PRODUCT DATA SHEET

NC-SMQ®92H

Solder Paste

Introduction

NC-SMQ®92H is a halogen-free, air reflow, no-clean solder paste formulated for low flux spatter. It provides consistent fine-pitch paste deposition, and excellent stencil life and tack time. **NC-SMQ®92H** has a hard flux residue and can accommodate reflow temperatures higher than typically required for many Pb-containing alloys. **NC-SMQ®92H** meets or surpasses all ANSI/J-STD-004, -005 specifications and Bellcore test criteria.

Features

- Compatibility with common conformal coatings
- Clear, benign residue
- Superior stencil life
- Exceptional wetting in air reflow
- Outstanding print characteristics
- Halogen-free

Alloys

Indium Corporation manufactures low-oxide spherical powder composed of SnPb and SnPbAg in the industry standard Type 3 mesh size. Other, non-standard, mesh sizes are available upon request. The weight ratio of the flux/vehicle to the solder powder is referred to as the metal load and is typically in the range of 84–92% for standard alloy compositions.

Standard Product Specifications

Alloy	Metal Load		Mesh Size
Sn63 & Sn62	Printing 90%	Dispensing 85%	Type 3 -325/+500
	89.5%	84%	Type 4 -400/635

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.

Packaging

Standard packaging for stencil printing applications includes 4 oz. jars and 6 oz. or 12 oz. cartridges. Packaging for enclosed print head systems is also readily available. For dispensing applications, 10cc and 30cc syringes are standard. Other packaging options are available on request.

Compatible Products

- Rework Flux: PoP Flux 8.9HF-LV, TACFlux®018
- Cored Wire: CW-807
- Wave Flux: WF-9945, WF-9955, FP-500, NC-771

Note: Other products may be applicable. Please consult Technical Support Engineers.

Bellcore and J-STD Tests and Results

Test	Result
J-STD-004 (IPC-TM-650)	
Flux Type Classification	ROL0
Flux Induced Corrosion (Copper Mirror)	Pass
Presence of Halide Fluoride Spot Test Elemental Analysis (Br, Cl, F)	Pass 0%
Post Reflow Flux Residue (ICA Test)	46%
Corrosion	Pass
SIR	Pass
Acid Value	128

Test	Result
J-STD-005 (IPC-TM-650)	
Typical Solder Paste Viscosity (Sn63, 90%, Type 3) Malcom (10rpm)	1,400 Poise
Typical Thixotropic Index; SSF (ICA Test)	-0.75
Slump Test	Pass
Solder Ball Test	Pass
Typical Tackiness	32 grams
Wetting Test	Pass
BELLCORE GR-78	
SIR	Pass
Electromigration	Pass

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

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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 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	25–100mm/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	>12 hrs. (at 30–60% RH and 22–28°C)

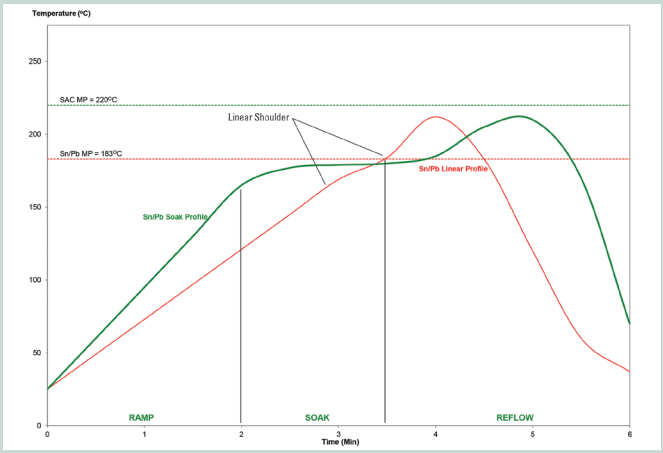
Cleaning

NC-SMQ®92H 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.

Reflow

Recommended Profile:



The stated profile applies to Sn63 and Sn62 alloys. This can be used as a general guideline in establishing a reflow profile when using **NC-SMQ®92H** 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	Parameters		Comments
	SnPb		
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 (Optional)	30–90 Seconds Recommended	30–120 Seconds Acceptable	May minimize BGA/CSP voiding
	140–150°C/Recommended	130–170°C/Acceptable	
Time Above Liquidus (TAL)	45–60 Seconds Recommended	30–100 Seconds Acceptable	Needed for good wetting/reliable solder joint As measured with thermocouple
Peak Temperature	220–230°C/Recommended	195–233°C/Acceptable	
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 for small components

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

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