TECHNIC INC

PROCESS APPLICATION GUIDE

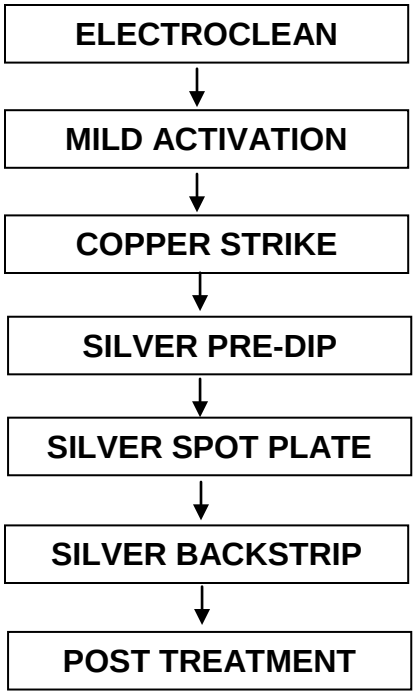
LEAD FRAME PLATING

PLEASE NOTE: This document is for guidance only.
Please refer to the appropriate Technical Data Sheet for additional information.

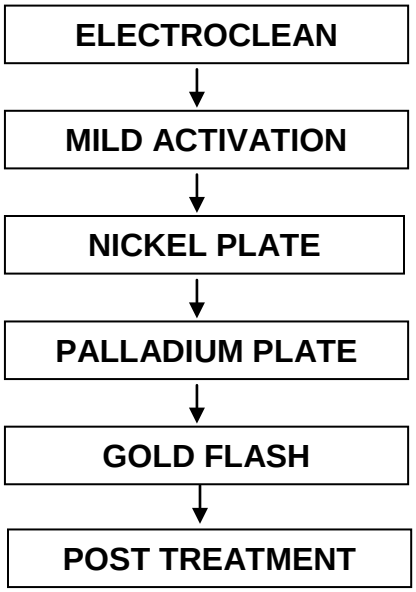
Rev 1215

Process Flow

I. Silver Spot Application



II. Ni/Pd/Au PPF Application



LEAD FRAME PLATING – RECOMMENDED PROCESS SEQUENCE

I. Silver Spot Application

Process Step	Recommended Process	Description	Process Makeup	Temp.	Current Density	Dwell Time	Recommended Control and Replenishment Schedule	Comments
Electroclean	Technic TEC 1016	Electrolytic cleaner	Technic TEC 1016 15 – 45 g/l DI water: balance	60 - 71°C	Steel, copper, brass 6-9V anodic; Non-ferrous metals 4-6V cathodic	5-20 seconds	Maintain by volumetric titration	Alkaline low foaming; chelated. Rapidly removes oils, grease, and other contaminants
Mild Activation	Techni ACT 9600	Mild descaler	ACT 9600 Salt: Cu alloys: 50 g/l Allioy 42: 150 g/l DI Water: balance	18-29°C	NA	20-60 sec	Replenish based on analysis; dump when Cu content exceeds 2 g/l	Acidic, non-foaming, mildly aggressive. Etch rate (1-3 µ-in/min). Effectively removes oxides & heat scale
Copper Strike	Techni Copper C	Cyanide copper plating process	Potassium cyanide: 28.5 g/l Potassium copper cyanide 160 ml/l Potassium hydroxide 22.5 g/l Copper "C" Brightener (optional) 20 ml/l Rochelle salts: 45 g/l DI water: balance	54-71ºC	0.5 – 6 ASD	Dependent on thickness requirements	Maintain all components by analysis.	Recommended as a copper strike on difficult to plate metals for improved deposit adhesion and surface activation.
Silver Pre-Dip	Technic Predip 470 3X	Anti Immersion predip prior to Silver plating	Technic Predip 470 3X Conc: 75 ml/l DI water: balance	15-50º C	0.1 ASD anodic	5-30 sec	Maintain by UV/VIS spectroscopy	Recommended for copper and copper alloy lead frame materials.
Silver Spot Plate	Techni Silver® EHS-3R **OR**	High speed pure silver plating process	Potassium Silver Cyanide: 120 g/l EHS Makeup: 90 g/l EHS-3R Brightener: 25 ml/l EHS Additive R-2: 10 ml/l Additive S-1: 5 ml/l DI water: balance pH: 8.0-9.0	45-80°C	Up to 400 ASD	Dependent on thickness requirements 2µm/sec @ 200 ASD	Silver replenished at ~4 g/A-hr EHS-3R Brightener: 2 ml/A-hr EHS Additive R-2: 3-5 ml/A-hr	High speed, phosphate based electrolyte designed for reel-to-reel and cut strip silver spot plating applications.

Process Step	Recommended Process	Description	Process Makeup	Temp.	Current Density	Dwell Time	Recommended Control and Replenishment Schedule	Comments
	Techni Silver® HCD		HCD Conducting Salts: 60 g/l Potassium Cyanide: 3.75 g/l Potassium Carbonate: 15 g/l HCD Silver Salt: 120 g/l HCD Brightener: 2.1 ml/l HCD Wetting Agent: 0.53 ml/l DI water: balance pH: 8.5-9.5	60-70°C	Up to 400 ASD	Dependent on thickness requirements 2µm/sec @ 200 ASD	Silver replenished based on analysis HCD Brightener 0.4 ml/A hr. HCD Wetting Agent maintain surface tension below or equal to 70 dynes/cm.	High speed, nitrate based electrolyte designed for reel-to-reel and cut strip silver spot plating applications
Silver Back-strip	Techni Silver® Stripper 3500	Anodic, high speed silver back-strip solution	Potassium hydroxide: 50 g/l Techni Silver Stripper 3500: 100 g/l DI water: balance	20-45°C	1-20 ASD, anodic	to meet requirements strip rate = 2µm/min @ 3 ASD	Replenish based on analysis	Alkaline, non-cyanide stripper for use on copper and copper alloys.
Post Treatment	Tarniban® KS II	Post-treatment process to protect silver from oxidation/ tarnishing.	Tarniban® KS II Conc. 100 ml/l DI water: balance	43-49°C Do not exceed 60°C	NA	3-30 sec	Replenish daily based on analysis	Forms a thin, colorless, transparent film on the silver surface which provides resistance to corrosion. Aqueous solution. May be applied by immersion or anodically. .

Rev 1215

LEAD FRAME PLATING – RECOMMENDED PROCESS SEQUENCE

II. Ni/Pd/Au PPF Application

Process Step	Recommended Process	Description	Process Makeup	Temp.	Current Density	Dwell Time	Recommended Control and Replenishment Schedule	Comments
Electroclean	Technic TEC 1016	Electrolytic cleaner	Technic TEC 1016 15 – 45 g/l DI water: balance	60 - 71°C	Steel, copper, brass 6-9V anodic; Non-ferrous metals 4-6V cathodic	5-20 seconds	Maintain by volumetric titration	Alkaline low foaming; chelated. Rapidly removes oils, grease, and other contaminants
Mild Activation	Techni ACT 9600	Mild descaler	ACT 9600 Salt: Cu alloys: 50 g/l Allioy 42: 150 g/l DI Water: balance	18-29°C	NA	20-60 sec	Replenish based on analysis; dump when Cu content exceeds 2 g/l	Acidic, non-foaming, mildly aggressive. Etch rate (1-3 µ-in/min). Effectively removes oxides & heat scale
Nickel Plate	High Speed Nickel Sulfamate FFP **OR**	High speed nickel sulfamate plating process	Ni sulfamate conc (150 g/l): 600 ml/l Nickel chloride: 20 ml/l OR Nickel bromide: 40 ml/l Boric Acid : 40 g/l M/U Brightener (optional: 10 ml/l HN-5 wetter: 2.0 ml/l	50 - 60°C	4 – 40 ASD	Dependent on thickness requirements ~3µm/min @ 15 ASD	Replenish based on analysis; replenish HN-5 wetter by drag-out	High speed Ni plating process producing low stress, ductile Ni deposits
	Goldeneye Nickel	High speed proprietary nickel plating process	Goldeneye Nickel Conc: 300 ml/l Goldeneye Nickel Makeup Solution: 550 ml/l Boric Acid: 50 g/l Goldeneye Nickel Stress Reducer: 20 ml/l HN-5: 5 ml/l DI water: balance	60-65°C	5 – 30 ASD	Dependent on thickness requirements ~3µm/min @ 15 ASD	Replenish based on analysis	A low stress, highly corrosion resistant process which exhibits superior thickness distribution, higher line speeds/yields and lower waste treatment costs.

Process Step	Recommended Process	Description	Process Makeup	Temp.	Current Density	Dwell Time	Recommended Control and Replenishment Schedule	Comments
Palladium Plate	Pallaspeed® VHS **OR**	High speed pure Pd plating process	Pallaspeed® VHS Makeup: 396 ml/l Pd as Pallaspeed® VHS Replenisher: 200 ml/l (1 g Pd = 10 ml); Pallaspeed® VHS Brightener: 4 ml/l pH: 7.5 – 8.5	37-54°C	2 – 50 ASD	Dependent on thickness requirements ~7.5µm/min @ 30 ASD	Replenish Pd metal by analysis. Replenish other components based on drag-out	High speed, pure Pd plating process based on Pd tetramine chloride. Produces a bright, ductile, low porosity deposit.
	Pallaspeed® 990	High speed pure Pd plating process	Pallaspeed® 990 Makeup Solution: 500 ml/l Pallaspeed® 990 Palladium Salt: 53 g/l Pallaspeed® Additive 25 ml/l DI water: Balance	57-63°C	1 – 30 ASD	Dependent on thickness requirements ~1µm/min @ 5 ASD	Replenish based on analysis	High speed chloride free, low ammonia Pd process based on palladium tetramine sulfate
Gold Flash	Technic Orostrike C	High speed acid gold plating process	Orostrike C Makeup #1: 180 g/l Gold as Orostrike C Gold Salts: 2.1 – 4.2 g/l Additive S-1: 10 ml/l DI water: Balance	27-52°C	0.5 – 2.5 ASD	Dependent on thickness requirements	pH control with Orostrike C Acid Adjusting Salts. Specific gravity control with Orostrike C Buffer Salts.	High speed. Meets ASTM B488 Type III Grade A requirements
Post Treatment	Tarniban® E	Post treatment process	Tarniban® E Conc: 50 ml/l DI water: balance	21-49°C	NA	3-20 sec	Maintain based on UV/VIS analysis	Recommended for minimization of epoxy bleed-out without adversely affecting downstream assembly operations such as wire bonding and die attach.

Rev 1215