

PRODUCT DATA SHEET

Indium5.1ATR

Pb-Free Solder Paste

Introduction

Indium5.1ATR is an air reflow, no-clean solder paste specifically formulated to accommodate the higher processing temperatures required by the Sn/Ag/Cu, Sn/Ag, and other Pb-free alloy systems favored by the electronics industry to replace conventional Pb-bearing solders. **Indium5.1ATR** offers consistent, repeatable printing performance combined with long stencil and tack times to handle the rigors of today's high-speed as well as high-mix surface mount lines. In addition to consistent printing and reflow requirements, **Indium5.1ATR** offers superb wetting to Pb-free metallizations and low-voiding on CSP's with microvia-in-pad designs.

Features

- Does not contain any RoHS or REACH regulated materials
- Ultra-low voiding in BGA/CSP components
- Ultra-low voiding at via-in-pad sites
- Excellent micro BGA/CSP printability
- Wide reflow process window
- Good response-to-pause performance

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 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 table below.

Standard Product Specifications

Alloy	Metal Load
96.5Sn/3.0Ag/0.5Cu (SAC305)	88.5% (Type 4)
96.5Sn/3.0Ag/0.5Cu (SAC305)	89.0% (Type 3)

Bellcore and J-STD Tests and Results

Test	Result	Test	Result
J-STD-004 (IPC-TM-650)		J-STD-005 (IPC-TM-650)	
Flux Type (per J-STD-004A)	ROLO	Typical Solder Paste Viscosity Malcom (10rpm)	1,700 poise
Flux Induced Corrosion (Copper Mirror)	Type L	Slump Test	Pass
Presence of Halide Oxygen Bomb Followed by Ion Chromatography	<100ppm	Solder Ball Test	Pass
SIR	Pass	Typical Tackiness	35 grams
<i>All information is for reference only. Not to be used as incoming product specifications.</i>		Wetting Test	Pass
		BELLCORE GR-78	
		SIR	Pass
		Electromigration	Pass

Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. The shelf life of **Indium5.1ATR** is 6 months when stored at <10°C. 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 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

Indium5.1ATR 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.

Safety Data Sheets

Please refer to the SDS document within the product shipment, or contact our local team to receive a copy.

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.

Recommended 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
Solder Paste Stencil Life	Up to 12 hours (at 30–60% RH and 22–28°C)

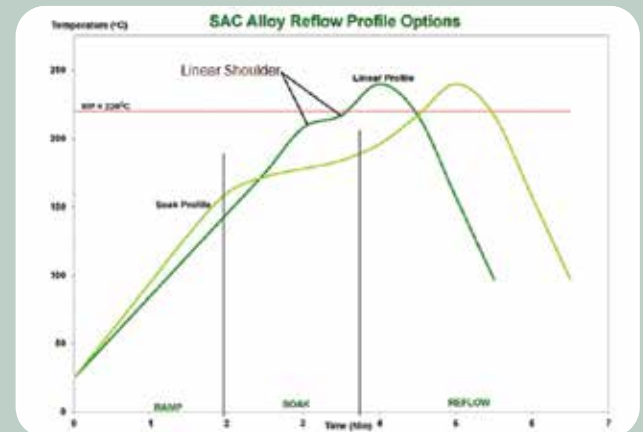
Cleaning

Indium5.1ATR 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 Sn/Ag/Cu (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 **Indium5.1ATR Solder Paste**. Deviations from these recommendations are acceptable, and may be necessary, based on specific process requirements, including board size, thickness & density.

Reflow Profile Details	SAC305 Parameters		Comments
	Recommended	Acceptable	
Ramp Profile (Average Ambient to Peak)—Not the Same as Maximum Rising Slope	1.0–1.5°C/second	0.5–2.5°C/second	To minimize solder balling, beading, hot slump
Soak Zone Profile (Optional)	20–60 seconds	30–120 seconds	May minimize BGA/CSP voiding
	140–160°C	140–170°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	0.5–6.0°C/second	Rapid cooling promotes fine-grain structure
Reflow Atmosphere	Air or N ₂		N ₂ preferred for small components

All parameters are for reference only.

Modifications may be required to fit process and design.

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All of Indium Corporation's solder paste and preform manufacturing facilities are IATF 16949:2016 certified. Indium Corporation is an ISO 9001:2015 registered company.

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