**Introduction**

Wafer Flux WS-3401 is a low-viscosity semiconductor-grade flux, specifically optimized to remove surface oxides from solder bumps on wafers. Working with the natural surface tension of solder, WS-3401 produces uniform hemispherical bumps without solder robbing or solder bridging. The rheology is suited to both spin coat and spray applications.

**Features**

- Water-soluble
- Viscosity suitable for 150–300mm wafers
- No residue after multiple reflow/cleaning cycles
- Uniform bump shape
- Halogen-free—no intentionally added (NIA) halogens
- Suitable for SnPb and Pb-free, and high-temperature applications
- Non-corrosive to underbump metallization

**Properties**

<table>
<thead>
<tr>
<th>Flux Type Classification</th>
<th>Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M0</td>
<td>J-STD-004 (IPC-TM-650: 2.3.32 and 2.3.33)</td>
</tr>
<tr>
<td>Typical Viscosity</td>
<td>42cSt</td>
<td>Cannon-Fenske viscometer</td>
</tr>
<tr>
<td>SIR (Ohms, post cleaning)</td>
<td>Pass (&gt;10^8 after 7 days @ 85°C and 85% RH)</td>
<td>J-STD-004 (IPC-TM-650: 2.6.3.3 IPC-B-24)</td>
</tr>
<tr>
<td>Typical Acid Value</td>
<td>60mg KOH/g</td>
<td>Titration</td>
</tr>
<tr>
<td>Color</td>
<td>Amber to brown</td>
<td>Visual</td>
</tr>
<tr>
<td>Shelf Life</td>
<td>6 months (0–25°C)</td>
<td>Viscosity change/microscope examination</td>
</tr>
</tbody>
</table>

*All information is for reference only. Not to be used as incoming product specifications.*

**Application**

WS-3401 can be applied by standard spray and spin coating techniques.

For spin coating applications, an initial rotation speed should be used to spread this liquid flux uniformly onto the wafer. Next, a velocity rotation ranging from 15–800rpm, based on the application, should be used. The wafer size, topology, pitch, and the flux application are all variations that would impact the rotation velocity. This velocity rotation should be used to thin the flux and remove the excess flux from the wafer surface.

**Cleaning**

WS-3401 is designed to be cleaned with DI water or water with an added cleaner. Ideal conditions for spray cleaning are 25°C or higher for >1 minute at >60psi.

**Packaging**

WS-3401 is sold by weight (grams) and is available in appropriate containers from 100g to 3.5kg (3,500 grams—approximately 1 gallon). Other packaging can be provided to meet specific requirements.

**Storage**

WS-3401 containers should be stored at 0–25°C for maximum shelf life. Storage temperatures should not exceed 25°C for more than 4 days, and should never exceed 30°C. After removing from cold storage, WS-3401 should be allowed to stand for at least 4 hours at room temperature before using.
Reflow

**Recommended Profile:**

The above profile is recommended as a starting point for 300mm wafers with SnAg solder microbumps, and should be optimized by the user to meet their individual process needs. Wafers should be reflowed in a nitrogen atmosphere (<10ppm O₂ is recommended, but <20ppm O₂ may be feasible; however, results may not be optimal). Note that bridging or solder thieving may be seen for fine-pitch microbumps (<60 microns) on copper pillars, and that reducing the peak temperature will reduce the occurrence of this failure mode.

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**Technical Support**

Indium Corporation sets the industry standard in providing rapid response, onsite technical support for our customers worldwide. Indium Corporation’s team of Technical Support Engineers can provide expertise in all aspects of Materials Science and Semiconductor Packaging process applications.

**Safety Data Sheets**

The SDS for this product can be found online at: http://www.indium.com/sds