PRODUCT DATA SHEET

Indium10.5HF
Pb-Free Solder Paste

Introduction
Indium10.5HF is no-clean solder paste, specifically formulated for today's Pb-free (Sn-based) alloys for PCB assembly in nitrogen or air reflow. Flux residues remain soft, pliable, yet non-tacky after reflow in order to provide the best in-circuit testing (ICT) performance. **Indium10.5HF** offers industry-leading stencil printing performance (excellent response-to-pause and consistent printing even at high print speeds). Oxidation barrier technology delivers superior solderability and wetting on many surface finishes.

Features
- Pliable post-reflow residue designed for in-circuit probe testing
- Non-tacky flux residue to avoid build-up on probes
- Excellent stencil printing and HIP performance
- Eliminates clogged apertures through advanced rheology
- Superior solderability and wetting on many surface finishes
- High oxidation resistance
- Halogen-free per EN14582 test method

Alloys
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 and Type 3 powders as standard offerings with SAC 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	
	Type 4	Type 3
95.5Sn/3.8Ag/0.7Cu (SAC387)	88.75%	89%
96.5Sn/3.0Ag/0.5Cu (SAC305)		
98.5Sn/1.0Ag/0.5Cu (SAC105)		
99Sn/0.3Ag/0.7Cu (SAC0307)		

Compatible Products
- Rework Flux: TACFlux® 089HF, TACFlux® 020B
- Cored Wire: CW-807
- Wave Flux: WF-9945, WF-9958

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

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
Indium10.5HF 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.

OVER→

BELLCORE AND J-STD TESTS & RESULTS

Test	Result	Test	Result
J-STD-004 (IPC-TM-650)		**J-STD-005 (IPC-TM-650)**	
• Flux Type (per J-STD-004A)	ROL0	• Typical Solder Paste Viscosity Malcom (10rpm) (SAC305, T4, 88.75%)	1300 poise
• Presence of Halide Oxygen Bomb followed by ion chromatography	<<500ppm Br- <<500ppm Cl-	• Slump Test	Pass
		• Solder Ball Test	Pass
• SIR	Pass	• Typical Tackiness	45 grams
		• Wetting Test	Pass

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

Form No. 99019 (A4) R4

www.indium.com askus@indium.com

ASIA: Singapore, Cheongju, Malaysia: +65 6268 8678
CHINA: Suzhou, Shenzhen: +86 (0)512 628 34900
EUROPE: Milton Keynes, Torino: +44 (0) 1908 580400
USA: Utica, Clinton, Chicago, Rome: +1 315 853 4900

Indium10.5HF Pb-Free Solder Paste

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	25-100mm/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 hours (at 30-60% RH and 22-28°C)

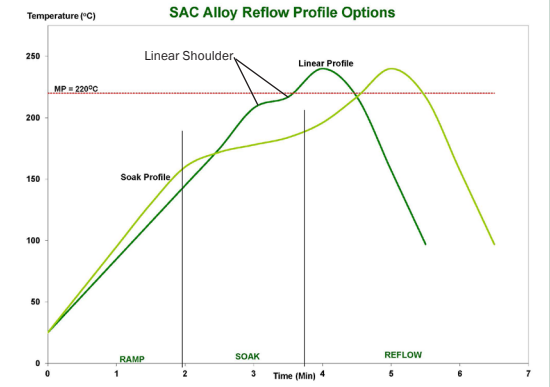
Cleaning

Indium10.5HF 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 **Indium10.5HF** 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		Comments
	Recommended	Acceptable	
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_2		N_2 preferred for small components

www.indium.com askus@indium.com

ASIA: Singapore, Cheongju, Malaysia: +65 6268 8678
CHINA: Suzhou, Shenzhen: +86 (0)512 628 34900
EUROPE: Milton Keynes, Torino: +44 (0) 1908 580400
USA: Utica, Clinton, Chicago, Rome: +1 315 853 4900

INDIUM CORPORATION®

ISO 9001 REGISTERED