Indium5.8LS Pb-Free Solder Paste

Features

- Ultra-low flux spattering (ideal for applications with Au finger connectors)
- Ultra-low solder beading
- Halogen-free
- Superior stencil life
- Outstanding print characteristics
- Extremely wide process window

Introduction

Indium5.8LS is a halide-free, no-clean solder paste specifically formulated for low flux spatter. This material is designed to accommodate the higher processing temperatures required by the Sn/Ag/Cu and Sn/Ag Pb-Free alloy systems in an air or nitrogen reflow atmosphere. This product formulation offers consistent, repeatable printing performance combined with long stencil and tack times to handle the rigors of today's high speed as well as high mix surface mount lines.

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 4 and Type 3 powder are standard offerings with SAC305 & SAC387 alloys. The metal percent is the weight percent of the solder powder in the solder paste and is dependant upon the powder type and application. Standard product offerings are detailed in the table below.

Standard Product Specifications

Alloy	Metal Load	IPN
96.5Sn/3.0Ag/0.5Cu (SAC305)	88.5% (Type 4)	800105
96.5Sn/3.0Ag/0.5Cu (SAC305)	89.0% (Type 3)	83753

Packaging

Standard packaging for stencil printing applications includes 4 oz. jars and 6 oz. or 12 oz. cartridges. Packaging for enclosed print head systems is also readily available. For dispensing applications, 10cc and 30cc syringes are standard. Other packaging options may be available upon request.

Storage and Handling Procedures

Refrigerated storage is recommended throughout the shelf life of solder paste. The shelf life of Indium5.8LS is 6 months when stored at <10°C. Store syringes and cartridges tip down.

Remove solder paste from refrigeration at least two hours before use to allow the solder paste to reach an ambient working temperature. As the time to reach thermal equilibrium will vary with container size, verify solder paste temperature prior to use. Label jars and cartridges with the date and time of opening.

Material Safety Data Sheets

The MSDS for this product can be found online at http://www.indium.com/techlibrary/msds.php

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Test	Result
J-STD-004A* (IPC-TM-650)	
•Flux Type (per J-STD-004A)	ROL0
•Flux Induced Corrosion (Copper Mirror)	L
•Presence of Halide	
Silver Chromate	Pass
Fluoride Spot Test	Pass
Quantitative Halide Content	0%
•Post Reflow Flux Residue (ICA Test)	46%
•SIR	Pass

Test	Result
J-STD-005 (IPC-TM-650)	
•Typical Solder Paste Viscosity	
88.5% metal load (Type 4)	1400 poise*
89% metal load (Type 3) Malcom (10rpm)	1600 poise*
•Slump Test	Pass
•Solder Ball Test	Pass
•Typical Tackiness	34 grams
•Wetting Test	Pass
BELLCORE GR-78	
•SIR	Pass
•Electromigration	Pass

*Pending statistical validation

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

**J-STD-004A has replaced J-STD-004 and is more stringent in its requirements.*

Form No. 97801 (A4) R12

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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 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 adequate release of solder paste from stencil aperatures, a minimum aspect ratio of 1.5 is required. 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 requirement:

- Solder Paste Bead Size: 20-25mm diameter
- Print Speed: 25-100mm/sec
- Squeegee Pressure: 0.018-0.027kg/mm of blade length
- Underside Stencil Wipe: Once every 10-25 prints
- Solder Paste Stencil Life: >8 hrs. @ 30-60% RH & 22°-28°C

Cleaning

Indium5.8LS is designed for no-clean applications, however the flux can be removed if necessary by using a commercially available flux residue remover.

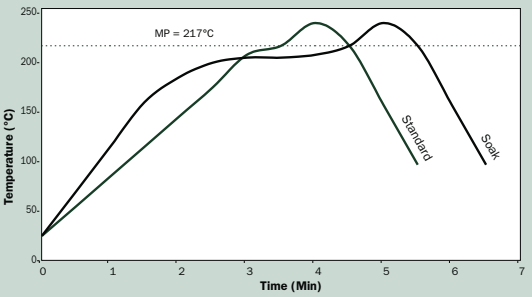
Stencil Cleaning: This is best performed using isopropyl alcohol (IPA) as a solvent. Most commercially available stencil cleaners work well.

Compatible Products

- Rework Flux: TACFlux® 018

Reflow

Recommended Profile:



The stated profile recommendations apply to most Pb-Free alloys in the Sn/Ag/Cu (SAC) alloy system, including SAC 305 (96.5Sn/3.0Ag/0.5Cu). This can be used as a general guideline in establishing a reflow profile when using **Indium5.8LS** Solder Paste. Deviations from these recommendations are acceptable, and may be necessary, based on specific process requirements, including board size, thickness & density.

Heating Stage:

The use of a linear ramp rate or ramp-to-spike (RTS) type profile assists in minimizing the greatest overall number of defects associated with the reflow process. If the ramp rate is too fast, it can cause solder balling, solder beading, and aggravated hot slump which can lead to bridging. The ramp rate in the preheat stage of the profile can range from 0.5°-2.5°C/second (0.5°-1°C/second is ideal). A short soak of 20-30 seconds just below the melting point of the solder alloy can help minimize tombstoning when using a RTS type profile.

If necessary, a ramp-soak-spike (RSS) profile can be implemented to minimize voiding on BGA and CSP type packages. A soak zone between 200°-210°C for up to 2 minutes is acceptable.

Liquidus Stage:

To achieve acceptable wetting and form a quality solder joint, the acceptable temperature range above the melting point of the solder alloy is 12°-50°C (15°-30°C is ideal). The acceptable range for time above liquidus (TAL) is 30-100 seconds (45-60 seconds is ideal). A peak temperature and TAL above these recommendations can result in excessive intermetallic formation that can decrease solder joint reliability.

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°C-6.0°C/second (2.0°-6.0°C/second is ideal).

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