

PRODUCT DATA SHEET

# SMQ®51-SC

## High-Lead (Pb) Die-Attach Solder Paste

### Features

- Ultra-low voiding with minimal profiling
- Bubble-free (airless)
- Reliable clog-free dispensing
- Consistent dispensing deposit size
- Superior wetting
- Excellent cleanliness

### Introduction

SMQ®51-SC 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.

When used with high temperature alloys, SMQ®51-SC is designed for reflow in a forming gas or nitrogen atmosphere at less than 100ppm O<sub>2</sub>. This product has superior wetting capabilities and offers low voiding with minimal attention to profiling.

### Alloys

Indium Corporation manufactures low oxide spherical powder in a standard Type 3 mesh size. Other 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 84-88% for high-lead (Pb) alloy compositions, with this flux.

### Packaging

Standard packaging for dispensing applications includes 25g fill 10cc, and 100g fill 30cc airless syringes. Other packaging options may be available upon request.



### Standard Product Specifications

| Alloy            | Melting Point (°C) | Metal Content | Particle Size             | Recommended Needle Size <sup>1</sup> |
|------------------|--------------------|---------------|---------------------------|--------------------------------------|
| Sn10/Pb88/Ag2    | 267 - 290          | 84% - 88%     | 25 to 45 microns (Type 3) | 20 gauge*                            |
| Sn5/Pb92.5/Ag2.5 | 287 - 296          |               |                           |                                      |
| Sn5/Pb95         | 308 - 312          |               |                           |                                      |
| Sn5/Pb85/Sb10    | 245 - 255          |               |                           |                                      |

Note: (1): 20 gauge needle - 0.58 mm or 0.023 in.

### 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.

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### BELLCORE AND J-STD TESTS & RESULTS

| Test                                     | Result          | Test                             | Result   |
|--|-----------------|----------------------------------|----------|
| <b>J-STD-004 (IPC-TM-650)</b>            |                 | <b>J-STD-005 (IPC-TM-650)</b>    |          |
| • Flux Type Classification               | ROL1            | • Typical Solder Paste Viscosity |          |
| • Flux Induced Corrosion (Copper Mirror) | Pass            | Indalloy® 151 - Type 3           |          |
| • Presence of Halide: Silver Chromate    | Pass            | Brookfield (TF 5 rpm)            |          |
| Fluoride Spot Test                       | Pass            | TF Spindle                       |          |
| Cl Equivalent                            | <0.03% of paste | 88% Metal Load                   | 440 kcps |
| • Post Reflow Flux Residue (ICA Test)    | 47%             | 86% Metal Load                   | 350 kcps |
| • Corrosion                              | Pass            | • Solder Ball Test               | Pass     |
| • SIR                                    | Pass            | • Wetting Test                   | Pass     |
| • Typical Acid Value                     | 85              | • Bellcore Electromigration      | Pass     |

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

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## SMQ®51-SC High-Lead Die-Attach Solder Paste

### Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. The shelf life of **SMQ®51-SC** can be found on the product label or on the Certificate of Analysis. 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

**SMQ®51-SC** 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 set up.

### Atmosphere

**SMQ®51-SC** is designed for use in a forming gas or nitrogen (100 ppm oxygen or less) atmosphere.

### Cleaning or Residue Removal

The post reflow residue of **SMQ®51-SC** can be removed with commercially available solvents. The vehicle is capable of high temperature reflow without charring but in case of overheating, any charred residue can be removed with the aid of ultrasonic or mechanical agitation.

### Quality

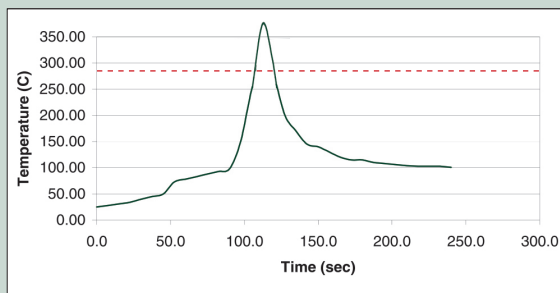
Indium Corporation is dedicated to producing the highest quality die-attach solder paste. **SMQ®51-SC** is packaged by highly-trained operators under controlled conditions in specially designed equipment to minimize air bubbles in every syringe and cartridge. Rheology and reflow characteristics as well as metal content and identity are carefully confirmed for each lot. Also, evaluations are performed on each lot to verify dispensing performance.

### Safety Data Sheets

The SDS for this product can be found online at <http://www.indium.com/sds>

### Reflow

#### Recommended Profile:



The typical profile above is designed for use with high-Pb (lead content 80% or greater) alloys in a forming gas or nitrogen atmosphere (100 ppm oxygen or less). This profile 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. To achieve acceptable wetting, and to minimize voiding and intermetallics formation, the profile must include a period of 15 to 30 seconds above the alloy's liquidus, and a peak temperature of 20° to 40°C above liquidus. However, excessive time above liquidus (and/or excessively high temperatures above liquidus) can produce negative consequences including: charred residue, increased difficulty in cleaning, 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.

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.

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