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TROUBLE SHOOTING GUIDE

COLSID K-250, EXTREME 100, EXTREME 110

01-02-11

PROBLEM

HCD burning

CAUSE

Low Carrier/Wetter

Low zinc metal

Low Boric Acid

High pH

Low operating bath temperature

Organic contamination

SOLUTION

Add 0.5-1% Carrier/Wetter and maintain at 3-5% for barrel and 4-5% rack plating

Raise zinc metal to 4.5 opg (34 g/l)

Raise the Boric Acid to 4.5 opg (34 g/l)

Lower the pH with Hydrochloric Acid to 5.0-5.9

Raise the bath temperature to 85° F (28° C)

Treat the bath with 1 lb. of potassium permanganate per 1,000 gal. (0.12 kg./1,000 liters)

Treat bath with 1 lb. of activated carbon per 1,000 gal. (0.12 kg./1,000 liters) and filter well. (This treatment should be performed during a shut down period to avoid roughness on the work)

Pack the filter with carbon and continuously filter

High to mid current density pitting/spangles

Brightener overload

Stop or reduce Brightener additions

Add hydrochloric acid to destroy excess Brightener (lower 0.2-0.8 pH units)

Add 1 quart hydrogen peroxide per 1,000 gal. (0.25 liters per 1,000 liters) to oxidize excess Brightener

Treat the bath with 1 lb. of potassium permanganate per 1,000 gal. (0.12 kg/1,000 liters) to oxidize excess Brightener

Pack the filter with carbon and continuously filter

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>
Low current density dullness	Low total chloride	Raise total chloride to 16-18 opg (120-135 g/l)
	High pH (above 6.2)	Lower pH with hydrochloric acid to 5.0-5.9
	Low Carrier/Wetter	Add 0.5-1.0% Carrier/Wetter
	High operating bath temperature	Lower temperature to 85° F (28° C)
Mid current density band	Carrier/Wetter Imbalance	Add 0.5-1% Carrier/Wetter
Overall dullness	Low Brightener	Add Brightener
	Low operating bath temperature	Raise bath temperature to 85° F (28° C)
	High pH (above 6.2)	Lower pH with hydrochloric acid to 5.0-5.9
	Organic contamination	Treat bath with 1 lb. potassium permanganate per 1,000 gal. (0.12 kg/1,000 liters) and filter well Treat with 1 lb. activated carbon per 1,000 gal. (0.12 kg/1,000 liters) and filter well (This treatment should be performed during a shut-down period to avoid roughness on work) Pack filter with carbon and continuously filter
Poor low current density coverage	Low total chloride	Raise total chloride level with potassium chloride to 18 opg (135 g/l)
	High zinc metal Over 5.5 opg (41 g/l)	Lower zinc metal by diluting plating bath
	High operating bath temperature	Lower bath temperature to 85° F (28° C)
Blisters/grey deposit	Chromium contamination (over 5 ppm)	Treat with 1.5 oz of sodium bisulfate per 1,000 gal. (10 g/1,000 liters) will treat 5 ppm of chrome.

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>
Blistering/random	Poor cleaning	Dump, dilute, charge-up or skim soak and electrocleaners
	Low temperature on soak and electrocleaner	Increase temperature
	Low current on electrocleaner	Raise current
	Smut formation during pickling	Use Columbia Pickle Pal at 1% by volume
	Spent or contaminated pickle	Dump and recharge pickle
White stain or cloud after chromate	Low bath cloud point	Treat bath with 1 lb. potassium permanganate per 1,000 gal. (0.12 kg/1,000liters) and filter well
		Treat bath with 1 lb. activated carbon per 1,000 gal (0.12 kg/1,000 liters) and filter well. This treatment should be performed during a shut-down period to avoid roughness on work.
		Pack filter with carbon and continuously filter
	Poor rinsing	Increase rinse water flow rate
	Thick foam blanket on plating bath	Use Columbia ANTI-FOAM Eliminate source causing the foam (drag-in of heavily wetted cleaners, drag-in foaming pickle inhibitor, other organic contaminants)
Poor chromate adhesion	Contaminated or spent chromate	Change chromate
	Brightener overload	Stop or reduce Brightener additions
		Add hydrochloric acid to destroy excess Brightener (lower 0.2-0.8 pH units)
		Add 1 quart hydrogen peroxide per 1,000 gal. (0.25 liters/1,000 liters) to oxidize excess Brightener
		Treat bath with 1 lb. potassium permanganate per 1,000 gal (0.12 kg/1,000 liters) to oxidize excess Brightener Carbon pack filters and continuously filter bath

PROBLEMCAUSESOLUTION

Black deposit in HCD area
dark hole pattern of barrel
after chromate

Iron contamination of
50-100 ppm or greater

Treat bath with 1-2 quarts of hydrogen peroxide per 1,000 gal. (0.25-0.5 liters/1,000 liters) and filter well. Multiple treatments may be necessary.

Treat bath with 1 lb. of potassium permanganate per 1,000 gal. and filter well (multiple treatments may be necessary)

Black/grey deposit in LCD
after chromate

Metallic contamination:
copper - over 5 ppm
lead – over 5 ppm
cadmium – over 10 ppm

Treat the bath with 1 lb. of zinc dust per 1,000 gal. (0.12 kg/1,000 liters) to remove 10 ppm of metallic contaminant. The zinc dust should be evenly spread over the entire surface of the plating bath and filtered if possible. This treatment should be performed during a shut-down period to avoid roughness on the work.

GLOSSARY OF TERMS

BRIGHTENER OVERLOAD	Concentration several times the recommended level.
BLISTERING	Electrodeposit lifts off the surface of the substrate in the form of bubbles.
CARBON	Activated carbon powder.
CAUSTIC SODA	Sodium Hydroxide
CHROMATE	A solution of hexavalent or trivalent chromium used to add additional corrosion protection to the surface of the plated part.
CLOUD POINT	The plating solution for Chloride zinc plating baths is an emulsion rather than a true solution. The nonionic emulsifying agents used under normal conditions form microemulsions of the organic chemicals in the plating bath. As the temperature of the plating bath increases, the microemulsion reverts to a simple emulsion and the plating bath becomes cloudy and no longer transparent. The temperature at which this occurs is called the cloud point of the bath.
DELAMINATION OF PLATE	The electrodeposit separates in layers.
ELECTROCLEANER	Alkaline cleaner used with anodic current on parts for surface agitation. Used at 170° - 190° F. (77° - 88° C.) after the soak cleaner.
HCD	High current density. The highest current density on a part is generally on the edge of the part or the area of the part closest to the anode. In a rack plating bath it is at the bottom edge and ends of the rack.
HCD BURNING	Course, dark deposit in the high current density area.
HCD BAND	Dull electrodeposit in the high current density area.
LATENT BLISTERING	Blistering that occurs several hours or days after plating.
LCD	Low current density. The lowest current density is generally in the recessed area of the part or the area of the part that is farthest from the anode. In a rack plating bath it is at the top and middle area of the rack.
LCD BAND	Dull electrodeposit in the low current density area.
MID CD	Medium current density area. This means the area in the middle of a part.
OPG	Ounces per gallon. Multiply by 7.5 to convert to grams per liter.
PICKLE	The acid dip tank after the alkaline cleaners that is used to dissolve rust and oxide scale. It is usually a 30 to 50% solution of hydrochloric acid.
POLARIZED ANODES	Anodes that have a non-conductive film on the surface.
SOAK CLEANER	Alkaline cleaner that parts soak in prior to electroplating. Soak cleaners are operated at 150 - 200° F (65 - 93° C). This is usually the first step in cleaning steel parts.