DEVECO CORPORATION
ISO 9001-2000

DATA SHEET

DEVECO IMPERIAL ZINC

ALKALINE NON-CYANIDE ZINC SYSTEM

DEVECO IMPERIAL ZINC plating system is a simple to use additive system designed to produce bright, lustrous zinc deposits over a wide range of current densities and metal concentrations and particularly higher metal concentration baths. **DEVECO IMPERIAL ZINC** will work well in both rack and barrel installations.

DEVECO IMPERIAL ZINC contains no chelating agents or complexing agents. The deposits easily accept chromate conversion coatings, including black and olive drab.

DEVECO IMPERIAL ZINC has excellent zinc distribution, much better than that in acid zinc systems. Deposits give good adhesion and ductility. Bath control is simple and can be done be titration.

DEVECO IMPERIAL ZINC is tolerant to excessive brightener additions, has excellent stability, and gives great plating life.

DEVECO IMPERIAL ZINC will convert most alkaline non-cyanide zinc systems found in the market today. Please submit a 1-quart sample to Deveco Corp. for recommendations.

OPERATING PARAMETERS

	Range	**Optimum**
Zinc Metal	1.25 – 2.50 opg	1.5 – 1.8 opg
Caustic Soda	14.0 – 18.0 opg	16.0 opg
Imperial Carrier	1.0 – 2.0% by vol. 1 Gal/12,000 Amp-hours	1.5% by vol. 1 Gal/12,000 Amp-hours
Imperial Brightener	0.25 – 0.75% by vol.	0.50% by vol.
Imperial Conditioner *	0.10 – 1.25% by vol.	1.0% by vol.
Imperial Purifier	0.05 – 0.15% by vol.	0.10% by vol.
Imperial LCD Booster	0.30 – 0.70% by vol.	0.50% by vol.

* If hard water is a problem, Imperial Conditioner can be added directly to the bath or in the final rinse prior to the bath to increase grain refinement.

PLATING PARAMETERS

Average Current Density	**Range**	**Optimum**
Barrel	1 – 25 ASF	5 – 10 ASF
Rack	3 – 120 ASF	10 – 25 ASF
Temperature	65 – 110 ^{o}F	85 ^{o}F

Maintenance Schedule:

DEVECO IMPERIAL Carrier should be added on the average of 1 quart every 3500 – 4000 amp-hours. Imperial Conditioner and Purifier are normally added on demand basis and can be determined via Hull Cell analysis or experience. Caustic and Zinc Metal titrations should be done periodically to maintain consistent bath chemistry.

Operating Notes:

Zinc Metal:

Higher zinc metal concentrations will give brighter deposits in high current density areas, and generally is used for rack plating. In any alkaline non-cyanide zinc plating operation, a zinc generating system, utilizing steel anodes and an exterior zinc generating tank is highly recommended.

Anodes:

Anodes should be constructed of low carbon steel. The zinc will be maintained by an out of circuit zinc generator. The anode to cathode area should be approximately 2:1.

Filtration:

Filtration should be continuous at 1 to 2 bath turnovers per hour through a 50-micron filter.

Zinc Generating Tank:

The volume of the zinc-generating tank should be from 10 to 20% of the total volume of the plating tank.

ANALYTICAL PROCEDURES:

The zinc metal and sodium hydroxide need to be analyzed periodically in order to operate a quality alkaline zinc-plating bath. Additions of proprietary products should always be confirmed in the Hull Cell prior to introduction to the operating bath. Frequent small additions on a regular basis are always preferred to occasional large doses of products.

CAUTION: The following procedures involve the use of potentially hazardous chemicals. Manufacturer's operating instructions should be consulted and the appropriate safety cautions followed.

Analysis for Zinc

Equipment Needed

5 ml pipette
50 ml pipette
100 ml graduated cylinder
500 ml Erlenmeyer flask

Reagents Needed

Xylenol Orange indicator - Mix 0.1 gram Xylenol orange tetrasodium salt with 100 grams of AR grade sodium chloride.

Buffer solution, pH 5.5 - Dissolve 90 grams of anhydrous sodium acetate in 500 ml of distilled water. Add 15 ml of concentrated AR acetic acid and dilute to one liter with water.

0.0575M EDTA - Add sufficient deionized or distilled water to 21.4 grams of AR grade EDTA Disodium Dihydrate salt and 6 grams of AR grade Sodium Hydroxide to make 1 liter of solution.

Procedure

1. Pipette a 5 ml sample of the Deveco Imperial Zinc plating solution into a 500 ml Erlenmeyer flask.
2. Add a pinch of Xylenol Orange indicator sufficient to produce a violet color.
3. Add 100 ml buffer solution to produce a pH of 5.5 and mix to dissolve any precipitate.
4. Titrate with 0.0575M EDTA solution to a yellow or gold endpoint.

Calculation: (ml of EDTA titrated) X (0.1) = oz/gal Zinc metal
or
(ml of EDTA titrated) X (0.75) = g/L Zinc metal

Analysis for Caustic Soda

Equipment Needed

5 ml pipette
50 ml burette
10 ml pipette
250 ml Erlenmeyer flask

Reagents Needed

10% Sodium Cyanide solution - Dissolve 10 grams of Sodium Cyanide in 90 ml of deionized or distilled water.

LaMotte Sulfo-orange indicator - Purchase from laboratory supply house.
or
Caustic blue indicator - Mix 0.4 grams of 5.5 Indigodisulfonic Acid Disodium salt with 100 grams of Sodium Chloride (table salt).

0.94N Sulfuric Acid (H_2SO_4) - Carefully add 26.5 ml of AR grade concentrated Sulfuric Acid to 500 ml of deionized or distilled water. Cool and dilute to 1 liter.

Procedure

1. Pipette a 5 ml sample of the plating solution into a 250 ml Erlenmeyer flask.
2. Add 10 ml of 10% sodium cyanide solution; then add either 8 to 12 drops of LaMotte Sulfo-orange indicator or 0.25 gram of caustic blue indicator.
3. Titrate with 0.94N H_2SO_4. Color change is from orange to yellow with LaMotte Sulfo-orange indicator and green to blue with caustic blue indicator.

Calculation: (ml of 0.94N H_2SO_4 titrated) = oz/gal Sodium Hydroxide
or
(ml of 0.94N H_2SO_4 titrated) X (7.5) = g/L Sodium Hydroxide

Read Material Safety Data Sheet before using this product.