PRODUCT DATA SHEET

NC-SMQ77

Solder Paste

Introduction

NC-SMQ77 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-SMQ77** 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.

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-SMQ77 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.

Bellcore and J-STD Tests and Results

Test	Result
J-STD-004 (IPC-TM-650)	
Flux Designation	REL0
Elemental Analysis	Halogen-free (NIA)
Post Reflow Flux Residue (ICA Test)	= <0.4% of solder paste depending on metal load
Acid Value (Typical)	40mg KOH/g

Test	Result
J-STD-005 (IPC-TM-650)	
Typical Solder Paste Viscosity (SAC305, Type 4, 90.75% metal load) Brookfield Viscometer	1,350kcps
Solder Ball Test	Pass
Wetting Test	Pass
Standard Metal Load (Printing)	90.75%

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

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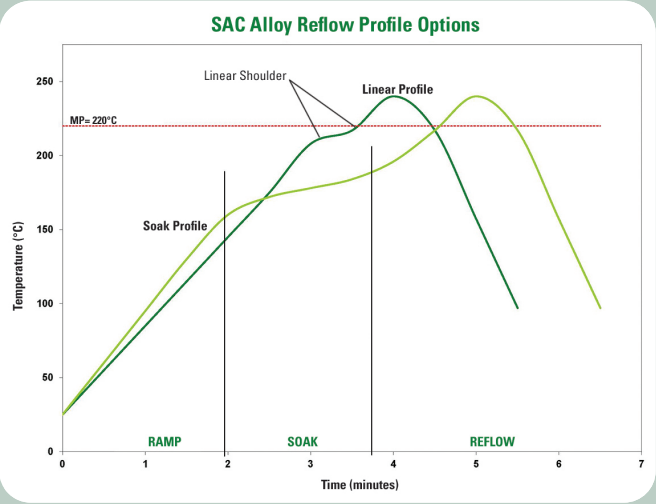
Reflow

Recommended Profile:



- Must be <100ppmO_2 in N_2 or H_2/N_2
- Spike: 235–260°C
- Higher temperature → lower voiding
- Minimum 15 seconds TAL
- Preheat plateau eliminates volatiles from flux

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.

Cleaning or Residue Removal

The post-reflow residue of **NC-SMQ77** 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 solder paste. For syringe-dispense, **NC-SMQ77** 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.

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

Please refer to the SDS document within the product shipment, or contact our local team to receive a copy.

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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