

## PRODUCT DATA SHEET

# Indium8.9HF (T5) Pb-Free Solder Paste



### Introduction

**Indium8.9HF (T5)** is an air reflow, no-clean solder paste specifically formulated to accommodate the higher processing temperatures required by the SnAgCu, SnAg, and other alloy systems favored by the electronics industry to replace conventional Pb-bearing solders.

**Indium8.9HF (T5)** offers unprecedented stencil print transfer efficiency to work in the broadest range of processes. In addition, the high probe testability of **Indium8.9HF (T5)** minimizes false failures in ICT. It is one of our lowest voiding pastes.

### Features

- Halogen-free per EN14582 test method
- Low BGA, CSP, QFN voiding
- One of our most stable pastes
- High transfer efficiency through small apertures ( $\leq 0.66AR$ )
- 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
- Compatible with SnPb alloys

### 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 T5 and T5-MC powder sizes. 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 **
SAC305	88.25-88.5% (T5 and T5-MC)
SAC387	
SACm**	

\* For more information about SACm®, visit [www.indium.com/SACm](http://www.indium.com/SACm).

\*\* The optimal metal loads are shown above. These can vary based upon geographic location and application/process needs.

### Compatible Products

- Rework Flux: TACFlux® 089HF, TACFlux® 020B
- Cored Wire: CW-807
- Wave Flux: WF-9945, WF-9958

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

### Storage and Handling Procedures

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

Storage Conditions (unopened containers)	Shelf Life
<10°C	6 months

Solder paste should be allowed to reach ambient working temperature prior to use. Generally, paste should be removed from refrigeration at least two 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.

### Packaging

**Indium8.9HF (T5)** 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.

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### BELLCORE AND J-STD TESTS & 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)	ROLO	• Typical Solder Paste Viscosity	1700 poise
• Flux Induced Corrosion (Copper Mirror)	Type L	• Malcom (10 rpm)	
• Presence of Halide		• Slump Test	Pass
• Oxygen Bomb Followed by Ion Chromatography	<100ppm	• Solder Ball Test	Pass
• SIR	Pass	• Typical Tackiness	35 grams
		• Wetting Test	Pass
		<b>BELLCORE GR-78</b>	
		• SIR	Pass
		• Electromigration	Pass

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

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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 20 mil 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.

Printer Operation	
Solder Paste Bead Size	~20-25mm in diameter
Print Speed	25-150mm/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 reached
Squeegee Type/Angle	Metal with appropriate length / ~60 degrees
Separation Speed	5-20mm/second or per equipment manufacturer's specifications
Solder Paste Stencil Life	Up to 12 hours (at 30-60% RH and 22-28°C)

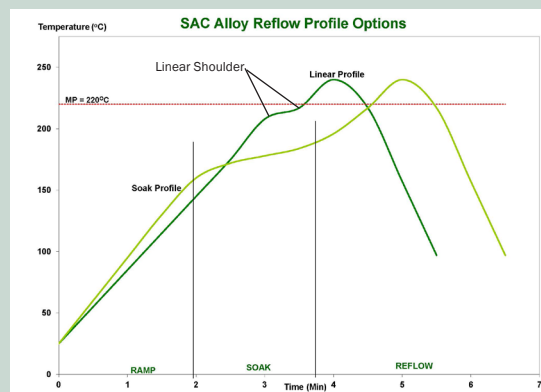
### Cleaning

**Indium8.9HF (T5)** 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 stencil cleaners work well.

### 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 **Indium8.9HF (T5)** 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.

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

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 As measured with thermocouple
Peak Temperature	230–260°C	230–262°C	
Cooling Ramp Rate	2–6°C/Second	0.5–6°C/Second	Rapid cooling promotes fine grain structure
Reflow Atmosphere	Air or N <sub>2</sub>		N <sub>2</sub> preferred for small components

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