Product Bulletin
Product Name: Electroblack SG
Product Code: 2830001
Revision Date: January 9, 2024

Electroblack SG

Cyanide electroplating process is ideal for both decorative and functional antique and black finishes. Electroblack SG is dependable, rapid, consistent, and economical. It is designed to meet the most exacting requirements.

An Electroblack SG process is an alkaline cyanide based electroplating process developed to produce a uniform, rich black finish on all substrate materials which will accept an electroplate. The process produces an adherent coating in forty-five seconds to two minutes plating time. The deposit has good corrosion resistance, excellent shelf-life and good wear and abrasion characteristics. The deposit can be used as a final black decorative finish or can easily be relieved to give a variety of antique finishes. Since the deposit is only a “flash” plate, it will retain the character of the surface being plated. The bright work remains bright and satin finishes are held. The tone of the deposit is enhanced and deepened by subsequent lacquering.

The Electroblack SG process is applicable to barrel plating. The process is not an arsenic plating solution and offers many advantages when compared to the arsenic black plating baths, black nickel-plating baths, and the conventional sulfide oxidizing systems. The finish is uniform, adherent, easily controlled and is produced in a single step. The process does not remove metal but will plate an additional coating which results in appreciable savings when silver is being antiqued.

Features & Benefits

Cyanide base	Forgiving; Can plate multiple substrates
Flash plate	Thin and easily “relieved” for simulated antiqued finish

Typical Applications

Antique Finishes
Pewter, Flemish, Old English, Brown to Black on Brass, Bronze, Copper, Silver and Gold items like Lamp Parts, Costume Jewelry, Hardware, Specialty Products, etc.

Black Finishes
Uniform rich, resistant, decorative black finish that is easily obtained on bright Nickel, Brass, Bronze, Copper, Silver, and other metals.

Operating Conditions

Solution Preparation

The solution is prepared by dissolving one-pound of Electroblack SG per gallon of water. The plating tank is filled 2/3 with warm water (120°F). The required amount of Electroblack SG is added slowly with stirring (Note: Heat is generated in mixing.) Water is added to working level of solution.

DO NOT ADD CYANIDE WHEN STARTING A NEW SOLUTION!

Tanks	Steel or Stainless steel
Anodes	Plain steel, stainless steel or the tank may be made anodic
Temperature	150°F – 170°F Heating may be accomplished by plain steel, stainless steel coils OJ thermo panels; by plain steel electric immersion heaters or direct gas fired heating.
Power	2 - 6 volts D.C. 5 - 60 amps/ft^2

Control, Limits, and Maintenance

The solution is extremely stable and operating limits very wide.

Free Cyanide	3.0 - 5.5 oz/gallon
pH	11.0 - 13.0
Concentration	12.0 - 19.0 oz/gallon

As the bath ages, lower levels of Free Cyanide (1.0 - 4.0 oz/gal) are acceptable.

Maintenance of the bath will naturally depend on the workload and drag-out. Normal maintenance additions will run 0.5 - 2.0 oz per gallon of sodium cyanide and equivalent amount of Electroblack SG per week.

Imbalances in solution composition might result in certain variances in the plating characteristics of the bath. The conditions which might result, and their corrections are as follows:

1. Poor coverage in low current densities
    a. Low Electroblack SG concentration
    b. Low free cyanide
    c. pH too high
2. Slow plate
    a. High free cyanide
    b. Low Electroblack SG

3. Brownish to grayish cast in high current densities
    a. Low free cyanide
    b. Low Electroblack SG concentration

Analytical Procedure

Electroblack SG concentration can be analyzed by Atomic Absorption (AA).

1. Pipette a 10mL sample into a 100mL volumetric flask, fill to volume with DI water. Mix well. This is a **x10** dilution.
2. Pipette a 10mL sample of the **x10** into a 2nd 100mL volumetric flask, fill to volume with DI water. Mix well. This is a **x100** dilution.
3. Pipette a 10mL sample of the **x100** into a 3rd 100mL volumetric flask, fill to volume with DI water. Mix well. This is a **x1000** dilution.
4. Use a 5ppm and a 10ppm Nickel standard. Nickel (ppm) = AA reading x 1000

Calculation

$$Electroblack\ SG\ Concentration\ \left(\frac{oz}{Gal}\right) = \frac{ppmNickel}{393.75}$$

Sodium Cyanide

1. Pipette a 2 ml sample into a 250 ml Erlenmeyer flask.
2. Add 10 ml of 15 % Potassium Iodide solution.
3. Titrate with 0.1N Silver Nitrate to a permanent faint yellow turbid/opaque endpoint.

Calculation

$$Free\ Sodium\ Cyanide\ \left(\frac{oz}{Gal}\right) = mL\ 0.1N\ AgNO_3\ x\ 0.66$$

Sodium Carbonate

1. Pipette a 10 ml sample into a 250 ml beaker.
2. Add 50 ml DI water.
3. Heat solution to approximately 150 deg F.
4. Add 50 ml of 10% Barium Chloride.
5. Allow the precipitate to settle.
6. Filter through #42 Whatman filter paper.
7. Wash filter paper well and return the paper to the original beaker.
8. Add 50 ml of DI water and 10 drops of Methyl Orange indicator to the beaker.
9. Titrate with 0.5 N Hydrochloric Acid while stirring to a pink end point.

Calculation

$$Sodium\ Carbonate\ \left(\frac{oz}{Gal}\right) = mL\ 0.5N\ HCl\ x\ 0.352$$

Hull Cell Panel Testing

Hull Cell plating tests should be done on clean, bright brass panels. The Electroblack SG should be run at 155°F -165°F, 2 amperes for 2 minutes with no agitation. Use a stainless steel or steel anode.

1. A normal panel will have a uniform black deposit from 2-80 amps/ft².
2. A panel that has a grayer tone in the high current density area, which may extend to 16 amps/ft² and is harder to relieve than the black deposit in the mid-low current density area may indicate that the free Sodium Cyanide is low.
3. A panel that has a brownish to purple-blue-black deposit in the low current density area, which can extend to the 40 amps/ft² may indicate low Electroblack SG salt concentration. Similar variations can be seen when the operating temperature is low.
4. A panel with a brown deposit in the high current density area, above 60 amps/ft², indicates high free Sodium Cyanide. The bath becomes less efficient, and deposition is slower in this state.
5. A panel that has no plate or plate that develops only with extended plating time (4-6 mins) can mean several difficulties.
    a. Free Sodium Cyanide is either too high or too low
    b. Sodium Carbonate is above 13 oz/gal
    c. Electroblack SG is very low
    d. Zinc, Copper, or Chrome contamination
    e. Hydrolysis of a bath component –
    This is caused by running the Electroblack SG at temperatures > 170°F

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Hull Cell Variations

1	**Normal Panel**	 80 amps/ft² … 2 amps/ft²
2	**Low Free Cyanide**	 40 amps/ft² … 16 amps/ft² … 2 amps/ft²
3	**Low Electroblack SG Concentration**	 40 amps/ft² … 16 amps/ft²
4	**High free Cyanide**	 60 amps/ft²
5	**Very high or very low free Cyanide** **High Carbonates, Contamination** **Very low Electroblack SG** **Hydrolysis of one of the bath components**	

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Caution

ELECTROBLACK SG IS A CYANIDE CONTAINING PRODUCT. DO NOT ALLOW IT TO COME INTO CONTACT WITH ACIDS AS DEADLY HYDROGEN CYANIDE WOULD BE GENERATED.

Avoid skin, eye and oral contact. Wear PPE: protective clothing, gloves, impervious shoes or boot, and goggles when handling the product. Wash thoroughly after handling. If skin or eye contact should occur flush exposed areas immediately with clean, cold water. Contact a doctor immediately in case of injury.

Read and thoroughly understand the SDS for Electroblack SG prior to handling and or using the it.

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