PRODUCT DATA SHEET

SiPaste® C201HF

Solder Paste

Introduction

Indium Corporation's **SiPaste® C201HF** is a no-clean solder paste specifically formulated to offer a flexible processing solution for the electronics industry. This material is classified as"cleanable," as it leaves behind a cleanable residue post-reflow, able to be removed with commercially available semi-aqueous cleaning solutions, with any residue remaining being benign if a no-clean process is preferred. In addition, this material has industry leading non-wet open (NWO) performance using superior oxidation barrier technology. In addition, this enables reduced head-in-pillow (HIP) defects and enhanced graping performance. **SiPaste® C201HF** combines superior NWO performance with excellent stencil print transfer efficiency to satisfy the broadest range of process requirements and boost SPI yields.

Features

- Easily cleanable residue
- High transfer efficiency with fine feature apertures (01005, 008004)
- Excellent NWO performance
- Excellent HIP performance
- Wide reflow profile window under both air and nitrogen atmospheres
- Halogen-free per EN14482 test method

Alloys

Indium Corporation manufactures low-oxide spherical powder composed of a variety of Pb-free alloys that cover a broad range of melting temperatures. 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* (T4/T4.5)
96.5Sn/3.0Ag/0.5Cu (SAC305)	88–89%

**The optimal metal load can vary depending on application/process needs.*

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)	ROL0	Solder Paste Viscosity (Type 6SGS, 87.75%) Malcom (10rpm)	1,550 poise (typical)
Elemental Analysis – for Cl – for Br	<.05% (ND) <.05% (ND)	Slump Test	Pass
Post-Reflow Flux Residue (ICA Test)	<5% of solder paste	Solder Ball Test	Pass
SIR (Ohms)	Pass (10^8 @ 85°C, 85% RH)	Wetting Test	Pass

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

Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. Solder paste packaged in cartridges 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 container size. The solder paste temperature should be verified before use. Jars and cartridges should be labeled with the date and time of opening.

Packaging	Storage Conditions (unopened containers)	Shelf Life
Jar/Cartridge	-20–0°C	6 months*

**Preliminary data.*

Packaging

Indium Corporation's **SiPaste® C201HF** is currently available in 250g and 500g jars or 600g cartridges. 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.

Safety Data Sheets

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

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:

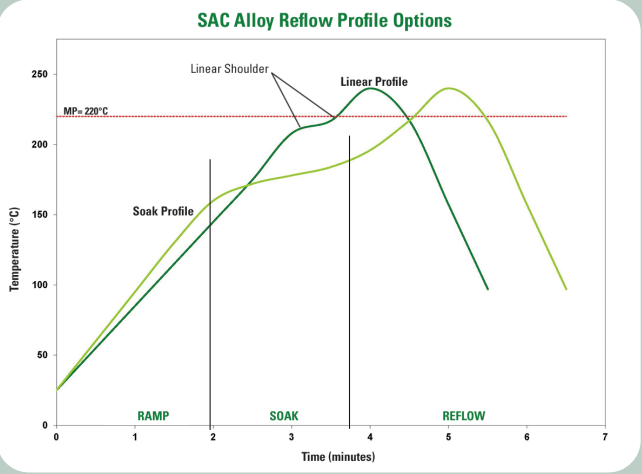
- Discrete components—A 10–20% reduction of stencil aperture has significantly reduced or eliminated the occurrence of mid-chip solder beads. The "home plate" design is a common method for achieving this reduction.
- Fine-pitch components—A surface area reduction is recommended for apertures of 20mil 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 or 60° squeegees are typically used
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)

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 **SiPaste® C201HF** 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	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
	160–180°C	150–200°C	Eliminating/reducing the soak zone may help to reduce HIP and graping
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	N_2 or Air		A N_2 reflow atmosphere with O_2 ppm <100 is preferable for fine powders.

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

Contact our engineers: askus@indium.com

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Cleaning

SiPaste® C201HF flux residue can be easily removed by using water with mixture of saponifier or semi-aqueous cleaners, and most commercially available flux residue removers. This material is formulated to leave an easily cleanable, benign residue after reflow. 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. For a recommendation of appropriate cleaning solutions, please contact one of Indium Corporation's Technical Support Engineers.

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.

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. All Indium Corporation's products and solutions are designed to be commercially available unless specifically stated otherwise.

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.

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