

# 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

Test	Result	Test	Result
<b>J-STD-004 (IPC-TM-650)</b>		<b>J-STD-005 (IPC-TM-650)</b>	
Flux Type (per J-STD-004A)	ORM1	Typical Solder Paste Viscosity SAC305 (96.5Sn/3Ag/0.5Cu, Type 3, 85.5%) Malcom (10rpm)	1,750 poise*
Flux Induced Corrosion	M		
SIR (cleaned)	Pass		
All information is for reference only. Not to be used as incoming product specifications.		Typical Tackiness	50g*
		Slump Test	Pass
		Solder Ball Test	Pass
		Thixotropic Index (ICA Test)	-0.60

\* The reported value is a running average subject to periodic updates.

### 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.

### 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>

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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	12–150mm/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	>8 hours (<60% RH and 22–28°C)

## Cleaning

### Residue Removal

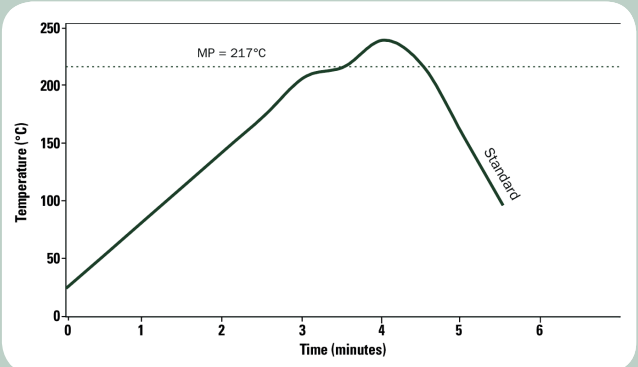
**Indium3.2** flux residues are water-soluble and best removed by an inline or batch type cleaning process using spray pressure and heated DI water. A spray pressure of 60psi and a DI water temperature of 55°C can be used as a starting point. The optimal spray pressure and temperature are a function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



**Indium3.2** should be reflowed using a linear profile in an air or nitrogen atmosphere. The stated profile recommendations can be used as a general guideline in establishing a reflow profile for **Indium3.2** with SnAgCu, SnAg, and SnSb alloy systems.

### Heating Stage:

A linear ramp rate of 0.5–2.0°C/second allows gradual evaporation of volatile flux constituents and helps minimize defects such as solder balling and/or beading and bridging resulting from hot slump. It also prevents unnecessary depletion of fluxing capacity when a high peak temperature and extended time above liquidus is used.

### Liquidus Stage:

**Indium3.2** can accommodate a peak temperature range of 235–260°C. The actual peak temperature is determined by the board size, complexity, and component limitations. The time above liquidus (TAL) should be 30–90 seconds. A peak temperature and TAL above these recommendations can result in excessive intermetallic formation that can decrease solder joint reliability.

### Cooling Stage:

A rapid cool down is desired to form a fine-grain structure. Slow cooling will form a large-grain structure, which typically exhibits poor fatigue resistance. The acceptable cooling range is 0.5–6.0°C/second (2.0–6.0°C/second is ideal).

## Compatible Products

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

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