ZINC BRITE CZ-55

ZINC BRITE CZ-55 is a high performance brightener system for cyanide zinc plating baths. The system produces brilliant bright deposits for both barrel and rack plating operations. ZINC BRITE CZ-55 is designed to produce zinc deposits with chrome like brilliance over a wide range of cyanide concentrations and cyanide to zinc metal ratios. The system is most economical, versatile and operates over a wide range of current densities. The deposits produced are bright and ductile and accepts all chromate layers.

OPERATING CONDITION

LOW CYANIDE

<table>
<thead>
<tr>
<th>Component</th>
<th>Range</th>
<th>Optimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc metal</td>
<td>7 - 15g/ltr</td>
<td>10g/ltr</td>
</tr>
<tr>
<td>Sodium cyanide</td>
<td>16 - 30g/ltr</td>
<td>20g/ltr</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>65 - 85g/ltr</td>
<td>75g/ltr</td>
</tr>
<tr>
<td>RATIO: NaCN : Zn</td>
<td>2:1</td>
<td></td>
</tr>
</tbody>
</table>

MEDIUM CYANIDE

<table>
<thead>
<tr>
<th>Component</th>
<th>Range</th>
<th>Optimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc metal</td>
<td>15 - 25g/ltr</td>
<td>20g/ltr</td>
</tr>
<tr>
<td>Sodium cyanide</td>
<td>30 - 70g/ltr</td>
<td>50g/ltr</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>65 - 85g/ltr</td>
<td>75g/ltr</td>
</tr>
<tr>
<td>RATIO: NaCN : Zn</td>
<td>2 - 2.7:1</td>
<td>2.5:1</td>
</tr>
</tbody>
</table>

HIGH CYANIDE

<table>
<thead>
<tr>
<th>Component</th>
<th>Range</th>
<th>Optimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc metal</td>
<td>30 - 40g/ltr</td>
<td>30g/ltr</td>
</tr>
<tr>
<td>Sodium cyanide</td>
<td>75 - 120g/ltr</td>
<td>100g/ltr</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>65 - 85g/ltr</td>
<td>75g/ltr</td>
</tr>
<tr>
<td>RATIO: NaCN : Zn</td>
<td>2.5 - 3.5 : 1</td>
<td>3 : 1</td>
</tr>
</tbody>
</table>

BATH MAKE UP

1. HIGH CYANIDE
   - ZINC BRITE SALT                     200g/ltr
   - ZINC BRITE CZ-55                    2.0 - 4.0ml/ltr
   - ZINC PURIFIER                         4.0ml/ltr

2. MEDIUM CYANIDE
   - ZINC BRITE MCZ SALT           125g/ltr
   - ZINC BRITE CZ-55                    2.0 - 4.0ml/ltr
   - ZINC PURIFIER                         4.0ml/ltr

3. LOW CYANIDE ZINC
   - ZINC BRITE LCZ SALT            125g/ltr
   - ZINC BRITE CZ-55                    2.0 - 4.0ml/ltr
   - ZINC PURIFIER                         4.0ml/ltr

OPERATING CONDITIONS

<table>
<thead>
<tr>
<th>Component</th>
<th>VAT</th>
<th>BARREL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cathode current density</td>
<td>2.0 - 4.0A/dm²</td>
<td>0.5 - 1.0A/dm²</td>
</tr>
<tr>
<td>Bath voltage</td>
<td>2.0 - 5.0volts</td>
<td>10 - 15volts</td>
</tr>
<tr>
<td>Temperature</td>
<td>20 - 30°C</td>
<td>20 - 40°C</td>
</tr>
<tr>
<td>Fume extraction</td>
<td>Recommended</td>
<td>Recommended</td>
</tr>
</tbody>
</table>

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SOLUTION PREPARATION

A fresh rubber lined tank is to be leached by filling it with 2% caustic solution for a minimum of 12 hours.

Fill the tank to half its volume with clean water. Add calculated amount of ZINC SALT 90 and stir the solution until the salts are dissolved completely. Allow it to cool.
Add 4ml/ltr ZINC PURIFIER, stir and allow it to settle overnight.
The next day filter the solution and make up the level with water. Add ZINC BRITE CZ-55. Now the solution is ready for plating.

OPERATING FEATURES:

ZINC METAL:

The optimum concentration of Zinc metal to be maintained in the bath depends upon certain other parameters such as operating temperature, cyanide concentration, part configuration, throwing and covering power expected and cathode efficiency expected.

A low zinc metal improves throwing power and gives uniform thickness, but decreases the cathode efficiency and limits the maximum current density. A high zinc Metal content has the opposite effect.

SODIUM CYANIDE:

The optimum concentration of sodium cyanide to be maintained depends upon the type of bath, zinc metal concentration and operating temperature. A low cyanide concentration gives dull deposits and reduces throwing power. High cyanide concentration reduces cathode efficiency, especially in high c.d. areas.

SODIUM HYDROXIDE:

Sodium hydroxide maintains the bath conductivity and promotes anode dissolution in the bath. A low concentration decreases bath conductivity and anode dissolution in the bath. A high concentration decreases the over all brightness and can also cause an increase in concentration of zinc metal in the solution. A high concentration also increases the temperature of an operating bath.

SODIUM CARBONATE:

Decomposition of cyanide and sodium hydroxide in cyanide plating bath results in gradual build up of sodium carbonate in the bath. The normal operating range is 15 - 75g/ltr.
Within proper limits it does not give a negative effect and is beneficial in some cases. High carbonates reduce bath conductivity and results in high current density burning and dullness.

MAINTENANCE

The required concentrations of the bath constituents can be maintained by periodic analysis.

ZINC BRITE CZ-55 brightner is the only additive required for the make up as well as maintenance. Addition of 150ml - 250ml for 1000 Amp. hr. is recommended. However exact amount required depends on solution composition, temperature, operating current density, degree of brilliance required, impurity level in the bath and the type of plating i.e. Vat or Barrel. Higher additions are required for barrel plating than vat plating.

ZINC PURIFIER is added regularly to remove any metallic impurities. Addition of purifier can be controlled by lead acetate paper. The colour of paper should be brown. White shows lack of purifier, and black shows excess of purifier. Approximately 40ml. of ZINC PURIFIER is recommended for 100ltr. of the bath.

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ANALYSIS

ZINC CONTENT

Pipette out 5ml. sample solution into a 250ml. conical flask and add 50ml. Ammonium Chloride Buffer and 50ml. of distilled water. Add a pinch of Eriochrome black T indicator and drops of (10%) formaldehyde. Titrate immediately against 0.1 M EDTA.

END POINT: Bluish green colour.

CALCULATION

\[
\text{Burette Reading} \times 1.308 \times \text{Normality of EDTA} = \text{g/ltr of Zinc.}
\]

ANALYSIS FOR SODIUM CYANIDE

Pipette out 2ml. solution in to a 250ml. conical flask and add 25ml. of 25% NaOH, DI water and 10ml. of 10% KI. Titrate it against 0.1 N AgNO₃

END POINT: White turbidity.

CALCULATION

\[
\text{Burette Reading} \times 4.9 \times \text{Normality of AgNO₃} = \text{g/ltr of NaCN}
\]

ANLYSIS FOR CAUSTIC

Take two Nesslers Tube.
In one tube take 5ml. of sample solution and 5ml. of DI water and in the other tube take 5ml of D.I. water Add 2 - 3 drops of Tropaeolin indicator in both tubes.
Titrate the test tube containing the sample against 0.1N. H₂SO₄.

END POINT: Similarity in colours of solutions in both tubes.

CALCULATION

\[
\text{Burette Reading} \times 8 \times \text{Normality of H₂SO₄} = \text{g/ltr}
\]

NOTE:

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