ORTHOBRITE COZ - 545

HIGH CORROSION RESISTANCE COBALT – ZINC ALLOY PLATING PROCESS

ORTHOBRITE COZ 545 zinc cobalt alloy system is designed to produce zinc cobalt alloy deposition with two to three times the corrosion protection available from zinc deposit of equal thickness. The system is based on chloride zinc solution, similar to conventional chloride zinc process. The deposit produced contains an average of 0.2 to 0.8 % wt. Cobalt and are exceptionally bright at normal current densities. The process can be used for vat and barrel applications using the same equipments as used for chloride zinc.

SALIENT FEATURES :-

Uniform alloy deposition allowing trouble free chromating.
Exceptional brightness and leveling over a wide operating range.
Easy to operate.
Very High Corrosion resistance.

BATH MAKE-UP AND OPERATING CONDITIONS :

ORTHOBRITE AZ – 526 A : 130 - 150 ml/ltr
ORTHOBRITE AZ – 526 B : 250 gm/ltr
ORTHOBRITE 545 COM : 40 - 60 ml/ltr
ORTHOBRITE 545 COR : 0.1 - 0.4 ml/ltr
ORTHOBRITE 545 COL : 8 - 15 ml/ltr
Cathode current density : 1.2 - 2.5 A/dm²
Anode current density : 0.2 - 2.0 A/dm²
Temperature : 21 - 35 ºC
pH : 5.0 – 5.4
Agitation : Lower to mild Air
Anodes : 99.99% pure zinc
Anode Bag : Spun polypropylene
Filtration : Continuous

CHEMICAL COMPOSITION :

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>RANGE</th>
<th>VAT</th>
<th>BARREL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZINC METAL</td>
<td>37 – 45 gm/ltr</td>
<td>42 gm/ltr</td>
<td>40 gm/ltr</td>
</tr>
<tr>
<td>COBALT METAL RANGE</td>
<td>1.2 – 2.4 gm/ltr</td>
<td>1.8 gm/ltr</td>
<td>1.2 gm/ltr</td>
</tr>
<tr>
<td>TOTAL CHLORIDE</td>
<td>140 - 170 gm/ltr</td>
<td>160 gm/ltr</td>
<td>140 gm/ltr</td>
</tr>
<tr>
<td>BORIC ACID</td>
<td>20 – 30 gm/ltr</td>
<td>25 gm/ltr</td>
<td>25 gm/ltr</td>
</tr>
</tbody>
</table>

SOLUTION MAKE - UP

Clean & leach the plating tank with 5% volume Hydrochloric Acid Solution for Four Hours.
Fill the plating tank to approximately 2/3rd of the final volume
With stirring, add the measured quantity of ORTHOBRITE AZ – 526 A and after thorough mixing add required quantity of ORTHOBRITE - 526 B and continue the stirring, until the salt are dissolved completely.
Treat the solution with zinc dust and activated carbon and allow to settle overnight.
Transfer the solution through filter to the standby tank and clean the plating tank. Retransfer the solution from the standby tank to the plating tank through the Filter.
Adjust the pH to the operating range.
Make up the level to final volume with water and mix well to ensure uniform composition of the solution.
Add the measured quantity of ORTHOBRITE 545 COL, 545 COM, 545 COR solution and stir well. The solution is ready for use.

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OPERATING CONDITIONS:

ZINC METAL:

Zinc metal in the bath can be maintained by analyzing the bath periodically. Metal content can be increased by addition of ORTHOBRITE AZ – 526 A. In barrel plating a lower zinc content gives bright low current density plating and also reduces drag out losses. Where as for vat plating higher metal content is recommended so that the bath can be operated at higher current density with out any burning at high c.d. areas.

TOTAL CHLORIDE:

Total Chloride in the bath is maintained by periodic analysis and addition of ORTHOBRITE AZ – 526 A. Low Chloride content leads to dullness in low c.d. areas and burning in high c.d. Higher chloride will reduce the solubility of addition agents.

BORIC ACID:

It is used as a buffering agent to minimize the pH fluctuation. Low concentration can cause burning at high c.d areas and dullness in low c.d. Higher concentration can give roughness due to insolubility and can reduce the conductivity by forming insoluble film at the anode.

CURRENT DENSITY:

Current density plays a major role in alloy composition deposited. If all other operating parameters are constant the amount of Cobalt deposited increases, with the increase in the current density. This should be taken care as too high cobalt content in the deposit make chromating deficient. A current density of 0.5 – 3.0 A/dm² is recommended.

COBALT CONTENT:

For the desired alloy composition the cobalt content in the bath is to be maintained well. The cobalt content in the bath is maintained by adding ORTHOBRITE 545 COL.

BATH pH:

The bath pH should be checked regularly and maintained at optimum level to get the correct alloy composition. The cobalt content in the alloy composition increases as pH increases.

TEMPERATURE:

To get an uniform alloy composition the temperature is to be maintained between 25 – 32°C. A higher temperature will increase the cobalt deposition in the alloy composition.

MAINTENANCE:

Regular addition is to be made to the bath to maintain Zinc Metal, Total chloride, Boric acid after analyzing bath. Three other major addition agents used are ORTHOBRITE 545 COR, ORTHOBRITE 545 COM and ORTHOBRITE 545 COL.

ORTHOBRITE 545 COR & 545 COM:

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ORTHOBRITE 545 COR gives the overall brightness in combination with 545 COM and is consumed by plating and drag out. The bath can be maintained by adding:

ORTHOBRITE 545 COR 150-200 ml per 1000 Amp hr.
ORTHOBRITE 545 COM 250 – 300 ml per 1000 Amp hr.

ORTHOBRITE 545 COL:

The cobalt Metal Concentration in the bath is maintained by adding ORTHOBRITE 545 COL. The concentration of cobalt in the deposit depends directly on the cobalt concentration maintained in the solution. Low concentration will lead to lower percentage of cobalt in the deposit which will reduce the corrosion resistance. Too high concentration will lead to chromating problems.

Regular addition of ORTHOBRITE 545 COL is to be made on 1000 Amp/hr basis. For most plating operations, the following additions will maintain the cobalt content in the bath within the range:

<table>
<thead>
<tr>
<th>COBALT CONTENT</th>
<th>ORTHOBRITE 545 COL</th>
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</thead>
<tbody>
<tr>
<td>IN THE BATH</td>
<td>ADDITION PER 1000 amp/hr.</td>
</tr>
<tr>
<td>0.75 gm/ltr</td>
<td>11.2 ml</td>
</tr>
<tr>
<td>1.50 gm/ltr</td>
<td>16.2 ml</td>
</tr>
<tr>
<td>2.25 gm/ltr</td>
<td>21.2 ml</td>
</tr>
<tr>
<td>3.00 gm/ltr</td>
<td>26.3 ml</td>
</tr>
<tr>
<td>3.75 gm/ltr</td>
<td>31.4 ml</td>
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CHROMATE CONVERSION COATING:

The chromatability of 545 COZ process depends to a great extent on the composition and uniformity of the alloy deposit. The appearance of the chromated part can become inconsistent if the amount of cobalt in the deposit is above 0.8 by weight. The discoloration occurs at the highest cobalt content area.

NOTE:

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