

# PMD (UK) LTD PROCESS DATA

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ZnCN3-07/02  
ISSUE 2  
PREV 1

## ZINCOBRITE CN3

### INTRODUCTION

Zincobrite CN3 is a concentrated brightener for use in high, medium and low cyanide formulations, and for rack and barrel plating.

### BENEFITS

Excellent throwing power

Highly concentrated – cost effective

Wide current density range

### SOLUTION MAKE-UP

	<u>High Cyanide</u>	<u>Medium Cyanide</u>	<u>Low Cyanide</u>
Zinc oxide (zinc)	46g/L (37)	25g/L (20)	19g/L (15)
Sodium cyanide	118g/L	60g/L	41g/L
Sodium hydroxide	29g/L	50g/L	56g/L
Zincobrite CN3 Brightener	0.5ml/L	0.5ml/L	0.5ml/L

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**OPERATING DATA**

Current density	
Rack	2-4 A/sq.dm
Barrel	0.5-1.0 A/sq.dm

Temperature	20-50°C
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	<u>High Cyanide</u>	<u>Medium Cyanide</u>	<u>Low Cyanide</u>
Ratio NaCN: Zn	3.2:1	3.0:1	2.75:1
Zinc	37g/L	20g/L	15g/L
Sodium cyanide	118g/L	60g/L	41g/L
Sodium hydroxide	75g/L	75g/L	75g/L

**EQUIPMENT**

Tanks	Welded mild steel, polypropylene or rubber lined mild steel.
Heaters	PTFE or mild steel immersion.
Cooling	Mild steel coil or heat exchanger.
Filtration	Not normally necessary unless excessive sludge is causing roughness.
Agitation	Not recommended.
Anodes	High purity zinc balls, bullets, ovals or slab in steel cages.

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**INSTALLATION**

It is essential that the tanks to be used for Zincobrite CN3 are thoroughly cleaned and leached before any product is introduced.

If in any doubt as to the cleaning procedure please contact PMD (UK) Limited Technical Department.

1. Clean the process tank with water then leach with a 50g/L solution of sodium hydroxide overnight, pumping through all pumps and pipework. Pump out and rinse thoroughly with water.
2. Fill the tank approximately one third full of water and dissolve the required amount of sodium hydroxide carefully with stirring.
3. Add the zinc oxide and stir to dissolve as much as possible.
4. Add the sodium cyanide and stir to dissolve. This will also dissolve any residual zinc oxide.
5. Make up to final volume with water.
6. Add the Zincobrite CN3 Brightener and stir thoroughly.

**MAINTENANCE AND CONTROL**

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

Maintain zinc and cyanide concentrations as detailed in operating data depending on the type of solution.

Sodium hydroxide should be maintained at 75g/L.

Zincobrite CN3 Brightener additions will vary depending on the type of solution, degree of drag-out etc, but a useful guide is 20-60ml / 1000 amhours. Higher temperatures may require higher addition rates.

Ensure brightener is fully mixed in after additions.

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**NOTES ON THE USE OF ZINCOBRITE CN3**

Cyanide : zinc ratio	The ratio quoted for each type of solution represents the best compromise of balancing throwing power with the highest cathode efficiency.  High ratios promote good distribution but reduce cathode efficiency. Low ratios vice versa.
Sodium hydroxide	High sodium hydroxide tends to increase efficiency but decrease throwing power.
Sodium carbonate	Carbonate will increase in concentration as a result of cyanide breakdown and carbon dioxide absorption, but will usually, because of drag-out, reach an equilibrium below harmful levels. If it reaches 50-75g/L some deterioration in performance will be seen (lower efficiency, reduced conductivity, grainy deposits). It can be removed by freezing out.
Temperature	Exceeding the optimum range will cause increased efficiency, reduced brightness, reduced throwing power.  Low temperatures reduce efficiency and conductivity.
Anodes	Anode current density should be 1-2A/sq.dm. Chemical dissolution may cause the zinc content to rise, in which case it may be necessary to replace some zinc anodes with mild steel up to a maximum of 1/3 total anode area.

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## **ANALYSIS METHODS**

### 1. Zinc

#### Reagents

25% hydrochloric acid  
Ammonia solution  
Eriochrome Black T indicator  
0.1M EDTA (standard volumetric solution)  
10% formaldehyde solution

#### Method

1. Pipette a 2.0ml aliquot of the bath into a 250ml conical flask.
2. In a fume cupboard add 25% hydrochloric acid dropwise until solution turns cloudy.
3. Add 10ml of ammonia solution and 100ml DI water.
4. Add 10ml of 10% formaldehyde
5. Add a spatula tip of Eriochrome black T indicator and titrate to a blue end point with 0.1M EDTA.
6. Record titre = t mls.

#### Calculation

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

#### Replenishment

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

#### 2. Sodium hydroxide

#### Reagents

BDH 11-13 indicator  
1N hydrochloric acid (standard volumetric solution)  
Sodium cyanide

#### Method

1. Pipette a 5.0ml sample into a 250ml conical flask.
2. Add 100ml DI water and 1gm sodium cyanide.
3. Add 5-6 drops of BDH 11-13 indicator.
4. Titrate to a yellow end point with 1N hydrochloric acid.
5. Record titre = t mls.

#### Calculation

$$t \times 8 = \text{g/L sodium hydroxide}$$

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#### Replenishment

For every 1g/L required add 1g/L sodium hydroxide.

#### 3. Sodium cyanide

#### Reagents

10% potassium iodide solution  
50% sodium hydroxide solution  
0.1N silver nitrate (standard volumetric solution)

#### Method

1. Pipette a 2.0ml aliquot of the bath into a 250ml conical flask.
2. Add 25ml of 50% sodium hydroxide solution and 50ml DI water.
3. Add 1ml 10% potassium iodide solution.
4. Titrate to first permanent turbidity with 0.1N silver nitrate solution.
5. Record titre = t mls.

#### Calculation

$t \times 4.9 = \text{g/L sodium cyanide}$

#### Replenishment

For every 1g/L required add 1g/L sodium cyanide.

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### **DISPOSAL**

Dispose of in accordance with local authority requirements.

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### **PRODUCT FAMILIES**

The following products are referred to in this data sheet.

<u>Product Name</u>	<u>Product Number</u>
Zincobrite CN3 Brightener	581017
Zinc oxide	M129

Whilst every endeavour has been made to ensure that the information given in this data sheet is correct, PMD (UK) gives no warranty, express or implied, relating to the use or performance of this product.