PRODUCT DATA SHEET

NC-SMQ®51SC
Solder Paste

Introduction
NC-SMQ®51SC is an air reflow, no-clean solder paste designed for use in a wide range of environmental conditions. It has exceptional stencil life and tack strength, and offers consistent print definition even in ultra-fine pitch applications. **NC-SMQ®51SC's** wide processing window allows it to be used with standard eutectic SnPb, SnPbAg, SnAgCu, and high-temperature alloys including AuSn, SnPb, and SnPbAg.

Alloys
Indium Corporation manufactures low-oxide spherical solder powder composed of SnPb and SnPbAg in a standard type 3 mesh size (J-STD-006). Other non-standard mesh sizes are available upon request. The weight ratio of the solder powder to solder paste is referred to as the metal load and is typically in the range of 82-91% for standard alloy compositions.

Standard Product Specifications

Alloy	Metal Load (% by weight)		Powder Type
	Printing	Dispensing	
Sn63	90-90.5	87	Type 3
Sn62	90-90.5	87	
SAC305	89	84	

Compatible Products
- Rework Flux: PoP Flux 8.9HF-LV, TACFlux® 007
- Cored Wire: CW-807
- Wave Flux: WF-9945, WF-9955, FP-500, NC-771

Note: Other products may be applicable. Please consult one of Indium Corporation's Technical Support Engineers.

Features
- Wide reflow process window
- Consistent fine pitch print deposition
- Extended open time
- Superior tack strength
- No-clean residue
- Exceptional wetting in air reflow

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 two 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.

Cleaning
NC-SMQ®92J 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.

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

BELLCORE AND J-STD TESTS & RESULTS

Test	Result
J-STD-004 (IPC-TM-650)	
• Flux Type Classification	ROL1
• Flux Induced Corrosion (Copper Mirror)	Pass
• Presence of Halide:	
Silver Chromate	Pass
Fluoride Spot Test	Pass
Cl Equivalent	<0.019% of paste
• Post Reflow Flux Residue (ICA Test)	47%
• Corrosion	Pass
• SIR	Pass
• Typical Acid Value	85

Test	Result
J-STD-005 (IPC-TM-650)	
• Typical Solder Paste Viscosity (Sn63/Pb37, Type 3) Brookfield (5 rpm)	
90% Metal Load	850 kcps
90.5% Metal Load	1100 kcps
Malcom (10 rpm)	
90% Metal Load	1800 poise
• Typical Thixotropic Index; SSF	-0.60
• Slump Test	Pass
• Solder Ball Test	Pass
• Typical Tackiness	38 grams
• Wetting Test	Pass
• Bellcore Electromigration	Pass

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

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INDIUM CORPORATION®

ISO 9001 REGISTERED

NC-SMQ®51SC Solder Paste

Printing

Stencil Design:

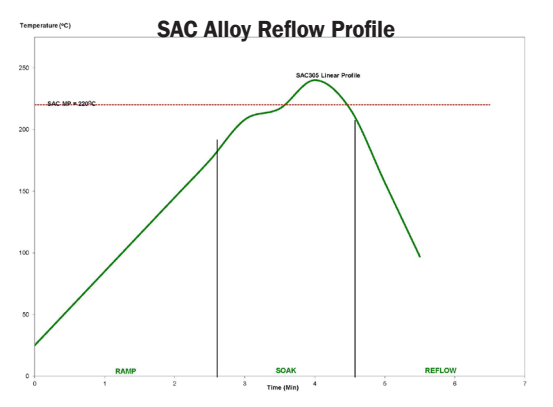
Electroformed and laser cut/electropolished stencils produce the best printing characteristics among stencil types. Stencil aperture design is a crucial step in optimizing the print process. The following are a few general recommendations:

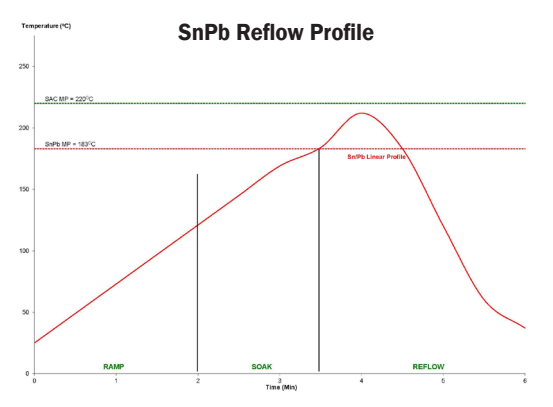
- Discrete components — A 10–20% reduction of stencil aperture has significantly reduced or eliminated the occurrence of mid-chip solder beads. The "home plate" design is a common method for achieving this reduction.
- Fine pitch components — A surface area reduction is recommended for apertures of 20 mil 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 suggested. The aspect ratio is defined as the width of the aperture divided by the thickness of the stencil.

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 / ~45-60 degrees
Separation Speed	5-20mm/second or per equipment manufacturer's specifications
Solder Paste Stencil Life	>8 hrs. (at 30-60% RH and 22-28°C)

Reflow

Recommended Profile:





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

Profile Details	Parameters			Comments
	SAC305	SAC305/Sn63/Sn62	Sn63/Sn62	
Ramp Profile (Average Ambient to Peak) - Not the Same as Maximum Rising Slope	0.5–1°C/Second Recommended 0.5–2.5°C/Second Acceptable			To minimize solder balling, beading, hot slump
Soak Zone Profile	160–180°C/Recommended 150–200°C/Acceptable	30–90 Seconds Recommended 30–120 Seconds Acceptable	140–150°C/Recommended 130–170°C/Acceptable	May minimize BGA/CSP voiding
Time Above Liquidus (TAL)	235–250°C/Recommended 232–270°C/Acceptable	45–60 Seconds Recommended 30–100 Seconds Acceptable	198–213°C/Recommended 195–233°C/Acceptable	Needed for good wetting/ reliable solder joint
Peak Temperature	260°C	—	230°C	As measured with thermocouple
Cooling Ramp Rate	2–6°C/Second Recommended 0.5–6°C/Second Acceptable			Rapid cooling promotes fine grain structure
Reflow Atmosphere	Air or N_2			N_2 typically preferred

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