PRODUCT DATA SHEET

NC-SMQ230

Pb-Free Solder Paste

Introduction

NC-SMQ230 is an air reflow, no-clean solder paste specifically formulated to accommodate the higher processing temperatures required by the SnAgCu, SnAgBi, SnAg, and other Pb-free alloy systems favored by the electronics industry to replace conventional Pb-bearing solders. **NC-SMQ230** offers consistent, repeatable printing performance combined with long stencil and tack times to handle the rigors of today's high-speed, as well as high-mix, surface mount lines.

Features

- Minimum peak temperature 229°C
- Wide reflow process window
- Consistent fine-pitch print deposition
- Excellent start-up after idle time
- Long stable tack life and open time

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 load required is applicationdependent and will vary with alloy density and mesh size. Type 3 (-325/+500 mesh) powder is standard, but other powder sizes are available. See Standard Product Specifications below for details on metal load and particle size.

Standard Product Specifications

Alloy	Metal Load
SAC305	89.3% Printing (Type 3)
SAC387	
SAC305	89% Printing (Type 4)

Bellcore and J-STD Tests and Results			
Flux Classification	ROL1	Typical Solder Paste Viscosity for SAC305 (96.5Sn/3.0Ag/0.5Cu, Type 3, 89.3% (Poise)	2,100
Based on the testing required by the current revision of IPC J-Standard-004		Conforms with all requirements from the current revision of IPC J-Standard-005	

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

Packaging

Standard packaging for stencil printing applications includes 4oz jars and 6 or 12oz cartridges. Packaging for enclosed print head systems is also readily available. For dispensing applications, 10 and 30cc syringes are standard. Other 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 **NC-SMQ230** is 6 months when stored at <10°C. The shelf life at room temperature (<25°C) is 72 hours (3 days). Solder paste packaged in syringes and 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.

Compatible Products

- **Cored Wire**: Core 230
- **Wave Fluxes**: WF-9940 and WF-7745
- **Flux Pen**: FP-500
- **Rework Flux**: TACFlux® 023

Technical Support

Indium Corporation's internationally experienced engineers provide in-depth technical assistance to our customers. Thoroughly knowledgeable in all facets of Material 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

The SDS for this product can be found online at http://www.indium.com/sds

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 adequate release of solder paste from stencil apertures, a minimum aspect ratio of 1:5 is required. The aspect ratio is defined as the width of the aperture divided by the thickness of the stencil.

Printer Operation:

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

Parameter	Value
Solder Paste Bead Size	20–25mm in diameter
Print Speed	25–50mm/second
Squeegee Pressure	0.018–0.027kg/mm of blade length
Squeegee Type/Angle	Metal with appropriate length; 45 or 60° squeegees are typically used
Underside Stencil Wipe	Once every 10–25 prints
Solder Paste Stencil Life	>8 hours (at 30–60% RH and 22–28°C)

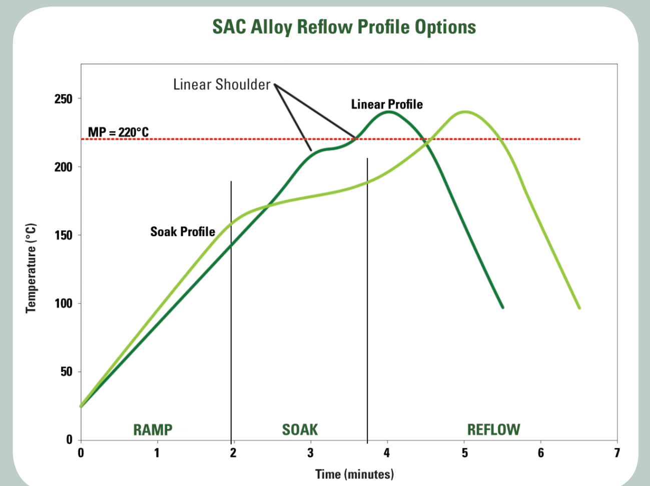
Cleaning

NC-SMQ230 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 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 **NC-SMQ230** 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 Eliminating/reducing the soak zone may 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

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

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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

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