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COLZINC ACF LEV-L-R

Alkaline Non-Cyanide Zinc Plating Process
TECHNICAL DATA
2-01-02

COLZINC ACF LEV-L-R
PROCESS FOR ALKALINE CYANIDE-FREE ZINC PLATING

COLZINC ACF LEV-L-R	is specially formulated for continuous process immersion plating such as high speed conveyor installations.
COLZINC ACF LEV-L-R	produces a level, semi-bright deposit that is ideal for post plate painting, e-coating, powder coating or zinc and iron phosphating.
COLZINC ACF LEV-L-R	is capable of plating at average current densities of 75 to 100+ ASF.
COLZINC ACF LEV-L-R	produces extremely ductile deposits, allowing for greater deposit thickness.
COLZINC ACF LEV-L-R	uses an economical electrolyte containing only zinc and caustic soda.
COLZINC ACF LEV-L-R	has excellent low current density covering and throwing power.
COLZINC ACF LEV-L-R	can plate at temperatures as high as 125°F.

OPERATING PARAMETERS

	Range	Optimum
Zinc Metal:	2.0 - 3.0 oz/gal *(15 - 22.5 g/l)*	2.5 oz/gal *(18.75 g/l)*
Caustic Soda:	16 - 20 oz/gal (*120 - 150 g/l)*	19 oz/gal *(142.5 g/l)*
Operating Temperature:	75º - 125º F (*25º - 50º C)*	90º F *(32º C)*

SOLUTION MAKE-UP

A new bath may be prepared either by dissolving zinc anodes in caustic soda or by using zinc oxide and caustic soda. In either case, the highest purity grade materials available should be used to eliminate metal impurities in initial makeup. Baths are prepared as follows:

	100 Liters of Bath	100 Gallons of Bath
Zinc Oxide:	2.3 kg	19.5 pounds
Caustic Soda:	14.2 kg	120 pounds
COLZINC ACF LEV-L-R	2.0 liter	2 gallons
COLZINC ACF PURIFIER:	100 ml	13 fl/oz

1. Slurry zinc oxide by slowly adding to minimal amount of water in plating tank, or preferably, in a separate make-up tank.
2. Slowly add caustic soda and water to approximately one-third the final volume.
3. Stir continuously until all zinc oxide is dissolved.
4. Dilute to near final volume with water and stir.
5. Add COLZINC ACF LEV-L-R additives, dilute to final volume with water and stir.

MAINTENANCE ADDITIONS

COLZINC ACF LEV-L-R	1 gallon per 12,000 to 20,000 ampere-hours
COLZINC ACF PURIFIER	1 gallon per 10 to 30 gallons of COLZINC ACF LEV-L-R or added as needed.

COLZINC ACF LEV-L-R ADDITION AGENTS

COLZINC ACF LEV-L-R is a blend of state-of-the-art cationic polyamines that produce a semi-bright, ductile deposit over a wide plating range.

COLZINC ACF PURIFIER (contains thiourea) is used to eliminate low current density dullness caused by trace metallics or impurities in the make-up water.

MAINTAINING THE ZINC LEVEL

Excessively high zinc metal levels are caused by an over abundance of caustic soda in the bath. A concentration of 14 oz/gal caustic soda can dissolve twice as much zinc over a weekend shut-down period as a concentration of 12 oz/gal. Reducing caustic soda additions near the end of the week will minimize zinc metal build-up on standing. A caustic soda level of under 10 oz/gal, for example, will generally eliminate zinc metal build-up entirely.

Each individual zinc installation is unique in its anode area and drag out characteristics. However, analysis during the first week of operation will quickly establish an optimum level for zinc anode area and caustic soda concentration, which will remain constant thereafter.

The use of a zinc generator is highly recommended for all alkaline cyanide free zinc plating installations. Information on the design and construction of a zinc plating generator can be obtained by contacting our Technical Department.

OPERATING TEMPERATURE

The preferred temperature range for COLZINC ACF LEV-L-R is 90° F *(30º C)* with an overall operating range of 75° - 125° F *(25º - 50º C)*. Optimum plating speed, covering power, throwing power, bath conductivity and leveling can be achieved in this preferred range. High temperatures cause excessive LEV-L-R consumption, loss of leveling in the low current densities and poor covering and throwing power. Low temperatures cause a loss of plating efficiency.

PRE-PLATE TREATMENT

No revision of the pretreatment procedures for zinc plating are required for the COLZINC ACF LEV-L-R process; a standard cleaning and pickling cycle is recommended, as follows:

1. Hot alkaline soak clean
2. Hot alkaline electro-clean (anodic or periodic reverse)
3. Rinses
4. 30% to 50% muriatic acid pickle with 1% to 2% COLUMBIA PICKLE PAL
5. Rinses
6. Zinc Plate

However, all alkaline non-cyanide zinc plating processes require that the cleaning and pickling solutions be maintained at their optimum operating conditions. Unlike conventional cyanide and low cyanide electrolytes, which have sufficient cleaning and complexing capabilities to compensate for poor pre-plate treatment, alkaline non-cyanide baths have practically no cleaning ability. Therefore, parts must be clean and free from oil films and soils prior to plating.

POST TREATMENT

COLZINC ACF LEV-L-R deposits can be chromated, painted, e-coated, powder coated or zinc and iron phosphated. Counter flow rinses using 1 to 2 gallons per minute of fresh water is highly recommended prior to applying these post plate coatings.

HANDLING & STORAGE

Use normal precautions when handling COLZINC ACF LEV-L-R addition agents - wear protective clothing, rubber gloves, and adequate eye protection. As with most chemicals, use in well ventilated areas.

COLZINC ACF LEV-L-R plating baths are of course highly alkaline and all the customary precautions associated with the use of caustic soda solutions should be observed.

COLZINC ACF LEV-L-R addition agents are stable on standing, with a shelf life in excess of 2 years. COLZINC ACF PURIFER has a shelf life of 6 months.

FREEZABILITY: As with most chemical products, it is preferable that freezing be avoided. However if freezing should occur during transportation or storage, directions for handling the products covered in this technical data sheet are as follows:

If COLZINC ACF LEV-L-R freezes, simply allow the container to completely thaw and bring to room temperature of 70-75F/ 21-24C. Thoroughly mix to bring back to original condition.

If COLZINC ACF PURIFER freezes, simply allow the container to completely thaw and bring to room temperature of 70-75F/ 21-24C. Thoroughly mix to bring back to original condition.

NON-WARRANTY

The data contained in this bulletin is believed to by Columbia Chemical Corp. to be accurate, true and complete. Since however, final methods of use of these products are in the hands of customer and beyond our control, we cannot guarantee that the customer will obtain the results described in this bulletin, nor can we assume any responsibility for the use of this product by the customer in any process which may infringe the patents of third parties.

ANALYSIS OF COLZINC ACF LEV-L-R BATHS

Analysis for Zinc Metal

1. Pipette 5 ml bath sample into 250 ml Erlenmeyer flask and add 50 ml distilled water;
2. Add 20 ml ammonium hydroxide buffer solution
3. Add approximately 0.2 gm Eriochrome Black T Indicator Mix; add 25 ml distilled water;
4. Add 20 ml 8% formaldehyde solution
5. Titrate immediately with Standard EDTA Solution 0.0575 M to a blue endpoint.

FACTOR: (ml Standard EDTA Solution 0.0575 M) · 0.10 = oz/gal zinc metal

Analysis for Caustic Soda

1. Pipette 5 ml bath sample into a 250 ml volumetric flask;
2. Add 10 ml of 10% Sodium Cyanide Solution and 1 to 2 ml Caustic Blue Indicator;
3. Titrate with standard Sulfuric Acid Solution to a color change of yellow-green to blue.

FACTOR: (ml Standard 0.94 N Sulfuric Acid Solution = oz/gal Caustic Soda)

PREPARATION OF ANALYTICAL REAGENTS

EDTA 0.0575 M - dissolve 21.6 gm C.P. Di-sodium EDTA salt distilled water; dilute to exactly one liter.

Formaldehyde 8% Solution - dilute 200 ml 40% C.P. Formaldehyde to one liter with distilled water.

Eriochrome Black "T" Indicator Mix - grind together 1 part indicator and 100 parts sugar.

Sulfuric Acid 0.94 N - dilute 26.50 ml C.P. Concentrated Sulfuric Acid to exactly one liter with distilled water.