Pre-application of flux-free solder pads on Condura® DCB substrates is one of the processing features under Condura®+.

Here solder material of defined thickness and varying sizes can be applied on the substrate and is so customized that the pad location is pre-fixed on the substrate.

Fixation dots deposited on the solder pads ensure that the dies do not move once placed. Upon reflow, the fixation material vaporizes without leaving any residues.
Alumina DCB substrate

- Alumina ceramic $\text{Al}_2\text{O}_3$ (96 %)
  Thicknesses: 0.25 mm/0.32 mm/0.38 mm/0.63 mm
- Direct Copper Bonding Cu-OFE
  Thicknesses: 0.2 mm/0.25 mm/0.3 mm/0.4 mm
- Single Unit or Master Card size 7" x 5" (usable area)
- Surface finish: bare Cu, Ni-plated (further options as Ag, NiAu by agreement)
- No visible splatter

Solder pads

<table>
<thead>
<tr>
<th>Alloy</th>
<th>SnAg3.5, SnAg3Cu0.5, SnSb10, SnAg20, PbSn5Ag2.5</th>
<th>Other alloys to be agreed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solder pad dimensions</td>
<td>Possible down to 1mm² in area; to be agreed on the maximum area</td>
<td></td>
</tr>
<tr>
<td>Solder thickness</td>
<td>Based on customer requirement</td>
<td>Typically ≤ 60µm after die attach</td>
</tr>
</tbody>
</table>

Various solder material thicknesses and areas can be placed on the substrate

Positioning solder pad with respect to the component

<table>
<thead>
<tr>
<th></th>
<th>± 100 µm</th>
</tr>
</thead>
<tbody>
<tr>
<td>$h$</td>
<td></td>
</tr>
<tr>
<td>$v$</td>
<td></td>
</tr>
</tbody>
</table>

Rotation of solder pad

<300µm, to be agreed
**Solder tilt**
Max. 5°, to be agreed

**Fixation dot**
The volume of the fixation dot varies with chip or solder pad size. The materials vaporizes without leaving any residue (checked through Auger spectroscopy and bonding wire pull & shear tests).

**Die backside metallization**
- **Metallization**: Solderable functional surface, e.g. Ag or Au
- **Size**: Based on customer requirement

**Die placement**
Standard chip placement parameters
No temperature needed for placement

**Die soldering**
- **Process**: Reflow in active atmosphere, e.g. formic acid, forming gas (N₂+H₂), pure H₂;
  Vacuum recommended for high quality
  We can support you in designing process conditions, e.g. reflow profile
- **Total void rate**: ≤ 5% of the wetted area
- **Max. void size**: ≤ 0.5% of wetted area
- **Splatter**: No splatter visible
- **Residue cleaning**: Not required
Handling and storage

**Shipping**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>5 - 40°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity</td>
<td>Keep packaged in a dry place</td>
</tr>
</tbody>
</table>

**Storage conditions**

<table>
<thead>
<tr>
<th>Room temperature</th>
<th>15 - 25°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity</td>
<td>Store in a dry place in original packaging</td>
</tr>
</tbody>
</table>

**Shelf life**

| Original packaging | 2 months after shipment date |

**Processing**

- **Open** the original package only in a clean environment
- **Floor life**: Total processing time after opening is max. 2 days
- Unused parts must be replaced in a moisture barrier bag and be stored in nitrogen atmosphere, max. storage time is 2 weeks

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**Heraeus Electronics offers:**

- Reliable IATF 16949 certified supply of:
  - Condura®.prime AMB-Si₃N₄ (active metal brazed Si₃N₄)
  - Condura®.extra DCB-ZTA (zirconia-toughened alumina)
  - Condura®.classic DCB-Al₂O₃ (direct copper bonded Al₂O₃)
- Condura®+ for example:
  - Engineering Services (Simulation, Prototype Design & Assembly, Testing and Qualification, Material Analysis)
  - Pre-applied sinter / solder
- To be your competent one-stop materials solutions partner!

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The descriptions and engineering data shown here have been compiled by Heraeus using commonly accepted procedures, in conjunction with modern testing equipment, and have been compiled as according to the latest factual knowledge in our possession. The information was up-to-date on the date this document was printed (latest versions can always be supplied upon request). Although the data is considered accurate, we cannot guarantee accuracy, the results obtained from its use, or any patent infringement resulting from its use (unless this is contractually and explicitly agreed in writing, in advance). The data is supplied on the condition that the user shall conduct tests to determine materials suitability for a particular application. Except as otherwise noted, all trademarks in this document are trademarks of legal entities of the Heraeus Group. Condura® is a trademark registered in Germany and Taiwan.

(2) Aging tests ongoing, longer shelf life up to 6 months is in testing