FCT Assembly
LEADERS IN TECHNOLOGY

Product Data Sheet

WS167 Water Soluble Solder Paste

- ORH1 Per IPC-J-STD-004
- Non-Hygroscopic

INTRODUCTION

WS167 water washable solder paste is designed to meet the requirements for reliable solder joints in PCB Assemblies. **WS167** displays previously unseen levels of repeatability and consistency even in a wide range of temperatures (65-85°F) and relative humidity (25-75% RH). **WS167** is formulated to deliver exceptional cosmetics with easy residue removal using warm water. **WS167** was formulated for high humidity environments.

ATTRIBUTES

- Excellent print consistency with Surface Area Ratios (SAR) as low as 0.55 when used with the UltraSlic™ stencil technology
- Excellent wetting characteristics on all surface finishes
- Resistance to slump and drying, even in extreme humidity conditions
- Developed for high humidity conditions
- Enhanced tack performance and printer open time
- Low voiding/high reliability

PRODUCT INFORMATION

Alloys:	63/37, 62/36/2
Powder Size:	Available in type 3 and type 4. Type 5 available by request
Packaging:	500gram jars or cartridges. Also available in enclosed print head systems.
Flux:	WS167 flux available in 10CC and 30CC syringes.

STORAGE AND HANDLING

WS167 should be refrigerated at 0-10°C to prolong shelf life. At this range the shelf life will exceed 6 months. Cartridges should be stored tip down. Paste can be stored up to two weeks at room temperature. When refrigerated, warm up paste container to room temperature for up to four hours. Paste must be at ≥ 19°C before processing. Working range of **WS167** is between 19-32°C.

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 are as follows:

- Fine pitch components (≤ 0.020") – a 0.001" reduction (L & W) to minimize bridging and create a gasket 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" homeplates, 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

PRINTER OPERATION

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

Solder Paste Bead:	2cm. Add when bead < 1 cm
Squeegee:	Metal, Slic blade preferred. 60 degrees from horizontal
Speed:	25 to 150 mm/sec.
Pressure:	0.18-0.27 Kg/cm (squeegee length)
Underside Wipe:	Slic and Ultraslic should exceed > 10 prints/wipe
Stencil life:	> 6 hours at 35+70% RH and 20-25°C

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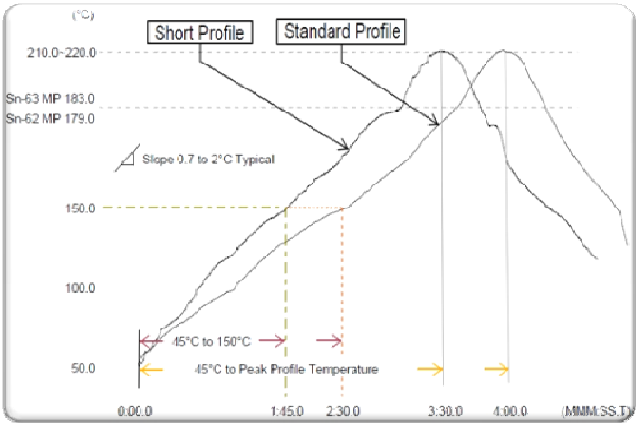
RECOMMENDED REFLOW PROFILE



A straight ramp profile @ 0.8°C to 1.5°C per second ramp profile rate is recommended with a 30 to 90 second TAL and 210°C to 220°C peak. High density assemblies may require preheating as follows:

- Ramp @ 1-2°C/sec to 140-160°C
- Dwell @ 195-225°C for 20-50 seconds
- Ramp @ 1-2°C/sec to 210-225°C peak
- Time above liquidus – 30-90 seconds
- Ramp down to R.T. @ 60-150°C/min

REFLOW

A peak temperature of 12-45 C above the melting point of the alloy is recommended for optimum results. A time above liquidus (TAL) of 30 to 90 seconds should also be used. Excessive temperature or excessive TAL may result in excessive Intermetallic Compound (SnCu—IMC) formation, which can adversely affect solder joint and long term reliability.

HEATING

A linear ramp of 0.5 to 2 C/sec 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 happen at extended times above the liquidus (TAL) and at very high reflow temperatures.

A profile with a soak between 200-210°C for less than 20 seconds can be used to reduce void formation on BGA and CSP devices. A short 20-30 second soak below the melting point of the solder can be used to help minimize tombstoning.

COOLING

A cooling rate greater than 2°C per second should be used to insure a fine grain solder structure and minimal IMC layer.

MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheets (MSDS) are available online at www.fctassembly.com

TEST RESULTS

J-STD-004 (IPC Tm-650) Test	Result
Flux Type (per J-STD-004)	ORH1
Copper Mirror	High activity
Halide Test	1.3-1.5%
Silver Chromate	Pass
Fluoride test	Zero
Ion Chromatography	Halides Present
SIR	Pass - Cleaned

J-STD-005 (IPC-TM-650) Test	Result
Brookfield viscosity Type 3	680,000
Brookfield viscosity Type 4	720,000
Slump	Pass
Solder Ball	Pass
Wetting	Pass

Bellcore Test	Result
SIR	Pass - Cleaned
Electromigration	Pass - Cleaned