COLUMBIA® CHEMICAL
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TROUBLE SHOOTING GUIDE

COLSID AP, COLSID AP- HT, EXTREME 200, EXTREME 210, EXTREME 300, EXTREME 310

01-02-11

PROBLEM	CAUSE	SOLUTION
HCD burning	Low Carrier	Add 1% of Carrier
	Low ammonium chloride (Does not apply to EXTREME 300, EXTREME 310 and COLSID AP-HT)	Keep the ammonium chloride level at 4 to 6 opg (30 to 45 g/l)
	Low bath temperature	Keep the bath temperature at 80° - 85° F (26° - 30° C).
	Low zinc metal from bath cut or high drag-out rate	Add zinc chloride to raise zinc metal to 2.5 to 3.0 opg (18.75 to 22.5 g/l)
LCD dullness	Low Carrier	Add 1% of Carrier
	High pH (usually above 6.2)	Keep the pH within the recommended operating range of 4.8 to 5.9
	Low level (2 to 5 ppm) metallic contamination	Treat with 1 lb. of zinc dust per 1,000 gal. (0.12 kg./1,000 liters)
	High zinc metal Zn = 5 to 7 opg (38 to 53 g/l) Cl = 16 to 18 opg	Increase the total chloride to 20 to 22 opg (150 to 165 g/l)
	Low bath temperature	Keep the bath temperature at 80° - 85° F (26° - 30° C).
	Organic contamination	Treat with 1 lb. of potassium permanganate per 1,000 gal. (0.12 kg./1,000 liters) Treat with 1 lb. of activated carbon per 1,000 gal. (0.12 kg./1,000 liters)
LCD thin/skip plate (No plate in LCD)	Total chloride level below 16 opg (120 g/l)	Keep the total chloride within the recommended operating range of 16 to 22 opg (120 to 165 g/l)
	Chromium contamination	Treat with 1.5 oz. of sodium bisulfite per 1,000 gal. (10 g/1,000 liters) will treat 5 ppm of chromium
Mid CD band	Emulsifier imbalance	Add 0.5% - 1.0% Carrier

PROBLEM	CAUSE	SOLUTION
Blisters	Poor cleaning	Charge-up or change the soak cleaner and electrocleaner
	Immersion copper on parts from contaminated pickle	Use Columbia Pickle Pal to eliminate the build-up of copper in the pickle
	Over pickled parts especially on heat treated steel	Use Columbia Pickle Pal to eliminate smut formation
	Chromium contamination	Treat with 1.5 oz. of sodium bisulfite per 1,000 gal. (10 g/1,000 liters) will treat 5 ppm of chromium
Foaming	Drag-in of wetters from the cleaner tanks	Increase the flow rate on preplate rinses
		Use Columbia Anti-Foam
Flaking, chipping, or cracking	Brightener overload	Treat the bath with 1 lb. of potassium permanganate per 1,000 gal. (0.12 kg./1,000 liters)
		Treat the bath with 1 quart of hydrogen peroxide per 1,000 gal. (0.25 liters/1,000 liters)
		Lower the pH with hydrochloric acid to 4.8 to 5.0
		Add 1% of Carrier
		Treat the bath with 1 lb. of activated carbon per 1,000 gal. (0.12 kg./1,000 liters)
Overall dull plate that does not respond to brightener	Very low Carrier	Add 1 - 2% of Carrier
	Organic contamination	Treat the bath with 1 lb. of potassium permanganate per 1,000 gal. (0.12 kg./1,000 liters)
		Treat the bath with 1 lb. of activated carbon per 1,000 gal. (0.12 kg./1,000 liters)
	Metallic contamination	Treat the bath with 1 lb. of zinc dust per 1,000 gal. (0.12 kg./1,000 liters)

PROBLEM	CAUSE	SOLUTION
Organic precipitate on solution surface and tank walls	Dragged-in oils from cleaners	Change cleaners
	High total chloride level salting-out the emulsifying agents	Keep the total chloride within the recommended operating range of 16 to 22 opg (120 to 165 g/l)
	Large pH adjustment with hydrochloric acid in an isolated area that is insolubolizing the emulsifying agents	Make small incremental additions over a large portion of the bath using good agitation
Low cloud point	Dragged-in oils from cleaners	Change the cleaners and treat the bath with 1 lb. of potassium permanganate or activated carbon per 1,000 gal.(0.12 kg./1,000 liters)
	High total chloride level	Keep the total chloride within the recommended operating range of 16 to 22 opg (120 to 165 g/l)
Cloudy blue or yellow chromate	Low cloud point	See above
	Poor post plate rinsing	Increase flow rate of rinses
	Weak chromate	Increase chromate concentration
	The chromate has a high pH	Keep pH within the recommended operating range
	Old or contaminated chromate	Change the chromate
Dark in LCD after chromate	Metallic contamination copper - over 15 ppm cadmium - over 15 ppm lead - over 5 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 metal contaminant
Poor adhesion of yellow chromate	Brightener overload	Treat the bath with 1 lb. of potassium permanganate per 1,000 gal. (0.12 kg./1,000 liters) or 1 quart of hydrogen peroxide per 1,000 gal. (0.25 liters/1,000 liters) Lower the pH with hydrochloric acid to 4.8 to 5.0 Treat the bath with 1 lb. of activated carbon per 1,000 gal. (0.12 kg./1,000 liters)

PROBLEM	CAUSE	SOLUTION
Black in HCD after chromate	Iron contamination	Treat the bath with 0.5 - 1 quart of hydrogen peroxide (0.25 liters/1,000 liters) or 0.5 - 1 lb. of potassium permanganate per 1,000 gal. (0.12 kg./1,000 liters)
White staining/ spots before chromate	Poor rinsing	Increase flow rate of rinses
Corrosion after parts stored	See white staining/spots before chromate	See above
Delamination of plate	More common in rack lines due to high iron levels	Keep the iron under 20 ppm by making small and frequent additions of hydrogen peroxide
Rapid iron build-up in bath	Parts on the bottom of plating tank	Remove parts regularly
	Hole in tank liner	Repair immediately
	Dragged-in iron from contaminated pickle	Use Columbia Pickle Pal to reduce iron build-up in the pickle
Roughness	Poor filtration	Clean filter
	Particles from anode balls	Use anode bags
		Increase the anode area
		Lower the pH to 4.8 to 5.0

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° - 190º F. (77° - 88º 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 - 200º F (65 - 93º C). This is usually the first step in cleaning steel parts.