FERRO ZINC ZE-70

FERRO ZINC ZE –70 is an alkaline zinc iron alloy process designed to produce bright zinc coatings, containing 0.3 - 0.6 % iron. The deposits produced have good weldability and workability. The process gives excellent covering and metal distribution. The alloy deposits show good adhesion of chromate films.

The zinc iron deposits produced are normally black chromated with an exclusive silver free chromate passivation which cannot be used as a general passivation dip for any other zinc or zinc alloy deposits. The black chromated zinc deposits offer good corrosion protection. The zinc iron deposits produced meets the requirements of automobile industry and surpass the corrosion protection offered by conventional black chromated zinc deposits.

The zinc iron deposits are black chromated with FERROPASS ZB – 91 followed by post dip FERROPASS ZP – 92

The system is suitable for both vat and barrel plating applications.

BATH MAKE – UP

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>RANGE</th>
<th>OPTIMUM</th>
</tr>
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<tbody>
<tr>
<td>ALKALINE ZINC SALT</td>
<td>110 – 130 g/ltr</td>
<td>120 g/ ltr</td>
</tr>
<tr>
<td>FERRO ZINC 70 CARRIER</td>
<td>10 – 14 ml/ltr</td>
<td>12 ml</td>
</tr>
<tr>
<td>FERRO ZINC 71 BRIGHTNER</td>
<td>4 – 0.8 ml/ltr</td>
<td>0.6 ml /ltr</td>
</tr>
<tr>
<td>FERROZINC IRON SOLUBLISER</td>
<td>80 - 100 ml/ltr</td>
<td>90 ml/ltr</td>
</tr>
<tr>
<td>FERROZINC IRON ADDITIVE</td>
<td>6 - 8 ml /ltr</td>
<td>7 ml /ltr</td>
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</tbody>
</table>

OPERATING CONDITIONS

TEMPERATURE : 22 – 32\(^\circ\) C
Current density : 2 - 4 A/dm\(^2\) For Vat
0.5 - 1.2 A/dm For Barrel
( Max Voltage 12-15 v)
Fume extraction : Recommended
Barrel rotation : 1-3 Revs /min
Filtration : Polypropylene alkaline resistant filters

SOLUTION MAKE - UP

Clean the plating tank thoroughly with fresh water. Incase of rubber lined tanks leach the tank with 3% Sodium hydroxide solution for 24 hrs. and then clean with fresh water.
Fill the tank with fresh water to 2/3\(^{rd}\) of it's final volume. Add the calculated quantity of Alkaline zinc salt Heat is generated by the dissolution of salt and it is recommended that the salt be added in small increments with continuous stirring. Dissolution is complete when initial cloudiness disappears.
Fill with water to 80% of the total volume and allow the solution to cool to room temperature.
Dummy the bath at low current density for about 3 –4 hrs.
Add the required quantity of FERROZINC IRON SOLUBLISER.
Add the required quantity of FERRO ZINC 70 CARRIER and FERROZINC 71 BRIGHTNER.
Add the calculated amount of FERROZINC IRON ADDITIVE and mix well.
The Electrolyte is ready for use.

BATH MAINTENANCE AND CONTROL

The required concentrations of bath constituents can be maintained by periodic analysis. The content is to be maintained at

ZINC : 8 – 10 g/ltr

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**SODIUM HYDROXIDE**: 100 - 120 g/ltr  
**IRON**: 80 - 120 ppm

A higher zinc concentration will reduce the iron content of the alloy. Replenishment is by continual exchange with zinc enriched electrolyte in a by-pass tank.

Sodium hydroxide in the bath is to be maintained within the recommended range in order to get proper throwing power and uniform metal distribution. In strongly alkaline solution sodium carbonate is formed (depending on age and operating conditions) A freshly prepared solution containing no sodium carbonate can be operated with a sodium hydroxide content of 120 g/ltr. As the sodium carbonate level increases (50 to a maximum of 70 g/ltr) the sodium hydroxide content should be reduced to approximately 80 – 90 g/ltr. A bath having carbonate content above 70 g/ltr is not recommended.

Addition of sodium hydroxide should always be done by making solution of it separately and after cooling it to room temperature.

**ADDITION AGENTS**:

FERROZINC 70 CARRIER is the main carrier additive and FERRO ZINC 71 BRIGHTNER is the brightener which along with FERRO ZINC 70 CARRIER gives good bright low current density areas.

**FERROZINC IRON ADDITIVE**:

Ferrozinc iron additive is a mixture of complexing agents and the iron required for alloy deposition. It is readily soluble in FERROZINC ZE-70 bath 1 ml of FERRO ZINC IRON ADDITIVE contains 15 mg iron.

**FERRO ZINC IRON SOLUBILISER**:

FERROZINC IRON SOLUBILISER complex the iron to ensure it remains in solution in the alkaline bath. The iron solubiliser is mainly required in the initial make up of the bath, but can also be added with iron additive in 1:1 ratio to ensure a good solubility.

**OPERATING TEMPERATURE**:

Bath temperature is to be maintained between 22 to 32°C. Within this temperature range the effect of temperature on alloy composition can be ignored. Freshly plated zinc iron deposits are relatively active and a higher temperature can cause dark flecks in the deposit. Even when operating within the correct range it is recommended that components are processed immediately after plating.

**ANODES**

FERROZINC ZE – 70 is operated with nickel coated steel anodes. The zinc content is maintained by placing steel baskets of zinc bullets in a by-pass tank and transferring the concentrate through a filter to the plating tank. The number of baskets, loading of baskets and flow rate can all be used to control the zinc content in the plating solution.

**CONSUMPTION AND REPLENISHMENT**:

<table>
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<tr>
<th>Additive</th>
<th>Consumption</th>
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<tbody>
<tr>
<td>FERROZINC 70 CARRIER</td>
<td>200 – 250 ml / 1000 Amp.hr</td>
</tr>
<tr>
<td>FERROZINC 71 BRIGHTNER</td>
<td>100 – 150 ml / 1000 Amp.hr</td>
</tr>
<tr>
<td>FERROZINC IRON ADDITIVE</td>
<td>120 – 180 ml / 1000 Amp.hr</td>
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The above consumptions may vary depending upon the drag out losses and different parts being plated.

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PRE- TREATMENT:

Since the cleaning ability of alkaline non - cyanide zinc bath is relatively poor, the cleaning cycles must be similar to those for chloride zinc or bright nickel plating. An alkaline dip of 30 g/l Sodium hydroxide is highly recommended immediately prior to the plating to neutralize any acid on the surface of the metal.

EQUIPMENT:

TANK : PVC, Poly propylene or rubber lined steel tanks can be used.
Fume Extraction : Recommended in areas of poor ventilation
Filtration : Polypropylene alkaline resistant filters. Papers filters are not recommended. 1 - 2 bath turnovers per hour.
Cooling Coils : If required mild steel cooling coils are recommended.

NOTE:

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