

PRODUCT DATA SHEET

SMQ®51-SC

High-Lead (Pb) Die-Attach Solder Paste

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 O₂. This product has superior wetting capabilities and offers low-voiding with minimal attention to profiling.

Features

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

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 Size¹
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 - 0.58mm or 0.023 inch.

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.

Belcore 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	ROL1	Typical Solder Paste Viscosity	440kcps 350kcps
Flux Induced Corrosion (Copper Mirror)	Pass	Indalloy®151—Type 3	
Presence of Halide:	Pass Pass <0.03% of paste	Brookfield (TF 5rpm)	
Silver Chromate		TF Spindle	
Fluoride Spot Test		88% Metal Load	Pass
Cl Equivalent		86% Metal Load	
Post Reflow Flux Residue (ICA Test)	47%	Solder Ball Test	Pass
Corrosion	Pass	Wetting Test	Pass
SIR	Pass	Bellcore Electromigration	Pass
Typical Acid Value	85	All information is for reference only. Not to be used as incoming product specifications.	

From One Engineer To Another®



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Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. This paste should not be exposed to >31°C at any point.

Shelf Life:

The shelf life of **SMQ[®]51-SC** is 6 months at storage temperatures of -20 to +10°C. Solder paste contained in syringes and cartridges should be stored tip down.

Floor Life:

Cartridges or syringes should be labeled with date and time of removal from refrigerated storage. Typical maximum total exposure time at room temperature (23–25°C) for this solder paste is 7 days (168 hours). Solder paste should be allowed to reach ambient working temperature prior to use. No heating should be employed. Generally, solder paste should be removed from the refrigerator at least 4 hours before usage. However, this time can be reduced to 2 hours for 30cc syringes if the sealed, separate syringes are allowed to warm to room temperature, separated from each other by at least 1cm, and open to the flow of cleanroom air (not in a separate container). Actual time to reach thermal equilibrium will vary with container size. Paste temperature should be verified before use.

Working Life:

Cartridges or syringes should be labeled with date and time of opening. The best usage environment is 35–65%RH, 20–27°C. The working life of **SMQ[®]51-SC** is at least 36 hours under these conditions.

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 setup.

Atmosphere

SMQ[®]51-SC is designed for use in a forming gas or nitrogen (100ppm 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.

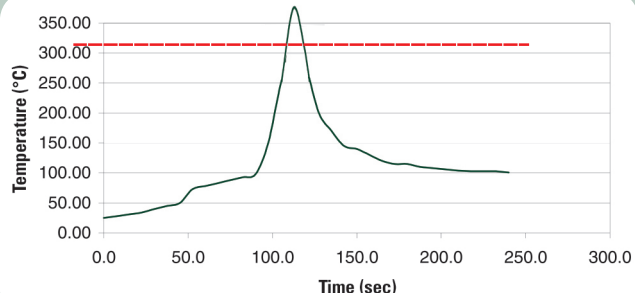
Quality

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.

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 (100ppm 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 15–30 seconds above the alloy's liquidus, and a peak temperature of 20–40°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.

Safety Data Sheets

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

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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