PRODUCT DATA SHEET

Indium12.9HF

Pb-Free Solder Paste

Introduction

Indium12.9HF is a no-clean, halogen-free solder paste specifically formulated to accommodate fine-feature printing, as seen with 01005 and 008004 components. **Indium12.9HF** offers unprecedented stencil print transfer efficiency to work in the broadest range of processes to boost SPI yields. This flux offers best in class voiding performance on OSP and ENIG. In addition, it demonstrates high oxidation resistance with little to no graping or solder balling on pads as small as 175 microns in size.

Features

- Halogen-free per EN14582 test method
- High transfer efficiency and exceptional SPI yield with fine-feature apertures (01005, 008004)
- Low BGA, CSP, LGA, and QFN voiding
- Excellent wetting on different PCB surface finishes and fine-pitch components
- High oxidation resistance to eliminate graping
- Little to no solder balling on pads as small as 175 microns in size

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 5-MC powder is the standard offering with Pb-free 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	Powder Type	Metal Load
SnAgCu Indalloy®291	T4	88–90%
SnAgCu Indalloy®291	T5MC	87–89%

**The optimal metal loads are shown above. These can vary based upon geographic location and application/process needs.*

BELLCORE and J-STD Tests & Results

Industry Standard Test Results and Classification			
Flux Classification	ROL0	Typical Solder Paste Viscosity for SAC305 T5-MC (Poise)	1,650
Based on the testing required by IPC J-STD-004D		Conforms with all requirements from IPC J-STD-005B	
Halogen-free per IEC 61249-2-21, Test Method EN14582	<900 ppm Cl <900 ppm Br <1,500 ppm Total		

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

From One Engineer To Another®

Complementary Products

- **Rework Flux**: TACFlux® 089HFT, TACFlux® 020B-RC
- **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 syringes and cartridges should be stored tip down.

Storage Conditions	Shelf Life	Alloy	Powder Type	Packaging
<10°C	12 months	SnAgCu, Indalloy®291	T3, T4, T4.5	Jar, Cartridge, and Proflow Cassette
<10°C	6 months	SnAgCu, Indalloy®291	T5, T6	Jar, Cartridge, and Proflow Cassette
<10°C	6 months	SnAgCu, Indalloy®291	Any	Syringe Pack

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

Indium12.9HF 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.

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Indium12.9HF 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 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

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 / ~60 degrees
Separation Speed	5–20mm/second or per equipment manufacturer's specifications
Solder Paste Stencil Life	Up to 60 hours (at 30–60% RH and 22–28°C) for T3, T4, and T4.5 solder paste
	Up to 12 hours (at 30–60% RH and 22–28°C) for T5 and T6 solder paste

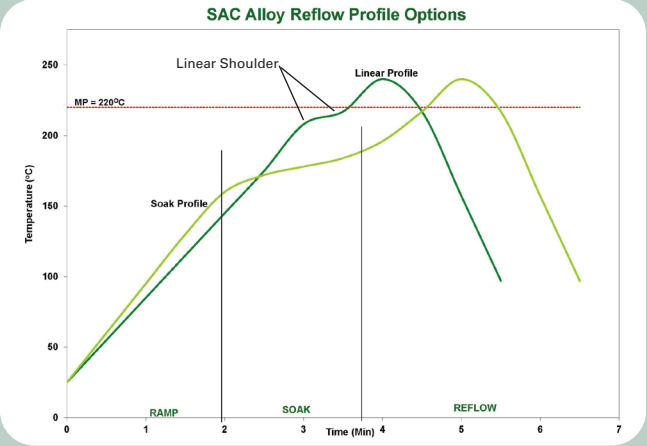
Cleaning

Indium12.9HF 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 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 **Indium12.9HF** 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 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 may 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	230–260°C	230–262°C	
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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