

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 100-ppm oxygen or less. This product has superior wetting capabilities compared to most low residue formulations, offers troublefree 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. Type 3 (-325/+500 mesh) powder is standard, but other powder sizes are available. See Standard Product Specifications section for details on metal load and particle size.

Standard Product Specifications

Alloy	Metal Load		Mesh Size	Particle Size
	Printing	Dispensing	Type 3	
Sn63/Pb37	91.5%	87%	-325/+500	25-45µ
Sn62/Pb36/Ag2	90.5%	86%	Type 3	25-45µ

Packaging

Standard packaging for stencil printing applications includes 4oz. jars and 6oz. or 12oz cartridges. For dispensing applications, 10cc and 30cc syringes are standard. Other packaging options may be available upon request.

Material Safety Data Sheets

The MSDS for this product can be found online at <http://www.indium.com/techlibrary/msds.php>

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 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.

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BELLCORE AND J-STD TESTS & RESULTS

Test	Result	Test	Result
J-STD-004 (IPC-TM-650)		J-STD-005 (IPC-TM-650)	
• Flux Type Classification	ORLO	• Typical Solder Paste Viscosity (Sn63, 91.5%, -325/+500)	
• Flux Induced Corrosion (Copper Mirror)	Pass	• Brookfield (5 rpm)	925 kcps
• Presence of Halide		• Malcom (10 rpm)	2175 poise
• Fluoride Spot Test	Pass	• Typical Thixotropic Index; SSF	-0.43
• Elemental Analysis (Br, Cl, F)	0%	• Slump Test	Pass
• Post Reflow Flux Residue (ICA Test)	<5%	• Solder Ball Test	Pass
• Corrosion	Pass	• Tackiness	40g
• SIR	Pass	• Wetting Test	Pass
• Acid Value	31.5		
• Bellcore SIR	Pass		
• Bellcore 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 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:

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 hrs. 30-60% R.H. & 22-28°C

Cleaning

NC-SMQ75 is designed for no-clean applications. However, the flux can be removed if necessary by using a commercially available flux residue remover.

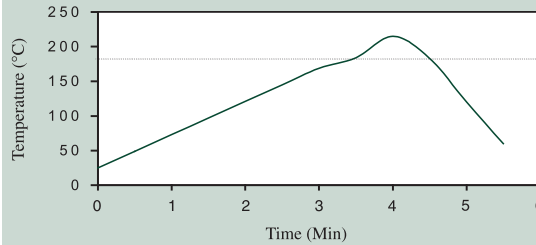
Stencil Cleaning: This is best-performed using an automated stencil cleaning system for both stencil and misprint cleaning to prevent extraneous solder balls. Most commercially available stencil cleaning formulations including isopropyl alcohol (IPA) work well.

Compatible Products

- Rework Flux: TACFlux 010

Reflow

Recommended Profile:



This profile is designed for use with Sn63/Pb37 and Sn62/Pb36/Ag2 and can serve as a general guideline in establishing a reflow profile for use with other alloys. Adjustments to this profile may be necessary based on specific process requirements.

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.

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.

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