PRODUCT DATA SHEET

Indium8.9HFRV with SAC305

Pb-Free Solder Paste

Introduction

Indium8.9HFRV is an air reflow, no-clean solder formulated to accommodate the higher processing temperatures required by SnAgCu, SnAgCuSb, and other alloy systems favored by the electronics industry to replace conventional Pb-bearing solders. **Indium8.9HFRV** features exceptional low-voiding performance. In addition, **Indium8.9HFRV** provides excellent stencil print transfer efficiency and response-to-pause performance.

Features

- Formulated for low voiding when used with SAC and high-reliability alloys
- Halogen-free
- High transfer efficiency through small apertures (≤0.66AR)
- Excellent wetting
- Excellent response-to-pause performance
- Compatible with both Air and N_2 reflow environments

Alloy

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 powder as a standard offering for high-reliability 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 Specifications

Alloy		Metal Load
Name	Composition	Type 4/4.5
SAC305	96.5Sn/3.0Ag/0.5Cu	89%
SAC405	95.5Sn/4.0Ag/0.5Cu	
SAC387	95.5Sn/3.8Ag/0.7Cu	
SAC105	98.5Sn/1.0Ag/0.5Cu	
SAC0307	99Sn/0.3Ag/0.7Cu	
SACm®	98.5Sn/0.5Ag/1.0Cu	
Sn/Ag	Various Compositions	

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	Packaging
<10°C	12 months	Jar
<10°C	6 months	Cartridge
<10°C	6 months	Syringe

Note: 12-month shelf life only pertains to solder paste made with T3, T4, and T4.5 powders.

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

Indium8.9HFRV solder paste is currently available in 500g jars and 600g cartridges. Alternate packaging options may be available upon request.

Complementary Products

- **Rework Flux**: TACFlux® 089HFRV, TACFlux® 020B-RC

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

Industry Standard Test Results and Classification

Test	Result
IPC J-Standard-004	
Flux Type Classification	ROL0
Quantitative Halide Content	0%
SIR (Ohms)	Pass

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

Test	Result
IPC J-Standard-005	
Typical Solder Paste Viscosity for Pb-free T4	1,340kcps
Tackiness	20g
Slump Test	Pass
Wetting	Pass
Solder Ball	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 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
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	>8 hours (at 30–60% RH and 22–28°C)

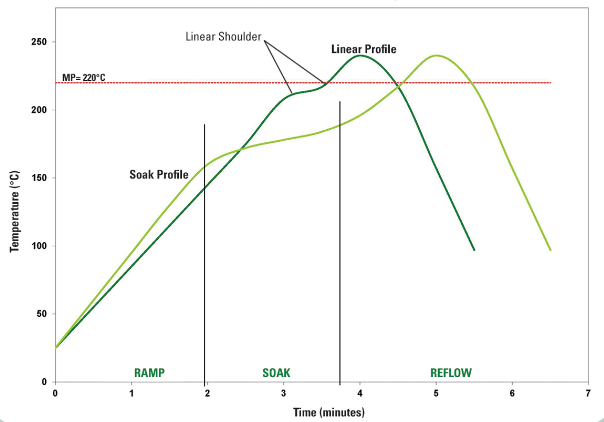
Cleaning

Indium8.9HFRV 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 and SnAgCuSb. This can be used as a general guideline in establishing a reflow profile when using **Indium8.9HFRV 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.

Reflow Profile Details	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 Eliminating/reducing the soak zone <u>may</u> help to reduce HIP and graping
	140–160°C	140–170°C	
Time Above Liquidus (TAL)	45–60 seconds	30–100 seconds	Needed for good wetting/reliable solder joint As measured with thermocouple
Peak Temperature	240–260°C	235–260°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

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

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.