#### INDIUM CORPORATION®

#### **PRODUCT DATA SHEET**

# Indium9.0A Pb-Free Solder Paste

# Pb-Free con

#### Introduction

Indium9.0A 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. Indium9.0A offers unprecedented stencil print transfer efficiency to work in the broadest range of processes. In addition, the high oxidation resistance of Indium9.0A virtually eliminates incomplete coalescence (graping) of small deposits.

#### 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 and Type 4 powders 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**

Alley	Metal Load		
Alloy	Type 3	Type 4	
95.5Sn/3.8Ag/0.7Cu (SAC387)			
96.5Sn/3.0Ag/0.5Cu (SAC305)	89.0%	88.5%	
98.5Sn/1.0Ag/0.5Cu (SAC105)	83.0%   88.3%		
99Sn/0.3Ag/0.7Cu (SAC0307)			

#### **Features**

- High transfer efficiency through small apertures (≤0.66AR)
- · Eliminates graping phenomenon on small deposits
- Low voiding in BGA/CSP solder joints

#### 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**

**Indium9.0A** 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® 020B, TACFlux® 089HF
- Cored Wire: CW-802, CW-807
- Wave Flux: WF-7745, WF-9945

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

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Test	Result	Test	Result
J-STD-004 (IPC-TM-650)		J-STD-005 (IPC-TM-650)	
Flux Type (per J-STD-004A)	ROL1	Typical Solder Paste Viscosity	
Flux Induced Corrosion		Malcom (10 rpm)	
(Copper Mirror)	Type L	Type 3	1850 poise
Presence of Halide		Slump Test	Pass
Silver Chromate	Pass	Solder Ball Test	Pass
Fluoride Spot Test	Pass	Typical Tackiness 40g	
Ion Chromatography	<0.5% Cl⁻ eq.	Wetting Test	Pass
• SIR	Pass	BELLCORE GR-78	
		• SIR	Pass
		Electromigration	Pass

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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	50-100mm/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 degrees	
Separation Speed	5-20mm/second or per equipment manufacturer's specifications	
Solder Paste Stencil Life	>8 hrs. (at 30-60% RH and 22-28°C)	

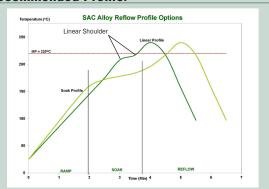
#### Cleaning

**Indium9.0A** 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 Indium9.0A 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		O	
	Recommended	Acceptable	Comments	
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 may 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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