

PRODUCT DATA SHEET

Indium5.9-AP

Pb-Free Solder Paste

Introduction

Indium5.9-AP is an air reflow, no-clean solder paste specifically formulated to accommodate the higher processing temperatures required by the SnAgCu, SnAg, and other alloy systems favored by the electronics industry to replace conventional Pb-bearing solders. **Indium5.9-AP** offers unprecedented stencil print transfer efficiency to work in the broadest range of processes. In addition, the high probe testability of **Indium5.9-AP** minimizes false failures in ICT.

Features

- Halogen-free per EN14582 test method
- Low BGA, CSP, QFN voiding
- One of our most stable pastes
- High transfer efficiency through small apertures ($\leq 0.66AR$)
- Eliminates hot and cold slump
- High oxidation resistance
- Wets well to oxidized BGA and pad surfaces
- Excellent soldering performance under high-temperature and long reflow processes
- Clear, probe testable flux residue

Alloys

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 and Type 3 powders as standard offerings with SAC 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 | Metal Load |
|--------|--|
| SAC305 | 89% (Type 3) 88.5% (Type 4) 88.25% (Type 4.5) 88% (Type 5-MC) |

Compatible Products

- Rework Flux: TACFlux®089HF, TACFlux®020B
- 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.

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.

Bellcore and J-STD Tests and Results

| Test | Result | Test | Result |
|---|---------|--|-------------|
| J-STD-004 (IPC-TM-650) | | J-STD-005 (IPC-TM-650) | |
| Flux Type (per J-STD-004A) | ROLO | Typical Solder Paste Viscosity Malcolm (10rpm) | 1,700 poise |
| Flux Induced Corrosion (Copper Mirror) | Type L | Slump Test | Pass |
| Presence of Halide Oxygen Bomb followed by Ion Chromatography | <100ppm | Solder Ball Test | Pass |
| SIR | Pass | Typical Tackiness | 35g |
| | | Wetting Test | Pass |
| | | BELLCORE GR-78 | |
| | | SIR | Pass |
| | | Electromigration | Pass |

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

Packaging

Indium5.9-AP 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.

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.

| 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 degrees |
| Separation Speed | 5–20mm/second or per equipment manufacturer’s specifications |
| Solder Paste Stencil Life | Up to 12 hours (at 30–60% RH and 22–28°C) |

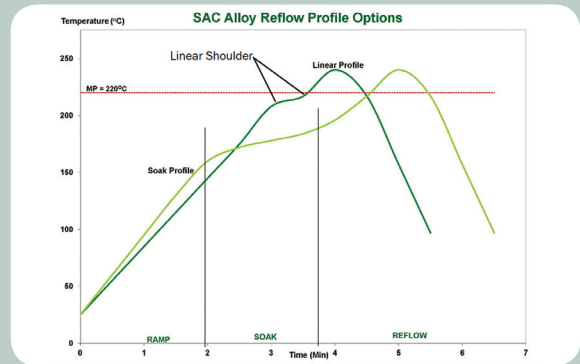
Cleaning

Indium5.9-AP 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:



The stated profile recommendations apply to most Pb-free alloys in the SnAgCu (SAC) alloy system, including SAC305 (96.5Sn/3.0Ag/0.5Cu). This can be used as a general guideline in establishing a reflow profile when using Indium5.9-AP 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, 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 | SAC305 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 | 30–120 seconds | May minimize BGA/CSP voiding Eliminating/reducing the soak zone <u>may</u> help to reduce HIP and graping |
| | 160–180°C | 150–200°C | |
| Time Above Liquidus (TAL) | 45–60 seconds | 30–100 seconds | Needed for good wetting/reliable solder joint |
| Peak Temperature | 230–260°C | 230–262°C | As measured with thermocouple |
| 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 |

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