PRODUCT DATA SHEET

Indium8.9HFRV (869-23-5)

High-Reliability (Indalloy®292 and Indalloy®276) Solder Paste

Introduction

Indium8.9HFRV is an air reflow, no-clean solder formulated to accommodate the higher processing temperatures required by Indalloy®292 and other alloy systems favored by the electronics industry to replace conventional Pb-bearing solders. **Indium8.9HFRV** features exceptional low-voiding performance. In addition, **Indium8.9HFRV** provides excellent stencil print transfer efficiency and response-to-pause performance.

Features

- Formulated for low voiding when used with high-reliability alloys
- Halogen-free
- Clear flux residue
- High transfer efficiency through small apertures (≤0.66AR)
- Excellent wetting
- Excellent response-to-pause performance

Alloy

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 powder as a standard offering for high-reliability 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	Composition	Printing Metal Load
Indalloy®292	Type 4	89.0%
Indalloy®276		

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)	Preliminary Shelf Life
<10°C	3 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

Indium8.9HFRV solder paste is currently available in 500g jars and 600g cartridges. Alternate packaging options may be available upon request.

Complementary Products

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

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

Industry Standard Test Results and Classification

Test	Result
IPC J-Standard-004	
Flux Type Classification	ROL0
Quantitative Halide Content	0%
SIR (Ohms)	Pass

Test	Result
IPC J-Standard-005	
Typical Solder Paste Viscosity for Indalloy®292	1,340kcps
Tackiness	30g
Slump Test	Pass
Wetting	Pass
Solder Ball	Pass

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

From One Engineer To Another®

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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.

Recommended 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; 45 or 60° squeegees are typically used
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)

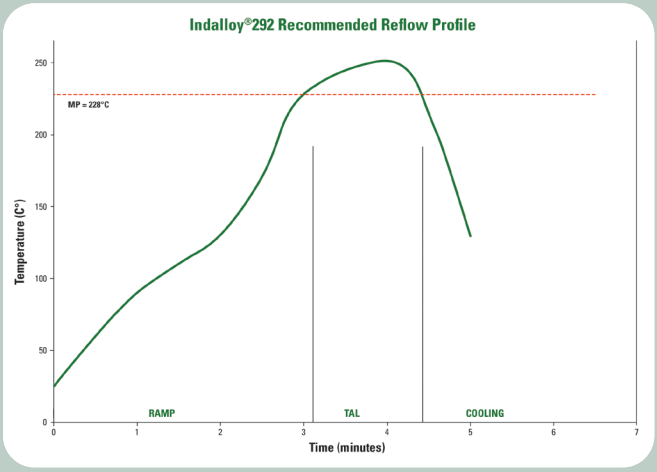
Cleaning

Indium8.9HFRV 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 can be used as a general guideline in establishing a reflow profile when using **Indium8.9HFRV with Indalloy®292 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. If needed, a flat soak portion or linear shoulder may be added to reduce the thermal gradient.

Reflow Profile Details	Indalloy®292 Parameters		Comments
	Recommended	Acceptable	
Ramp Profile (Average Ambient to Peak)—Not the Same as Maximum Rising Slope	1–2.5°C/second	1–3°C/second	To minimize solder balling, beading, hot slump
Soak Zone Profile (Optional)	N/A	20–120 seconds	A soak profile is not recommended for optimum voiding performance but may be used to diminish delta T between components.
	N/A	120–170°C	
Time Above Liquidus (TAL, over 228°C)	70–90 seconds	50–100 seconds	Needed for good wetting/reliable solder joint As measured with thermocouple
Peak Temperature	245–250°C	240–260°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

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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