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A2LA Accredited ISO/IEC 17025:2005 Certificate # 2558.01

802 ZINC-IRON ALLOY

Accu-Labs 802 is an ALKALINE NON-CYANIDE zinc/iron alloy electroplating process. When properly post-treated the zinc/iron alloy deposit provides up to 600 hours of corrosion protection to red rust in a neutral salt spray per ASTM B 117.

Accu-Labs 802 produces bright, burn-free deposits even at high current densities. The solution operates successfully over a wide range of concentrations and temperatures: exhibits excellent throwing and covering power and uniformity of plate. It produces ductile and blister free deposits which chromate easily. The **Accu-Labs 802** process offers ease of control, low operating costs and simplified waste treatment. The **Accu-Labs 802** chemistry can be used with either a traditional anode system or with a zinc generator assisted system.

ADDITIVES FOR MAKE-UP AND REPLENISHMENT

Accu-Labs 802 process is based upon only two additives to produce bright and uniform deposits. One provides brightness and the second furnishes iron to the deposit.

Accu-Labs 802-BR is the brightener additive for make-up and replenishment. Make-up concentration is 2.0 to 4.0% by volume of the plating bath.

Accu-Labs 802-BR brightener is an easy to use single additive system. The Accu-Labs 802-BR brightener product contains a balanced mixture of high, mid and low current density brightening agents as well as the conditioner and purifier components needed to maintain the zinc plating bath.

Accu-Labs 802-FE is the iron furnishing additive for make-up and replenishment. Make-up concentration is 0.3-0.9% by volume of the plating bath.

SOLUTION MAKE-UP: Solution make-up may be carried out in the same manner as that for any alkaline cyanide-free zinc bath. It is recommended, however, that **Accu-Labs 802-BR** be added to the cold solution prior to the addition of alloying component, **Accu-Labs 802-FE**. Each component should be added while stirring the bath to ensure thorough mixing of the additive.

SOLUTION COMPOSITION AND OPERATING CONDITIONS

<u>RACK OR BARREL</u>	<u>OPTIMUM</u>	<u>RANGE</u>
Zinc, metal	1.25 oz/gal	0.75 – 2.0 oz/gal
Caustic Soda	12.0 oz/gal	10.5 – 16.0 oz/gal
Accu-Labs 802-BR	3.0% by vol.	2.0 – 4.0% by vol.
Accu-Labs 802-FE	0.40% by vol.	0.3 – 0.9% by vol.
Iron	40 ppm	40 – 90 ppm
Temperature	65° - 105°F	
Cathode Current Density	20 – 50 ASF	
Anode Current Density	30 ASF	
Anode / Cathode Ratio	Zinc: 1:1 Steel: 2:1	
Filtration	Continuous, recommended	

MAINTENANCE

Caustic soda and zinc concentrations are determined by titration. See the ‘Analytical Procedure’ section for methods. Caustic soda periodically requires replenishment due primarily to drag-out. The zinc concentration is maintained by the external zinc generating tank or adjustment of zinc anodes in the plating tank.

Iron is depleted from the solution by electrolysis. The iron concentration should be analyzed by atomic absorption spectroscopy. To raise the iron concentration by 10 mg/L, add 0.1% by volume of **802-FE**. A 35 mg/L to 50 mg/L iron content in the bath will furnish about 0.25% to 0.35% iron in the electroplated alloy coating.

Accu-Labs 802-BR is depleted by electrolysis and by drag-out. Plating test cell may be used to determine the amount of brightener needed to maintain a desired level of brightness. A suggested initial addition schedule is one gallon of **802-BR** per 14,000 – 18,000 ampere hours.

POST-PLATING TREATMENT

Freshly plated parts may be processed in an appropriate conversion coating solution to obtain blue-bright, iridescent and black finish. Baked parts or parts that are not processed immediately after plating may first be activated either in blue-bright conversion coating solution before treating in either iridescent or black conversion coating bath.

GENERAL RECOMMENDATIONS

TANKS: Mild steel tanks may be used, however, for optimum plating current control suitable plastic or plastic lined tanks are recommended.

ANODES: Use of a mixture of steel plate and spiral steel anode baskets are desirable in the alloy plating tank. For plating tanks above 500 gallons zinc can be controlled and replenished by galvanic dissolution in a tank or weir that is external to the plating tank. High purity zinc anodes, 99.99% zinc, are dissolved in steel baskets in about 20% volume of the total plating solution. This concentrated zinc solution is filtered and pumped back into the plating tank at a rate to maintain the desired zinc concentration.

VENTILATION: Due to the inherent inefficiency of the alkaline system, tank ventilation is highly recommended to avoid exposure to caustic soda mist.

COOLING: To maintain the temperature of the plating solution within the range, cooling or heating may be necessary. Titanium or steel are suitable material for heating elements or cooling coils.

ANALYTICAL PROCEDURE:

Zinc Metal:

1. Pipet 5.0 ml of plating solution into an Erlenmeyer flask and dilute with 100 ml of distilled water.
2. Add 50 mls of D.I. water.
3. Add 50 mls of Acetate Buffer Solution.
4. Add 4 – 8 drops of Xylenol Orange Indicator Solution.
5. Titrate immediately with 0.0575 M E.D.T.A to red-orange endpoint. (The first sharp color change)

Calculation:

$$\text{ml of EDTA} \times 0.10 = \text{oz/gal of zinc metal}$$

Caustic Soda:

1. Pipet 5.0 ml of plating solution into an Erlenmeyer flask.
2. Add 2-3 drops of Azoviolet indicator.
3. Titrate with 1.0 N Hydrochloric Acid to an orange-yellow end point.

Calculation:

ml of 1.0 N HCl x 1.07 = oz/gal of caustic soda.

Iron:

Iron content should be determined by Atomic Absorption Spectroscopy.

SAFETY AND HANDLING PRECAUTIONS:

Always wear proper personal protective gear including eye protection when handling this product and its associated chemicals. Read MSDS prior to using these products.

DISCLAIMER

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