PRODUCT DATA SHEET

Indium3.2HF Pb-Free

Water-Soluble Solder Paste

Introduction

Indium3.2HF is an air or nitrogen reflow, water-soluble solder paste specifically formulated to accommodate the higher processing temperatures required by the Sn/Ag/Cu, Sn/Ag, Sn/Sb, and other Pb-free alloy systems. This product formulation offers consistent, repeatable printing performance combined with a long stencil life and sufficient tack strength to handle the challenges of today's high-speed as well as high-mix surface mount lines. In addition to consistent printing and reflow requirements, this solder paste offers superb wetting to the various Pb-free metallizations and has exceptional low-voiding performance on fine-pitch components, including BGAs and CSPs.

Features

- Exceptional printing
- Long stencil life
- Good response-to-pause
- Wide reflow profile window
- Outstanding slump resistance
- Excellent wetting capability
- Superior fine-pitch soldering ability
- Low-voiding
- Halogen-free

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 powder sizes are the standard offering with Sn/Ag/Cu, Sn/Ag and Sn/Sb Pb-free alloy systems. The metal percent is the weight percent of the solder powder in the solder paste and is dependent upon the powder type and application.

Indium3.2HF Test Data Summary

Industry Standard Test Results and Classification			
Flux Classification	ORH0	Typical Solder Paste Viscosity for SAC305 T3 (Poise)	2,100
Based on the testing required by IPC J-STD-004B		Conforms with all requirements from IPC J-STD-005A	
Halogen-free per IEC 61249-2-21, Test Method EN14582	<900ppm Cl <900ppm Br <1,500ppm Total		

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

Standard Product Specifications

Alloys	Powder Size	Printing
SAC305 SAC387 99.3Sn/0.7Cu	T3	88.50–89.00%
	T4	88.25–89.00%
	T4.5	
	T5/T5MC	88.00–88.50%

Packaging

Indium3.2HF 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

Refrigerated storage will prolong the shelf life of solder paste. The shelf life of **Indium3.2HF** is no less than 6 months when stored at <10°C. Solder paste packaged in cartridges and syringes should be stored tip down.

When refrigerated, solder paste should be allowed to reach ambient working temperatures 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 the container size and the solder paste temperature should be verified before use. Jars and cartridges should be labeled with the date and time of opening. It is not recommended to remove worked paste from the stencil and mix it with the unused paste in the jar, because this may alter the rheology of the unused paste.

Compatible Products

- **Rework Flux**: TACFlux®032HF
- **Flux Pen**: FP-300
- **Cored Wire**: CW-301
- **Wave Flux**: 1095-NF

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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:

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

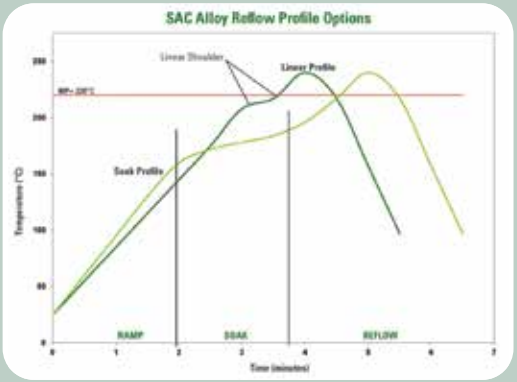
Recommended Printer Operation	
Solder Paste Bead Size	20–40mm in diameter
Print Speed	12–150mm/second
Squeegee Pressure	0.018–0.027Kg/mm of blade length
Underside Stencil Wipe	Start at once every 5 prints, then decrease frequency until an optimum value is determined
Solder Paste Stencil Life	>8 hours @ 60% RH and 22–28°C

Cleaning

Residue Removal: **Indium3.2HF** flux residues are water-soluble and best removed by an inline or batch type cleaning process using spray pressure and heated DI water. A spray pressure of 60psi and a DI water temperature of 55°C can be used as a starting point. The optimal spray pressure and temperature are a function of board size, complexity, and the efficiency of the cleaning equipment and should be optimized accordingly. We recommend cleaning the flux residue 12 hours (or sooner) after reflow for optimal test performance.

Stencil Cleaning: This is best performed using an automated stencil cleaning system for both stencil and misprint cleaning to remove extraneous solder particles. Most commercially available stencil cleaners and isopropyl alcohol are acceptable.

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 **Indium3.2HF 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		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°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.

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