PRODUCT DATA SHEET

Indium8.9

Pb-Free Solder Paste

Introduction

Indium8.9 is an air or nitrogen 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. **Indium8.9** offers unprecedented stencil print transfer efficiency to work in the broadest range of processes. In addition, the high probe testability of **Indium8.9** minimizes false failures in ICT.

Features

- High transfer efficiency through small apertures (≤ 0.66AR)
- Excellent wetting to all common finishes at high and low peak reflow temperatures
- Clear, probe testable flux residue
- Eliminates head-in-pillow defects

Alloys

Indium Corporation manufactures low-oxide spherical powder composed of a variety of Pb-free alloys that cover a broad range of melting temperatures. Types 3 and 4 powder are standard offerings with SAC 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 below.

Standard Product Specifications

Alloy	Metal Load	
	Type 3	Type 4
SAC387	88.50%	88.25%
SAC305		
SAC105		
SAC0307		
SACm®*		

**For more information about SACm®, visit www.indium.com/SACm.*

Bellcore and J-STD Tests and Results

Test	Result
J-STD-004A (IPC-TM-650)	
Flux Type (per J-STD-004A)	ROL1
Flux-Induced Corrosion (Copper Mirror)	Type L
Presence of Halide Silver Chromate Fluoride Spot Test Ion Chromatography	 Pass Pass <0.5% Cl^- eq.
Post-Reflow Flux Residue (ICA Test)	35%
SIR	Pass

Test	Result
J-STD-005 (IPC-TM-650)	
Typical Solder Paste Viscosity Type 3 (800449) Type 4 (800420) Malcolm (10rpm)	 1,750 poise 2,000 poise
Slump, Solder Ball, and Wetting Tests	Pass
Typical Tackiness	50g
BELLCORE GR-78	
SIR	Pass
Electrochemical Migration	Pass

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

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 2 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

Indium8.9 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.

Compatible Products

- **Rework Flux**: TACFlux® 089, TACFlux® 020B
- **Cored Wire**: CW-807
- **Wave Flux**: WF-7742, WF-9942

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

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

From One Engineer To Another®

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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.

Printer Operation

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	Start at once per every 5 prints and decrease frequency until optimum value is reached
Squeegee Type/Angle	Metal with appropriate length; 45 or 60° squeegees are typically used
Separation Speed	5–20mm/second or per equipment manufacturer's specifications
Solder Paste Stencil Life	Up to 8 hours (at 30–60% RH and 22–28°C)

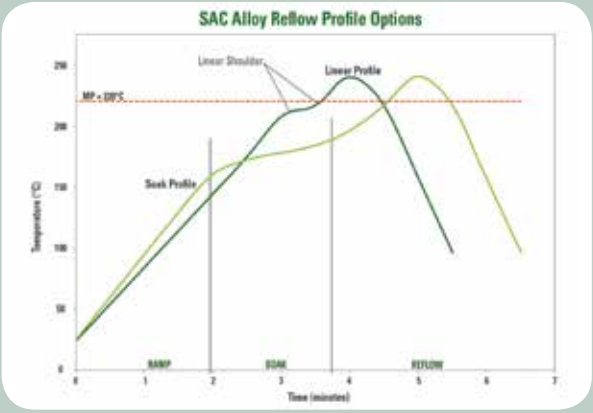
Cleaning

Indium8.9 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 non-water-based 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 **Indium8.9 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.

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
	160–180°C	150–200°C	Eliminating/reducing the soak zone may help to reduce HIP and graping
Time Above Liquidus (TAL)	45–60 seconds	30–100 seconds	Needed for good wetting/reliable solder joint
Peak Temperature	230–260°C	230–262°C	As measured with thermocouple
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

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

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