LEW Techniques offers a subcontract service for the vacuum coating of components with thin films. For demanding applications thin films of metals can be sputtered or evaporated onto metals, ceramics, or other difficult-to-coat surfaces. These coatings can provide conductive and solderable layers on non-conductive materials or barriers and protective finishes on difficult-to-plate metals. Our manufacturing know-how and dedicated in-house facilities allows us to offer a comprehensive and versatile service.

**Capability outline**
- Deposition by vacuum sputtering or evaporation
- Various component substrate materials including ceramics, metals and glass
- Coating schemes suitable for soldering, wire-bonding and protective finishes
- Fine line pattern imaging by photolithography
- Pattern realisation by wet chemical and plasma etching
- Deposition through holes, around edges and on side walls
- Global or selective deposition of gold/tin (AuSn) solder

**Applications**
- Semiconductor heatsinks/mounts
- Filters/windows/displays
- Conductors/terminations
- Medical implements
- Reflectors/mirrors
- Earth shields/grounding planes

**Facilities**
- Housed in a class 10,000 clean room, our thin film facilities include:
  - Up and down sputtering tools with three- or four-source magnetron sputter targets
  - E-beam evaporators with four-source indexing crucibles
  - RIE and plasma cleaner/etchers

**Complementary capabilities**
- Laser drilling, profiling and marking
- Diamond sawing
- Electroplating
- Assembly by atmosphere brazing, soldering and welding
- Comprehensive testing facilities to ensure product quality

**Component materials**
- Ceramics including alumina, aluminium nitride and silicon carbide
- Glasses including borosilicate and soda lime
- Fused quartz, sapphire and ferrites
- Semiconductor wafers including silicon and gallium arsenide
- Metals including copper, kovar, tungsten/copper

**Component geometry limits**
- Maximum length and width: 200 mm x 200 mm
- Maximum diameter: 200 mm
- Maximum thickness/height: 50 mm
Coatings

Depending on the equipment and coating types required up to four different coatings can be sequentially deposited in each coating run.

Typical coating layers include:

<table>
<thead>
<tr>
<th>Layer</th>
<th>Coatings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesion</td>
<td>Ti, Cr, NiCr, TiW, TaN</td>
</tr>
<tr>
<td>Barrier</td>
<td>Pd, Pt, Ni</td>
</tr>
<tr>
<td>Conductor</td>
<td>Cu, Au</td>
</tr>
<tr>
<td>Solder</td>
<td>AuSn</td>
</tr>
</tbody>
</table>

Typical coating schemes include:

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr/Au</td>
<td>For decorative/reflective finish</td>
</tr>
<tr>
<td>TiW/Pd/Au</td>
<td>For SnPb, SnAg soldering</td>
</tr>
<tr>
<td>TiW/Pd/Au/Ni/Au</td>
<td>For additional soldering leach resistance</td>
</tr>
<tr>
<td>Ti/Pt/Au</td>
<td>Best soldering performance but more costly</td>
</tr>
<tr>
<td>NiCr</td>
<td>For protective finish</td>
</tr>
<tr>
<td>Ti/Cu/Ni/Au</td>
<td>For high conductivity</td>
</tr>
<tr>
<td>AuSn</td>
<td>Solder pre-deposition for critical attach</td>
</tr>
</tbody>
</table>

Typical deposition thickness:

<table>
<thead>
<tr>
<th>Layer</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesion</td>
<td>100 - 2000 Å (angstroms)</td>
</tr>
<tr>
<td>Barrier</td>
<td>0.1 - 2 µm</td>
</tr>
<tr>
<td>Conductors</td>
<td>0.2 - 5 µm</td>
</tr>
</tbody>
</table>

Masking

By using physical masks the coatings can be selectively deposited onto required areas only.

High resolution patterning

Utilising wet or dry film photo resists, fine high density lines and features can be resolved to create circuits, logos and other images.

Microcircuits

See our website for details of our comprehensive capabilities for manufacturing RF and optoelectronic microcircuits.