Luster-On Products

Technical Data Sheet

CNX-55

NON-CYANIDE ALKALINE ZINC PLATING PROCESS

I. GENERAL DESCRIPTION

The Luster-On CNX-55 Zinc Plating Process is an alkaline cyanide-free process which produces bright lustrous deposits over a wide current density range. The process is suitable for both rack and barrel plating operations. Use of this system in place of conventional cyanide plating will eliminate the need for cyanide destruction.

Use of the Luster-On CNX-55 process 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 CNX-55 process offers ease of control; low operating costs and simplified waste treatment. The CNX-55 chemistry can be used with either a traditional anode system or with a zinc generator assisted system.

II. CHEMICAL COMPOSITION

	Rack Operation	Barrel Operation
Zinc Metal	0.5 - 1.1 oz./gal	1.0 - 1.8 oz./gal
Caustic Soda (NaOH)	10.5 - 14 oz./gal	10-18 oz./gal

III. SOLUTION MAKE-UP

READ MATERIAL SAFETY DATA SHEETS ON BRIGHTENER CNX-55 AND LIQUID CAUSTIC SODA (50% SODIUM HYDROXIDE) BEFORE MAKING UP SOLUTION.

New Luster-On CNX-55 Solutions should be made up, if time permits, by dissolving zinc anodes in a Caustic Soda solution.

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III. SOLUTION MAKE-UP (continued)

Suggested Make-up**:**

	Rack Operation	Barrel Operation
Zinc Metal	0.75 oz./gal	1.5 oz./gal.
Caustic Soda	11.0 oz./gal	15.0 oz./gal
Luster-On CNX-55	1.0% by volume	1.0% by volume
Luster-On CNX-56	0.25% by volume	0.25% by volume

Check that the plating tank is clean and that any residues of cyanide from old solutions have been removed. Fill a steel tank with approximately 20% of the final plating solution volume with cold tap water. With constant stirring, slowly add the required Caustic Soda to the tank. **Use caution due to extreme heat that will be generated.**

After the Caustic Soda has dissolved, but before the solution has cooled, fill steel anode baskets with new zinc ball anodes to provide the proper zinc metal concentration. Hang the anode baskets in the solution and allow the zinc balls to dissolve. Dissolution of zinc will produce gassing. It is suggested that the tank be covered or exhausted to avoid fumes in the plant. After the zinc concentration reaches the proper level, dilute solution to final volume.

Add 0.75% Luster-On CNX-55 and 0.25% Luster-On CNX-56, and mix well. Analyze solution and adjust to recommended concentrations for rack or barrel plating. Generally, there is only a minimal effect on plating performance during initial plating even though the CNX-55 concentration is lower than the final recommended amount, therefore, plating can begin immediately. **After plating for 10ampere hours per gallon of solution, add an additional 0.25% Luster-On CNX-55.**

An addition of Luster-On CNX Purifier at the rate of 0.025 - 0.05% by volume is frequently required on initial startup to assure maximum low current density brightness.

A new solution can also be made up using zinc oxide. A zinc generator system can also be used with the CNX-55 system to more tightly control metal concentration. Contact the Luster-On Customer Service Laboratory for recommendations and precautions to be used when employing either method.

IV. SOLUTION COMPONENTS

A. Zinc Metal

The concentration of zinc metal maintained in the plating solution will determine the maximum current density that can be used in production without polarization. It will also influence the cathode efficiency, and the throwing and covering power. The optimum concentration of zinc metal for a given installation will depend on the following factors: part configuration, throwing and covering power required and plating speed.

The use of a zinc generator assisted system will greatly enhance control of zinc metal concentrations. The Luster-On Customer Service Laboratory should be contacted for detailed information on the advantages of the zinc generator assisted system.

Low zinc metal concentrations decrease cathode efficiency and covering power but improve the throwing power. A low zinc metal concentration is suggested for situations where the most uniform deposit thickness is desired, increased throwing power is required and where a slightly lower cathode efficiency is not objectionable.

High zinc metal concentrations have the opposite effect on performance, and are recommended for installations where the highest possible operating cathode efficiency and plating speed are required and a less uniform deposit thickness is not significantly detrimental.

B. Caustic Soda

Caustic Soda is necessary for conductivity and to promote anode dissolution.

Low caustic soda concentrations decrease both bath conductivity and the chemical dissolving of zinc anodes in the operating solution. A low concentration causes polarized anodes, higher than normal voltages necessary to draw the correct amperage, a tendency for the zinc metal to decrease during operation and poor throwing capabilities.

High caustic soda concentrations decrease overall deposit brightness and can cause an increase in the concentration of zinc metal in the solution. As a rule, the caustic soda should be maintained at a concentration just high enough to keep the zinc metal within the range needed to produce the proper plating quality.

IV. SOLUTION COMPONENTS (continued)

C. Brighteners

CNX-55

The recommended addition of Luster-On CNX-55 for a newly made up bath is 1% by volume. However, brightener concentration is often directly related to actual metal concentration in the plating solution. For conversion of an existing bath to the CNX-55 process the optimum addition is best determined by submission of a solution sample to the Luster-On Customer Service Laboratory for recommendations. Low brightener concentrations will reduce the overall deposit brightness and brilliance. It will also limit the maximum current density at which plating can be accomplished without frosty and/or grainy deposits occurring.

Slightly high brightener concentrations have no effect on solution performance, other than to increase the operating cost. A larger excess can produce a dull band in low current density areas, streaky deposits and run the risk of a more stressed deposit. This can be eliminated by discontinuing normal brightener additions until the excess has been plated out of the bath.

CNX LCD

Luster-On CNX LCD is necessary to maintain deposit brightness in low current density areas at higher metal concentrations. Recommended addition, when deemed necessary, is 0.05% by volume with additions during conversions best determined by our laboratory. CNX LCD should be diluted 3-4 fold with water before addition to the plating solution.

Low concentrations will reduce brightness of extremely low current density areas. A large excess of Luster-On CNX LCD will cause a dull band in the mid-range current density areas, and may lead to a stressed deposit.

CNX-56

Luster-On CNX-56 is a water conditioning agent added to new solutions as well as to many conversions to compensate for dissolved mineral material in the make-up water. Local water conditions will determine whether or not CNX-56 is required on a replenishment basis. The Luster-On Customer Service Laboratory should be consulted for CNX-56 addition recommendations.

V. PLATING CONDITIONS

A. General

	Rack Operation	Barrel Operation
Temperature	68°- 95° F.	68°-95° F.
Cathode Current Density	3-60 amps/ft.²	3-15 amps/ft.²
Anode Current Density	<30 amps/ft.²	<30 amps/ft.²
Voltage	3-6 Volts	9-15 Volts

B. Anodes

Special high-grade zinc ball anodes (99.99% zinc) in steel spiral baskets are recommended for in-tank soluble anode area. Baskets should be filled frequently with zinc balls to minimize the presence of insoluble anode area in the bath. Steel strips should **NOT** be used in combination with filled anode baskets as a method of controlling zinc metal concentration.

Submerged steel anode rails, insulated from the tank walls, are suggested, as they will reduce maintenance time and provide better contact of the anodes to the buss bar.

The Luster-On Customer Service Laboratory should be consulted for recommendations on specially designed anode baskets and insoluble anodes for zinc generator assisted systems.

C. Temperature

The recommended temperature range for operating this solution is 68°-95° F. Higher temperatures will increase brightener consumption and carbonate build-up. Temperatures below 65° F can cause brittle deposits.

D. Current Density

The recommended cathode current density range for this solution is 3-60 amps/ft.² and less than 30 amps/ft.²for anodic current density.

E. Filtration

Filtration, as well as solution movement, of CNX-55 rack operations will serve to enhance deposit quality by reducing roughness and increasing overall brightness, and eliminating iron contamination.

F. Tanks

Luster-On CNX-55, Non-Cyanide Plating Process may be used with standard mild steel plating tanks, however, for optimum current control, a lined tank is recommended.

G. Heating/Cooling Equipment

Heating and/or cooling equipment may be constructed of mild steel and is recommended if conditions call for temperatures outside recommended range.

VI. REPLENISHMENT

Additions of CNX-55 should be based on ampere-hours and are somewhat dependent on plating conditions. Experience will determine the exact amount needed. A suggested initial addition schedule is 1 gallon of CNX-55 per 12,000-ampere hours. Visual inspections of the work or Hull cell plating tests are the most effective means of determining brightener additions.

VII. PACKAGE

5-gallon non-returnable containers and 55-gallon non-returnable drums.

VIII. STORAGE

Keep container closed when not in use. Do not expose to extremely low temperatures for prolonged periods of time.

IX. DISPOSAL

Treatment and disposal must be in accordance with Federal, State, and Local Regulations. Usually neutralization of the solution and precipitation of the zinc metal is all that is required for waste treatment of Luster-On CNX-55 Alkaline Non-Cyanide Zinc Plating Process solutions and rinses.

X. SAFETY AND HANDLING PRECAUTIONS

CAUTION! The Luster-On CNX-55 additives do not require any special handling procedures; however, it is recommended that protective clothing, face shield, goggles, etc. be worn. In case of contact with the eyes, flush immediately with cold water and obtain medical assistance. Avoid prolonged contact with the skin.

The Luster-On CNX-55 plating solution is highly alkaline. The following precautions should be observed:

X. SAFETY AND HANDLING PRECAUTIONS (Continued)

DANGER! Causes burns of eyes and skin.

Harmful if swallowed or inhaled.

Avoid contact with eyes, skin and clothing.
Wear rubber gloves, safety goggles or face shield and suitable protective clothing when handling.

Wash thoroughly after handling.
Avoid breathing mist.
Use with adequate ventilation.
Do not take internally.

FIRST AID IN CASE OF CONTACT: Immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing and shoes before reuse.

FOR EYES: Get medical attention.

IF SWALLOWED: Wash out mouth thoroughly with water. Give several glasses of water or milk to drink. Follow with diluted vinegar, lemon juice, or other citrus fruit juice. Get medical attention.

KEEP OUT OF REACH OF CHILDREN

FOR INDUSTRIAL USE ONLY

This product is sold for industrial use only. Our suggestions for its use are based upon reliable tests and procedures, which from our experience we believe to be reliable. Since the use is beyond our control, neither we nor our distributors can assume responsibility, either expressed or implied, for the results and/or for violation of any patents or any claims resulting from such use.

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