

A = Selective Coatings; B = Loose Coatings (Powdery); C = Dull Brown Color; D = Salt Spray Failure

DEFECT CAUSE	A	B	C	D
Solvent Cleaning: incomplete removal of inks	•			
Emulsion Degrease: Na <sub>2</sub> SiO <sub>3</sub> too low <100ppm				•
Emulsion Degrease: excessively long immersion time				•
Alkaline Cleaner: incomplete removal of grease/lube	•			
Alkaline Cleaner: concentration too low				•
Alkaline Etch: immersion time too long				•
Alkaline Etch: immersion time too short	• <sup>1</sup>			
Deoxidizer: concentration too low				•
Deoxidizer: mixed acid deoxidizer	•			
Deoxidizer: non-Cr deoxidizer (not recommended)				•
Deoxidizer: pH is too high				•
Deoxidizer: immersion time low	• <sup>2</sup>			
Deoxidizer: immersion time high				• <sup>3</sup>
Ion Contamination: Cl concentration low <12ppm				• <sup>4</sup>
Ion Contamination: Cl concentration high >350 ppm				• <sup>5</sup>
Ion Contamination: high Al >11,000ppm				• <sup>6</sup>
Ion Contamination: high Cu >50ppm				•
Ion Contamination: high Zn				•
Ion Contamination: high Fe				•
Ion Contamination: low sulfate <1,000ppm	•			
Ion Contamination: too many adds				• <sup>7</sup>
Ion Contamination: use of sulfuric based deoxidizers				• <sup>8</sup>
Ion Contamination: high mineral content in water				• <sup>9</sup>
Ion Contamination: green color				• <sup>9</sup>
Ion Contamination: stray current				•
Ion Contamination: etch rate too high				•
Conversion Coating: pH low		•		
Conversion Coating: pH high	•			•
Conversion Coating: agitation low	•			
Conversion Coating: agitation high		• <sup>10</sup>		
Conversion Coating: Fluoride concentration low	•			•
Conversion Coating: Fluoride concentration high	• <sup>11</sup>	•		
Conversion Coating: solution concentration low				•
Conversion Coating: solution concentration high		•		
Conversion Coating: Cr <sup>6</sup> /Cr <sup>3</sup> ratio is low <1.0	•			• <sup>12</sup>
Conversion Coating: ion contamination, high Fe <sup>+2</sup>				•
Conversion Coating: Cl concentration <12ppm				•
Conversion Coating: Cl con. >43ppm for new solutions				•
Conversion Coating: Cl concentration >100ppm				•
Conversion Coating: Cl concentration >400ppm				•
Conversion Coating: Al concentration low	• <sup>13</sup>			
Conversion Coating: Al concentration high >250ppm				• <sup>14</sup>
Conversion Coating: combined Cl+SO <sub>4</sub> high >400ppm				•
Conversion Coating: sulfate con. high >400ppm				•
Conversion Coating: nitrate con. high >200ppm				•
Conversion Coating: Cu concentration high >30ppm				•
Conversion Coating: Zn concentration high >10ppm				•
Conversion Coating: Ca concentration high >25ppm				•
Conversion Coating: phosphate high >25ppm				• <sup>15</sup>
Conversion Coating: DI water for solution make-up	•			
Conversion Coating: new bath was not seeded				•
Conversion Coating: immersion time low	•			•
Conversion Coating: immersion time high		•		
Conversion Coating: temperature low	•			•
Conversion Coating: temperature high		•		
Conversion Coating: excessive transfer times	•			
Alkaline Clean Rinse: transfer time too slow	•			
Alkaline Clean Rinse: long immersion time in first rinse				•
Alkaline Clean Rinse: TDS too high				•
Alkaline Clean Rinse: contam. that causes micropitting				•
Deoxidizer Rinse: less than 60ppm TDS avoid DI	•			•
Deoxidizer Rinse: contaminated final rinse		•		•
Deoxidizer Rinse: long immersion time				• <sup>16</sup>

DEFECT CAUSE	A	B	C	D
Conversion Coating Rinse: misaligned spray nozzles	•			
Conversion Coating Rinse: clogged spray nozzles	•			
Conversion Coating Rinse: high ambient temperature	•			
Conversion Coating Rinse: low pH in first rinse <4.0		•		
Conversion Coating Rinse: excessive spray velocities	•			•
Conversion Coating Rinse: TDS too high >1,000ppm				•
Dryer: temp. high >130°F				•
Dryer: temp. low <90°F				•
Dryer: dirty FOD blows onto wet part	•			•
Racking: contact of parallel surfaces	•			
Racking: entrapped solution draining down part	•			
Racking: dirty hooks	•			
Testing Panels: mylar residue not fully removed	•			
Testing Panels: unseen micropitting storage issue				•
Testing Panels: ungloved hands				•
Testing Panels: roll code not fully removed				•
Testing Panels: cleaning with acetone				•
Testing Panels: storage in desiccator				•
Testing Panels: wet panels on brown Kraft paper				•
Testing Panels: short age times <48 hours				•
Testing: operator variation				•
Testing: rust in salt spray chamber				•
Testing: rough handling during transport				•
Testing: spray impingement				•
Testing: condensate splatter during lid opening				•
Part Condition: work hardened uneven Zn at surface	•			
Part Condition: inclusions				•
Part Condition: geometry susceptible to coating fracture				• <sup>17</sup>
Part Condition: heavy surface oxide	•			
Part Condition: use of soap as media for Vibra Debur		•		

- Scale not fully removed
- Smut not fully removed
- 6061 needs longer times
- Especially for high Al, aged solutions
- For low Al, new solutions
- With long immersion times
- Dump when adds equal tank volume
- Nitric-based recommended
- For Cr-based deoxidizers
- Can also cause surface roughness
- When Al is low
- Better if 3:1
- When F is high
- Al can be much higher 2.5g/L for K<sub>3</sub>[Fe(CN)<sub>6</sub>] conversion coatings
- PO<sub>4</sub> can be much higher 2,000 ppm for K<sub>3</sub>[Fe(CN)<sub>6</sub>] conversion coatings
- Especially if preceded by long deox time
- A600 best for tubing

