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.

Standard Product Specifications

Type	Flux	Metal Load %
T3	10.1	88.75
	8.9HF	89
	RMA-155	89
T4	10.1	88.5
	8.9HF	
	RMA-155	
T4.5	10.1	88.5
	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.

Features

Indium8.9HF	Indium10.1	RMA-155
• 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	• 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	• Halogen-free per EN14582 test method • Low voiding • High performance stencil printing characteristics • Eliminates hot and cold slump • Clear, probe-testable post-reflow residues • 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

Form No. 99271 R1

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

Indalloy® 272 Pb-Free Solder Paste Options

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

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 (10 rpm)	1700 poise	1450 poise	1700 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 flux components	–	≥51% of non-volatile flux components
All information is for reference only. Not to be used as incoming product specifications.			

Indalloy® 272 Pb-Free Solder Paste Options

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	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)

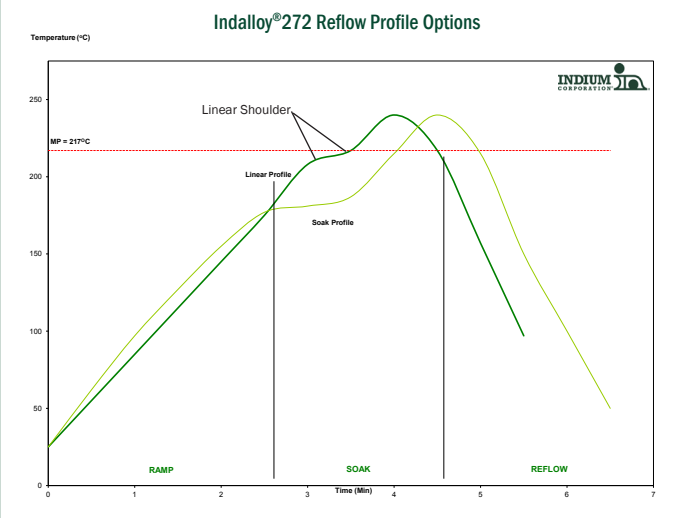
Cleaning

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:



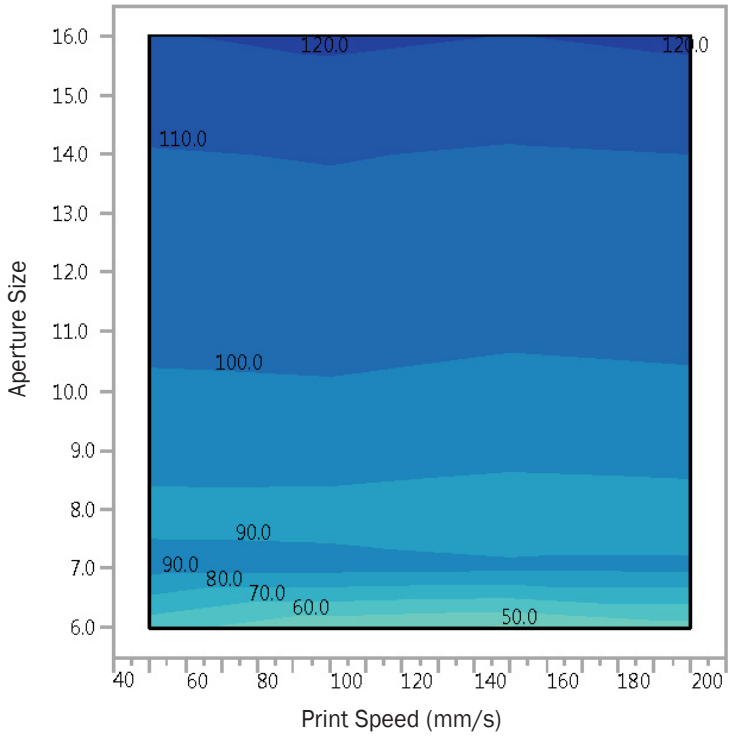
This profile applys to **Indalloy®272**, and other similar SAC alloys. This can be used as a general guideline in establishing a reflow profile when using **Indalloy®272** solder pastes. Deviations from these recommendations are acceptable, and may be necessary, based on specific process requirements, 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.

Note: All parameters are for reference only. Modifications may be required to fit process and design.			
Reflow Profile Details	**Indalloy®272 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	20–120 Seconds	May minimize BGA/CSP voiding Eliminating/reducing the soak zone may help to reduce HIP and graping
	160–180°C	160–180°C	
Time Above Liquidus (TAL)	45–90 Seconds	30–100 Seconds	Needed for good wetting/reliable solder joint As measured with thermocouple
Peak Temperature	240–260°C	235–265°C	
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

Indalloy®272 Pb-Free Solder Paste Options

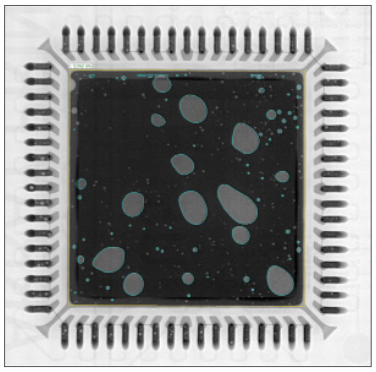
Consistent Printing Capability for a Wide Process Window

Indium8.9HF

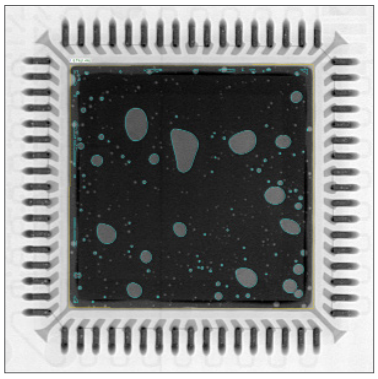


QFN Voiding

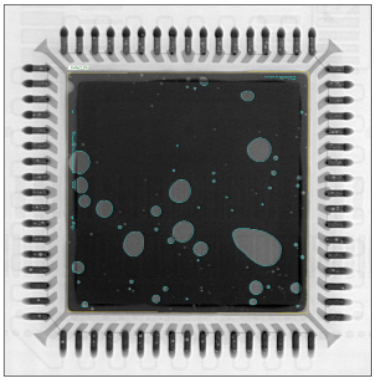
Typical QFN voiding for Indium8.9HF is ~12%



Typical QFN voiding for Indium10.1 is ~10%



Typical QFN voiding for RMA-155 is ~13%



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

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