

# NC676 No Clean Solder Paste

- ROLO – Per IPC-J-STD-004
- Bellcore GR-78-CORE Compliant
- Halogen-Free–No Hidden Halides
- Formulated for fast printing

## INTRODUCTION

**NC676** No Clean Solder Paste is a new generation halide-free, rosin-based chemistry designed to provide a previously unseen level of repeatability and consistency to the printing process. This paste offers an excellent open time, extended abandon time and good soldering activity with all surface finishes. **NC676** meets or exceeds the requirements for ANSI/J-STD -004, -005 as well as all Bellcore test criteria for solder pastes. Residues left behind are clear and maintain a virtually indefinite pin probability life.

## ATTRIBUTES

- Excellent print volume consistency with Surface Area Ratios (SAR) as low as 0.55 when used with the UltraSlic™ stencil technology
- No Hidden Halides - Completely halogen free by all test standards
- Non-hygroscopic formulation suitable for high RH areas.
- Wide reflow window with good solderability on various PCB surface finishes
- Unlimited pin probability and clear post-process residues
- Low voiding/high reliability composition
- Formulated for fast printing

## PRODUCT INFORMATION

<b>Alloys:</b>	<ul style="list-style-type: none"> <li>• SN63 – MP=183°C</li> <li>• 62/36/2 – MP=179°C</li> </ul>
<b>Applications:</b>	<ul style="list-style-type: none"> <li>• Automatic / Manual Printing</li> <li>• Automatic / Manual Dispensing</li> </ul>
<b>Powder Size:</b>	<ul style="list-style-type: none"> <li>• Type-3 and Type-4 standard</li> <li>• Type-5 available upon request</li> </ul>
<b>Packaging:</b>	<ul style="list-style-type: none"> <li>• 500 gram jars or cartridges standard</li> <li>• Enclosed print head systems.</li> <li>• Other packaging upon request</li> </ul>
<b>Repair Flux:</b>	<ul style="list-style-type: none"> <li>• 10CC and 30CC syringes</li> <li>• Larger package sizes upon request</li> </ul>

## PRINTING

Stencil aperture design and stencil quality are major factors in achieving excellent print consistency with any solder paste. UltraSlic™ (SAR ≥ 0.45) and Slic™ (SAR ≥ 0.55) stencils from Fine Line Stencil are recommended for optimal print performance, and can be custom designed to minimize rework and improve the yields of any process. Some general stencil aperture design guidelines follow:

- **Fine pitch components (≤ 0.020")**  
A 0.001" reduction (L & W) to minimize bridging and create proper gasketing between the stencil and SMT pad
- **Discrete components**  
A 0.002" reduction (L & W) for water washable and a 0.002" reduction (L & W), with "U-shaped" home-plates, for no clean to minimize mid-chip solder beads.

Contact Fine Line Stencil at 719-579-8055 for process-specific stencil design recommendations. [www.finelinestencil.com](http://www.finelinestencil.com)

## PRINTER OPERATION

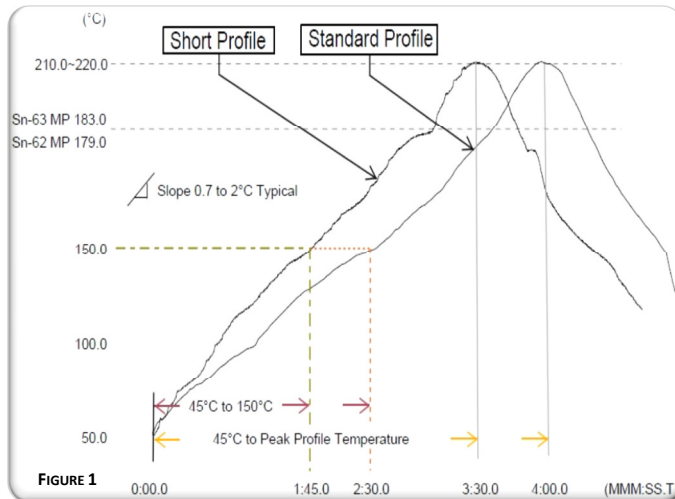
The following are general recommendations for stencil printer optimization. Further adjustments may be necessary based on specific process requirements.

<b>Solder Paste Bead Size:</b>	<ul style="list-style-type: none"> <li>• 2cm (~0.75") on startup</li> <li>• Add when bead &lt; 1.4 cm (~0.5")</li> </ul> Maintaining a minimal controlled volume of solder paste on the stencil at all times will ensure paste consistency as well as print process repeatability and reliability
<b>Squeegee:</b>	<ul style="list-style-type: none"> <li>• Metal, Slic™ blade preferred</li> <li>• 60 degrees from horizontal</li> </ul>
<b>Speed:</b>	<ul style="list-style-type: none"> <li>• 25 to 200 mm/sec. (1 to 6 in/sec)</li> </ul> Adjust printer for a pull or print-on-demand process
<b>Pressure:</b>	<ul style="list-style-type: none"> <li>• 0.18-0.27 Kg/cm (squeegee length)</li> </ul> Apply only enough pressure to achieve a clean top-side wipe of the stencil surface after each squeegee pass
<b>Underside Wipe:</b>	<ul style="list-style-type: none"> <li>• Slic™ and Ultraslic™ stencils should exceed &gt;10 prints/wipe</li> </ul>
<b>Stencil life / Environment:</b>	<ul style="list-style-type: none"> <li>• &gt;8 hours</li> <li>• 30+60% RH and 20°C-25°C</li> </ul>

## STORAGE AND HANDLING

- Cartridges should be stored tip down.
- Paste can be stored up to two weeks at room temperature.
- To prolong the shelf life of **NC676**, refrigerate between 5°C~10°C, (41°F~50°F). At this range the shelf life will exceed 9 months.
- **NC676** should not be allowed to freeze.
- When refrigerated, solder paste must be allowed to warm up to room temperature.
- Paste must be ≥22°C, (~66°F) prior to applying to stencil for processing.
- Working range of **NC676** is between 22-32°C, (~66°F – 89.5°F).
- First-In-First-Out (FIFO) inventory management practices should be used with all solder pastes.



**REFLOW PROFILE**

**HEATING**

A linear ramp of 0.7°C to 2.0°C C/second is suggested to gradually remove the solvents and other volatile components in the solder paste. This also helps in minimizing solder balls, beading and bridging from hot slump.

A linear ramp also helps minimize depletion of flux activity which can occur with excessive temperature, and at extended preheat times, and at very high reflow temperatures.

A profile with a soak between 140-150°C for less than 20 seconds can be used to reduce void formation on BGA and CSP devices.

While a linear profile typically does not produce tombstoning, a short 10-20 second dwell prior to transitioning into the liquidus point of the solder, and minimizing the ΔT between soak and liquid temperatures will help minimize tombstoning if experienced.

**STANDARD LINEAR PROFILE GUIDELINES**

A linear ramp-style profile (Figure 1) is recommended with **NC676**; however, it will also perform well in ramp-soak profiles. Some general guidelines for a standard linear profile:

Standard Linear Profile	
Ramp Rate	• 0.7°C ~ 2.0°C Per Second Typical
Time Above Liquidus (TAL)	• 60 Seconds Nominal • 45~75 Sec. Process Window
Peak Temperature	• 215°C Nominal • 210°C~220°C Process Window
Profile Length	• 3½ ~ 4 Minutes Max • From 45°C to Profile Peak
Cool Down	• 2.0°C ~ 3.0°C Per Second Typical

**HIGH TEMPERATURE PROFILE**
**When Soldering to Au, Pt, Pd, Alloy 42 and Thermally Demanding Assemblies**

Time Above Liquidus (TAL)	• 75~90 Seconds
Peak Temperature	• 225°C ~ 230°C
Profile Length	• 4 ~ 4 ½ Minutes Max • From 45°C to Profile Peak
Cool Down	• 2.0°C ~ 3.0°C Per Second Typical

Soldering hard-to-wet alloys such as Au, Pt, Pd, Alloy 42 lead frame, and heavier OSP coatings can be easily achieved through slight modification of Peak, TAL and Profile Length parameters to overcome secondary eutectic, and lower dissolution rates associated with these alloys.

Densely populated, high layer count, and otherwise thermally demanding PWB's will also typically require, and benefit from these suggested process adjustments.

**COOLING**

A cooling rate of 2°C-3°C per second is typical for most Sn62 and Sn63 applications. These parameters should be utilized to insure a fine grain solder structure and minimal IMC layer.

**CLEANING**

**NC676** is a no clean solder paste and does not need to be removed from the circuit board. If the need arose to remove the flux residue, then the following cleaners could be used.

Kyzen Aquanox: A4241, A4520, A4615, A4625, A4633, A4639, A4703, A4651US.  
 Kyzen Ionox: I3330, I3335, I3302, FCR  
 Kyzen Micronox: MX2305

**MATERIAL SAFETY DATA SHEETS**

Material Safety Data Sheets (MSDS) are available upon request, and online at [www.fctassembly.com](http://www.fctassembly.com)

**TEST RESULTS8**

J-STD-004 (IPC TM-650) Test	Result
Flux Type (per J-STD-004)	ROLO
Copper Mirror	Low
Halide test	0.00%
Silver Chromate	No halides
Fluoride test	None detected
Ion Chromatography	Zero halides
J-STD-005 (IPC-TM-650) Test	Result
Brookfield viscosity Type 3	520 to 620 Kcps
Brookfield viscosity Type 4	520 to 620 Kcps
Slump	Pass
Solder Ball	Pass



Wetting	Pass
<b>Bellcore Test</b>	<b>Result</b>
SIR-Surface Insulation Resistance	Pass
Electromigration	Pass

