**PRODUCT DATA SHEET**

**Indium8.9HF**

High-Reliability (Indalloy®292 and Indalloy®276) Solder Paste

**Introduction**

*Indium8.9HF* is an air reflow, no-clean solder paste formulated to accommodate the higher processing temperatures required by high-reliability alloy Indalloy®292 and other alloy systems favored by the electronics industry to replace conventional Pb-bearing solders. *Indium8.9HF* offers unprecedented stencil print transfer efficiency to work in the broadest range of processes. In addition, the high probe testability of *Indium8.9HF* minimizes false failures in ICT. It is an exceptional material for conformal coating compatibility.

**Features**

- Halogen-free per EN14582 test method
- One of our most stable pastes
- High transfer efficiency through small apertures (≤0.66AR)
- Eliminates hot and cold slump
- High oxidation resistance
- Wets well to oxidized BGA and pad surfaces
- Excellent soldering performance under high-temperature and long reflow processes
- Clear, probe testable flux residue

**Alloys**

Indium Corporation manufactures low-oxide spherical powder composed of a variety of Pb-free alloys that cover a broad range of melting temperatures. This document covers Type 4 powder as a standard offering with Indalloy®292. The metal percent is the weight percent of the solder powder in the solder paste and is dependent upon the powder type and application.

**Standard Product Specifications**

<table>
<thead>
<tr>
<th>Alloy</th>
<th>Metal Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Composition</td>
</tr>
<tr>
<td>Indalloy®292</td>
<td>Patent Pending</td>
</tr>
<tr>
<td>Indalloy®276</td>
<td>Patent Pending</td>
</tr>
</tbody>
</table>

**Industry Standard Test Results and Classification**

- Flux Classification: ROLO
- Typical Solder Paste Viscosity for Indalloy®292 T4 (Poise): 1,440
- Halogen-free per IEC 61249-2-21, Test Method EN14582:
  - <900ppm Cl
  - <900ppm Br
  - <1,500ppm Total

Conforms with all requirements from IPC J-STD-005A.

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

**Storage and Handling Procedures**

Refrigerated storage will prolong the shelf life of solder paste. Solder paste packaged in cartridges should be stored tip down.

<table>
<thead>
<tr>
<th>Storage Conditions (unopened containers)</th>
<th>Shelf Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10°C</td>
<td>6 months</td>
</tr>
</tbody>
</table>

Solder paste should be allowed to reach ambient working temperature prior to use. Generally, paste should be removed from refrigeration at least 2 hours before use. Actual time to reach thermal equilibrium will vary with container size. Paste temperature should be verified before use. Jars and cartridges should be labeled with date and time of opening.

**Complementary Products**

- **Rework Flux**: TACFlux®089HF, TACFlux®020B-RC
- **Cored Wire**: CW-807 or Core 230-RC within the Indalloy®292C alloy
- **Wave Flux**: WF-9945, WF-9958

*Note: Other products may be applicable. Please consult one of Indium Corporation’s Technical Support Engineers.*

**Packaging**

*Indium8.9HF* is currently available in 500g jars or 600g cartridges. Packaging for enclosed print head systems is also readily available. Alternate packaging options may be available upon request.

**Technical Support**

Indium Corporation’s internationally experienced engineers provide in-depth technical assistance to our customers. Thoroughly knowledgeable in all facets of Materials Science as it applies to the electronics and semiconductor sectors, Technical Support Engineers provide expert advice in solder preforms, wire, ribbon, and paste. Indium Corporation’s Technical Support Engineers provide rapid response to all technical inquiries.

**Safety Data Sheets**

Please refer to the SDS document within the product shipment, or contact our local team to receive a copy.
**Product Data Sheet**

**Indium8.9HF**

**High-Reliability (Indalloy®292 and Indalloy®276) Solder Paste**

### Printing

**Stencil Design:**

Electroformed and laser cut/electropolished stencils produce the best printing characteristics among stencil types. Stencil aperture design is a crucial step in optimizing the print process. The following are a few general recommendations:

- **Discrete components**—A 10–20% reduction of stencil aperture has significantly reduced or eliminated the occurrence of mid-chip solder beads. The "home plate" design is a common method for achieving this reduction.
- **Fine-pitch components**—A surface area reduction is recommended for apertures of 20mil pitch and finer. This reduction will help minimize solder balling and bridging that can lead to electrical shorts. The amount of reduction necessary is process-dependent (5–15% is common).
- **For optimum transfer efficiency and release of the solder paste from the stencil apertures, industry standard aperture and aspect ratios should be adhered to.**

**Recommended Printer Operation**

<table>
<thead>
<tr>
<th>Solder Paste Bead Size</th>
<th>~20–25mm in diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Speed</td>
<td>25–150mm/second</td>
</tr>
<tr>
<td>Squeegee Pressure</td>
<td>0.018–0.027kg/mm of blade length</td>
</tr>
<tr>
<td>Underside Stencil Wipe</td>
<td>Start at once per every 5 prints and decrease frequency until optimum value is reached</td>
</tr>
<tr>
<td>Squeegee Type/Angle</td>
<td>Metal with appropriate length; 45 or 60° squeegees are typically used</td>
</tr>
<tr>
<td>Separation Speed</td>
<td>5–20mm/second or per equipment manufacturer’s specifications</td>
</tr>
<tr>
<td>Solder Paste Stencil Life</td>
<td>Up to 60 hours (at 30–60% RH and 22–28°C)</td>
</tr>
</tbody>
</table>

### Cleaning

**Indium8.9HF** is designed for no-clean applications; however, the flux can be removed, if necessary, by using a commercially available flux residue remover.

**Stencil cleaning** is best performed using isopropyl alcohol (IPA) as a solvent. Most commercially available non-water-based stencil cleaners work well.

### Reflow

**Recommended Profile:**

This can be used as a general guideline in establishing a reflow profile when using **Indium8.9HF** with **Indalloy®292 Solder Paste**. Deviations from these recommendations are acceptable, and may be necessary, based on specific process requirements, including board size, thickness, and density. Start with a linear profile. If needed, a flat soak portion or a linear shoulder may be added to reduce the thermal gradient.

<table>
<thead>
<tr>
<th>Reflow Profile Details</th>
<th>Indalloy®292 Parameters</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramp Profile (Average Ambient to Peak)—Not the Same as Maximum Rising Slope</td>
<td>1–2.5°C/second</td>
<td>1–3°C/second</td>
</tr>
<tr>
<td>Soak Zone Profile (Optional)</td>
<td>N/A</td>
<td>20–120 seconds</td>
</tr>
<tr>
<td>Time Above Liquidus (TAL, over 228°C)</td>
<td>70–90 seconds</td>
<td>50–100 seconds</td>
</tr>
<tr>
<td>Peak Temperature</td>
<td>245–250°C</td>
<td>240–260°C</td>
</tr>
<tr>
<td>Cooling Ramp Rate</td>
<td>2–6°C/second</td>
<td>0.5–6°C/second</td>
</tr>
<tr>
<td>Reflow Atmosphere</td>
<td>Air or N₂</td>
<td>N₂ preferred for small components</td>
</tr>
</tbody>
</table>

*Note: All parameters are for reference only. Modifications may be required to fit process and design.*

---

**Contact our engineers:** askus@indium.com

**Learn more:** [www.indium.com](http://www.indium.com)

**ASIA +65 6268 8678 • CHINA +86 (0) 512 628 34900 • EUROPE +44 (0) 1908 580400 • USA +1 315 853 4900**

*©2021 Indium Corporation*