

# PRODUCT DATA SHEET

# NC-SMQ81

## Solder Paste

### Introduction

**NC-SMQ81** is an air reflow, halide-free, no-clean solder paste designed for assembly processes using the eutectic SnBi and SnBiAg alloys. This paste is a moderate residue product with exceptional wetting capabilities. The low activation temperature of **NC-SMQ81**, in combination with the SnBi alloy, can be especially useful as a low-temperature, Pb-free solution. In addition, **NC-SMQ81** meets J-STD-004 and -005 test criteria.

### Features

- Designed for use with SnBi and SnBiAg alloys
- Low-temperature Pb-free solution
- No-clean residue
- Exceptional wetting in air reflow
- Halide-free

### Alloys

Indium Corporation manufactures low-oxide spherical powder composed of the 58Bi/42Sn eutectic alloy 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 83–92% for standard alloy compositions.

### Standard Product Specifications

Alloy	Metal Load		Mesh Size	Particle Size
	Printing	Dispensing		
Indalloy®281 (58Bi/42Sn)	89%	84%	Type 3 -325/+500	25–45µm 0.001–0.0018"
Indalloy®282 (57Bi/42Sn/1Ag)				

### Bellcore and J-STD Tests and Results

Test	Result	Test	Result
J-STD-004 (IPC-TM-650)		J-STD-005 (IPC-TM-650)	
Flux Type Classification	ROLO	Typical Solder Paste Viscosity (Indalloy®281, 89%, -325/+500) Brookfield (5rpm)	900kcps
Flux-Induced Corrosion (Copper Mirror)	Pass		
Presence of Halide – Silver Chromate – Fluoride Spot Test	Pass Pass	Typical Thixotropic Index; SSF (ICA Test)	-0.6
		Slump Test	Pass
Post-Reflow Flux Residue (ICA Test)	56%	Solder Ball Test	Pass
		Typical Tackiness	37g
Corrosion	Pass	Wetting Test	Pass
SIR	Pass	<i>All information is for reference only. Not to be used as incoming product specifications.</i>	
Acid Value	116		

### Packaging

Standard packaging of **NC-SMQ81** is 4oz jars, and 6 and 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-SMQ81** is 6 months at storage temperatures <5°C. Storage temperatures should not exceed 25°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 Materials Science as it applies to the electronics and semiconductor sectors, Technical Support Engineers provide expert advice in solder properties, alloy compatibility and selection of 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>

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 in stencil aperture area may significantly reduce or eliminate 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).
- A minimum aspect ratio of 1:5 is suggested for adequate release of solder paste from stencil apertures. 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 in diameter
Print Speed	12.5–50mm/second
Squeegee Pressure	0.018–0.027kg/mm of blade length
Underside Stencil Wipe	Once every 10–25 prints
Solder Paste Stencil Life	>8 hours (at 30–60% RH and 22–28°C)

## Cleaning

**NC-SMQ81** 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® 021

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All of Indium Corporation's solder paste and preform manufacturing facilities are IATF 16949:2016 certified. Indium Corporation is an ISO 9001:2015 registered company.

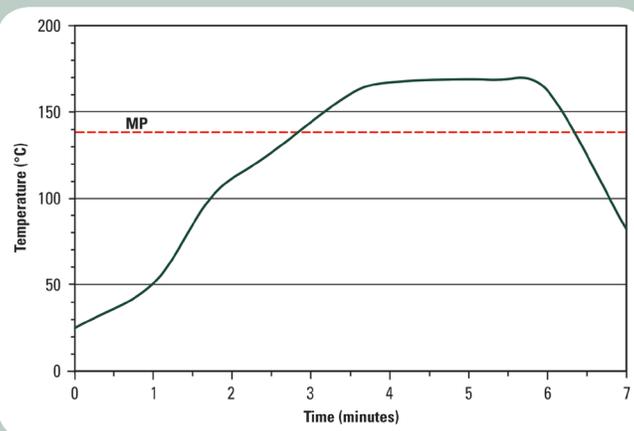
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## Reflow

### Recommended Profile:



This profile is designed for use with Indalloy #281 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 0.5–1.0°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.

### Liquidus Stage:

A peak temperature of 25–45°C (175°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.

### Cooling Stage:

A rapid cool down of <4°C/second is desired to form a fine-grain structure in the solder joint. Slow cooling will form a large-grain structure, which typically exhibits 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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