addition of filtered solution from the dissolution tank. Large variations in zinc concentration are not recommended.

The nickel concentration is adjusted using Zincalloy ZNI Additive. 10ml/L of will increase the nickel concentration by 1 g/L. In aged baths the nickel concentration required may be higher than the values listed.

During working, the ZINCALLOY ZNI process leads to the formation of carbonates. The accumulation of these carbonates reduces the bath efficiency. It is essential to maintain the carbonate concentration below 60 g/L for good electrolyte performance. This can be achieved through refrigeration.

FUNCTION OF ADDITIVES

Zincalloy ZNI Make Up contains the complexing agents required to ensure a uniform, bright deposit. It is used on make-up and for maintenance.

Zincalloy ZNI Brightener produces a bright deposit across the current density range.

Zincalloy ZNI Additive is used for bath make-up and for maintaining the bath Nickel concentration.

Zincalloy ZNI Replenisher gives clear deposits at high and medium current densities.

ANALYSIS METHODS

1. Zinc

Reagents

0.1M EDTA (standard volumetric solution)
Xyenol orange indicator
Acetate buffer solution (105g sodium acetate, 100ml acetic acid, Deionised water to 1 litre).

Method

1. Pipette 5ml aliquot of the plating solution into a 500ml conical flask.
2. Add 25ml buffer solution and 50ml DI water.
3. Add a pinch of xyenol orange.
4. Titrate with 0.1M EDTA to a yellow end-point.
5. Record titre = t mls.

Calculation

t x 1.308 = g/L zinc.

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 x 8.0 = g/L sodium hydroxide

3. Nickel

Nickel is analysed by atomic absorption.

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
Zincalloy ZNI Make UP	585009
Zincalloy ZNI Brightener	581027
Zincalloy ZNI Replenisher	585008
Zincalloy ZNI Additive	581028

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