

ACCU-LABS INC.

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A2LA Accredited ISO/IEC 17025:2005 Certificate # 2558.01

940

ALKALINE NON-CYANIDE ZINC

ACCU-LABS 940 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.

ACCU-LABS 940 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 940** process offers ease of control, low operating costs and simplified waste treatment. The **ACCU-LABS 940** chemistry can be used with either a traditional anode system or with a zinc generator assisted system.

OPERATING RANGE

	RACK OPERATION	BARREL OPERATION
Zinc Metal:	0.5 - 1.1 oz/gal (3.75-8.25 g/l)	1.0 - 1.8 oz/gal (7.5-13.5 g/l)
Caustic Soda (NaOH):	10.5 - 14 oz/gal (78.75-105 g/l)	10 - 18 oz/gal (75-135 g/l)

SOLUTION MAKE-UP:

New **ACCU-LABS 940** solutions should be made up, if time permits, by dissolving zinc anodes in a Caustic Soda solution.

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
ACCU-LABS 940	1.0% by volume	1.0% by volume
ACCU-LABS 945	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 the 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% ACCU-**LABS** 940 brightener and 0.25% ACCU-**LABS** 945 water conditioner 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 ACCU-**LABS** 940 concentration is lower than the final recommended amount; therefore, plating can begin immediately. After plating for 10 ampere hours per gallon of solution, add an additional 0.25% Accu-Labs 940.

An addition of ACCU-**LABS** 944 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 ACCU-**LABS** 940 system to more tightly control metal concentration. Contact your ACCU-**LABS** sales representative for recommendations and precautions to be used when employing either method.

SOLUTION COMPONENTS

Zinc Metal

Use only high purity grades of zinc (low lead or no lead) for the plating bath makeup and maintenance. Use plating grade zinc oxide and plating grade SHG 99.99% pure zinc anodes.

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.

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 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.

Caustic Soda

Use only high purity grades of sodium hydroxide (caustic soda) for plating bath makeup and maintenance. Use rayon or mercury cell grade caustic soda to minimize the amount of heavy metal impurities (lead and iron). Liquid technical grade caustic soda is not recommended since it may introduce high levels of metallic impurities to the bath.

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.

ACCU-LABS 940 BRIGHTENER

The recommended addition of ACCU-LABS 940 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 ACCU-LABS 940 process the optimum addition is best determined by submission of a solution sample to your ACCU-LABS sales representative 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.

ACCU-LABS 946 LCD BOOSTER

ACCU-LABS 946 is necessary to maintain deposit brightness in low current density areas to higher metal concentrations. Recommended addition, when deemed necessary, is 0.05% by volume with additions during conversions best determined by our laboratory. Accu-Labs 946 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. An excess of ACCU-LABS 946 will cause a dull band in the mid-range current density areas, and may lead to a stressed deposit.

ACCU-LABS 945 WATER CONDITIONER

ACCU-LABS 945 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 945 is required on a replenishment basis. Your ACCU-LABS sales representative should be consulted for 945 addition recommendations.

PLATING CONDITIONS

	Rack Operation	Barrel Operation
Temperature:	68 - 95°F	68 - 95°F
Cathode Current Density:	3-60 amps/sq ft	3-15 amps/sq ft
Anode Current Density (max):	Max 30 amps/sq ft	Max 30 amps/sq ft
Voltage:	3-6 volts	9-15 volts

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.

CURRENT DENSITY

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

FILTRATION

Filtration, as well as solution movement, of ACCU-LABS 940 rack operations will serve to enhance deposit quality by reducing roughness and increasing overall brightness, and elimination iron contamination. Filtration is required for all rack operations to eliminate roughness and iron impurities.

TANKS

ACCU-LABS 940, Non-cyanide plating process may be used with standard mild steel plating tanks, however, for optimum current control, a lined tank is recommended.

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.

REPLENISHMENT

Additions of ACCU-LABS 940 should be based on ampere hours and are somewhat dependent of plating conditions. Experience will determine the exact amount needed. A suggested initial addition schedule is 1 gallon of Accu-Labs 940 per 12,000 ampere hours. Visual inspection of the work or Hull cell plating tests are the most effective means of determining brightener additions.

PACKAGING

Accu-Labs 940 is packaged in 5-gallon non-returnable pails and 55-gallon non-returnable drums.

STORAGE

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

SAFETY AND HANDLING PRECAUTIONS

READ MATERIAL SAFETY DATA SHEETS ON ALL ACCU-LABS 940 PROCESS ADDITIVES AND LIQUID CAUSTIC SODA (50% SODIUM HYDROXIDE) BEFORE MAKING UP THE ACCU-LABS 940 BATH. ALWAYS WEAR EYE PROTECTION AND PERSONAL PROTECTIVE GEAR WHEN WORKING WITH OR HANDLING THIS PRODUCT.

DISCLAIMER

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.