SOLDERON™ SG-J Tin Alloy Plating Bath
For Electronic Finishing Applications

Regional Product Availability
• North America

Description
SOLDERON™ SG-J Electrolytic Tin is an organic sulfonate electroplating electrolyte specifically formulated for the electrodeposition of tin and tin-lead alloy coatings on pH-sensitive electronic components. The product is distinguished by its ability to produce deposits with stable alloy compositions, good thermal resistance and superior soldering properties. It is suitable for either rack or barrel electroplating techniques.

Bath Make-up

<table>
<thead>
<tr>
<th>Chemicals Required</th>
<th>Metric</th>
<th>(U.S.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deionized water</td>
<td>400 ml</td>
<td>(40% v/v)</td>
</tr>
<tr>
<td>SOLDERON™ SG-J Make-up Liquid</td>
<td>350 ml</td>
<td>(35% v/v)</td>
</tr>
<tr>
<td>SOLDERON Tin HS 300 Concentrate or SOLDERON MLCC Tin Concentrate</td>
<td>45 ml</td>
<td>(4.5% v/v)</td>
</tr>
<tr>
<td>SOLDERON PB Concentrate</td>
<td>2.0 ml</td>
<td>(0.2% v/v)</td>
</tr>
<tr>
<td>SOLDERON SG-J Complexer</td>
<td>150 ml</td>
<td>(15% v/v)</td>
</tr>
<tr>
<td>SOLDERON SG-J Brightener</td>
<td>30 ml</td>
<td>(3.0% v/v)</td>
</tr>
</tbody>
</table>

Note: *Typical to produce 90/10 Sn/Pb alloy deposits. Actual lead concentration in bath may need to be varied due to equipment variation.

Make-up Procedure
1) Add deionized water to tank.
2) Add SOLDERON™ SG-J Make-up Liquid and mix thoroughly.
3) Add SOLDERON Tin HS 300 Concentrate (or SOLDERON™ MLCC Tin Concentrate) and mix thoroughly.
4) Add SOLDERON PB Concentrate (if necessary) and mix thoroughly.
5) Add SOLDERON SG-J Complexer and mix thoroughly.
6) Add SOLDERON SG-J Brightener and mix thoroughly.
7) Dilute to final volume with deionized water.
8) Check pH and adjust if necessary.
### Bath Operation

#### Bath Operation—Metric

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin Concentration</td>
<td>10–15 g/l</td>
<td>13.5 g/l</td>
</tr>
<tr>
<td>Lead Concentration (if necessary)</td>
<td>0.5–10 g/l</td>
<td>0.75 g/l</td>
</tr>
<tr>
<td>pH</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>20–30°C</td>
<td></td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.14 g/ml</td>
<td></td>
</tr>
<tr>
<td>Current Density</td>
<td>0.25–1.5 A/dm²</td>
<td></td>
</tr>
<tr>
<td>Deposition Rate</td>
<td>4.0 microns/10 minutes at 1.0 A/dm²</td>
<td></td>
</tr>
<tr>
<td>Agitation</td>
<td>Solution plus cathode movement</td>
<td></td>
</tr>
</tbody>
</table>

#### Bath Operation—U.S.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin Concentration</td>
<td>1.3–2.0 oz./gal</td>
<td>1.8 oz./gal</td>
</tr>
<tr>
<td>Lead Concentration (if necessary)</td>
<td>0.7–0.13 g/l</td>
<td>0.1 oz./gal</td>
</tr>
<tr>
<td>pH</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>68–86°F</td>
<td></td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>17.8° Baumé</td>
<td></td>
</tr>
<tr>
<td>Current Density</td>
<td>2.5–15.0 A/ft²</td>
<td></td>
</tr>
<tr>
<td>Deposition Rate</td>
<td>160 microinches/10 minutes at 1.0 A/ft²</td>
<td></td>
</tr>
<tr>
<td>Agitation</td>
<td>Solution plus cathode movement</td>
<td></td>
</tr>
</tbody>
</table>

### Bath Maintenance

SOLDERON™ MLCC Tin Concentrate OR SOLDERON Tin HS 300 Concentrate

Each product contains 300 g/l tin (II). To raise tin (II) concentration 1.0 g/l, add 3.33 ml/l (0.333% v/v) of SOLDERON MLCC Tin Concentrate or SOLDERON Tin HS 300 Concentrate.

SOLDERON PB Concentrate

SOLDERON PB Concentrate contains 450 g/l (60 oz./gal.) 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 PB Concentrate.

The metal concentrates are used to replenish and control tin and lead concentrations, respectively, in the electrolyte.

SOLDERON SG-J Complexer

The SOLDERON SG-J Complexer is used to maintain specific gravity. Replenishment should be done according to drag-out.

SOLDERON SG-J Make-up Liquid

SOLDERON SG-J Make-up Liquid is used to stabilize the bath and eliminate precipitation of metal hydroxides. Replenishment amounts are dependent on volume of drag-out.

SOLDERON SG-J Brightener

SOLDERON SG-J Brightener is used to maintain deposit appearance in the desired current density range. SOLDERON SG-J Brightener is replenished at the rate of 150 ml per 1,000 ampere hours.

SOLDERON Acid HC

Solution pH should be maintained between 3.0–4.2. SOLDERON Acid will reduce the pH 0.1 units for every 4 ml added. Sodium hydroxide should be used to increase the pH. An addition of 1.5 g/l sodium hydroxide will increase the pH 0.1 units.
**Equipment**

- **Tanks:** Polypropylene, polyethylene or PVDC
- **Heaters:** Titanium, silica sheathed or PTFE fluoropolymer
- **Anodes:** Pure tin (or 90:10 tin-lead alloy slab anodes, when depositing tin-lead alloy)
- **Filtration:** Continuous 1–5 micron polypropylene filter cartridge

**Preparation**

Prior to make-up, the process tank and ancillary equipment should be thoroughly cleaned and then leached with a SOLDERON™ Acid 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**

SOLDERON Acid HC 100 ml/l (10% v/v)

**III. Procedure**

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

b) Re-circulate 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 re-circulate through the complete system.

e) Discard cleaning solution.

f) Re-circulate water through the complete system.

g) Discard water.

h) Add leaching solution and re-circulate through the complete system.

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

j) Re-circulate leaching solution through the complete system.

k) Discard leaching solution.

l) Re-circulate water through the complete system.

m) Discard water.
Product Data
For the specific product data values, please refer to the Certificate of Analysis provided with the shipment of the product(s).

Associated Products
SOLDERON™ Tin HS 300 Concentrate
SOLDERON MLCC Tin Concentrate
SOLDERON PB Concentrate
SOLDERON SG-J Complexer
SOLDERON SG-J Make-up Liquid
SOLDERON SG-J Brightener
SOLDERON Acid HC

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 Dow Electronic Materials Technical Representative for more information.

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http://www.rohmhaas.com

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