

PRODUCT DATA SHEET

Indium3.2

Pb-Free Water-Soluble Solder Paste

Introduction

Indium3.2 is an air or nitrogen reflow, water-soluble solder paste specifically formulated to accommodate the higher processing temperatures required by the SnAgCu, SnAg, SnSb, and other Pb-free alloy systems. This product formulation offers consistent, repeatable printing performance combined with a long stencil life and sufficient tack strength to handle the challenges of today's high-speed as well as high-mix surface mount lines. In addition to consistent printing and reflow requirements, this solder paste offers superb wetting to the various Pb-free metallizations and has exceptional low-voiding performance on fine-pitch components, including BGAs and CSPs.

Features

- Consistent fine-pitch printing performance with high transfer efficiency from stencil apertures
- Superior fine-pitch soldering ability
- Wide reflow profile window
- Excellent response-to-pause printing performance
- Outstanding slump resistance
- Low-voiding
- Minimal foaming during the cleaning process
- Excellent wetting

Alloys

Indium Corporation manufactures low-oxide spherical powder composed of a variety of Pb-Free alloys that cover a broad range of melting temperatures. Type 3 powder is the standard offering with SnAgCu, SnAg, and SnSb Pb-free alloy systems. The metal percent is the weight percent of the solder powder in the solder paste and is dependent upon the powder type and application.

Bellcore and J-STD Tests and Results

| Industry Standard Test Results and Classification | | | |
|---|------|--|-------|
| Flux Classification | ORM1 | Typical Solder Paste Viscosity for SAC305 T4 (Poise) | 1,700 |
| Based on the testing required by IPC J-Standard-004B. | | Conforms with all requirements from IPC J-Standard-005A. | |

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

Standard Product Specifications

| Alloy | Metal Load |
|-----------------------------|----------------|
| 96.5Sn/3.0Ag/0.5Cu (SAC305) | 88.5% Printing |
| 95.5Sn/3.8Ag/0.7Cu (SAC387) | |

Packaging

Indium3.2 is 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.

Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. The shelf life of **Indium3.2** is no less than 4 months when stored at <5°C. Solder paste packaged in cartridges and syringes should be stored tip down.

When refrigerated, solder paste should be allowed to reach ambient working temperatures 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 the container size, and the solder paste temperature should be verified before use. Jars and cartridges should be labeled with the date and time of opening. It is not recommended to remove worked paste from the stencil and mix it with the unused paste in the jar because this may alter the rheology of the unused paste.

Compatible Products

- **Rework Flux:** TACFlux® 025-NP
- **Flux Pen:** FP-1095-NF
- **Cored Wire:** CW-301
- **Wave Flux:** 1095-NF

Technical Support

Indium Corporation's internationally experienced engineers provide in-depth technical assistance to our customers. Thoroughly knowledgeable in all facets of Material 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

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

From One Engineer To Another®



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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

| | |
|---------------------------|---|
| Solder Paste Bead Size | 20–40mm in diameter |
| Print Speed | 150mm/second |
| Squeegee Pressure | 0.018–0.027kg/mm of blade length |
| Underside Stencil Wipe | Start at once per every 5 prints and decrease frequency until optimum value is determined |
| Solder Paste Stencil Life | >12 hours (<60% RH and 22–28°C) |

Cleaning

Residue Removal

Indium3.2 flux residues are water-soluble and best removed by an inline or batch type cleaning process using spray pressure and heated DI water. A spray pressure of 60psi and a DI water temperature of 55°C can be used as a starting point. The optimal spray pressure and temperature are a function of board size, complexity, and the efficiency

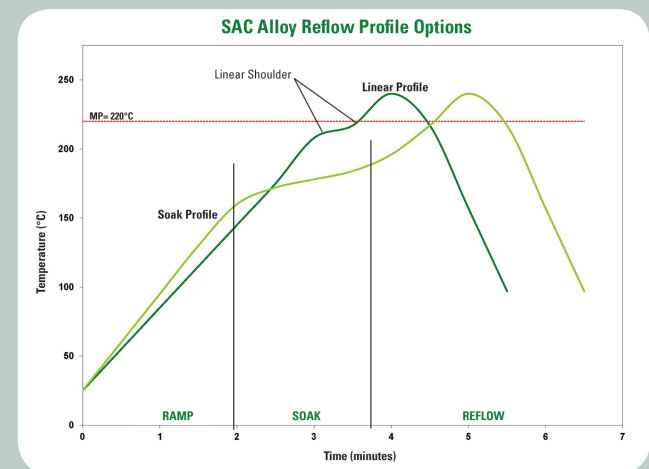
of the cleaning equipment and should be optimized accordingly. We recommend cleaning the flux residue 12 hours (or sooner) after reflow for optimal test performance. Electrical testing should be completed after the flux residue is removed.

Stencil Cleaning

This is best performed using an automated stencil cleaning system for both stencil and misprint cleaning to remove extraneous solder particles. Most commercially available stencil cleaners and isopropyl alcohol are acceptable.

Reflow

Recommended Profile:



The stated profile recommendations apply to most Pb-free alloys in the SnAgCu (SAC) alloy system, including SAC305 (96.5Sn/3.0Ag/0.5Cu). This can be used as a general guideline in establishing a reflow profile when using Indium3.2 Pb-Free Water-Soluble 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 the linear profile, then move to the optional soak profile, if needed. The flat soak portion of the linear profile (linear shoulder) may also be eliminated.

| Reflow Profile Details | SAC305 Parameters | | Comments |
|---|-----------------------|------------------|--|
| | Recommended | Acceptable | |
| Ramp Profile (Average Ambient to Peak)— Not the Same as Maximum Rising Slope | 0.5–1°C/second | 0.5–2.5°C/second | To minimize solder balling, beading, hot slump |
| Soak Zone Profile (Optional) | 30–90 seconds | 30–120 seconds | May minimize BGA/CSP voiding Eliminating/reducing the soak zone <u>may</u> help to reduce HIP and graping |
| | 160–180°C | 150–200°C | |
| Time Above Liquidus (TAL) | 45–60 seconds | 30–100 seconds | Needed for good wetting/reliable solder joint |
| Peak Temperature | 230–260°C | 230–262°C | As measured with thermocouple |
| Cooling Ramp Rate | 2–6°C/second | 0.5–6°C/second | Rapid cooling promotes fine-grain structure |
| Reflow Atmosphere | Air or N ₂ | | N ₂ preferred for small components |

Note: All parameters are for reference only.

Modifications may be required to fit process and design.

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All of Indium Corporation's solder paste and preform manufacturing facilities are IATF 16949:2016 certified. Indium Corporation is an ISO 9001:2015 registered company.

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