

# PRODUCT DATA SHEET

# Indium3.1

## Pb-Free Water-Soluble Solder Paste

### Features

- Exceptional printing
- Long stencil life
- Wide reflow profile window
- Outstanding slump resistance
- Excellent wetting compatibility
- Superior fine-pitch soldering ability
- Low-voiding
- Low foam

### 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 other 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.

### Standard Product Specifications

Alloy	Metal Load		Particle Size
	Printing	Dispensing	
Indalloy®241 95.5Sn/3.8Ag/0.7Cu	88.5%	83%	25–45µm 0.001–0.0018"
Indalloy®256 96.5Sn/3.0Ag/0.5Cu			
Indalloy®121 96.5Sn/3.5Ag			

### Packaging

Standard packaging for stencil printing applications includes 500g jars and 500g cartridges. Other 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 **Indium3.1** is no less than 4 months when stored at less than 10°C.

Solder paste should be allowed to reach ambient working temperature prior to use (about 4–6 hours). Actual time to reach thermal equilibrium will vary with container size. Paste temperature should be verified before use. Use paste within 8 hours of exposure to atmosphere. Jars and cartridges should be labeled with date and time of opening.

When storing solder paste contained in syringes and cartridges, the solder paste should be stored with the tip down.

### 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>

### Bellcore and J-STD Tests and Results

Test	Result	Test	Result
J-STD-004A (IPC-TM-650)		J-STD-005 (IPC-TM-650)	
Flux Type (per J-STD-004A)	ORM1	Typical Solder Paste Viscosity Malcolm (10rpm) SAC387 (95.5Sn/3.8Ag/0.7Cu, Type 3, 89%) SAC305 (96.5Sn/3.0Ag/0.5Cu, Type 3, 88.5%)	1,950 poise
Flux-Induced Corrosion	M		
Presence of Halide Silver Chromate Fluoride Spot Test Quantitative Halide Content	Pass Pass <5,000ppm		
		Slump Test	Pass
SIR (Cleaned)	Pass	Solder Ball Test	Pass

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

From One Engineer To Another®



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## Printing

The sharp print definition of **Indium3.1** is ideal for fine-pitch applications. The unprecedented stencil life of this water-soluble product virtually eliminates waste of solder paste.

### Recommended Printer Operation

The following are general recommendations for stencil printer optimization for **Indium3.1**. Adjustments may be necessary based on specific process requirements:

Solder Paste Bead Size	20–25mm in diameter
Print Speed	25–100mm/second
Squeegee Pressure	0.018–0.027kg/mm of blade length
Underside Stencil Wipe	Once every 10–25 prints or as necessary
Solder Paste Stencil Life	>8 hours (at 20–50% RH and 22–28°C) ~4 hours (at 50–70% RH and 22–28°C)

## Wetting

**Indium3.1** exhibits excellent wetting under both air and nitrogen reflow atmosphere. The solder joints yielded are shiny and smooth, including those of ultrafine-pitch components. **Indium3.1** has low-voiding performance, including joints of BGAs and CSPs.

## Cleaning

### Residue Removal

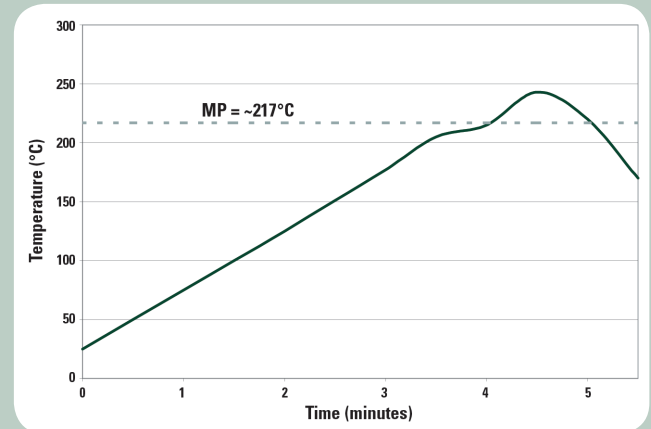
**Indium3.1** flux residues are water-soluble and best removed by an inline or batch type cleaning process using spray pressure and heated DI water. A spray pressure of 60psi and a DI water temperature of 55°C can be used as a starting point. The optimal spray pressure and temperature are a function of board size, complexity, and the efficiency of the cleaning equipment and should be optimized accordingly. For gaps less than about 50µm (2mil), the addition of an appropriate surfactant in the water washing tank will lower the surface tension of the water to allow for faster penetration of the cleaning medium and improve cleaning effectiveness. We recommend cleaning the flux residue 12 hours (or sooner) after reflow for optimal test performance.

### 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 above reflow profile was designed to serve as a starting point for process optimization using **Indium3.1 Solder Paste**. When seeking to minimize thermal gradient or reduce voiding in BGA assemblies, a profile utilizing a soak of up to 2 minutes at 205–210°C may help.

### Heating Stage:

A linear ramp rate of approximately 1°C/second allows gradual evaporation of volatile flux constituents and prevents defects such as solder balling/beading and bridging as a result of hot slump. It also prevents unnecessary depletion of fluxing capacity when using higher temperature alloys.

### Liquidus Stage:

A peak temperature of 10–35°C (240°C shown) above the melting point (217°C) of the solder alloy is needed to form a quality solder joint and achieve acceptable wetting due to the formation of an intermetallic layer. If the peak temperature is excessive, or the time above liquidus is greater than the recommended 30–90 seconds, flux charring, excessive intermetallic formation, and damage to the board and components can occur.

### 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 (2–6°C/second is ideal).

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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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