

## E-Brite™ 400

### Brightener for Conventional Cyanide Zinc Plating

**E-Brite 400** is a liquid addition agent which produces brilliant, lustrous zinc deposits from both barrel and rack plating operations.

**E-Brite 400** has good temperature stability with a very wide plating range which eliminates burning problems.

**E-Brite 400** exhibits excellent covering with a bright deposit in low current density areas which provides for trouble free plating of irregularly shaped parts.

**E-Brite 400** deposits readily accept all conventional chromate post treatments.

**E-Brite 400** is highly effective in conventional high cyanide plating baths. It can also be used very effectively in mid-cyanide baths.

#### OPERATING CONDITIONS

<u>Bath</u>	<u>Range</u>	<u>Conventional Bath</u>	<u>Mid-</u>
Zinc Metal	2-6 oz/gal	4.5 oz/gal	2.25 oz/gal
Sodium Cyanide	5-18 oz/gal	12.4 oz/gal	6.2 oz/gal
Sodium Hydroxide	8-12 oz/gal	10.0 oz/gal	10.0 oz/gal
Sodium Carbonate	4-10 oz/gal	4.0 oz/gal	4.0 oz/gal
NaCN/Zn Ratio	2.5 - 3.2	2.75	2.75
Operating Temperature	65 - 95°F	80°F	80°F

#### NEW BATH MAKE-UP

<u>lbs./100 gal</u>	<u>Conventional Bath</u>		<u>Mid-Bath</u>	
	<u>oz/gal</u>	<u>lbs./100-gal</u>	<u>oz/gal</u>	
Zinc Cyanide	8.1	50.0	4.0	25.0
Sodium Cyanide	19.2	120.0	9.6	60.0
Sodium Hydroxide	10.0	65.0	10.0	65.0
Sodium Carbonate	4.0	25.0	4.0	25.0
E-Brite 400	0.5 fl oz	3 pints	0.5 fl oz	3 pints

Baths may also be made up using high purity zinc oxide.

	<u>Conventional Bath</u>		<u>Mid-Bath</u>	
	<u>oz/gal</u>	<u>lbs./100-gal</u>	<u>oz/gal</u>	
<u>lbs./100 gal</u>				
<b>Zinc Oxide</b>	5.6	35.0	2.8	17.0
<b>Sodium Cyanide</b>	12.4	78.0	6.2	39.0
<b>Sodium Hydroxide</b>	4.4	28.0	7.2	45.0
<b>Sodium Carbonate</b>	4.0	25.0	4.0	25.0
<b>E-Brite 400</b>	0.5 fl oz	3 pints	0.5 fl oz	3 pints

### **BRIGHTENER MAINTENANCE ADDITIONS**

One (1) gallon of **E-Brite 400** is normally consumed per 15,000 to 20,000 ampere hours of plating.

Make-up and maintenance additions are similar for rack and barrel plating. However, due to drag out, the consumption may be higher in barrel plating operations.

**E-Brite 400** should be diluted with two or three parts of water if automatic metering and feeding equipment is used for additions directly to the plating bath.

Higher maintenance additions than the one (1) gallon per 15,000 to 20,000 ampere hours may be required to compensate for lower chemical ratios and higher operating temperatures.

### **POST TREATMENT**

For optimum post treatment with chromates, it is recommended that the fresh zinc plate be rinsed thoroughly with cold water, followed by a short dip in 0.5% Nitric Acid followed by another cold-water rinse prior to immersion in the chromate solution.

### **CONVERSIONS**

**E-Brite 400** is compatible with most cyanide zinc plating systems and running conversions are easily accomplished. Send a one-quart sample of the bath to be converted to **EPI's** technical service laboratory for complete analysis and recommendations for conversion to the **E-Brite 400** process.

### **EQUIPMENT**

<b>Anodes:</b>	High purity zinc anodes preferred
<b>Anode Baskets:</b>	Titanium
<b>Tank:</b>	Mild steel is permissible. However, a lined tank is preferred to avoid stray currents.
<b>Filter:</b>	Standard type for alkaline cyanide solutions
<b>Heating Elements:</b>	Mild steel permissible
<b>Ventilation:</b>	Forced ventilation required

## **SOLUTION ANALYSIS**

### **Metallic Zinc**

1. Pipette a 2 ml sample into a 250 ml Erlenmeyer flask.
2. Add 100 ml D.I. water and 10 ml concentrated Ammonium Hydroxide.
3. Add few particles Eriochrome Black T mixture.
4. Add 2 grams Chloral Hydrate (or 20 ml of a 10% Chloral Hydrate solution). Swirl slightly.
5. Titrate with standard 0.1 Molar EDTA solution until a color change from red-violet to blue is noted. (Titration must be done immediately after the addition of the Chloral Hydrate.)

Calculation: **oz/gal of Zinc metal** = ml of 0.1M EDTA x 0.438

### **Total Cyanide (sodium)**

1. Pipette a 1 ml sample into a 250 ml Erlenmeyer flask.
2. Add 50 ml D.I. water, 5 ml of Sodium Hydroxide (20% solution) and 5 ml of Potassium Iodide (10% solution).
3. Titrate with standard 0.1 Normal Silver Nitrate solution to a faint turbidity.

Calculation: **oz/gal of Sodium Cyanide** = ml of 0.1N Silver Nitrate x 1.31

### **Sodium Hydroxide**

1. Pipette a 10 ml sample into a 250 ml Erlenmeyer flask.
2. Add 10 ml D.I. water, 1 gram Sodium Cyanide and 10 drops of LaMotte Sulfo-Orange Indicator solution.
3. Add 1 drop Alkali Blue indicator.
4. Titrate with standard 1.0N Hydrochloric Acid (HCl) to a color change from brown-orange to green.

Calculation: **oz/gal of Sodium Hydroxide** = ml of 1.0N HCl x 0.535

## **Carbonates**

1. Pipette a 10 ml sample into a 250 ml beaker and add 100 ml D.I. (room temperature) water.
2. Add 25-30 ml of 10% Barium Nitrate while stirring. Allow to settle. Test solution in beaker with 2-3 drops of Barium Nitrate to see if precipitate forms. If no more precipitate forms, filter; if more precipitate forms add 10 ml of Barium Nitrate, stir and again allow to settle. Repeat this step until precipitate stops forming.
3. Filter, using No. 40 paper. Wash with room temperature distilled water.
4. Test filtrate with a few drops of 10% Barium Nitrate to make certain all carbonates have been precipitated.
5. Transfer filter paper and precipitate to the original beaker and add 50 ml of D.I. water. Mash up.
6. Add 4-5 drops of 0.2% Methyl Orange solution.
7. Titrate with 1.0N HCl until a permanent pink is obtained.

Calculation: **Sodium Carbonate, oz/gal** = ml 1.0N HCl x 0.706

## **HANDLING AND STORAGE**

The **E-Brite 400** addition agent is not hazardous and special precautions are not required. However, it is always a good practice to wear eye protection (safety glasses), when working with **E-Brite 400** to avoid contact with the eyes.

**E-Brite 400** has excellent shelf life in excess of two years. It should be kept from freezing. If the solution does freeze, it should be thawed by immersing the container in hot water or by dilution with hot water prior to use.

## **CAUTION**

The zinc plating solutions to which the **E-Brite 400** are added are highly alkaline and are toxic and the precautions for working with cyanide and caustic as recommended by the manufacturers **Safety Data Sheets** for these products must be followed to ensure personal safety. A full-face shield, rubber gloves and rubber apron must be worn when working with zinc plating solutions.

## **PACKAGING**

Five (5) gallon and 55-gallon non-returnable containers.

## **IMPORTANT NOTICE! For Industrial Use Only**

The following is made in lieu of all warranties, expressed or implied, including the implied warranties of merchantability and fitness for purpose: seller's and

manufacturers' only obligation shall be to replace such quantity of the product as proved to be defective. Before using, user shall determine the suitability of the product for its intended use, and user assumes all risk and liability whatsoever in connection therewith. **Neither seller nor manufacturer shall be liable either in tort or in contract for any loss or damage, direct, incidental or consequential, arising out of the use or the inability to use the product.**

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