NC-SMQ®92J Solder Paste

Benefits

- Excellent wetting reflow in air
- Probe-testable residue
- Extended open time
- Consistent fine-pitch printing
- Strong initial tack strength and long-term stability
- High humidity resistance
- Halogen-free

Introduction

NC-SMQ®92J is a halogen-free, air reflow, no-clean solder paste formulated to leave a benign, probe-testable residue. The residue is easily penetrated and will not clog multi-point probes. This product has other qualities such as consistent fine-pitch paste deposition, unsurpassed stencil life and tack time, and excellent wetting. **NC-SMQ92J** will perform well on high speed surface mount lines utilizing fast print speeds and rapid chip placement. **NC-SMQ92J** meets or surpasses all ANSI/J-STD-004, -005 specifications and Bellcore test criteria.

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 85–92% for standard alloy compositions.

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.

Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. The shelf life of **NC-SMQ92J** is 6 months when stored at <10°C. 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 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.

Standard Product Specifications

Alloy		Metal Load (% by weight)			
Name	Composition	T3 Printing	T3 Dispense	T4 Printing	T4 Dispense
Sn63	Sn63/Pb37	90% & 90.25%	85%	89.5%	84%
Sn62	Sn62/Pb36/Ag2				
Indalloy® 100	Sn62.6/Pb37/Ag0.4				

OVER→

BELLCORE AND J-STD TESTS & 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	Pass
Elemental Analysis (Br, Cl, F)	0%
• Post Reflow Flux Residue (ICA Test)	45%
• Corrosion	Pass
• SIR	Pass
• Acid Value	113

Test	Result
J-STD-005 (IPC-TM-650)	
• Typical Solder Paste Viscosity (Sn63, 90.25%, Type 3) Malcom (10 rpm)	2000 poise
• Typical Thixotropic Index; SSF (ICA Test)	-0.75
• Slump Test	Pass
• Solder Ball Test	Pass
• Typical Tackiness	38 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.

Form No. 97703 R12

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INDIUM CORPORATION®

ISO 9001 REGISTERED

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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 requirement:

• Solder Paste Bead Size:	20–25mm diameter
• Print Speed:	25–100mm/sec
• 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% RH & 22°–28°C

Cleaning

NC-SMQ92J 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

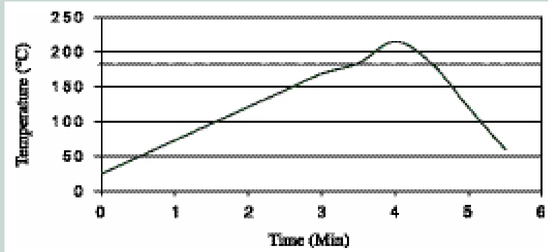
- Rework Flux: TACFlux® 020
- Cored Wire: Core 92

Material Safety Data Sheets

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

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.

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