



Enclosed Print Head Performance DEK ProFlow System

The following solder paste qualification was performed in conjunction with DEK in Flemington, NJ. Three individual studies were performed to evaluate NC-SMQ230's performance in DEK's ProFlow DirEkt Imaging System.

Equipment and Material:

Solder Paste	NC-SMQ230, 95.5Sn/3.8Ag/0.7Cu, type III, 89.3% metal
Printer	DEK 265 Horizon with ProFlow Head
Stencil/Board	6 mil laser cut, electropolished/DEK 05 test board

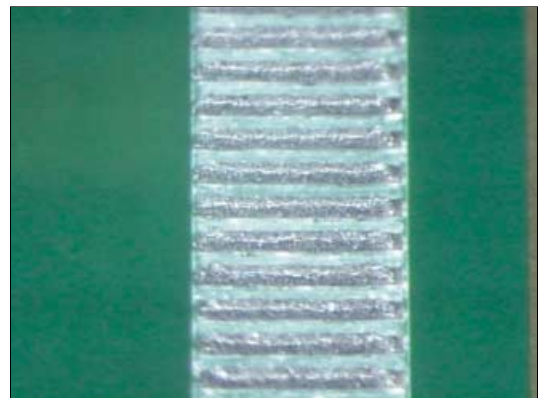
1. **Compaction Test:** This study investigates solder paste stability. >300 continuous print cycles are performed using a blank (no aperture) stencil. Upon completion, the paste in the conditioning chamber is inspected for any separation or coldwelding indicating paste breakdown. Printing is resumed on a "true" stencil and deposition quality is analyzed.

NC-SMQ230 successfully completed the compaction test. The print head was cycled for 1.5 hrs, the equivalent of 437 prints, and the following settings were used to simulate a "worst case" scenario: 150mm/sec speed, 8-kg-system pressure, and 3.0 bar pressure. Print deposition was acceptable and visual inspection of the conditioning chamber found the paste creamy and soft. Minimal paste breakdown had occurred.

Immediately after compaction test



Print #438, 16 mil QFP



2. **Retaining/Oozing Test:** This study is designed to detect lower viscosity, potentially "messy" solder pastes which may be unsuitable or difficult to use. Following a series of print strokes, with paste in its "working" condition, the paste is inspected for its ability remain properly retained in the system while the head is lifted off the stencil. The paste must remain contained for 10 minutes minimum. Furthermore, the stencil should remain relatively clean during and after printing.

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NC-SMQ230 remained properly retained in the system well after 10 minutes of the print head being raised from the stencil. The stencil surface remained clean of paste residues during and after printing.

Following retention test



3. Print Speed/Pressure Matrix Test: This study ascertains the relationship between solder paste print speed and pressure. Starting at 30mm/sec, pressure is adjusted to achieve a “full” print with minimal deficiency on leading edge of larger apertures. Speed is then increased in 20mm/sec increments and pressure adjusted accordingly to maintain a consistent level of print deposition quality.

NC-SMQ230’s speed/pressure relationship was very predictable and easily optimized to achieve good print deposition from 30 –150 mm/sec. The following table identifies NC-SMQ230’s optimized speed/pressure set-up.

Print Speed	Bar Pressure	Observations
30mm/sec	1.6 bar	Acceptable print
50	1.6	Improvement over 30mm
70	1.6	Fine pitch well defined, some scavenging on large pads
90	2.0	Well defined print all around, full deposits
110	2.5	Well defined print all around, full deposits
130	2.0	Insufficient Print
130	2.5	Some Bridging
130	2.5	Stencil cleaned, excellent print deposition
150	3.0	Slight bridging on NS & EW fine pitch pads, overall good
150	3.2	Good print when system pressure raised to 8kg Reduced bleed-out/bridging

NC-SMQ230 Solder Paste is well suited for use in
DEK’s ProFlow DirEKt Imaging System.