Indium3.2 Pb-Free Water-Soluble Solder Paste

Features

- Consistent fine-pitch printing performance with high transfer efficiency from stencil apertures
- Superior fine-pitch soldering ability
- Wide reflow profile window
- Excellent response-to-pause printing performance
- Outstanding slump resistance
- Low voiding
- Minimal foaming during the cleaning process
- Excellent wetting

Introduction

Indium3.2 is an air or nitrogen reflow, water-soluble solder paste specifically formulated to accommodate the higher processing temperatures required by the Sn/Ag/Cu, Sn/Ag, Sn/Sb, and other Pb-Free alloy systems. This product formulation offers consistent, repeatable printing performance combined with a long stencil life and sufficient tack strength to handle the challenges of today's high-speed as well as high-mix surface mount lines. In addition to consistent printing and reflow requirements, this solder paste offers superb wetting to the various Pb-Free metallizations and has exceptional low voiding performance on fine-pitch components, including BGA's and CSP's.

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 3 powder is the standard offering with Sn/Ag/Cu, Sn/Ag and Sn/Sb Pb-Free alloy systems. 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 Specifications

Alloy	Metal Load	IPN
96.5Sn 3.0Ag 0.5Cu (SAC305)	88.5% Printing	800164
95.5Sn 3.8Ag 0.7Cu (SAC387)	88.5% Printing	

Packaging

Indium3.2 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.

Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. The shelf life of **Indium3.2** is no less than 4 months when stored at <5°C. Solder paste packaged in cartridges and syringes should be stored tip down.

When refrigerated, solder paste should be allowed to reach ambient working temperatures 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 the container size and the solder paste temperature should be verified before use. Jars and cartridges should be labeled with the date and time of opening. It is not recommended to remove worked paste from the stencil and mix it with the unused paste in the jar, because this may alter the rheology of the unused paste.

OVER→

INDIUM3.2 TEST DATA SUMMARY

Test	Result
J-STD-004* (IPC-TM-650)	
• Flux Type (per J-STD-004A)	ORM1
• Flux Induced Corrosion	M
• Presence of Halide	
Silver Chromate	Pass
Fluoride Spot Test	Pass
Quantitative Halide Content	<0.7% Cl equivalent
• SIR (cleaned)	Pass

Test	Result
J-STD-005* (IPC-TM-650)	
• Typical Solder Paste Viscosity SAC305 (Sn96.5/Ag3/Cu0.5, Type 3, 88.5%) Malcom (10 rpm)	1750 poise**
• Typical Tackiness	50g**
• Slump Test	Pass
• Solder Ball Test	Pass
• Thixotropic Index (ICA Test)	-.60

***The reported value is a running average subject to periodic updates.*

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

**The most current revision of the applicable IPC Joint Industry Standard shall always be referenced.*

Form No. 98180 (A4) R6

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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 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:

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

- Solder Paste Bead Size: 20-40mm diameter
- Print Speed: 12-150mm/sec
- Squeegee Pressure: 0.018-0.027kg/mm of blade length
- Underside Stencil Wipe: Start at once every 5 prints, then decrease frequency until an optimum value is determined.
- Solder Paste Stencil Life: >8 hrs. <60% RH & 22-28°C

Cleaning

Residue Removal

Indium3.2 flux residues are water-soluble and best removed by an inline or batch type cleaning process using spray pressure and heated DI water. A spray pressure of 60 PSI and a DI water temperature of 55°C can be used as a starting point. The optimal spray pressure and temperature are a function of board size, complexity and the efficiency of the cleaning equipment and should be optimized accordingly.

Stencil Cleaning

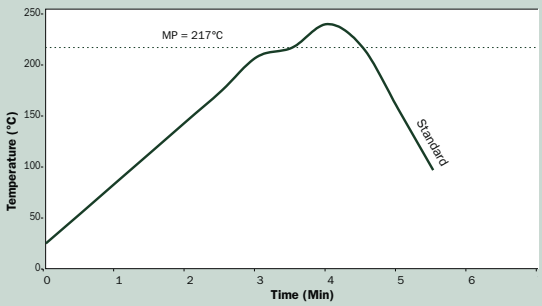
This is best performed using an automated stencil cleaning system for both stencil and misprint cleaning to remove extraneous solder particles. Most commercially available stencil cleaners and isopropyl alcohol are acceptable.

Compatible Products

- Rework Flux: **TACFlux® 025**
- Flux Pen: **FP-300**
- Cored Wire: **CW-301**
- Wave Flux: **1095-NF**

Reflow

Recommended Profile:



Indium3.2 should be reflowed using a linear profile in an air or nitrogen atmosphere. The stated profile recommendations can be used as a general guideline in establishing a reflow profile for **Indium3.2** with Sn/Ag/Cu, Sn/Ag, and Sn/Sb alloy systems.

Heating Stage:

A linear ramp rate of 0.5°- 2.0°C/second allows gradual evaporation of volatile flux constituents and helps minimize defects such as solder balling and/or beading and bridging resulting from hot slump. It also prevents unnecessary depletion of fluxing capacity when a high peak temperature and extended time above liquidus is used.

Liquidus Stage:

Indium3.2 can accommodate a peak temperature range of 235°C to 260°C. The actual peak temperature is determined by the board size, complexity, and component limitations. The time above liquidus (TAL) should be 30–90 seconds. 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).

This product data sheet is provided for general information only. It is not intended, and shall not be construed, to warrant or guarantee the performance of the products described which are sold subject exclusively to written warranties and limitations thereon included in product packaging and invoices.

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