

# PRODUCT DATA SHEET

# NC-SMQ<sup>®</sup>77

## Solder Paste

### Introduction

**NC-SMQ<sup>®</sup>77** 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 or forming gas atmosphere of 100ppm oxygen or less. This product has superior wetting capabilities compared to most low-residue formulations and offers a “no-residue” appearance. **NC-SMQ<sup>®</sup>77** meets or surpasses all ANSI/J-STD-004 and -005 specifications.

### Features

- Ultra-low residue
- Low-voiding with minimal profiling
- Halogen-free flux (no intentionally added halogens)
- Consistent printing
- Superior wetting
- Compatible with common metal finishes

### Alloys

Indium Corporation manufactures low-oxide spherical powder in a standard Type 3–7 mesh sizes. Typical alloys with this flux are composed of SnPb, SnSb, SnPbAg, AuSn, and SnAgCu. Other non-standard mesh sizes and solder alloys are available upon request. The weight ratio of the solder powder to the solder paste (%w/w) is referred to as the “metal load” and is typically 86–94% for standard alloy compositions depending on the alloy density and the application: dispensing or printing.

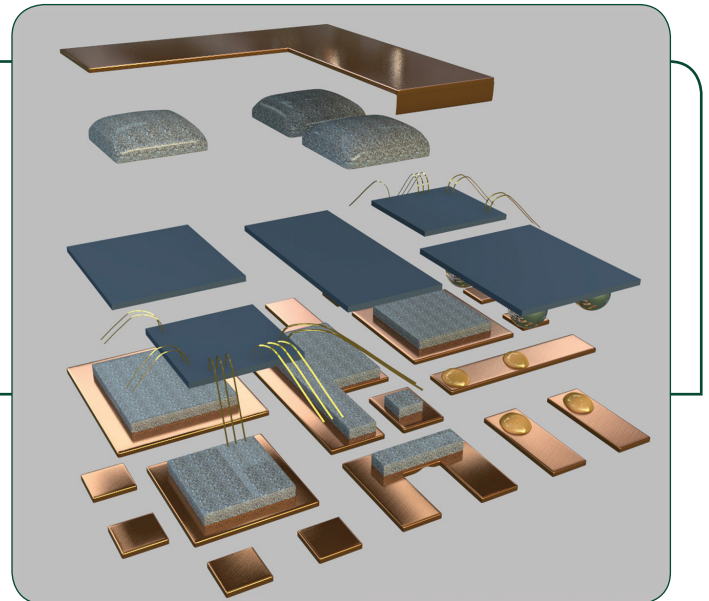
### Packaging

Standard packaging is in jars or cartridges for printing applications. For dispensing applications, 10 and 30cc syringes are used. Other packaging options may be available upon request.

### Bellcore and J-STD Tests and Results

Test	Result	Test	Result
<b>J-STD-004 (IPC-TM-650)</b>		<b>J-STD-005 (IPC-TM-650)</b>	
Flux Designation	ORLO	Typical Solder Paste Viscosity (SAC305, Type 4, 90.75% metal load) Malcolm (10rpm)	1,350kcps
Elemental Analysis	Halogen-free (NIA)	Solder Ball Test	Pass
Post Reflow Flux Residue (ICA Test)	= <0.4% of solder paste depending on metal load	Wetting Test	Pass
Acid Value (Typical)	40mg KOH/g	Standard Metal Load (Printing)	90.75%

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



### Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. 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. No heating should be employed.

Generally, paste should be removed from refrigeration at least 4 hours before use. Actual time to reach thermal equilibrium will vary with container size. Paste temperature should be verified before use. Cartridges or syringes should be labeled with date and time of opening.

### Atmosphere

**NC-SMQ<sup>®</sup>77** is designed for use in a nitrogen (100ppm oxygen or less) atmosphere. The use of forming gas (hydrogen/nitrogen mix) may help to remove oxides on copper surfaces and will help to stabilize flux residues against carbonization at higher temperatures.

**From One Engineer To Another<sup>®</sup>**

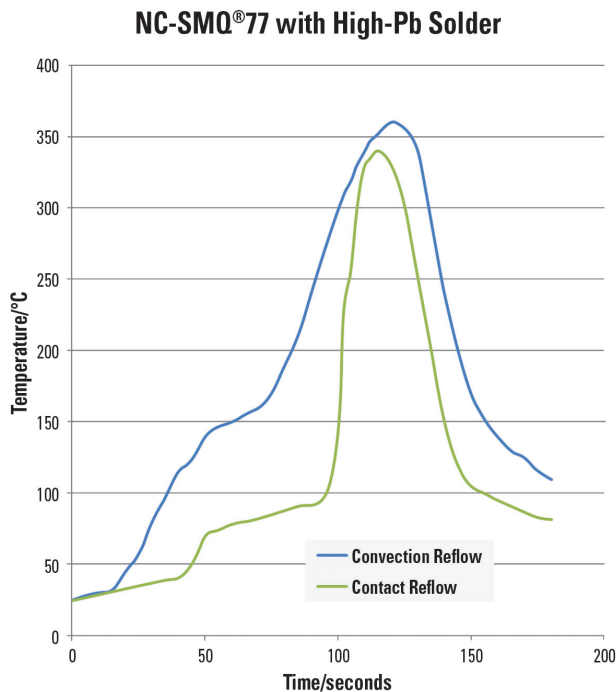


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### Reflow

#### Recommended Profile:



- Must be <100ppmO<sub>2</sub> in N<sub>2</sub> or H<sub>2</sub>/N<sub>2</sub>
- Spike: 320–390°C
- Higher temperature → lower voiding
- Minimum 15 seconds TAL
- Preheat plateau eliminates volatiles from flux

### Cleaning or Residue Removal

The post-reflow residue of **NC-SMQ<sup>®</sup>77** can be removed with commercially available solvents. The vehicle is capable of high-temperature alloy reflow without charring but, in case of overheating, any charred residue can be removed with the aid of ultrasonic or mechanical agitation.

### Quality

Indium Corporation is dedicated to producing the highest quality die-attach solder paste. For syringe-dispense, **NC-SMQ<sup>®</sup>77** is vacuum packaged by highly trained operators under controlled conditions in unique, specially designed equipment to minimize air bubbles in every syringe. Evaluations are performed on each lot to verify dispensing performance.

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. All Indium Corporation's products and solutions are designed to be commercially available unless specifically stated otherwise.

Contact our engineers today: [askus@indium.com](mailto:askus@indium.com)

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### Heating and Liquidus Stage:

Establish a profile which provides a rapid heating of the assembly to the solder's liquidus temperature. A slow linear, fast ramp, or soak type profile can be used to optimize the reflow; however, nature of the assembly and the capabilities of the reflow oven should govern the actual rate. To achieve acceptable wetting, and to minimize voiding and intermetallics formation, the profile must include a period of 15–90 seconds above the solder liquidus, and a peak temperature of 20–80°C above liquidus. However, excessive time above liquidus (and/or excessively high temperatures above liquidus) can produce negative consequences including: charred residue, difficulty in residue removal, excessive intermetallic formation (tin-containing alloys), voiding, and more.

### Cooling Stage:

This stage refers to the temperature from the peak to approximately 50°C below the liquidus temperature where the cooling rate has negligible effect. A rapid cool down of <6°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 is used, both the components and the solder joint can be stressed due to a high TCE mismatch.

### 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>



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