PRODUCT DATA SHEET

NC-SMQ71

Die-Attach Solder Paste

Introduction

NC-SMQ71 is a dispensing solder paste designed and formulated specifically for die-attach processes. Considerable care has been taken to produce a product that gives reliable dispensing of a consistent size deposit in automated dispensing equipment.

NC-SMQ71 is formulated for reflow in nitrogen atmospheres of 500ppm oxygen or less and leaves a completely benign residue of only 2% of paste or 20–25% of flux/vehicle. **NC-SMQ71** is halogen-free and meets ANSI/JSTD-004 and -005 criteria, as well as Bellcore electromigration specifications.

Features

- Low residue
- Vacuum-packed (bubble-free)
- Reliable miss-free, clog-free dispensing
- Consistent deposit size
- Halogen-free
- Compatible with all common metal finishes

Alloys

Indium Corporation manufactures low-oxide spherical powder composed of SnPb, SbSnPb, and SnPbAg in a standard Type 3 mesh size. Other non-standard mesh sizes are available upon request. The weight ratio of the solder powder to the solder paste is referred to as the metal load and is typically 86–90% for standard alloy compositions.

Packaging

Standard packaging for dispensing applications includes airlessly filled (bubble-free) 10 and 30cc EFD syringes (Semco® syringes also available). Other packaging options may be available upon request.

Standard Dispensing Powder Specifications

Alloy	Metal Content			Particle Size		
	Type 3	Type 4	Type 5	Type 3	Type 4	Type 5
Sn10/Pb88/Ag2 Sn5.0/Pb92.5/Ag2.5 Sn5/Pb95 Sn5/Pb85/Sb/10	86–88%	85.5–87.5%	85–87%	25–45µm	25–38µm	20–25µm

Bellcore and J-STD Tests and Results

Test	Result
J-STD-004A (IPC-TM-650)	
Flux Type Classification	ROL0
Presence of Halide Fluoride Spot Test	Pass
Elemental Analysis	0%
Post-Reflow Flux Residue (ICA Test)	2% of solder paste
Corrosion	Pass
SIR (Post-Clean)	Pass
Acid Value (Typical)	26

Test	Result
J-STD-005 (IPC-TM-650)	
Typical Solder Paste Viscosity (Sn5.0/Pb92.5/Ag2.5, Type 3, 89%) Brookfield (TF 5rpm)	430kcps
Slump Test	Pass
Solder Ball Test	Pass
Wetting Test	Pass
Standard Metal Load	86–90%

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

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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Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. The shelf life of **NC-SMQ71** is 6 months at storage temperatures of <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. 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.

Dispensing

NC-SMQ71 is formulated to be applied using automated high-speed, high-reliability, single-point, or multi-point dispensing equipment, but will also function in hand-held applications. Highly accurate volumes can be dispensed using either pneumatic or positive displacement devices. Optimal dispensing performance is dependent on storage conditions, equipment type, and setup.

Atmosphere

NC-SMQ71 is designed for use in a nitrogen (500ppm oxygen or less) atmosphere.

Cleaning

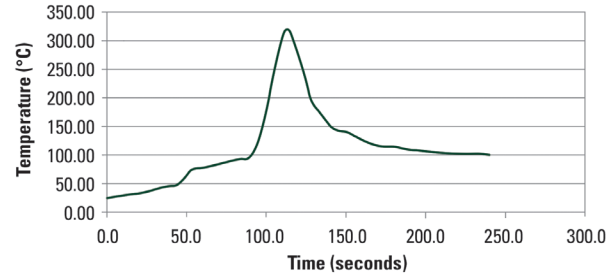
NC-SMQ71 is designed for no-clean applications; however, the flux residue can be removed, if necessary, by using a semi-aqueous system, saponified water, alcohols, and other CFC-free alternatives.

Quality

The Indium Corporation is dedicated to producing the highest quality die-attach solder paste. **NC-SMQ71** is vacuum-packaged by highly trained operators under controlled conditions in unique, specially designed equipment to minimize air bubbles in every syringe and cartridge. Rheology and reflow characteristics as well as metal content and identity are carefully confirmed for each lot. Also, evaluations are performed on each lot to verify dispensing performance.

Reflow

Recommended Profile:



The typical profile above is designed for use with Sn10/Pb88/Ag2 or Sn5.0/Pb92.5/Ag2.5 alloy in a nitrogen atmosphere (500ppm oxygen or less). It can serve as a general guideline for establishing a profile for your process and should be regarded as a typical example. Adjustments to this profile may be necessary based on assembly size, thermal density, and other factors. Use of other alloys with lower or higher liquidus temperatures will also require changes.

Heating and Liquidus Stage:

Establish a profile which provides a rapid heating of the assembly to the solder's liquidus temperature. Ramp rates of 1–4°C/second are recommended, but the nature of the assembly should govern the actual rate. To achieve acceptable wetting, and to minimize voiding and intermetallics formation, the profile must include a period of 15–30 seconds above the alloy's liquidus, and a peak temperature of 10–20°C above liquidus. However, excessive time above liquidus (and/or excessively high temperatures above liquidus) can produce negative consequences including: charred residue, difficult residue removal, excessive intermetallics formation, voiding, and more.

Cooling Stage:

Cooling after reflow should be as fast as practical. This is desired to form a fine-grained metallic structure. Slow cooling will result in a coarse, large-grain structure that will exhibit poor thermal cycling and fatigue resistance.

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