PRODUCT DATA SHEET

NC-SMQ®75 Solder Paste

Introduction

NC-SMQ®75 is a halogen-free, no-clean solder paste formulated to leave a completely benign, invisible residue of 0.4% of paste or <5% of flux vehicle. It is designed for reflow in a nitrogen atmosphere of 100ppm oxygen or less. This product has superior wetting capabilities compared to most low-residue formulations, offers trouble-free probe testing, and a "no-residue" appearance. **NC-SMQ®75** meets or surpasses all ANSI/J-STD-004, -005 specifications and Bellcore Electromigration test criteria.

Alloys

Indium Corporation manufactures low-oxide spherical powder composed of a variety of Pb-bearing and Pb-free alloys that cover a broad range of melting temperatures. The metal load required is application dependent and will vary with alloy density and mesh size. See Standard Product Specifications section for details on metal load and particle size.

Standard Product Specifications

Alloy	Metal Load	Mesh Size	Particle Size
Sn90/Sb10	Dispensing 84%	T6SG	5–15μ

Packaging

Standard packaging for stencil printing applications includes 4oz jars and 6 or 12oz cartridges. 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-SMQ®75** is 6 months at storage temperatures of -20 to +5°C. When storing solder paste contained in syringes and cartridges, they 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.

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

Bellcore and J-STD Tests and Results

Test	Result
J-STD-004 (IPC-TM-650)	
Flux Type Classification	ORL0
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)	<5%
Corrosion	Pass
SIR	Pass
Acid Value	31.5
Bellcore SIR	Pass
Bellcore Electromigration	Pass

Test	Result
J-STD-005 (IPC-TM-650)	
Typical Solder Paste Viscosity (Sn90, 89.5%, -325/+500) Brookfield (5rpm) Malcolm (10rpm)	 625kcps 1,800 poise
Typical Thixotropic Index; SSF	-0.43
Slump Test	Pass
Solder Ball Test	Pass
Tackiness	40g
Wetting Test	Pass

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

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 suggested. 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 requirements:

- Solder Paste Bead Size: 20–25mm diameter
- Processing Temperature: 25–30°C (inside of printer)
- Print Speed: 25–100mm
- Squeegee Pressure: 0.018–0.027kg/mm of blade length
- Underside Stencil Wipe: Once every 10–25 prints
- Solder Paste Stencil Life: >12 hours 30–60% R.H. and 22–28°C

Cleaning

NC-SMQ®75 is designed for no-clean applications. However, the flux can be removed, if necessary, by using a commercially available flux residue remover.

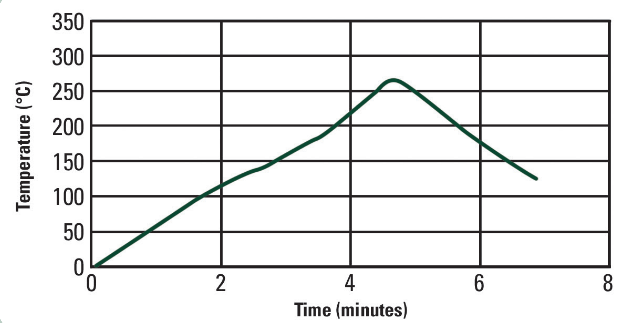
Stencil Cleaning: This is best performed using an automated stencil cleaning system for both stencil and misprint cleaning to prevent extraneous solder balls. Most commercially available stencil cleaning formulations including isopropyl alcohol (IPA) work well.

Compatible Products

- **Rework Flux**: TACFlux®010

Reflow

Recommended Profile:



This profile is for use with Indalloy®133 (Sn95/Sb5 and Sn90/Sb10) alloys and will serve as a general guideline in establishing a reflow profile for your process. Adjustments will be necessary for use with other alloys. Various board geometries, densities, and oven types may require further profile adjustments.

Heating Stage:

A linear ramp rate of 0.5–2°C/second allows gradual evaporation of volatile flux constituents and prevents defects such as solder balling/beading and bridging as a result of hot slump. It also prevents unnecessary depletion of fluxing capacity when using higher temperature alloys. A profile with an extended soak above 150°C can be implemented to reduce void formation and minimize tombstoning when required.

Liquidus Stage:

A peak temperature of 25–45°C (215°C shown) above the melting point of the solder alloy is needed to form a quality solder joint and achieve acceptable wetting due to the formation of an intermetallic layer. If the peak temperature is excessive, or the time above liquidus greater than the recommended 30–90 seconds, flux charring, excessive intermetallic formation and damage to the board and components can occur.

Cooling Stage:

A rapid cool down of <4°C/second is desired to form a fine-grain structure. Slow cooling will form a large grain structure, which typically exhibit poor fatigue resistance. If excessive cooling >4°C/second is used, both the components and the solder joint can be stressed due to a high CTE mismatch.

Contact our engineers today: askus@indium.com
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