SOLDERON™ BTD

For Electronic Finishing Applications

Regional Product Availability			
N. America	Japan/Korea	Asia	Europe
✔		✔	✔

DESCRIPTION

Solderon BTD is a low-foaming electroplating process for the high speed deposition of bright tin and tin-lead alloys from a non-fluoborate electrolyte.

The Solderon BTD system is designed for use in the high-speed reel-to-reel selective electroplating of connector components with tin and high tin-lead alloy (> 80% tin) coatings.

ADVANTAGES

- Very low-foaming electrolyte.
- High cathode efficiency, which minimizes the problem of poor definition caused by stable cathodic foam in controlled depth cell electrodeposition
- Exceptional solderability performance

DEPOSIT PROPERTIES

Appearance: Fine grained, bright

Alloy Range: 80–100% Tin, 0–20% Lead

Deposits meet or exceed Military Specification 202F Method 208F.

BATH MAKE-UP

Chemicals Required

Deionized Water	Solderon Acid
Solderon Tin Concentrate	Solderon Lead
Solderon BTD Carrier	Solderon BTD Additive

*Refer to specific alloy solution make-up procedures on the following pages for exact quantities required.

MAKE-UP PROCEDURE

1. Add deionized water to tank.
2. Slowly, with constant mixing, add Solderon Acid HC.
3. Add Solderon Tin HS-300 Concentrate and mix thoroughly.
4. Add Solderon BTD Carrier and mix thoroughly.
5. Add Solderon BTD Additive and mix thoroughly.
6. Dilute to final volume with deionized water and mix thoroughly.

Note: Solderon Tin Concentrate contains Solderon Acid. This component contributes to the total concentration of Solderon Acid in the electroplating process.

PURE/TIN BATH MAKE-UP

Chemicals Required	Metric	(U.S.)
Deionized Water	400.0 ml/l	(40.0% v/v)
Solderon Acid HC	130.0 ml/l	(13.0% v/v)
Solderon Tin HS-300 Concentrate	133.0 ml/l	(13.3% v/v)
Solderon BTD Carrier	40.0 ml/l	(4.0% v/v)
Solderon BTD Additive	40.0 ml/l	(4.0% v/v)

Dilute to final volume with de-ionized water

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BATH OPERATION

Bath Operation—Pure/Tin—Metric		
Parameter	**Range**	**Recommended**
Tin Metal	25–50 g/l	40 g/l
Solderon Acid HC	175–245 ml/l	210 ml/l
Temperature	16–24°C	Dependent upon current density requirements
Cathode Current Density	5–30 A/dm^2	Dependent upon equipment design and production requirements
Anode to Cathode Ratio	1:1 minimum	
Agitation	Vigorous solution coupled with cathode movement.	
Cathode Efficiency	90–100%	
Deposition Rate	5.0–5.25 microns per min. at 10 A/dm^2	

Bath Operation—Pure/Tin—U.S.		
Parameter	**Range**	**Recommended**
Tin Metal	3.3–6.7 oz./gal.	5.3 oz./gal.
Solderon Acid HC	17.5–24.5% v/v	21.0% v/v
Temperature	60–75°F	Dependent upon current density requirements
Cathode Current Density	50–300 A/ft^2	Dependent upon equipment design and production requirements
Anode to Cathode Ratio	1:1 minimum	
Agitation	Vigorous solution coupled with cathode movement.	
Cathode Efficiency	90–100%	
Deposition Rate	3.25–3.5 microns per min. at 100 A/ft^2	

PRETREATMENT

A final activation step of 10–20% Solderon Acid HC is recommended prior to entering the electroplating cell.

90/10 TIN/LEAD ALLOY BATH MAKE-UP

Chemicals Required	Metric	(U.S.)
Deionized Water	350.0 ml/l	(35.0% v/v)
Solderon Acid HC	100.0 ml/l	(10.0% v/v)
Solderon Tin HS-300 Concentrate	183.0 ml/l	(18.3% v/v)
Solderon Lead Concentrate	13.0 ml/l	(1.3% v/v)
Solderon BTD Carrier	40.0 ml/l	(4.0% v/v)
Solderon BTD Additive	40.0 ml/l	(4.0% v/v)

Dilute to final volume with de-ionized water

BATH OPERATION

Bath Operation—90/10 Tin/Lead—Metric		
Parameter	**Range**	**Recommended**
Tin Metal	40–70 g/l	55 g/l
Lead Metal	4.0–8.0 g/l	6.0 g/l
Solderon Acid HC	175–245 ml/l	210 ml/l
Tin: Lead in solution	6:1 to 10:1	These ratios may vary depending on agitation, temperature and current density
Temperature	16–24°C	Dependent upon current density requirements
Cathode Current Density	5–30 A/dm^2	Dependent upon equipment design and production requirements
Anode to Cathode Ratio	1:1 minimum	
Agitation	Vigorous solution coupled with cathode movement.	
Cathode Efficiency	90–100%	
Deposition Rate	5.0–5.25 microns per min. at 10 A/dm^2	

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Bath Operation—90/10 Tin/Lead—U.S.		
Parameter	**Range**	**Recommended**
Tin Metal	5.3–9.3 oz./gal.	7.3 oz./gal.
Lead Metal	0.53–1.07 oz./gal.	0.8 oz./gal.
Solderon Acid HC	17.5–24.5% v/v	21.0% v/v
Tin: Lead in solution	6:1 to 10:1	These ratios may vary depending on agitation, temperature and current density
Temperature	60–75°F	Dependent upon current density requirements
Cathode Current Density	50–300 A/ft^2	Dependent upon equipment design and production requirements
Anode to Cathode Ratio	1:1 minimum	
Agitation	Vigorous solution coupled with cathode movement.	
Cathode Efficiency	90–100%	
Deposition Rate	3.25–3.5 microns per min. at 100 A/ft^2	

BATH MAINTENANCE

Solderon BTD Additive

Solderon BTD Additive is required to maintain bright deposits. Add 1 liter for every 1,000 ampere hours.

DETERMINATION OF THE CONTENT OF ADDITIVE IN SOLDERON BTD PLATING BATH BY GAS CHROMATOGRAPHY

I. Equipment

a) Gradient Gas Chromatograph equipped with flame ionization detector Heliflex capillary column with AT-Wax stationary phase 15 m length ID 0.53 mm and 1.2 µm film thickness (Alltech Applied Science #9951152)

b) Maxi-Clean C-18, 600 mg cartridges. (Alltech Applied Science #20934)

c) 5 ml plastic syringes

d) Syringe filter pore size 0.2 µm membrane type PTFE filter size 25 mm

e) Assorted volumetric pipettes

f) 100 ml Class A volumetric flasks

II. Reagents

a) Cyclohexane, HPLC grade

PARAMETERS—H.P. GAS CHROMATOGRAPH

Parameters for Hewlett Packard Gas Chromatograph	
Detector	Flame Ionization
Zero	10%
Attenuation	4
Chart Speed	0.5
Area Reject	5,000
Threshold	2
Peak Width	0.05
Gases: Hydrogen Air Helium make-up/carrier Split carrier flow Head column pressure Septum purge	80 ml 250 ml 15 + 4 ml 60 ml 3 psi 4 mi
Temperature Gradient: Initial (Oven Temperature) After 3 minutes 10°C/ minute up to	 40°C 260°C
Detector Temperature	270°C
Injector Temperature	150°C
Injector Volume	2 ul
Run Time	29 minutes

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ANALYSIS PROCEDURE

Extraction

1. Condition a Maxi-Clean C-18, 600 mg cartridge according to the manufacturer's instructions.
2. Use one cartridge per sample.
3. Take a 5 ml sample of the solution to be analyzed using a 5 ml plastic syringe and attach syringe to the conditioned cartridge.
4. Manually apply pressure to the syringe and let drop at a rate of 1 drop per 1.5 second until all of the 5 ml solution from the syringe has passed through the cartridge. Discard eluant.
5. Draw 5.1 ml of cyclohexane into the syringe and reattach it to the cartridge.
6. Note: After discarding the first three drops eluted from the cartridge, the cyclohexane extract is collected for analysis. Manually apply pressure to the syringe, and after discarding the first three drops, collect the eluant.
7. Filter the cyclohexane extract through a 0.2 µm PTFE membrane syringe filter into a labeled gas chromatography vial.
8. Inject the filtered solution into the gas chromatograph.
9. Determine the concentration of Solderon BTD Additive in the production electrolyte by plotting the peak height on a calibration curve.

CALIBRATION CURVE GENERATION

1. Prepare three standard solutions of 30, 40 and 50 ml/l Solderon BTD Additive in a matrix of Solderon Tin, Lead, Acid and Solderon BTD Carrier at equivalent concentrations to that used in production.
2. Determine the additive peak height using the analysis procedure above.
3. Plot Solderon BTD Additive Concentration vs. peak height.

DETERMINATION OF SOLDERON BTD ADDITIVE BY HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY

I. Equipment

a) Gradient High Pressure Liquid Chromatograph equipped with UV Detection

b) 150 x 4.6 mm Econosphere C18 3 µ particle size analytical column cartridge

c) 10 x 4.6 mm 10 µ Econosphere C18 guard column cartridge

d) 20 ml Luer-Hub Syringe

e) 0.2 µ 47 mm Nylon Membrane Filters

f) 0.2 µ 25 mm Nylon Syringe Filters

g) Mobile Phase Vacuum Filtration Setup (Alltech Applied Science #2001)

h) Vacuum Pump

i) Sonic Bath

j) 2 x One liter Volumetric Flasks

k) 500 ml Volumetric Flask

l) 4 x 100 ml Volumetric Flasks

m) Assorted Transfer Pipettes

n) Sample Vials

II. Reagents

a) Methanol HPLC grade or better

b) Acetonitrile HPLC grade or better

c) Water HPLC grade or better

d) Solderon Tin HS-300 Concentrate

e) Solder Lead Concentrate (not required for pure tin applications)

f) Solderon Acid HC

g) Solderon BTD Carrier

h) Solderon BTD Additive

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PREPARATION OF MOBILE PHASE

Mobile Phase B:

1. Measure 600.0 ml methanol and 400.0 ml acetonitrile into a clean, dry 1 liter volumetric flask.
2. Stopper and mix thoroughly.
3. Filter solution through a 47 mm 0.2 µ nylon filter membrane using on vacuum filtration setup.
4. Remove dissolved gas by sonicating under vacuum.

Mobile Phase A:

1. Measure 450.0 ml Mobile Phase B and 550.0 ml HPLC water into a clean, dry 1 liter volumetric flask.
2. Stopper and mix thoroughly.
3. Filter solution through a 47 mm 0.2 µ nylon membrane filter using the vacuum filtration setup.
4. Remove dissolved gas by sonicating under vacuum.

PARAMETERS FOR WATERS POWERLINE SYSTEM

Fluid Handling

Pressure limits: Low High	100 psi 2,500 psi
Temperature, column	30°C
Sparge Control	25%
Mobile Phase Flow Rate	0.45 ml/min.
Injection Volume	5.0 ul

Mobile Phase Gradient

Initial Time	Final Time	Initial %A	Initial %B	Final %A	Final %B	Gradient Curve
0	8	100	0	100	0	Linear
8	17	100	0	100	0	Linear
17	40	0	100	0	100	Linear
40	49	0	100	0	100	Linear
49	55	100	0	100	0	Linear

Detection

Detector	Photodiode Array
Setting	278 nm
Collection	205–301 nm
Y Scale	0–2 AUFS
Time Range	0–55 minutes
Accumulation	4 times
Interval	1 minute
Resolution	4 nm

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PROCEDURE

PREPARATION OF SOLDERON BTD BASIS ELECTROLYTE I

1. Measure 260 ml Solderon Acid HC into a 500 ml volumetric flask.
2. Measure 260 ml Solderon Tin HS-300 Concentrate and add to flask.
3. Measure 11.0 ml Solderon Lead Concentrate and add to flask. This step is not required for pure tin applications.
4. Pipette 80 ml Solderon BTD Carrier into flask.
5. Dilute to the mark with deionized water.
6. Stopper flask and mix thoroughly.

PREPARATION OF SOLDERON BTD ADDITIVE STANDARD SOLUTIONS

1. Prepare dilutions of the Solderon BTD Additive as follows:

ml/l Solderon BTD Additive

a) 60 ml/l; Pipette 6.0 ml Solderon BTD Additive into a 100 ml volumetric flask. Pipette 50.0 ml of Solderon BTD Basis Electrolyte I into flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

b) 40 ml/l: Pipette 4.0 ml Solderon BTD Additive into a 100 ml volumetric flask. Pipette 50.0 ml of Solderon BTD Basis Electrolyte I into flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

c) 20 ml/l; Pipette 2.0 ml Solderon BTD Additive into a 100 ml volumetric flask. Pipette 50.0 ml of Solderon BTD Basis Electrolyte I into flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

d) 0 ml/l; Pipette 50.0 ml Solderon BTD Basis Electrolyte I into a 100 ml volumetric flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

2. Filter each Additive Standard through a 25 mm 0.2 µ nylon syringe filter into a sample vial for injection.
3. Run standards by HPLC under the conditions detailed above.

PRODUCTION SAMPLE ANALYSIS

1. Filter the sample electrolyte through a 25 mm 0.2 µ nylon syringe filter into a sample vial for injection.
2. Run sample electrolyte by HPLC under the conditions detailed above.

DATA ANALYSIS

1. The retention volume of the Solderon BTD Additive is approximately 9 ml when run under the specific conditions detailed above. Note: Retention volumes are influenced by equipment type and operating conditions.

2. Obtain the average of the standards as follows:

   a) Divide the area of the peak by the amount of Solderon BTD Additive pipetted into the respective standard.

   b) Obtain the average of the results obtained in the step above of all the standards. Record value (A).

Note: Peak height data may be used in the above instead of Peak Area provided the peak has a sharp Gaussian shape.

CALCULATIONS

$$\% \text{ Solderon BTD Additive (v/v)} = \frac{\text{Sample Area}}{A}$$

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DETERMINATION OF SOLDERON BTD CARRIER BY HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY

I. Equipment

a) Gradient High Pressure Liquid Chromatograph equipped with UV Detection 150 x 4.6 mm

b) Econosphere C18 3 µ particle size analytical column cartridge

c) 10 x 4.6 mm 10 µ Econosphere C18 guard column cartridge

d) 20 ml Luer-Hub Syringe

e) 0.2 µ 47 mm Nylon Membrane Filters

f) 0.2 µ 25 mm Nylon Syringe Filters

g) Mobile Phase Vacuum Filtration Setup (Alltech Applied Science #2001)

h) Vacuum Pump

i) Sonic Bath

j) 2 x One liter Flasks

k) 500 ml Volumetric Flask

l) 4 x 100 ml Volumetric Flasks

m) Assorted Transfer Pipettes

n) Sample Vials

II. Reagents

a) Methanol HPLC grade or better

b) Acetonitrile HPLC grade or better

c) Water HPLC grade or better

d) Solderon Tin HS-300 Concentrate

e) Solderon Lead Concentrate (not required for pure tin applications)

f) Solderon Acid HC

g) Solderon BTD Carrier

h) Solderon BTD Additive

PREPARATION OF MOBILE PHASE

Mobile Phase B:

a) Transfer 600.0 ml methanol and 400.0 ml acetronitrile into a clean, dry 1 liter volumetric flask.

b) Mix thoroughly.

c) Filter solution through 47 mm 0.2 µ nylon filter membrane using the vacuum filtration setup.

d) Remove dissolved gas by sonicating under vacuum.

Mobile Phase A:

a) Transfer 450.0 ml Mobile Phase B and 550.0 ml HPLC water into a clean, dry 1 liter volumetric flask.

b) Mix thoroughly.

c) Filter solution through a 47 mm 0.2 µ nylon membrane filter using the vacuum filtration setup.

d) Remove dissolved gas by sonicating under vacuum.

PARAMETERS FOR WATERS POWERLINE SYSTEM

Fluid Handling	
Pressure limits: Low High	100 psi 2,500 psi
Temperature, column	30°C
Sparge Control	25%
Mobile Phase Flow Rate	0.45 ml/min.
Injection Volume	10 ul

Mobile Phase Gradient

Initial Time	Final Time	Initial %A	Initial %B	Final %A	Final %B	Gradient Curve
0	8	100	0	0	100	Linear
8	40	0	100	0	100	Linear
40	49	0	100	100	0	Linear
49	55	100	0	100	0	Linear

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Detection	
Detector	Photodiode Array
Setting	278 nm
Collection	205–301 nm
Y Scale	0–2 AUFS
Time Range	0–55 minutes
Accumulation	4 times
Interval	1 minute
Resolution	4 nm

PROCEDURE

PREPARATION OF SOLDERON BTD BASIS ELECTROLYTE II

1. Measure 260 ml Solderon Acid HC into a 500 volumetric flask.
2. Measure 260 ml Solderon Tin HS-300 Concentrate and add to flask.
3. Measure 11.0 ml Solderon Lead Concentrate and add to flask. This step is not required for pure tin applications.
4. Pipette 80 ml Solderon BTD Additive into flask.
5. Dilute to the mark with deionized with water.
6. Stopper flask and mix thoroughly.

PREPARATION OF SOLDERON BTD CARRIER STANDARD SOLUTIONS

1. Prepare dilutions of the Solderon BTD Carrier as follows:

ml/l Solderon BTD Carrier

a) 60 ml/l; Pipette 6.0 ml Solderon BTD Carrier into a 100 ml volumetric flask. Pipette 50.0 ml of Solderon BTD Basis Electrolyte II into flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

b) 40 ml/l; Pipette 4.0 ml Solderon BTD Carrier into a 100 ml volumetric flask. Pipette 50.0 ml of Solderon BTD Basis Electrolyte II into flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

c) 20 ml/l; Pipette 2.0 ml Solderon BTD Carrier into a 100 ml volumetric flask. Pipette 50.0 ml of Solderon BTD Basis Electrolyte II into flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

d) 0 ml/l; Pipette 50.0 ml Solderon BTD Basis Electrolyte II into a 100 ml volumetric flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

2. Filter each Carrier Standard through a 25 mm 0.2 µ nylon syringe filter into a sample vial for injection.
3. Run standards by HPLC under the conditions detailed above.

Production Sample Anaylsis

1. Filter the sample electrolyte through a 25 mm 0.2 µ nylon syringe filter into a sample vial for injection.
2. Run sample electrolyte by HPLC under the conditions detailed above.

DATA ANALYSIS

1. The retention volume of the Solderon BTD Carrier molecular weight distribution is approximately 15–20 ml when run under the specific conditions detailed above.

   Note: Retention volumes are influenced by equipment type and operating conditions.

2. Total the area of all the peaks in the distribution for the area used in calculations.
3. Obtain the average of the standards as follows:

   a) Subtract the peak area of the "0% Carrier" Standard from each peak area of the remaining standards.

   b) Divide the results of a) by the amount of Solderon BTD Carrier pipetted into the respective standard.

   c) Obtain the average of the results obtained in the step above of all the standards. Record value (A).

CALCULATIONS

$$\% \text{ Solderon BTD Carrier (v/v)} = \frac{(\text{Sample Area - Area of 0\% STD})}{A}$$

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ANALYSIS SOLDERON BTD CARRIER BY UV SPECTROPHOTOMETRY

I. Equipment

a) UV Spectrophotometer

b) Two 10 nm Far-UV Quartz Spectrophotometer Cells

c) 500 ml Graduated Cylinder

d) 50 ml Graduated Cylinder

e) 1,000 ml Beaker equipped with magnetic Stir Bar

f) Magnetic stir plate

g) Whatman 42 Filter Paper or equivalent

h) 20 ml Transfer pipette

i) 10 ml Transfer pipette

j) 5 ml Transfer pipette

k) Four 100 ml Volumetric Flasks

l) Five 1,000 ml Volumetric Flasks

m) 50 ml Separatory Funnel

n) 0.2 micron Syringe Filter Apparatus

II. Reagents

a) n-Amyl Alcohol (analytical reagent grade)

b) Sodium Sulfate Anhydrous

Solderon BTD Carrier Standard Solution prepared as follows:

a) Deionized Water, 300 ml/l

b) Solder Acid HC, 100 ml/l

c) Solderon Tin HS-300 Concentrate, 185 ml/l

d) Solderon Lead Concentrate, 13 ml/l

e) Solderon BTD Additive, 40 ml/l

f) Solderon BTD Carrier, 40 ml/l

Add materials in the order listed to a 1,000 ml with stirring. Transfer solution to a 1,000 ml volumetric flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

PROCEDURE
CALIBRATION CURVE GENERATION

1. Prepare dilutions of the Solderon BTD Carrier Standard Solution as follows:

ml/l Carrier Equivalent

a) 80 ml/l; Pipette 20.0 ml of the Standard Solution into a 1000 ml volumetric flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly. Pipette 10.0 ml of this diluted sample into a 100 ml volumetric flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

b) 40 ml/l; Pipette 10.0 ml of the Standard Solution into a 1,000 ml volumetric flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

c) 20 ml/l; Pipette 5.0 ml of the Standard Solution into a 1,000 ml volumetric flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly. Pipette 10 ml of this dilute sample into a 100 ml volumetric flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

2. With deionized water in both reference and sample cells, establish a zero baseline on the UV Spectrophotometer by scanning from 300–200 nm.
3. Filter approximately 100 ml of Solderon BTD Carrier Standard Solution A through a Whatman 42 Filter Paper (7.5 micron) or equivalent.
4. Pipette 10.0 ml of the filtered sample into a 1000 ml volumetric flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.
5. Pipette 10.0 ml of this diluted sample into a 100 ml volumetric flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.
6. Pipette 10.0 ml of this sample into a 50 ml separatory funnel.
7. Pipette 10.0 ml of n-amyl alcohol into the separatory funnel.
8. Agitate solution vigorously for 3 minutes.
9. Remove separatory funnel stopper and allow the phases to separate completely.
10. Draw off lower aqueous layer and discard.

    Note: It is important to remove the entire aqueous phase, even if a small amount of the alcohol phase is drawn off in the process.

11. Transfer alcohol phase to a small beaker and dry by addition of a small amount (approximately 1.0 g) of anhydrous sodium sulfate. Allow to stand for 5 minutes.
12. Filter sodium sulfate dried n-amyl alcohol solution prepared above using a 0.2 micron syringe filter apparatus. Syringe filter apparatus must be completely free of water.
13. Transfer filtered solution to the sample cuvette of the ultraviolet spectrophotometer and record peak height absorbance between 220 and 230 nm versus a reference of n-amyl alcohol. Filtered solution should be clear and homogeneous.

Note: Immediately following measurement, rinse UV-Vis Spectrophotometer sample cell with deionized water. Do not allow extended contact of samples with cell after scan is completed. The reference cell, containing deionized water, does not need to be rinsed between analyses.

14. Repeat Steps 3 through 13 for the two other Solderon BTD Carrier Standard Solutions.
15. Prepare a calibration curve by plotting absorbance vs ml/l Carrier concentration.

Note: Calibration curve need only be run periodically.

SAMPLE ANALYSIS

Repeat Steps 3 through 13 above on the production electrolyte.

To obtain the corresponding ml/l Carrier concentration, locate peak height absorbance obtained in Sample Analysis Section, Step 13, on the calibration curve.

Solderon BTD Booster

Solderon BTD Booster is designed to extend the upper current density limit of the Solderon BTD process. The increased range of operation is particularly beneficial when plating parts which, due to their complicated geometries, experience wide current density profiles.

Since the Solderon BTD process was designed to meet the most stringent solderability requirements, it must be noted that the use of Solderon BTD Booster may compromise solderability performance in demanding solderability tests. The effect of Solderon BTD Booster additions on solderability performance should, therefore, be tested prior to implementation.

Addition

Additions of 10–30 ml/l are used to obtain the desired current density range and appearance.

Replenishment

Replenishment of Solderon BTD Booster is carried out as required to maintain plating range and appearance.

Solderon Tin HS-300 Concentrate

Solderon Tin HS-300 Concentrate contains 300 g/l (40 oz./gal.) of tin metal.

To raise tin concentration 1.0 g/l (0.13 oz./gal.), add 3.33 ml/l (0.33% v/v) Solderon Tin HS-300 Concentrate.

Solderon Lead Concentrate

Solderon Lead Concentrate contains 450 g/l of lead metal.

To raise lead concentration 1.0 g/l (0.13 oz./gal.), add 2.2 ml/l (0.22% v/v) Solderon Lead Concentrate.

Solderon Acid HC

To raise concentration 1% by volume add 10 ml/l Solderon Acid HC.

EQUIPMENT

Tanks:	Polypropylene, Polyethylene or PVDC
Anodes:	Soluble: Tin or Tin-Lead alloy balls or slugs in titanium or Type 316 stainless steel baskets; Tin or Tin-Lead alloy slabs
	Note: Anode baskets must be kept full at all times
	Insoluble: Platinized Titanium
Heaters:	Titanium, Silica sheathed or Teflon coated
Filtration:	Continuous, 1 micron polypropylene filter cartridge

EQUIPMENT PREPARATION

Prior to make-up, the process tank and ancillary equipment should be thoroughly cleaned and then leached with a Solderon Acid HC solution.

This procedure is particularly important for new equipment or equipment previously used for other processes, for example, fluoboric acid based systems.

I. Cleaning Solution

a) Trisodium Phosphate — 15 g/l (2 oz./gal.)

b) Sodium Hydroxide — 15 g/l (2 oz./gal.)

II. Leaching Solution

a) Solderon Acid HC — 100 ml/l (10% v/v)

III. Procedure

a) Thoroughly wash down tank and ancillary equipment with clean water.

b) Recirculate water through the complete system to remove water soluble materials.

c) Discard water.

d) Add cleaning solution to the tank, heat to 55–60°C (130–140°F) and recirculate through the complete system.

e) Discard cleaning solution.

f) Recirculate water through the complete system.

g) Discard water.

h) Add leaching solution and recirculate through the complete system.

i) Leave leaching solution in tank for minimum of 8 hours.

j) Recirculate leaching solution through the complete system.

k) Discard leaching solution.

l) Recirculate water through the complete system.

m) Discard water

PRODUCT DATA

Solderon BTD Carrier

Appearance:	Clear, colorless to pale amber liquid
pH:	7
Specific Gravity:	1.052

Solderon BTD Additive

Appearance:	Clear, colorless to pale amber liquid
pH:	2.7
Specific Gravity:	0.980

Solderon Tin HS-300 Concentrate

Appearance:	Colorless to yellow liquid
pH:	1
Specific Gravity:	1.55

Solderon Lead Concentrate

Appearance:	Clear, colorless to pale yellow liquid
pH:	<3.5
Specific Gravity:	1.64

Solderon Acid HC

Appearance:	Clear, colorless to pale yellow liquid
pH:	<1
Specific Gravity:	1.043

Solderon BTD Booster

Appearance:	Clear, colorless liquid
pH:	3.5
Specific Gravity:	1

HANDLING PRECAUTIONS

Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

CAUTION! Keep combustible and/or flammable products and their vapors away from heat, sparks, flames and other sources of ignition including static discharge. Processing or operating at temperatures near or above product flashpoint may pose a fire hazard. Use appropriate grounding and bonding techniques to manage static discharge hazards.

CAUTION! Failure to maintain proper volume level when using immersion heaters can expose tank and solution to excessive heat resulting in a possible combustion hazard, particularly when plastic tanks are used.

STORAGE

Store products in tightly closed original containers at temperatures recommended on the product label.

DISPOSAL CONSIDERATIONS

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Rohm and Haas Electronic Materials Technical Representative for more information.

ELECTRONIC MATERIALS

Circuit Board Technologies

CMP Technologies

Microelectronic Technologies

Packaging and Finishing Technologies

For locations and information please visit **http://electronicmaterials.rohmhaas.com**

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