Indium8.9HFA
Pb-Free Solder Paste

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

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.

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 4 and Type 3 powder are 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
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

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.

Storage and Handling Procedures

The shelf life of **Indium8.9HFA** is 6 months. Solder paste packaged in cartridges should be stored tip down.

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.

OVER→

BELLCORE & J-STD TESTS & RESULTS

Test	Result
J-STD-004A (IPC-TM-650)	
• Flux Type (per J-STD-004A)	ROLO
• Flux Induced Corrosion (Copper Mirror)	Type L
• Presence of Halide Oxygen Bomb followed by ion chromatography	<50ppm Br^- <50ppm Cl^-
• SIR	Pass

Test	Result
J-STD-005 (IPC-TM-650)	
• Typical Solder Paste Viscosity Malcom (10rpm)	1300 poise
• Slump Test	Pass
• Solder Ball Test	Pass
• Typical Tackiness	35g
• Wetting Test	Pass
BELLCORE GR-78	
• SIR	Pass
• Electromigration	Pass

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

Form No. 98549 R5

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INDIUM CORPORATION®

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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:

The following are general recommendations for stencil printer optimization. Adjustments may be necessary based on specific process requirement:

• Solder Paste Bead Size:	20–25mm diameter
• Print Speed:	25–150mm/sec
• Squeegee Pressure:	0.018–0.027kg/mm of blade length
• Underside Stencil Wipe:	Start at once every 5 prints then decrease frequency until an optimum value is determined.
• Solder Paste Stencil Life:	>8 hrs. @ 30–60% RH & 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.

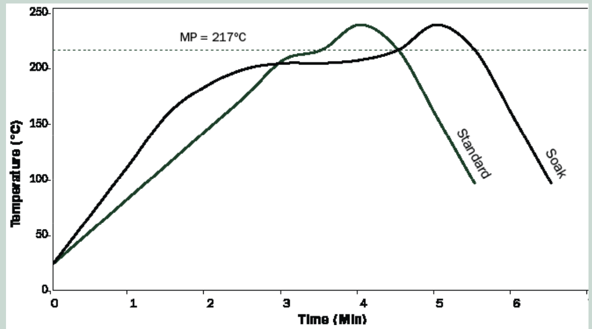
Automated stencil cleaning is best performed using a dry wipe followed by a vacuum wipe. If using a wet wipe, isopropyl alcohol or a solvent-based commercially available cleaner should be used. IPA and other solvent-based cleaners are also acceptable for manual stencil cleaning.

Compatible Products

- Rework Flux: TACFlux® 020B, TACFlux® 089HF
- Cored Wire: CW-802, CW-807
- Wave Flux: WF-7745, WF-9945

Reflow

Recommended Profile:



The stated profile recommendations apply to most Pb-free alloys in the SnAgCu (SAC) alloy system, including SAC 305 (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 & density.

Heating Stage:

The use of a linear ramp rate or ramp-to-spike (RTS) type profile assists in minimizing the greatest overall number of defects associated with the reflow process. If the ramp rate is too fast, it can cause solder balling, solder beading, and aggravated hot slump, which can lead to bridging. The ramp rate in the preheat stage of the profile can range from 0.5°–2.5°C/second (0.5°–1°C/second is ideal). A short soak of 20–30 seconds just below the melting point of the solder alloy can help minimize tombstoning when using a RTS type profile.

If necessary, a ramp-soak-spike (RSS) profile can be implemented to minimize voiding on BGA and CSP type packages. A soak zone between 200°–210°C for up to 2 minutes is acceptable.

Liquidus Stage:

To achieve acceptable wetting and form a quality solder joint, the acceptable temperature range above the melting point of the solder alloy is 12°–50°C (15°–30°C is ideal). The acceptable range for time above liquidus (TAL) is 30–100 seconds (45–60 seconds is ideal). 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°C–6.0°C/second (2.0°–6.0°C/second is ideal).

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