

PRODUCT DATA SHEET

Indium8.9HFA Pb-Free Solder Paste



Introduction

Indium8.9HFA is an air reflow, no-clean solder paste specifically formulated to accommodate the higher processing temperatures required by SnAgCu, SnAg, and other alloy systems favored by the electronics industry to replace conventional Pb-bearing solders. **Indium8.9HFA** offers unprecedented stencil print transfer efficiency to work in the broadest range of processes.

Features

- Eliminates clogged apertures through advanced rheology
- Excellent wetting
- Halogen-free per EN14582 test method
- Eliminates hot and cold slump
- High oxidation resistance
- Excellent soldering performance under high temperature and long reflow processes

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 and Type 3 powder as standard offerings with SAC305 and SAC387 alloys. 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 offerings are detailed in the following table.

Standard Product Specifications

Alloy	Metal Load*			
	Type 3	Type 4	Type 4.5	Type 5/ Type 5-MC
95.5Sn/3.8Ag/0.7Cu (SAC387)	88.5%	88.0% - 88.5%	87.75% - 88.25%	
96.5Sn/3.0Ag/0.5Cu (SAC305)				
98.5Sn/1.0Ag/0.5Cu (SAC105)				
99Sn/0.3Ag/0.7Cu (SAC0307)				

*Application Dependent

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

Indium8.9HFA 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.

Industry Standard Test Results and Classification

Flux Classification	ROLO	Typical Solder Paste Viscosity for SAC305 T4 (Poise)	1300
Based on the testing required by the current revision of IPC J-standard-004.		Conforms with all requirements from the current revision of IPC J-standard-005.	
Halogen-free and low-halogen per J-004, IEC, and JEDEC requirements	<<1000ppm Cl <<1000ppm Br		

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Form No. 98549 (A4) R10

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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	> 8 hours (at 30-60% RH and 22-28°C)

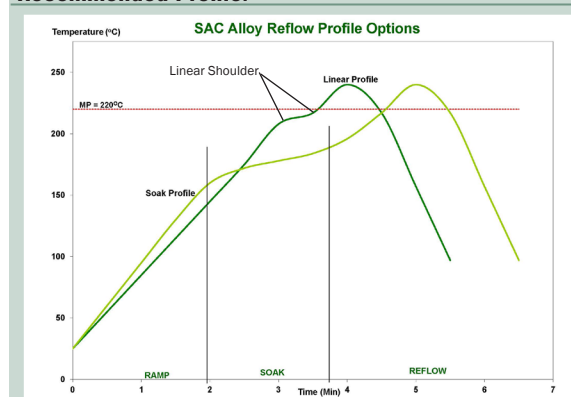
Cleaning

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

Automated stencil cleaning is best performed using a dry wipe followed by a vacuum wipe. If using a wet wipe, isopropyl alcohol or a solvent-based commercially available cleaner should be used. IPA and other solvent-based cleaners are also acceptable for manual stencil cleaning.

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 Indium8.9HFA 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 ₂		N ₂ preferred for small components

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