

E-Brite™ 30/30

Non-Cyanide Alkaline Copper Plating

E-Brite 30/30 plates directly on steel, copper, brass, stainless steel, zincated aluminum, electroless nickel and most high quality properly prepared zinc diecastings in both rack and barrel installations. Lead alloys can be plated in rack lines. It is free of chelating agents.

It eliminates necessity of striking in cyanide copper. One bath serves as both strike and plate bath.

It meets requirements of **MIL-C-14550 B** and **AMS 2418J**.

Accidental drag-in of **E-Brite 30/30** into an acid copper solution poses no health hazards due to evolution of poisonous cyanide gas as with cyanide copper.

The solution does not have to be treated for carbonates as with cyanide solutions.

E-Brite 30/30 produces a fine grained, smooth, dense and ductile copper deposit which is non-porous with excellent bonding properties. The plate may be buffed easily for a high luster.

It has excellent throwing and covering power, especially in low current areas and is superior to cyanide copper in these properties.

It is used as a preplate strike for nickel, acid copper, tin, solder and silver plate.

The **E-Brite 30/30** plate is an excellent heat treat stop-off and EMI shield.

It is also an excellent decorative finish for buttons, rivets, etc. The copper plate can be readily blackened or oxidized for a variety of attractive antiqued finishes such as those found on wall plates, lighting fixtures and builder's hardware.

It does not contain strong chelators. It does not have a negative effect on typical waste treatment systems. **E-Brite 30/30** plates while dissolving the copper anodes rather than plating out of the solution as is the case with other processes. Therefore, it offers lower operating costs.

The **E-Brite 30/30** bath is stable and does not have to be periodically dumped and recharged as with other non-cyanide alkaline copper processes which are based on pyrophosphate.

E-Brite 30/30 is supplied as a liquid concentrate. Tap water can be used to make up the bath, however, deionized or soft water is preferred.

It is extremely easy to control with only one (1) liquid maintenance addition agent, **E-Brite 30/31**, versus as many as five (5) agents with other processes.

Zinc diecast surfaces must be properly cleaned with **EPI's E-Kleen 140** soak cleaner and activated with **E-Pik 211** acid salt formulation. Some diecast surfaces may require

anodic electro-cleaning with **E-Kleen 173. E-Prep 280 NCZ** zincate is recommended for aluminum surfaces.

PLATING SPECIFICATIONS

	<u>RACK PLATING</u>		<u>BARREL PLATING</u>	
	<u>New Bath Make-up</u>	<u>Range</u>	<u>Optimum</u>	<u>Range</u>
Concentration E-Brite 30/30	40% by volume	35-60% by volume	40% by volume	30-60% by volume
E-Brite 30/31	10% by volume	Bath maintained at 40 times copper concentration in oz/gal.	10% by volume	Bath maintained at 40 times copper concentration in oz/gal
E-Brite 30/35	8% by volume	5 – 10%	8% by volume	5 – 10% by volume
Copper Metal	1.0 oz/gal	0.85 to 1.5 oz/gal	1.0 oz/gal	0.7 to 1.5 oz/gal
pH	9.6	9.2 to 10.0	9.8	9.5 to 10
Temperature	120°F	100 to 140°F	120°F	100 to 140°F
Cathode-Current Density	15 ASF	5 to 30 ASF	5 to 8 ASF	2 to 10 ASF
Voltage	1 – 6 Volts		15 to 18 Volts	
Anode-Current Density	Minimum of 10 ASF in order to corrode the anodes and maintain the copper concentration in the bath.			
Agitation	Vigorous air mandatory for rack lines and also helpful in barrel lines. Use low pressure, large volume blowers only – not compressed air. <u>In-tank filter systems</u> do not produce sufficient solution agitation to be used with E-Brite 30/30 and must not be used for agitation or for filtration. Air agitation aids in producing a brighter finish and helps to avoid burning in the high current density areas.			
Plate Thickness	Minimum of 0.0002 inches for strike			

EQUIPMENT AND OPERATION

- Copper Anodes:** Oxygen-free UNS C10100 or C10200 only. Use bar or balls. Oxygen-free UNS C10100 or C10200 copper anodes from Univertical, IMC-MetalsAmerica, or Outokumpu are acceptable. Do not use phosphorous-containing anodes.
- Insoluble Anodes:** Graphite (grade JC-1) or 316 stainless steels for some rack installations.
- Anode Basket:** Titanium only.
- Anode/Cathode Ratio:** 1.5:1 Note: In barrel plating it is important to have the proper ratio. Calculate the maximum cathode area before setting up the process and ensure that the anode area equals the maximum cathode area. Also, it is required that the anode area be such that the anode current density is sufficient to corrode the anodes.
- Carbon:** **EPI's E-Carb Powder** and **E-Carb Granular** have been tested to be compatible with **E-Brite 30/30** process. Please note that you may have to use up to 100 times more of granular carbon vs powder carbon to achieve the same results, therefore powder is recommended.
- Filtration:** Continuous 10 micron, 2-3 turns per hour. New filter cartridges must be soaked in hot water then flushed with hot water prior to use. An **E-Carb Powder or Granular** carbon pack must be maintained on the bath – one pound per 100 gallons – change weekly. When plating heavy copper (one (1) mil or more) as a heat treat stop-off a 1-micron filter is recommended.
- Heating:** Stainless steel, titanium or Teflon coated elements or coils.
- Tanks:** Mild steel lined with rubber, Koroseal or polypropylene or a drop in liner. All plastic tanks may be used. Large polypropylene tanks must be reinforced.
- Ventilation:** Not required, but it is a good practice as with all heated plating solutions.
- Rinsing:** Whenever possible, 2 or 3 counter current flow rinses are recommended immediately prior to the **E-Brite 30/30** bath. It is especially helpful following acid dips to reduce the amount of dissolved iron being dragged into the **E-Brite 30/30** bath.
- Contamination:** Lead, cyanide, dissolved iron and organics are contaminants – bath plates with a brown to black smut in MCD and HCD areas Of Hull Cell panel when contaminated.

PLATING ADDITIVES

- E-Brite 30/30:** Liquid concentrate used in make-up of new baths and replenishment. Contains the copper metal and the other balanced components of the bath.
- E-Brite 30/31:** Liquid electrolyte replenisher. Periodic adds over time to complex copper dissolved from anodes. Adds determined by Hull Cell tests or by **EPI**.
- E-Brite 30/32:** Liquid High Current Density (HCD) area booster used only with rack plating for heat treat stop-off plating of one (1) mil or more. Charge new rack baths used

for heat treat stop-off plating with 4% by volume. Added thereafter as needed based on Hull Cell tests for burn in HCD. It is not normally used in rack strike baths. For barrel installations **EPI** lab will recommend level of **30/32**.

E-Brite 30/35: Liquid buffer to control pH. Additions determined by pH measurement with an electronic pH Meter. It is added **to raise the pH** upon bath make-up and when the pH decreases from acid drag in.

E-Brite 30/37: The preferred method for **reducing the pH** of the bath is by adding **E-Brite 30/37**. If necessary, as a temporary solution, the pH may be lowered by adding dilute (10%) Sulfuric Acid. Eventually this causes sulfates to build up in the bath causing precipitates to form. Therefore, this method should not be used regularly. Excessive increase in bath pH is due to incorrect anode to cathode ratio.

REPLENISHMENT OF PLATING SOLUTION

E-Brite 30/30 concentrate has a copper concentration of 2.4 oz/gallon. If the copper concentration in the bath decreases, additions of **E-Brite 30/30** concentrate are required to replenish the copper and the other balanced components in the working solution. The strength of the working solution is monitored by determining the copper concentration.

E-Brite 30/31 electrolyte is added on a regular basis (daily) to complex the copper dissolved from the anodes and to replace drag-out. Its consumption will depend upon drag-out, copper metal content and metallic contamination in the bath. The proper concentration of **E-Brite 30/31** must be maintained for maximum adhesion to the base metal.

Note: Each installation is different with regard to drag-out and anode area. Therefore, daily analysis of the copper concentration must be made during the first week of operation to establish the optimum level of copper, stainless steel or carbon anodes required. The anode areas established should remain reasonably constant thereafter.

CLEANING PARTS

Unlike cyanide baths, the **E-Brite 30/30** solution does not offer any cleaning. Therefore, it is extremely important to evaluate the cleaning in an existing line. Cleaners must be free-rinsing. **EPI** has soak and electrocleaners, as well as acid salts and zincates that are compatible with the **E-Brite 30/30** solution.

METALLIC COPPER ANALYSIS

1. Pipette a 5 ml sample of the plating solution into a 250 ml Erlenmeyer flask. Add 25 ml distilled or deionized water.
2. Add 2 to 3 grams Ammonium Persulfate – let stand for 10 to 15 minutes. (Swirl a few times while waiting.)
3. Add approximately 5 ml of concentrated Ammonium Hydroxide. Solution will be a clear, deep blue.
4. Add 50 ml distilled or deionized water.

5. Add 4 to 6 drops 0.1% Pan Indicator. (Do not add more than 6 drops, as it will affect the end point.)
6. Solution should be purple or pale red in color.
Titrate with 0.1M EDTA solution to a yellow-green end point.

Calculation: **oz/gal of copper** = (ml of EDTA) x 0.170

Note: When **E-Brite 30/30** copper is used as a replacement for a cyanide copper plating solution, the tanks, anodes and anode bars, baskets and barrels must be free of cyanide before charging the tank with the **30/30** solution. After the removal of the cyanide solution, the equipment should be washed with Hypochlorite solution and the tank soaked for 24 hours in 2% Sodium Hypochlorite to destroy residual cyanide. Do not neglect racks, barrels, heating and filtering equipment. After removal of the Hypochlorite solution and water rinsing, a dilute 1 to 2% Sulfuric Acid rinse should be used, followed with another rinse with cold water and then a 5% Potassium Hydroxide rinse should be used to eliminate the acid. Remove the alkaline rinse, rinse with cold water and then make up the tank with the **E-Brite 30/30** solution. **When destroying cyanide, forced ventilation should be used at all times to prevent toxic cyanide fumes from accumulating. Personnel should be equipped with self-contained breathing apparatus.**

Best results are obtained with a new tank or by installing a new flexible liner in a tank which previously contained a cyanide copper plating solution. New anodes and baskets are also recommended.

WASTE TREATMENT

Copper from **E-Brite 30/30** rinse water by itself or mixed with other metallic rinse waters is precipitated by conventional Sodium Hydroxide treatment with **EPI Coagulants** and **EPI Polymers**. A spill of **E-Brite 30/30** requires treatment with lime.

CAUTION

The **E-Brite 30/30, 30/31, 30/35** and **30/37** concentrates are eye and skin irritants. **DO NOT** work with these products without first reading and understanding the **Safety Data Sheet** furnished by **EPI**.

PACKAGING

Five (5) 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 manufacturer's 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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