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TECHNICAL DATA

E-Brite™ Ultra Cu RTP

Non-Cyanide, Non-Pyrophosphate Alkaline Copper Plating

E-Brite Ultra Cu RTP plates directly on steel, copper, brass, stainless steel, zincated aluminum, electroless nickel and most new high quality properly prepared zinc diecastings in both rack and barrel installations. Leaded alloys can be plated in rack lines. **E-Brite Ultra Cu RTP** is free of chelating agents.

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

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

E-Brite Ultra Cu RTP eliminates potential health and environmental liability and the high cost of waste treating the cyanide.

Accidental drag-in of **E-Brite Ultra Cu RTP** 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 Ultra Cu RTP 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 Ultra Cu RTP** 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.

E-Brite Ultra Cu RTP is supplied as a ready-to-plate solution.

Zinc diecast surfaces must be properly cleaned with **EPI's E-Kleen 140** soak cleaner and **E-Kleen 173** electrocleaner followed by activation with **E-Pik 211** acid salt formulation. Other cleaners and acid salts cannot be used on zinc diecast surfaces. **E-Prep 280 NCZ** zincate is the only recommended zincate for aluminum surfaces.

PLATING SPECIFICATIONS

	Optimum	Range
Copper Metal	1 oz/gal	0.8-1.2 oz/gal
pH	9.6	9.2 to 10.0
Temperature	120°F	100 to 140°F
Cathode-Current Density	10 ASF	5 to 25 ASF
Voltage		1 – 6 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. In-tank filter systems do not produce sufficient solution agitation to be used with **E-Brite Ultra Cu RTP** and must not be used for agitation or filtration. Air agitation aids in producing a brighter finish while helping to avoid burning in the high current density areas.

Plate Thickness Minimum of 0.0002 inches for strike

Rectification: Rack: 9 volts, Barrel: minimum of 15 volts
It is recommended that the parts go into the solution "live".

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: With some installations it may prove to be helpful to use a mix of copper and graphite or stainless steel (304 or 316) anodes in order to plate down too high of a copper concentration or to maintain 10 ASF on the copper anodes in order to dissolve the copper into the solution. In most rack installations a mixture of graphite or stainless steel and copper anodes is advantageous. Use only high density, pure graphite extruded or molded anodes – grade JC-1.

Anode Baskets: 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.

Anode Bags: Normally not required except for heat treat stop off plating or other high build applications. Bags must be thoroughly leached in hot water prior to use to avoid contaminating the bath with sizing compounds. Cotton, Dynel, or polypropylene bags may be used.

Racking: Positive, firm racking with good contact is recommended. Wiring parts can lead to difficulties as can hanging parts on hooks. This is especially true for plating zinc diecastings.

Heating: Teflon coated electric heaters are recommended. Scorching the solution must be avoided. D rated heaters should be used. Stainless steel or titanium heaters may be used. Also 316 stainless steel, titanium or Teflon steam coils.

Tanks: Mild steel lined with rubber, koroseal or polypropylene or a drop in plastic liner. All plastic tanks may be used. Large polypropylene tanks must be reinforced. New plastic tanks and liners must be leached with a 2% Potassium or Sodium Hydroxide solution for 2 days followed by cold water rinsing.

Ventilation: Not required, but it is a good practice as with all heated plating solutions.

Rinsing: Whenever possible, 2 or 3 stage counter current flow rinses are recommended immediately prior to the **E-Brite Ultra Cu RTP** bath. It is especially helpful following acid dips to reduce the amount of dissolved metals being dragged into the **E-Brite Ultra Cu RTP** bath which can produce poor plating results. A soft water rinse prior to the bath will improve performance.

NOTE: When **E-Brite Ultra Cu RTP** is used to replace cyanide copper in a plating line, it has been found that is very difficult to completely destroy residual cyanide. That is why a new drop-in plastic tank liner is recommended or a new tank be used. Anodes previously used with cyanide must be replaced. Anode bars, anode baskets, bus bars, racks and barrels must be free of residual cyanide. The equipment must be washed with 5% sodium hypochlorite or 3% hydrogen peroxide solutions. Do not neglect heating and filtration equipment. Rinse thoroughly with cold water and then rinse with dilute 1 to 2% sulfuric acid solutions**. When destroying cyanide, forced ventilation must be used at all times to prevent toxic cyanide fumes from accumulating. Personnel should be equipped with self contained breathing apparatus.**

New racks and barrels are recommended.

METAL SURFACE PREPARATION

Unlike cyanide baths, the **E-Brite Ultra Cu RTP** solution does not offer any cleaning. Therefore it is extremely important to do a thorough cleaning with an **EPI** compatible cleaner.

1. Steel, copper, and brass surfaces should be thoroughly cleaned with a hot **E-Kleen 102**, **163** or **196** hot alkaline soak cleaning solution followed by a water rinse and then electrocleaned in **E-Kleen 120** or **129** solution for steel, **E-Kleen 173** for copper and brass, followed by a water rinse and then activation in either a dilute hydrochloric or sulfuric acid solution. If adhesion problems arise with difficult-to-plate steel surfaces, a warm, 100 to 120°F solution of **E-Pik 211** or a 140°F, 25% sulfuric acid activation solution is required.
2. Stainless steel surfaces require activation after cleaning with cathodic (direct) d.c. current in either a 25% sulfuric acid solution or an **E-Pik 211** or **E-Pik 215** acid salt solution.
3. Freshly plated electroless nickel and sulfamate nickel surfaces require a dip in a sulfuric acid solution at a pH of 3.0. Do not allow surfaces to age prior to plating with **E-Brite Ultra Cu RTP.**
4. Zinc diecast surfaces must be properly soak cleaned with **EPI's E-Kleen 140** and then anodically (reverse) cleaned in an **E-Kleen 173** solution. The **E-Kleen 140** is used at a low concentration of 6 oz/gal as a soak cleaner and the **173** at 6 oz/gal as an electrocleaner. Immersion times in the soak and electrocleaning solutions should be as short as possible so as not to open up

pores the diecast surface - - 1 to 2 minutes for soak and 30 seconds for electrocleaning. Temperature: 120 - 130°F.

Following cleaning, surfaces must be rinsed and then activated in a dilute (1 1/2 to 2 oz/gal) solution of **EPI's E-Pik 211** acid salts or a 4 to 5% by volume solution of EPI's **E-Pik 216** Zinc Diecast Deoxidizer and Surface Conditioner. Here again, immersion times should be kept short (30 seconds) to avoid the development of a black smut which will cause blistering. Overactivation should be avoided to eliminate opening up the pores of the diecast surfaces.

5. Aluminum surfaces are cleaned with **E-Kleen 163** soak cleaner. **E-Pik 232** is used for a heavy etch. Aluminum surfaces must be properly zincated with **EPI's E-Prep 280 NCZ**, non-cyanide zincate. **E-Prep 280 NCZ** was specifically formulated to be compatible with **E-Brite Ultra Cu RTP** and is the only zincate to be used prior to **E-Brite Ultra Cu RTP**. Please see the **E-Prep 280 NCZ** technical data sheet for operating procedures.

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 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

WASTE TREATMENT

Copper from **E-Brite Ultra Cu RTP** 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 Ultra Cu RTP** requires treatment with lime. Sometimes, using a small addition of lime to the hydroxide treatment will increase the effectiveness of the precipitation.

Trouble Shooting

PROBLEMS	POSSIBLE CAUSES	REMEDIES
Discolored plating, chalky, brick red to black and sometimes peels off.	Organic contamination dragged in from cleaners or due to poor cleaning and rinsing.	Change carbon filters or peroxide/carbon batch treatment. Improve cleaning and rinsing.
	Cyanide contamination - from previous copper cyanide process or from a cyanide zincate or plating processes in the vicinity.	Temporary treatment with peroxide. HCD dummying. Trace and eliminate the sources of cyanide - such as cracked racks.
Non-adherent plating, particularly in LCD areas or upon bending.	Poor cleaning and surface preparation.	Ensure proper soak, electroclean and acid or acid salt along with good, counter-flow rinsing.

PROBLEMS	POSSIBLE CAUSES	REMEDIES
Black non-adherent plating in HCD areas.	Lead contamination from leaded brass or leaded steel parts being plated	HCD dummy plate to remove lead on a periodic basis. Improve counter current flow rinsing to avoid drag in of dissolved lead. Check for parts dropped into tanks.
Burned deposits in HCD areas	Too much current	Lower Current
	No or insufficient air agitation.	Ensure good vigorous air agitation.
	Too low temperature	Raise temperature to 120 to 140°F.
	Too low copper metal (below 0.5 oz/gal)	Make new solution.

CAUTION

Do not work with the **E-Brite Ultra Cu RTP** solutions or other **EPI** products without first reading and understanding the **MATERIAL SAFETY DATA SHEET** furnished by **EPI**.

Packaging

One (1) Liter, One (1) gallon, and 5 gallon 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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