Nickel Troubleshooting Guide

PLATING PROCESS SYSTEMS

BRIGHT NICKEL

Index Type

Troubleshooting Bright Nickel Solutions with Bright Nickel Make-Up

(Index Type)

Symptom	Usual Causes	Correction
Cloudy deposits (MCD and HCD areas)		
	1. Low Brightener	1. Increase concentration of Brightener
	2. Low pH	2. Adjust pH
	3. Organic contamination	3. Carbon treatment*
	4. Metallic contamination (e.g., Fe, Si, Al, Cr+3)	4. High pH + carbon treatment*
Cloudy deposits (LCD areas)		
	1. Low Brightener	1. Adjust Brightener concentration
	2. Low pH	2. Adjust pH
	3. Low Bright Nickel Make-Up	3. Add Bright Nickel make-Up
Dull deposits (LCD area)		
	1. High Brightener	1. "Dummy" solution at 4-5 ASF*
	2. Metallic contamination (e.g., Cu, Zn, Pb, Cd)	2. "Dummy" solution at 4-5 ASF*
	3. Low Carrier	3. Add Carrier
	4. High agitation	4. Reduce agitation rate
Poor leveling		
	1. Low Brightener	1. Add Brightener
	2. Low Carrier	2. Add Carrier
	3. Low pH	3. Adjust pH
	4. Low Bright Nickel Make-Up	4. Add Bright Nickel Make-Up
	5. Low agitation	5. Increase agitation rate
Poor ductility		
	1. High Brightener	1. "Dummy" solution at 4-5 ASF*
	2. Low Carrier	2. Add Carrier
	3. High pH	3. Adjust pH
	4. Metallic contamination (e.g., Zn, Cd)	4. "Dummy" solution at 4-5 ASF*
	5. Organic contamination	5. Carbon treatment*
Burning		
	1. Low nickel salts/boric acid	1. Add nickel salts/boric acid
	2. High CD	2. Reduce CD
	3. Low temperature	3. Adjust temperature

	4. Low agitation	4. Increase agitation rate
	5. Chromate contamination	5. High CD "dummy" + high pH treatment*
	6. Metallic contamination (e.g., Fe, Al, Si)	6. High pH + carbon treatment*
Skip plating		
	1. High Brightener	1. "Dummy" solution at 4-5 ASF*
	2. Metallic contamination (e.g., Zn, Cd, Pb)	2. "Dummy" solution at 4-5 ASF*
	3. Chromate contamination	3. High CD "dummy" + high pH treatment*
Poor chromium acceptance		
	1. High Brightener	1. "Dummy" solution at 4-5 ASF*
	2. Low Carrier	2. Add Carrier
	3. Inadequate rinsing between Ni and Cr	3. Improve rinsing
	4. Cr solution out of balance	4. Adjust Cr solution
High Consumption Carrier		
	1. High drag-out	1. Use reclaim tank
	2. Excessive carbon usage	2. Reduce amount of carbon used
	3. Very high nickel concentration	3. Dilute solution
Brightener		
	1. High concentration of Brightener	1. Reduce concentration of Brightener
	2. Low anode area/polarized anodes	2. Increase anode area and/or increase nickel chloride and/or reduce pH
Bright Nickel Make-Up		
	1. High drag-out	1. Use reclaim tank
	2. Low anode area/polarized anodes	2. Increase anode area and/or increase nickel chloride and/or reduce pH

Non-Index Type

Troubleshooting Bright Nickel Solutions Without Bright Nickel Make-Up

(Non-Index Type)		
Symptom	**Usual Causes**	**Correction**
Cloudy deposits (MCD and HCD areas)		
	1. Low Brightener	1. Increase Brightener concentration
	2. Low pH	2. Adjust pH
	3. Organic contamination	3. Carbon treatment*
	4. Metallic contamination (e.g., Fe, Si, Al, Cr+3)	4. High pH + carbon treatment*
Cloudy deposits (LCD areas)		

1. Low Brightener	1. Adjust Brightener concentration
2. Low pH	2. Adjust pH
Dull (dark) deposits (LCD area)	
1. High Brightener	1. "Dummy" solution at 4-5 ASF*
2. Metallic contamination (e.g., Cu, Zn, Pb, Cd)	2. "Dummy" solution at 4-5 ASF*
3. Low Carrier	3. Add Carrier
4. High agitation	4. Reduce agitation rate
Poor leveling	
1. Low Brightener	1. Add Brightener
2. Low Carrier	2. Add Carrier
3. Low pH	3. Adjust pH
4. Low Leveling Agent	4. Add Leveler
5. Low agitation	5. Increase agitation rate
Poor ductility	
1. High Brightener	1. "Dummy" solution at 4-5 ASF*
2. Low Carrier	2. Add Carrier
3. High pH	3. Adjust pH
4. Metallic contamination (e.g., Zn, Cd)	4. "Dummy" solution at 4-5 ASF*
5. Organic contamination	5. Carbon treatment*
Burning	
1. Low nickel salts/boric acid	1. Add nickel salts/boric acid
2. High CD	2. Reduce CD
3. Low temperature	3. Adjust temperature
4. Low agitation	4. Increase agitation rate
5. Chromate contamination	5. High CD "dummy" + high pH treatment*
6. Metallic contamination (e.g., Fe, Al, Si)	6. High pH + carbon treatment*
Skip plating	
1. High Brightener	1. "Dummy" solution at 4-5 ASF*
2. Chromate contamination	2. High CD "dummy" + high pH treatment*
3. Metallic contamination (e.g. Fe, Al, Si)	3. High pH + carbon treatment*
Poor chromium acceptance	
1. High Brightener	1. "Dummy" solution at 4-5 ASF*
2. Low Carrier	2. Add Carrier
3. Inadequate rinsing between Ni and Cr solutions	3. Improve rinsing
4. Cr solution out of balance	4. Adjust Cr solution
High Consumption Carrier	
1. High drag-out	1. Use reclaim tank
2. Excessive carbon usage	2. Reduce carbon used
3. Very high nickel concentration	3. Dilute solution
Brightener	

	1. High concentration of Brightener	1. Reduce concentration of Brightener
	2. Low anode area/polarized anodes	2. Increase anode area and/or increase nickel chloride and/or reduce pH
	3. High agitation	3. Reduce agitation rate.

SEMI-BRIGHT NICKEL

Semi-Bright Nickel Troubleshooting

Troubleshooting Semibright Nickel

Symptom	**Usual Cause**	**Correction**
Cloudy deposits (MCD and HCD areas)		
	1. Low leveler	1. Increase concentration of Leveler
	2. Low pH	2. Adjust pH
	3. High Make Up additive	3. Reduce Make Up concentration (carbon filter)
	4. High STEP Additive	4. Discontinue additions temporarily
	5. Organic contamination	5. Carbon treatment
	6. Metallic contamination (e.g., Fe, Si, Al, Cr+3)	6. High pH + carbon treatment
	7. Low agitation	7. Increase agitation
Cloudy deposits (LCD areas)		
	1. Low Leveler	1. Adjust Leveler concentration
	2. Low pH	2. Adjust pH
Dull deposits (LCD area)		
	1. Metallic contamination (e.g., Cu, Zn, Pb, Cd)	1. "Dummy" solution at 4-5 ASF*
Too Bright		
	1. High leveler	1. Reduce Leveler concentration
	2. Low Make Up	2. Add Make Up
Poor leveling		
	1. Low Leveler	1. Add Leveler
	2. Low Make Up	2. Add Make Up
	3. Low pH	3. Adjust pH
	4. High STEP Additive	4. Discontinue additions temporarily
	5. Low agitation	5. Adjust agitation
Poor ductility		
	1. High Leveler	1. Reduce Leveler concentration
	2. Low Make Up	2. Add Make Up
	3. High pH	3. Adjust pH
	4. Metallic contamination (e.g., Zn, Pb, Cd)	4. "Dummy" solution at 4-5 ASF
	5. Organic contamination	5. Carbon treatment
Burning		
	1. Low nickel salts/boric acid	1. Add nickel salts/boric acid

	2. High current density (CD)	2. Reduce current density
	3. Low temperature	3. Adjust temperature
	4. Low agitation	4. Increase agitation
	5. Chromate contamination	5. High CD "dummy" + high pH treatment*
Skip plating		
	1. High Leveler	1. "Dummy" solution at 4-5 ASF
	2. Low Make Up	2. Add Make Up
	3. Metallic contamination (e.g., Pb, Zn, Cd, Cr+6)	3. "Dummy" solution at 4-5 ASF
High Consumption of: Make Up		
	1. High drag-out	1. Use reclaim tank
	2. Excessive carbon usage on filter	2. Reduce amount of carbon used
Leveler		
	1. High concentration of Leveler	1. Reduce concentration of Leveler
	2. Low anode area (polarized anodes)	2. Increase anode area
	3. Organic contamination	3. Carbon treatment (may help)

DUPLEX NICKEL

Duplex Nickel Troubleshooting

Troubleshooting Duplex Nickel

Symptom	**Usual Cause**	**Correction**
Poor STEP results		
	1. Low STEP Additive in semibright nickel	1. Add STEP Additive to semibright nickel
	2. Poor Bright Nickel deposit	2. Carbon treatment (may help)
	3. Contamination of semibright nickel solution with sulfur containing material	3. Adjust brightener in Bright Nickel solution
Poor corrosion performance		
	1. See **Poor STEP** results above.	
	2. Pits present in either Semibright Nickel or Bright Nickel solutions.	2. Correct pitting problem (add anti-pitter and/or carbon treat solution)
	3. Particulate matter present (indicated by rough deposits) in either Semibright or Bright nickel solutions.	3. Filter solutions.
	4. Microporous porous chromium layer not functioning (if used)	4. Inspect microporous Nickel and/or chromium and correct.
Peeling of Bright Nickel layer from Semibright Nickel layer Overall		
	1. Drying of Semibright Nickel solution during part transfer.	1. If consistent, insert rinse operation between Semibright and Bright Nickel solutions.

	2. Pickup of films during exit from Semibright Nickel or entrance to Bright Nickel solutions.	2. See above and/or carbon treat each solution.
Trailing edges only		
	Parts are bipolar exiting from Bright Nickel solution	Install live current exit from Bright Nickel (Use approx. 10% of normal rack current)
Leading edges only		
	Parts are bipolar entering Semibright Nickel solution.	Install live current entrance to Semibright Nickel (Use approx. 10% of normal rack current)
Bottom of part/rack only		
	Too much current during exit from Semibright Nickel and/or entry to Bright Nickel solutions.	Reduce current density at these points (consider removal of some anode material at these points)
Pattern after Bright Nickel		
	1. Drying of Semibright Nickel solution during part transfer.	1. If consistent, insert rinse operation between Semibright and Bright Nickel solutions.
	2. Drying of foam from Semibright Nickel solution	2. Carbon treat solution to reduce foaming or reduce air agitation to minimize foam.