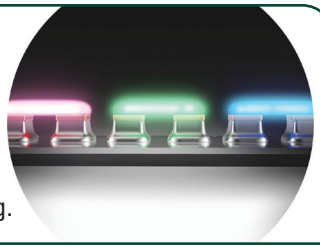
PRODUCT DATA SHEET

AuLTRA™ 5.1

AuSn No-Clean Solder Paste

Introduction



AuLTRA™ 5.1 is an air or nitrogen reflow, AuSn no-clean solder paste specifically formulated to accommodate the higher processing temperatures required by the Au-based alloy. Ideal for use in high-power LED module array assembly applications, this product formulation offers a wide processing window and consistent print definition, even those with ultra-fine pitches. In addition to consistent printing and reflow requirements, **AuLTRA™ 5.1** offers superb wetting and low-voiding.

Features

- Excellent for use in high-power LED module array assembly applications
- Exceptional wetting in air reflow
- Low voiding
- Wide reflow process window
- Consistent fine-pitch print deposition
- Superior tack strength
- No-clean residue
- Long open life, reduced waste

AuSn Alloy Options

- 80Au20Sn
- 79Au21Sn
- 78Au22Sn
- 77Au23Sn

Particle Size

AuLTRA™ 5.1 is available in powder sizes 2 to 7 SGS (see list below). Metal loadings vary from 89–94% according to the intended application method and particle size. Please speak to an Indium Corporation Applications Engineer to determine the best product specification for your needs.

Powder Capabilities

- Type 2 (-200/+325)
- Type 3 (-325/+500)
- Type 4 (-400/+635)
- Type 5 (-500/+635)
- Type 6 (-635)
- Type 6 SGS (5–15µm w/less than 10% overs/unders)
- Type 7 SGS (2–11µm w/less than 10% overs/unders)

Properties

Industry Standard Test Results and Classification			
Flux Classification	ROL1	Typical Solder Paste Viscosity for Sn63 T3 (Poise)	1,700
Based on the testing required by the current revision of IPC J-STD-004.		Conforms with all requirements from the current revision of IPC J-STD-005.	

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

Packaging

AuLTRA™ 5.1 is available in jars or syringes. Standard packaging for dispensing applications include 10 and 30cc syringes. Other packaging options are available upon request.

Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. The shelf life of **AuLTRA™ 5.1** is no less than 6 months when stored at <10°C. Solder paste packaged in cartridges should be stored tip down.

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. 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.

Dispensing

AuLTRA™ 5.1 is formulated for automated high-speed, high reliability, or single- or multi-point dispensing equipment. It also functions well in hand-held applications. Highly accurate volumes can be dispensed using either pneumatic or positive displacement devices. Optimal dispensing performance is dependent on storage conditions, equipment type, and setup.

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Heating and Cooling Stages

Heating Stage (1):

A linear ramp rate of 1–2°C/second allows gradual evaporation of volatiles and helps minimize 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 (2):

A minimum peak temperature of 40–50°C above the melting point of the solder alloy is usually needed to achieve excellent wetting and spread to form a quality solder joint. The time above liquidus (TAL) should be 45–90 seconds. A peak temperature and TAL above these recommendations can result in excessive intermetallics formation that can decrease solder joint reliability and lead to increased difficulty in repair on precious metal surfaces. A ramp rate of 2.5–3.5°C/second from liquidus to peak temperature is recommended.

Cooling Stage (3):

This stage refers to the temperature range from peak temperature to approximately 50°C below the liquidus temperature where the cooling rate has a negligible effect. A rapid cool down of <4°C/second is desired to form a fine-grain structure. Slow cooling will form a large-grain structure, which typically exhibits poor fatigue resistance. If excessive cooling of >4°C/second is used, both the components and the solder joint can be stressed due to a high CTE mismatch.

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	25–50mm/second
Squeegee Pressure	0.018–0.027kg/mm of blade length
Underside Stencil Wipe	Start at once per every 10–25 prints and decrease frequency until optimum value is reached
Squeegee Type/Angle	Metal with appropriate length/ 60 degrees
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

Residue Removal

AuLTRA™ 5.1 is designed for no-clean applications; however, the flux can be removed, if necessary, by using a commercially available flux residue remover.

Stencil Cleaning

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

Technical Support

Indium Corporation's internationally experienced engineers provide in-depth technical assistance to our customers. Thoroughly knowledgeable in all facets of Materials Science as it applies to the electronics and semiconductor sectors, Technical Support Engineers provide expert advice in solder preforms, wire, ribbon, and paste. Indium Corporation's Technical Support Engineers provide rapid response to all technical inquiries.

Safety Data Sheets

Please refer to the SDS document within the product shipment, or contact our local team to receive a copy.

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.

Contact our engineers: askus@indium.com
Learn more: www.indium.com

ASIA +65 6268 8678 • CHINA +86 (0) 512 628 34900 • EUROPE +44 (0) 1908 580400 • USA +1 315 853 4900