PRODUCT DATA SHEET

Indium6.5R

Water-Soluble Pb-Free Solder Paste

Introduction

Indium6.5R is a versatile, water-soluble solder paste flux, formulated for air or nitrogen reflow. It is capable of Pb-free assembly processes with a wide reflow process window. This solder paste provides exceptional stencil printing performance, with long stencil life and excellent response-to-pause. **Indium6.5R** exhibits superior wetting to a variety of surface finishes and exhibits excellent low-voiding performance.

Features

- Lowest voiding water-soluble flux for solder paste:
  - Reduced largest voids
  - Fewer voids
  - Minimized voiding overall
- Exceptional printing process window:
  - Excellent response-to-pause
  - Long stencil life
  - Prints consistently at a wide range of speeds
- Wide reflow process window for profiling
- Excellent wetting on a variety of surface finishes
- Maintains tack over time

Alloys

Indium Corporation manufactures low-oxide spherical powder composed of a variety of alloys covering a broad range of melting temperatures. Type 4 powder is the standard offering with SnAgCu and SnAg alloy systems. 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 offerings are detailed in the following table.

Bellcore and J-STD Tests and Results

Industry Standard Test Results and Classification			
Flux Classification	ORH1	Typical Solder Paste Viscosity for SAC305 T4 (Poise)	2,000
Based on the testing required by IPC J-Standard-004B.		Conforms with all requirements from IPC J-Standard-005A.	

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

Standard Product Specification

Alloy Grouping	Indalloy® #	Common Name	Composition	T4 (%)
Pb-Free Alloys	241	SAC387	95.5Sn/3.8Ag/0.7Cu	88–89
	256	SAC305	96.5Sn/3.0Ag/0.5Cu	
	258	SAC105	98.5Sn/1.0Ag/0.5Cu	

Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. The preliminary shelf life of **Indium6.5R** is 3 months when stored at <10°C. When storing solder paste contained in syringes and cartridges, the packages should be stored with tip down.

Solder paste should be allowed to reach ambient working temperature prior to use and before opening the jar. Ideally, the working environment would be 23–28°C and 25–50% RH. Generally, paste should be removed from refrigeration at least 2 hours prior to 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

Indium6.5R is 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.

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.

From One Engineer To Another®

INDIUM CORPORATION®

PRODUCT DATA SHEET

Indium6.5R Water-Soluble Pb-Free Solder Paste

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	20–40mm in diameter
Print Speed	25–100mm/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 determined
Solder Paste Stencil Life	>8 hours (<25–50% RH and 22–28°C)

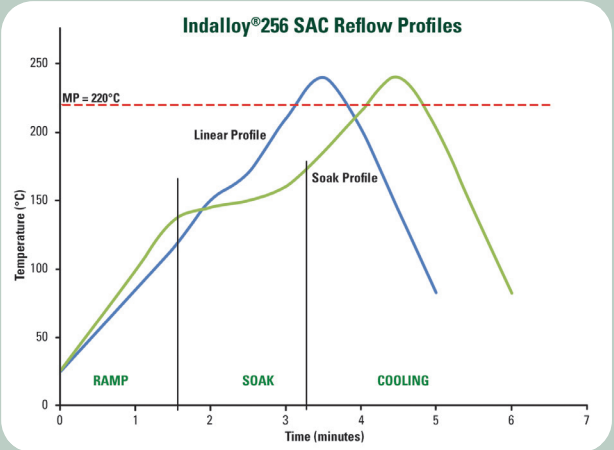
Cleaning

Residue Removal: Indium6.5R 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 60psi 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. We recommend cleaning the flux residue 12 hours (or sooner) after reflow for optimal test performance. Electrical testing should be completed after the flux residue is removed.

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.

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 **Indium6.5R** 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.

Reflow Profile Details	SAC305 Parameters		Comments
	Recommended	Acceptable	
Ramp Profile (Average Ambient to Peak)—Not the Same as Maximum Rising Slope	1.0–1.5°C/second	0.5–2.5°C/second	To minimize solder balling, beading, hot slump
Soak Zone Profile (optional)	20–60 seconds	30–120 seconds	May minimize BGA/CSP voiding Eliminating/reducing the soak zone may help to reduce HIP and graping
	140–160°C	140–170°C	
Time Above Liquidus (TAL)	45–60 seconds	30–100 seconds	Needed for good wetting/reliable solder joint As measured with thermocouple
Peak Temperature	230–260°C	230–262°C	
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

All parameters are for reference only.
Modifications may be required to fit process and design.

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