PRODUCT DATA SHEET

Indium5.7LT-1 with Indalloy®303 (Bi+)

An Enhanced Low-Temperature Solder Paste

Introduction

Bi+ is a doped, near-eutectic bismuth-tin-based alloy for low-temperature reflow processes which require enhanced thermal cycling reliability. Unlike standard BiSn or BiSn1Ag, the doped Bi+ has a more refined crystal structure which improves joint longevity during thermal cycling. Bi+ can be reflowed at 170°C for both homogeneous and heterogeneous joint compositions.

Features

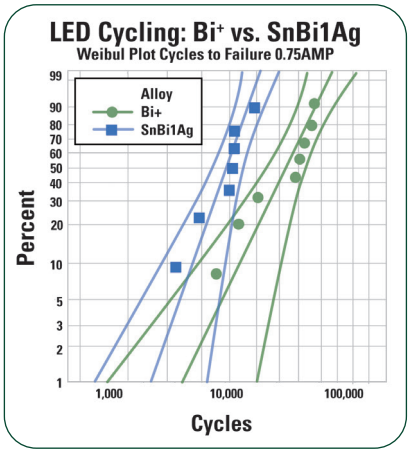
- Low-temperature Pb-free solution
- Excellent thermal cycling performance
- Reflow temperature as low as 170°C
- Resistant to hot tearing
- Compatible with SAC in hybrid BGA joints

Flux Vehicle

Indium5.7LT-1 is an air reflow, halogen-free, no-clean solder paste designed for assembly processes using Bi-based and In-containing low-temperature alloys. This paste is a clear residue product with exceptional wetting capabilities in both air and nitrogen reflow environments. The low activation temperature and high thermal tolerance of **Indium5.7LT-1** enables a fully optimized reflow process in addition to the outstanding print transfer efficiency and low print variation.

Applications

Low-temperature solders reduce warpage of thermally sensitive components by reducing peak reflow temperature. However,applications requiring the reduced processing temperature of Bi-based solder alloys now include increased thermal cycling challenges. Bi+ is a near-eutectic Bi-based alloy capable of reflow at 170°C while also improving thermal cycling performance for BGAs, LEDs, and other PCB components.



Bi+ samples in the chart (left) demonstrated improved reliability when experiencing LED power cycling versus standard Bi-based alloys.

Standard Product Specifications

Flux	Mesh Size	Printing Metal Load
Indium5.7LT-1	Type 4	89–90%
	Type 5-MC	88–89%

Indium Corporation manufactures mixed low-oxide spherical powders in the industry standard Types 4 and 5-MC mesh sizes. Other non-standard mesh sizes are available upon request. The weight ratio of the flux/vehicle to the solder powder is referred to as the metal load and is typically in the range of 83–92% for standard compositions.

Industry Standard Test Results and Classification			
Based on the testing required by J-Standard-004 (IPC-TM-650)		Typical Solder Paste Viscosity for Type 4 (Poise)	1,600kcps
Presence of Halide Quantitative Halide Content	0%	Typical Tackiness	45g
Post Reflow Flux Residue (ICA Test)	<5% of solder paste	Conforms with all requirements from J-STD-005 (IPC-TM-650).	

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

Standard packaging for **Indium5.7LT-1** is 500g jars and 600g cartridges. For dispensing applications, 10 and 30cc syringes are standard. Other packaging options may be available upon request.

Complementary Products

- **Rework Flux**: TACFlux® 571HF, TACFlux® 020B-RC
- **Liquid Rework Flux**: FP-500
- **Solid Wire**

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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).
- A minimum aspect ratio of 1.5 is suggested for adequate release of solder paste from stencil apertures. The aspect ratio is defined as the width of the aperture divided by the thickness of the stencil.

Printer Operation:

The following are general recommendations for stencil printer optimization. Adjustments may be necessary based on specific process requirements:

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	Once every 10–25 prints
Solder Paste Stencil Life	>8 hours @ 30–60% RH and 22–28°C

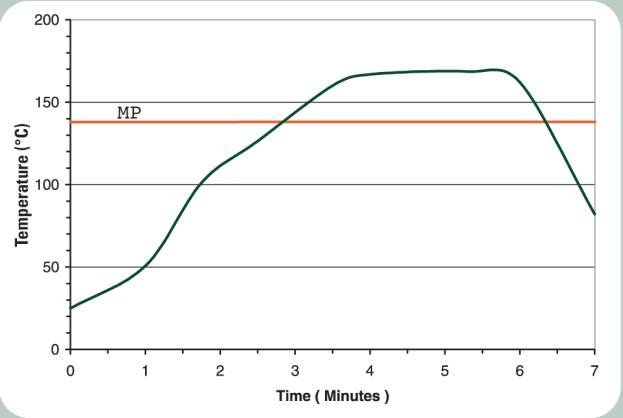
Cleaning

Indium5.7LT-1 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 an automated stencil cleaning system for both stencil and misprint cleaning to prevent extraneous solder balls. Most commercially available stencil cleaning formulations including isopropyl alcohol (IPA) work well.

Reflow

Recommended Profile:



This profile is designed for use with Bi+ with **Indium5.7LT-1**. This can be used as a general guideline in establishing a reflow profile for Bi+ solder paste. Deviations from these recommendations are acceptable and may be necessary, based on specific process requirements.

Heating Stage:

A linear ramp rate of 0.5–1.5°C/second allows gradual evaporation of volatile flux constituents and prevents defects such as solder balling/beading and bridging as a result of hot slump. It also prevents unnecessary depletion of fluxing capacity when using higher temperature alloys.

Liquidus Stage:

A peak temperature of 25–45°C (175°C shown) above the melting point of the solder alloy is needed to form a quality solder joint and achieve acceptable wetting due to the formation of an intermetallic layer.

Cooling Stage:

A rapid cool down is desired to form a fine-grain structure. Slow cooling will form a large-grain structure, which typically exhibits poor fatigue resistance. The acceptable cooling range is 0.5–6.0°C/second (2.0–6.0°C/second is ideal).

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