

BZ-617 alkaline zinc nickel alloy brightener

Description and characteristics

The environmentally friendly zinc-nickel alloy BZ-617 is an alkaline zinc-nickel alloy electroplating process, which is designed to meet the market's demand for up to 16% nickel alloy content. This kind of electroplating alloy can provide excellent anti-corrosion appearance and tolerance to post-passivation heat treatment. Can provide a complete series of coatings, including: Color passivation, natural color passivation and black passivation.

The environmentally friendly zinc-nickel alloy BZ-617 is particularly suitable for use in Bigely's trivalent chromium passivation series that meets ELV guidelines.

Excellent anti-corrosion effect

Contains 12-16% nickel alloy deposit

Especially suitable for use in trivalent chromium passivation series

Suitable for rack plating and barrel plating

Good coating dispersion

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1. Parameters		
	Rack plating	barrel plating
Zinc	7.5-9.0g/l	7.5-10.5g/l
Sodium hydroxide	110-120g/l	110-130g/l
Nickel metal	0.85-1.3g/l	0.85-1.3g/l

Zinc-nickel alloy supplement (BZ-617E)	2-3L/25Kgs NaOH	2-3L/25Kgs NaOH
Zinc-nickel alloy B agent (BZ-617B)	4-8L/25Kgs NaOH	4-8L/25Kgs NaOH
Zinc-nickel alloy C agent (BZ-617C)	7.5-10L/10KAH	12.0-15L/10KAH
Zinc-nickel alloy D agent (BZ-617D)	1.5-2.5L/10KAH	1.5-2.5L/10KAH
Zinc-nickel alloy wetting agent (BZ-617F)	0-1ml/L(0.1%volume ratio)	0-1ml/L (0.1%volume ratio)
Cathode current	1.5-2.5Adm ⁻² (15-25asf)	0.3-1 Adm ⁻² (3-10asf)
Temperature	20-28°C (68-82°F)	
Stirring	through the movement of the ejector system (1-2 times solution circulation per hour) or the use of cathode rods is recommended	
Filtration	It is recommended to use 5-10µm filter paper for continuous filtration (circulate the solution 2-3 times per hour)	

2. Bath make-up

Tank preparation

The tank must be clean. It is recommended to soak the tank with 1% sodium hydroxide solution overnight before use.

Required chemicals	rack plating	barrel plating
Zinc	7.5-9.0g/l	7.5-10.5g/l
Sodium hydroxide	110-120g/l	110-130g/l
Zinc-nickel alloy supplement (BZ-617E)	10ml/l(1%volume ratio)	10ml/l(1%volume ratio)
Zinc-nickel alloy A agent (BZ-617A)	25ml/l(2.5%volume ratio)	25ml/l(2.5%volume ratio)
Zinc-nickel alloy B agent	40ml/l(4%volume ratio)	40ml/l(4%volume ratio)

(BZ-617B)		
Zinc-nickel alloy C agent (BZ-617C)	14-18ml/l(2.0%volume ratio)	15-18ml/l(2.0%volume ratio)
Zinc-nickel alloy D agent (BZ-617D)	5-7ml/l(0.5-0.7%volume ratio)	3-5ml/l(0.3-0.5%volume ratio)
Zinc-nickel alloy wetting agent (BZ-617F)	1ml/l(0.1%volume ratio)	1ml/l(0.1%volume ratio)

*Note: The exact amount of PartC will depend on the amount of nickel metal required in the working solution (see Part 1)

Bath steps

The steps to build 1000 liters of bath are as follows:

- 1.) Add the calculated zinc concentrate and sodium hydroxide.
- 2.) Add water to make the solution volume not higher than 850L, then add 10L of zinc-nickel alloy to make up Refill. Before adding the solution, the temperature of the following zincate solution must be below 30°C.
- 3.) The composition of the single solution is as follows:

	Rack plating	Barrel plating
Zinc-nickel alloy A agent (BZ-617A)	25 L	25 L
Zinc-nickel alloy B agent (BZ-617B)	40 L	40 L
Zinc-nickel alloy C agent (BZ-617C)	15 L	15 L
Zinc-nickel alloy D agent (BZ-617D)	5 L	3 L
Water	55 L	57 L

- 4.) Add this mixture to the zinc solution, and add 1ml/l of zinc-nickel alloy wetting agent (BZ-617F) to reduce the alkaline corrosive mist generated during use.
- 5.) Before use, electrolyze for at least 24 hours at a current of 0.5-2.0 Adm-2 (5-20 ASF).

3. Solution Control & Maintenance

Zinc-nickel alloy A agent (BZ-617A)

Agent A is added to increase the solubility of nickel in the solution. If this substance is too much, it will cause a decrease in cathode efficiency and reduce the nickel content in the alloy.

Zinc-nickel alloy B agent (BZ-617B)

Adding agent B is to improve the solution performance in the low current area. Excessive addition of B will

seriously reduce the cathode efficiency.

Zinc-nickel alloy C agent (BZ-617C)

Agent C is a nickel metal additive. 1ml/l of C agent will increase the nickel concentration in the bath to 66ppm.

Zinc-nickel alloy D agent (BZ-617D)

Agent D is the main bright component and can limit the deposition in the high current area.

4、 Analysis Control

Environmental protection zinc-nickel alloy analysis method

Zinc can be analyzed by AAS or the following methods

Method 1a-Use zinc and sodium hydroxide together

Reagent

0.1N EDTA

N H₂SO₄

BDH 1113 indicator

EDTA indicator solution

PH 10 buffer solution

4% formaldehyde solution

Sodium cyanide

- a. Draw 5ml of sample solution and dilute to 10ml with water.
- b. Use NH₂SO₄ for titration, use MacDermid 1113* indicator to indicate the yellow end point.
- c. The concentration of NaOH (g/l) = N H₂SO₄ (mls) × 8
- d. Add 20mls to this solution containing 10g/l NaCN, pH 10 buffer solution
- e. Add a few drops of EDTA indicator solution
- f. Add formaldehyde (4% solution) until the solution turns pink/orange
- g. Titrate to the yellow endpoint with 0.1N EDTA.
- h. The concentration of zinc (g/l)=EDTA(mls)×1.3

Method 1b-Zinc

Reagent

0.1N EDTA

12.5% volume ratio HCL

Xylene Orange indicator Xylene Orange indicator

PH 5.5 buffer solution

- a. Take 5ml of the sample solution and dilute it to 50ml with water.
- . Add 5ml 12.5% HCL
- c. Add 20ml PH 5.5 buffer solution and X.O. indicator.

- d. Titrate with 0.1N EDTA, the color of the solution changes from red to yellow/orange.
- e. The concentration of zinc (g/l) = EDTA (mls) $\times$ 1.3

Method 1c-Sodium Hydroxide

Reagent

N HCL

Indigo-carmin indicator

- a. Take 5ml of sample solution and dilute it to 50ml with water
- b. Add edible indigo indicator
- c. Titrate with N HCL, the color changes from orange to blue.
- d. The concentration of sodium hydroxide = HCL (mls) $\times$ 8.0

2) Nickel — Nickel can be determined by AAS or the following analytical methods.

Method 2a

Reagent

12.5% volume ratio HCL

PH5.5 buffer solution

20% ammonia citrate

5% gum arabic

0.5% 1,2-cyclohexanedione dioxime Nioxime

- a. Accurately pipette 10mls of electroplating solution into a 100mls volumetric flask. Add water to bring the volume of the solution to the mark.
- b. Pipette 2ml of this solution into a large beaker and add 2mls of 20% ammonium citrate solution.
- c. Add 5ml of "12.5% HCL to this solution, and add 20ml of buffer solution with a pH of 5.5. Make sure that the PH is between 4 and 6.
- d. Add 2ml of gum arabic solution, then add 2ml of 0.5% 1,2-cyclohexanedione dioxime solution, and add water to dilute to 100mls. Let stand for 15 minutes.
- e. Use a photometer to measure the absorbance at 520nm.
- f. Use the standard nickel curve to determine the gm of nickel.

The Hull cell test of the new solution will pass XRF and get the following results 1A-20m.

4asd	8-10 micron	14-16% nickel
2asd	5-6 microns	12-15% nickel
0.5asd	2-2.6 microns	12-13% nickel

5. Equipment

Trough

Rubber lining steel, PVC or PP. It is recommended to use an independent zinc dissolving tank, so that the solution overflows from the plating tank into the dissolving tank to replenish the zinc content. If you need more details, please contact Bigely.

Stir

It is recommended to perform a slight solution exercise. Do not use air to stir.

filter

It is strongly recommended.

anode

It is recommended to use nickel anodes. It is recommended to use nickel bars or oval anodes. It is recommended not to use nickel flakes, small balls or round balls. The ratio of anode to cathode should be 1:1.

heating

Heating is to ensure that the temperature is not lower than the required operating range. It is best to use iron, steam or hot water heating coils. Alternatively, iron-covered electric immersion heaters can be used.

cool down

This is needed. An iron ring that can be operated with chilled water should be used.

Warning: Do not connect the cooling coil directly to the main water supply device.

6. Safety warning

Please check the relevant material safety information.

7. Wastewater treatment

It is recommended that the wastewater treatment carried out should meet the special requirements of the local government. Once you know how to meet these requirements, you can ask Bigely for information.

8. Ordering Information	
Product	Product Number
Zinc-nickel alloy A agent (BZ-617A)	BZ-617A
Zinc-nickel alloy B agent (BZ-617B)	BZ-617B
Zinc-nickel alloy C agent (BZ-617C)	BZ-617C
Zinc-nickel alloy D agent (BZ-617D)	BZ-617D
Zinc-nickel alloy supplement (BZ-617E)	BZ-617E
Zinc-nickel alloy wetting agent (BZ-617F)	BZ-617F

Statement:

Any safety/health regulations given in this TDS are general recommendations. Anyone who uses it should ask

for the relevant MSDS from the technical service personnel of Bigely. The MSDS has more detailed safety regulations.

All the contents specified in this TDS are for reference/guidance, and users must adjust them according to their actual operating conditions.