

E-Brite™ 50/50

Non-Cyanide Alkaline Silver Plating

E-Brite 50/50 is an alkaline, cyanide free plating solution, which can plate bright silver for electronic, industrial and decorative uses. **E-Brite 50/50** eliminates the high cost of waste treatment of cyanide. It operates at room temperature and can be utilized in both rack and barrel plating.

E-Brite 50/50 can plate directly on silver, brass, bronze and copper and does not require a separate silver strike on these substrates. It will plate on nickel surfaces with activation with **EPI's E-Pik 242**. **E-Brite 50/50** has exceptional covering and throwing power. It produces fine-grained, smooth, dense, hard silver plate with low porosity and excellent bonding properties. The plate may be buffed for a high luster.

E-Brite 50/50 plates substantially faster than cyanide silver and with adhesion superior to cyanide silver. It exhibits superior color of a brilliant white. It is cost effective because it plates out of the silver anodes rather than the solution. **E-Brite 50/50** is easy to maintain with a single maintenance additive.

It is a very stable bath.

E-Brite 50/50 is supplied as a liquid concentrate, which contains 4 oz/gallon of silver. The concentrate is diluted with D.I. water.

Plating Specifications:

	Rack Plating		Barrel Plating	
	<u>Optimum</u>	<u>Range</u>	<u>Optimum</u>	<u>Range</u>
Silver Metal	2.0 oz/gal	1.5-2.5 oz/gal	2.4 oz/gal	2-2.5 oz/gal
pH	9.2	9.0-9.6	9.2	9.0-9.6
Temperature	68°F	60-75°F	68°F	60-75°F
Cathode current density	3 - 10	2-20 ASF	1 - 3	0.5 – 5 ASF
Anode current density	--	2-10 ASF	--	2-10 ASF
Agitation	air agitation on the anodes, plus cathode rod agitation or air agitation on the cathodes.			

Charging a New Bath

	Rack Plating		Barrel Plating	
	<u>Optimum</u>	<u>Range</u>	<u>Optimum</u>	<u>Range</u>
E-Brite 50/50 concentrate	50%	40-60%	60%	50-70%
E-Brite 50/51 electrolyte	5%		10%	
D.I. Water	45%	55-35%	30%	40-20%
45% KOH solution to adjust pH to 9.2				

Equipment and Operation:

Anode	Pure silver anodes should be used.
Anode/cathode ratio	A 2:1 anode to cathode ratio is required. Calculate the maximum cathode area before setting up the process and insure the anode area is two times the maximum cathode area.
Filtration	The solution must be kept free of suspended matter in order to prevent roughness. Continuous carbon filtration with 1 micron filter is recommended. New filter cartridge must be flushed prior to use by circulating DI water through the cartridge. A sulfur-free carbon pack must be maintained in the bath and changed weekly.
Tank	Plastic tanks may be used. Large polypropylene tanks must be reinforced. A high volume, low pressure air source is required for air agitation of the anodes and cathodes.

Cooling: In hot climates or manufacturing facilities, a cooling system using a 304/316 stainless cooling coil will extend the bath life. A water or chiller cooling system is preferred. In some locations, a cooling coil fixtured in the DI Water rinse with the silver bath flowing through (utilizing the filtration system pump) can be used to keep the bath at 68°F (20°C).

Warning: Tanks, racks, filters, barrels and other equipment must be thoroughly cleaned before using them with an **E-Brite 50/50** solution. Equipment previously used for cyanide silver should be washed with hypochlorite solution and the tank soaked for 24 hours in 2% hypochlorite to destroy residual cyanide. After removal of the hypochlorite solution and water rinsing, a 5% sulfuric acid or nitric acid rinse should be used, followed with another rinse with DI water. 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 silver solution and which has been cleaned as outlined above. New anodes and baskets are also recommended.

Plating additives

E-Brite 50/50 liquid concentrate and silver replenisher.

E-Brite 50/51 liquid concentrate of electrolyte replenisher. Periodic adds over time based on ampere hours, on Hull Cell tests or analysis by **EPI**.

pH control for E-Brite 50/50 solution

It is very important to operate **E-Brite 50/50** at pH range 9.0 to 9.6. If pH is below 9.0, adjust with KOH. If pH is over 9.6 adjust with 50% nitric acid. The pH must not go over 10.0.

Bath temperature must not exceed 120°F.

Replenishment of Plating Solution

The **E-Brite 50/50** concentrate has a silver concentration of 4.0 oz/gallon. The working bath has a silver concentration of 2.0 or 2.4 oz/gallon. If the silver concentration in the bath decreases, addition of **E-Brite 50/50** concentrate is required to replenish silver and the other balanced components in the working solution. The strength of the working solution is monitored by determining the silver concentration.

E-Brite 50/51 Additions - High Production / High Dragout

E-Brite 50/51 electrolyte is added on a regular basis to complex the silver dissolved from the anodes. Additions of **E-Brite 50/51** are made based on ampere hours, Hull Cell tests or as recommended by **EPI**. Additions are usually required every 500 ampere hours and the required addition will be based on the silver concentration. Typically 1% of **E-Brite 50/51** is added each day silver is plated and the pH is adjusted to 9.2. Add an extra 1.5% **E-Brite 50/51** on Monday each week if parts will be plated that week. If silver is not plated on a particular day, **E-Brite 50/50** or **E-Brite 50/51** is not added. If the bath will be idle for a period of time, add 1.5% **E-Brite 50/51** after the first 7 days the bath is idle. After that add 1% **E-Brite 50/51** every 7 days until plating is resumed. Use a 1-micron filter to take out small particles in the bath. Continuous carbon filtration of the bath is required even when the bath is idle.

E-Brite 50/51 Additions - Low Production < 10 Hours per Week

Add 1 % by volume **E-Brite 50/51** every week and raise the pH to 9.2-9.5. Add additional **E-Brite 50/51** (1) liter for every 300-400 amp hours.

E-Brite 50/50 bath control

The bath is maintained by measuring the pH, by titrating the silver concentration, and by running Hull Cell panels to determine contamination and evaluate plate adhesion.

Silver Analysis

1. Pipette a 10 ml sample of the plating solution into a 250 ml Erlenmeyer flask. Add 50 ml distilled water.
2. Add 2 ml concentrated nitric acid and 2 ml of 98% H₂SO₄ . Heat up solution and boil for 5 min.
3. Wait until the solution cools down and add 5 ml of 2% ferric ammonium sulfate solution.
4. Titrate with standard 0.1 N potassium thiocyanate (KSCN) solution until the light orange color remains.
5. oz/gal silver metal = (ml of KSCN) x 0.144

Cleaning Parts

It is extremely important to evaluate the cleaning in the existing line in order to have good performance for the **E-Brite 50/50** process. **EPI** has electrocleaners as well as acid salts that are compatible with the **E-Brite 50/50** solution.

Plating copper, brass and bronze substrates

1. Soak clean with **EPI's E-Kleen 125** or **E-Kleen 196**.
2. Electroclean with **EPI's E-Kleen 125**
3. Cold water rinse
4. Activation with **EPI's E-Pik 219**.
5. Cold water rinse
6. Cold water rinse
7. Plate with **E-Brite 50/50**
8. Silver drag out (D.I. Water)
9. Cold water rinse (tap water)
10. Cold water rinse (D.I. Water)
11. A 10% Sulfuric Acid rinse
12. D.I. water rinse
13. **EPI's E-Tec 529** anti-tarnish solution or **EPI's B.P.A.** electrolytic chromate solution
14. Hot D.I. water rinse
15. Dry

Plating Steel Substrates

1. Soak clean with **EPI's E-Kleen 120**
2. Electroclean with **EPI's E-Kleen 120**
3. Cold water rinse
4. Activation in 50% HCl or 5-20% Sulfuric Acid
5. Cold water rinse
6. Cold water rinse
7. Copper strike with **EPI's E-Brite Ultra Cu** non-cyanide alkaline copper
8. Cold water rinse
9. Cold water rinse
10. Plate with **E-Brite 50/50**
11. Silver drag out (D.I. Water)
12. Cold water rinse (tap water)
13. Cold water rinse (D.I. Water)
14. A 10% Sulfuric acid dip
15. D.I. water rinse
16. **EPI's E-Tec 529** anti-tarnish solution or **EPI's B.P.A.** electrolytic chromate solution
17. Hot water rinse
18. Dry

Plating Fresh Nickel: Electroless and Electroplated Nickel Substrates

1. Soak clean with **EPI's E-Kleen 173** (no cleaning required if plated in line with the nickel)
2. Electroclean with **EPI's E-Kleen 173** (no cleaning required if plated in line with the nickel)
3. Cold water rinse

4. Electroactivate with **EPI's E-Pik 242**
5. Cold water rinse
6. Activate in a 5 to 20% Sulfuric Acid Solution
7. Cold water rinse
8. Plate with **E-Brite 50/50** (parts have to enter the solution "live")
9. Silver drag-out (D.I. Water)
10. Cold water rinse (tap water)
11. Cold water rinse (D.I. water)
12. A 10% Sulfuric Acid dip.
13. D.I. water rinse
14. **EPI's E-Tec 529** anti-tarnish solution or **EPI's B.P.A.** electrolytic chromate solution
15. Hot water rinse
16. Dry

Note: **E-Brite 50/50** contains silver in solution and therefore Section 313 of the Federal Emergency Planning and Community Right-To-Know Act, which pertains to reporting, must be adhered to.

Caution

There is the possibility of chronic health effects with **E-Brite 50/50**. The absorption of silver compounds into the circulation and the deposition of reduced silver in various tissues of the body may result in the production of generalized grayish pigmentation of the skin and mucous membranes (argyria). Generalized argyria develops after 2 to 25 years of exposure. Ingestion is harmful and may cause death.

Packaging

One (1) gallon, five (5) gallon pails and 55 gallon drums

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.**

02/08/18

E-Brite 50/50 Plating

