PRODUCT DATA SHEET

Indium6.6HF

Water-Soluble Pb-Free and SnPb Solder Paste

Introduction

Indium6.6HF is a versatile, water-soluble solder paste flux, formulated for air or nitrogen reflow. It is capable of SnPb and Pb-free assembly processes with an exceptional reflow process window. This solder paste provides exceptional stencil printing performance, with long stencil life and excellent response-to-pause.

Indium6.6HF exhibits superior wetting to a variety of surface finishes and exhibits the best voiding performance, with fewest voids, reduced size of largest voids, and overall minimized voiding for BGAs, CSPs, and BTCs (QFNs, DPAKs, LGAs, etc.).

Features

- Low-voiding water-soluble flux for solder paste:
  - Reduced largest voids
  - Fewer voids
  - Minimized voiding overall
  - For BGA, CSP, and bottom termination components, such as QFNs and DPAKs
- Exceptional printing process window:
  - Excellent response-to-pause
  - Long stencil life
  - Prints consistently at a wide range of speeds
- Wide reflow process window
- Excellent wetting on a variety of surface finishes
- Maintains tack over time
- Outstanding cleanability

Bellcore and J-STD Tests and Results

Industry Standard Test Results and Classification			
Flux Classification	ORH0	Typical Solder Paste Viscosity for SAC305 Type 4 (Poise)	2,200
Based on the testing required by IPC J-Standard-004A.		Conforms with all requirements from IPC J-Standard-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.

Alloys

Indium Corporation manufactures low-oxide spherical powder composed of eutectic SnPb and SnPbAg as well as many Pb-free alloys for printed circuit board assembly in the industry standard Types 3 and 4 mesh size (J-STD-006). Other non-standard mesh sizes are available upon request. The metal load is the weight percent of the solder powder in the solder paste and is dependent upon the powder type, alloy, and application. Standard product offerings are detailed in the following table.

Standard Product Specifications

Alloy Grouping	Indalloy® #	Common Name	Composition	T4	T3
SnPb Near-Eutectic	106	Sn63	63Sn/37Pb	89.5%	90.0%
	-	Sn62	62Sn/36Pb/2Ag		
	100	-	62.6Sn/37Pb/0.4Ag		
Pb-Free Alloys	241	SAC387	95.5Sn/3.8Ag/0.7Cu	88.5%	89.0%
	256	SAC305	96.5Sn/3.0Ag/0.5Cu		
	258	SAC105	98.5Sn/1.0Ag/0.5Cu		

Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. The preliminary shelf life of **Indium6.6HF** is 6 months when stored at <10°C. When storing solder paste contained in syringes and cartridges, the packages should be stored with tip down.

Solder paste should be allowed to reach ambient working temperature prior to use and before opening the jar. Ideally, the working environment would be 23–28°C and 40–60% RH. Generally, paste should be removed from refrigeration at least 2 hours prior to 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

Standard packaging for stencil printing applications includes 500g jars and 600g cartridges. For dispensing applications, 30cc syringes are available. Other packaging options may be available upon request.

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Printing

Stencil Design:

Electroformed and laser cut 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	25–100mm/sec
Squeegee Pressure	0.018–0.027kg/mm of blade length
Underside Stencil Wipe	Start at once per every five 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/sec or per equipment manufacturer's specifications
Solder Paste Stencil Life	Up to 12 hours (at 30–60% RH and 22–28°C)

Complementary Products

- **Rework Flux**: TACFlux® 66HF
- **Cored Wire**: CW-305
- **Wave Flux**: 1095-NF, WF-1082

Placement

The high tack value of **Indium6.6HF** assures consistent component holding power. It allows high-speed component placement operation, including use of tall components. Tack remains adequate for over 8 hours over a wide humidity range.

Cleaning

Indium6.6HF flux residue is cleanable up to at least 72 hours after reflow and is best cleaned using DI water with a spray pressure of at least 40psi and a temperature of at least 40°C. These parameters are a function of board complexity and cleaner efficiency. Electrical testing should be performed after the flux residue is removed.

Stencil cleaning is best performed using an automated stencil cleaning system for both stencil and misprint cleaning to prevent extraneous solder particles. Most commercially available stencil cleaners and isopropyl alcohol (IPA) work well.

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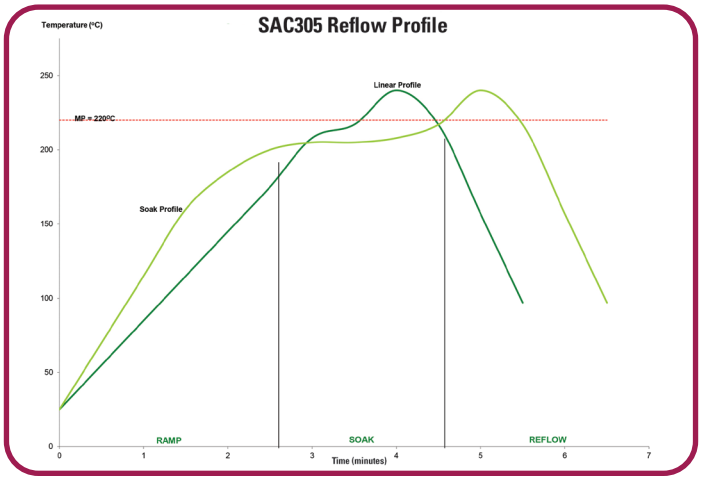
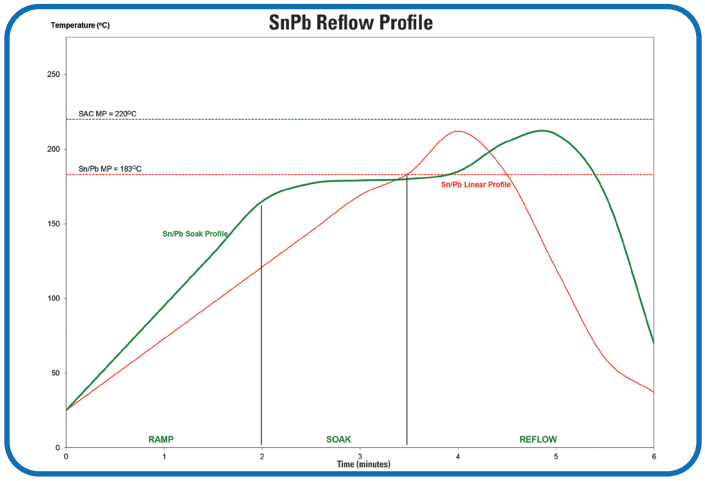
Reflow Profile Details	Parameters SAC305		Comments
Ramp Profile (Average Ambient to Peak)—not the same as maximum rising slope	1.0–1.5°C/sec Recommended	0.5–2.5°C/sec Acceptable	To minimize solder balling, beading, hot slump
Soak Zone Profile (optional)	20–60 sec Recommended	30–120 sec Acceptable	May minimize BGA/CSP voiding Eliminating/reducing the soak zone may help to reduce HIP and graping
	140–160°C Recommended	140–170°C Acceptable	
Time Above Liquidus (TAL)	45–60 sec Recommended	30–100 sec Acceptable	Needed for good wetting/reliable solder joint As measured with thermocouple
Peak Temperature	230–260°C Recommended	230–262°C Acceptable	
Cooling Ramp Rate	2–6°C/sec Recommended	0.5–6°C/sec Acceptable	Rapid cooling promotes fine-grain structure
Reflow Atmosphere	Air or N_2		N_2 preferred for small components

General guidelines, adjustments may be required based on specific process requirements.

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



Start with the linear profile, then move to the optional soak profile if needed.



Start with the linear profile, then move to the optional soak profile if needed.

Reflow Profile Details	Parameters SnPb		Comments
Ramp Profile (Average Ambient to Peak) — not the same as maximum rising slope	0.5–1°C/sec Recommended	0.5–2.5°C/sec Acceptable	To minimize solder balling, beading, hot slump
Soak Zone Profile (optional)	30–90sec Recommended	30–120sec Acceptable	May minimize BGA/CSP voiding
	140–150°C Recommended	130–170°C Acceptable	
Time Above Liquidus (TAL) Total Time and Temperature	45–60sec Recommended	30–100sec Acceptable	Needed for good wetting/reliable solder joint
	198–213°C Recommended	195–233°C Acceptable	
Cooling Ramp Rate	2–6°C/sec Recommended	0.5–6°C/sec Acceptable	Rapid cooling promotes fine-grain structure
Reflow Atmosphere	Air or N_2		N_2 preferred for small components

General guidelines, adjustments may be required based on specific process requirements.

Note: 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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