PRODUCT DATA SHEET

Indalloy®272

Pb-Free Solder Paste Offerings

Introduction

Indalloy®272 is a SAC solder with the addition of Bi and Sb. The exact composition is available upon request. It provides high-reliability solder joints for automotive applications. Currently, it is available with three different no-clean flux chemistries: one is halogen-containing and two are halogen-free (no intentionally-added halogens). Type 3, Type 4, and Type 4.5 powders are all readily available. Also, T5-MC powder has recently become available. Both air and nitrogen reflow are supported.

Features

Indium8.9HF

- Halogen-free (no intentionally added halogens) per EN 14582 test method
- Low QFN, BGA, CSP voiding
- High print transfer efficiency down to 0.55 area ratio
- Hot/cold slump resistant
- Clear, probe-testable flux residue
- High oxidation resistance
- Our most stable paste
- Wets well to oxidized BGA and pad surfaces
- Excellent soldering under high temperature and long reflow profiles

Indium10.1

- Halogen-containing
- Very low QFN voiding for large ground planes
- High print transfer efficiency/low print variations down to 0.55 area ratio
- Hot/cold slump resistant
- Eliminates incomplete coalescence (graping) and head-in-pillow defects
- Outstanding RF shield metallization wetting

RMA-155

- Halogen-free per EN 14582 test method
- Low-voiding
- High-performance stencil printing characteristics
- Eliminates hot/cold slump
- Clear, probe-testable post-reflow flux residue
- High oxidation resistance
- RMA paste
- Robust reflow performance to accommodate assembly of BGA and components with large ground planes
- Maintains very high resistance during SIR testing
- Ideal for mixed alloy SnPb and Pb-free processes

Standard Product Specifications

Type	Flux	Metal Load %
T3	10.1	88.75
	8.9HF	89.00
	RMA-155	89.00
T4	10.1	88.50
	8.9HF	
	RMA-155	
T4.5	10.1	88.50
	8.9HF	88.25
	RMA-155	88.25

Compatible Products

- **Rework Flux**: TACFlux® 020B, TACFlux® 089HF
- **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.

From One Engineer To Another®

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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 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

Indalloy®272 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.

Bellcore and J-STD Tests and Results

Test	Results		
	Indium8.9HF	Indium10.1	RMA-155
J-STD-004A (IPC TM-650)			
Flux Type (per J-STD-004A)	ROL0	ROL1	ROL0
Flux-Induced Corrosion (Copper Mirror)	Type L	Type L	Type L
Presence of Halide – Silver Chromate – Fluoride Spot Test – Ion Chromatography	<100ppm	Pass Pass <0.5% Cl- eq.	<100ppm
SIR	Pass	Pass	Pass
J-STD-005 (IPC TM-650)			
Typical Solder Paste Viscosity Malcom (10rpm)	1,700 poise	1,450 poise	1,700 poise
Slump Test	Pass	Pass	Pass
Solder Ball Test	Pass	Pass	Pass
Typical Tackiness	35 grams	35 grams	35 grams
Wetting Test	Pass	Pass	Pass
BELLCORE GR-78			
SIR	Pass	Pass	Pass
Electromigration	Pass	Pass	Pass
QQ-S-571F			
RMA Paste	Meets/exceeds	–	Meets/exceeds
Rosin Content	≥51% of non-volatile components	–	≥51% of non-volatile components

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

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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:

Solder Paste Bead Size	~20–25mm in diameter
Print Speed	50–100mm/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/~60 degrees
Solder Paste Stencil Life	>8 hours (at 30–60% RH and 22–28°C)

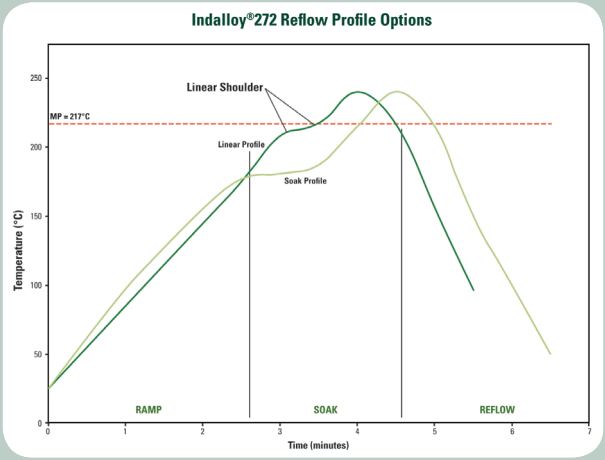
Cleaning

Indalloy®272 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:



This profile applies to **Indalloy®272** and other similar SAC alloys. This can be used as a general guideline in establishing a reflow profile when using **Indalloy®272** solder pastes. 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	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	20–120 seconds	May minimize BGA/CSP voiding
	160–180°C	160–180°C	Eliminating/reducing the soak zone may help to reduce HIP and graping
Time Above Liquidus (TAL)	45–90 seconds	30–100 seconds	Needed for good wetting/reliable solder joint
Peak Temperature	240–260°C	235–265°C	As measured with thermocouple
Cooling Ramp Rate	2–4°C/second	0.5–4°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.

Contact our engineers: askus@indium.com

Learn more: www.indium.com

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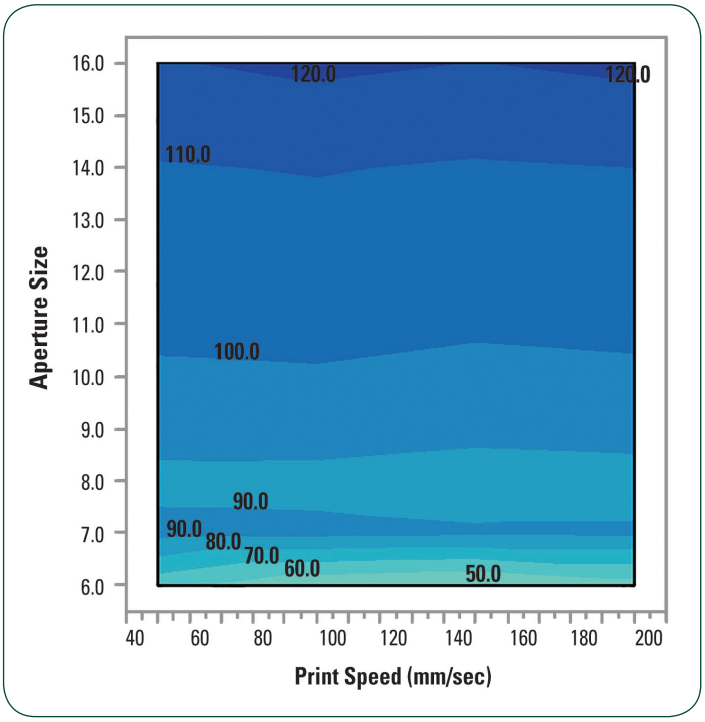
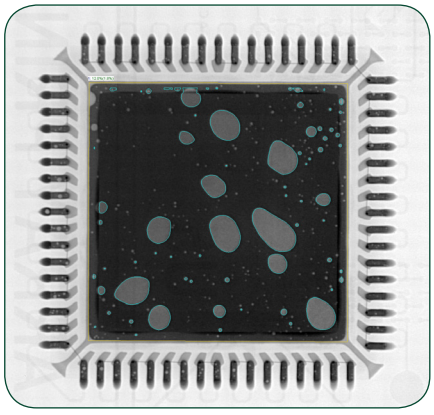
Consistent Printing Capability for a Wide Process Window

Indium8.9HF

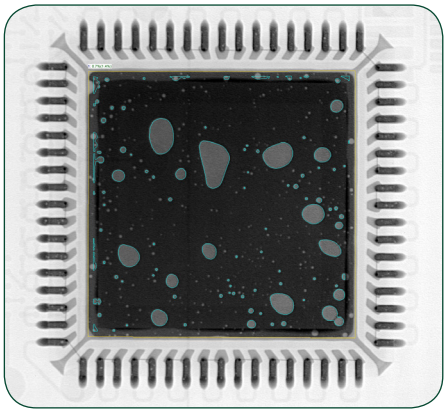


QFN Voiding

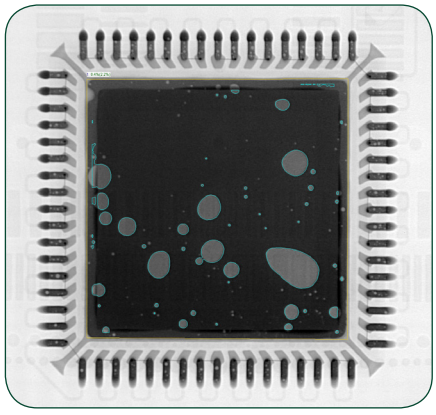
Typical QFN Voiding for Indium8.9HF is ~12%



Typical QFN Voiding for Indium10.1 is ~10%



Typical QFN Voiding for RMA-155 is ~13%



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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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