

WS159 Water Soluble Solder Paste Leaded

INTRODUCTION

WS159 is a water soluble, leaded solder paste. WS159 is tolerant to a wide range of environmental conditions, and has a long stencil life. WS159 flux residues are easy to clean using warm water.

ATTRIBUTES

- Tolerant to a wide range of environmental conditions
- Long stencil life
- Residues that are easy to clean

ALLOY AND POWDER SIZE

Sn63/Pb37	Type 3 and 4
Sn62/Pb36/Ag2	Type 3
Anti-tombstoning mixtures	Type 3

PACKAGING

Jars	250, 500 grams
Cartridges	500, 600 grams
Syringes	30, 100 grams
Enclosed print systems	

STORAGE AND HANDLING

- Store solder paste at 5 – 10°C (40 – 50°F).
- Warm to room temperature for at least 4 hours before use, but warming overnight is desired. Do not open the container during the warming period.
- Once opened, do not refrigerate the solder paste again. Keep it in a sealed container at room temperature.
- Solder paste can be stored at room temperature for up to 2 weeks.
- Solder paste used on the printer should not be returned to the container with the fresh solder paste. It should be stored in a separate container at room temperature.
- Once the solder paste is printed, the circuit boards are usable for up to 8 hours. Beyond this time, the solder paste should be cleaned off of the circuit boards.

J-STD-004 DATA

Classification	ORH0
Copper mirror (TM 2.3.32)	High activity
Halide content (TM 2.3.28.1)	0.00 % wt.
Silver chromate (TM 2.3.33)	Halides not detected
Fluoride spot test (TM 2.3.35.1)	None detected
SIR (TM 2.6.3.7)	Pass > 1.00E+08 ohms
ECM (TM 2.6.14.1)	Pass, increase of 2.0 Log ₁₀ ohms

J-STD-005 DATA

Viscosity Brookfield (TM 2.4.34)	700 – 900 Kcps
Slump (TM 2.4.35)	Pass
Solder balling (TM 2.4.43)	Pass
Wetting (TM 2.4.45)	Pass

STENCIL DESIGN

Slic stencils from Fine Line Stencil are recommended for fine feature printing down to an area ratio of 0.55. NanoSlic Gold coating should be used for area ratios below 0.55.

residues may be difficult to remove with DI water alone, and a commercial cleaning agent may have to be used.

PRINTER PARAMETERS

Solder paste bead size	Initial 2 cm (0.75 in) Add below 1.4 cm (0.50 in)
Squeegee	Slic metal preferred 60 deg. from horizontal
Speed	25 to 100 mm/sec (1 to 4 in/sec)
Pressure	0.18 to 0.27 kg/cm (1 to 1.5 lb/in)
Underside cleaning	Solvent and dry wipe recommended. NanoSlic Gold enables wiping every 20 – 40 prints
Stencil life	6 hours at 65-85 °F and 10-70% RH

REFLOW PROFILE - LINEAR

Time from 45°C to peak	3.5 to 4.0 min
Ramp rate	0.7 to 2.0 °C / sec
Preheat time (130–160°C)	50 - 90 sec (70 sec target)
Peak temperature	210 – 220 °C (215 °C target)
Time above liquidus (TAL)	45 – 75 sec (60 sec target)
Cooling rate	3 – 6 °C / sec

TAL should be calculated based on the liquidus point of the alloy used: Sn63/Pb37 183°C, Sn62/Pb36/Ag2 179°C.

Adding a soak between 140 and 150 °C for 10 – 20 seconds can reduce the potential for both tombstoning and voiding.

CLEANING

Raw solder paste can be removed from the stencil using isopropyl alcohol or a variety of commercial cleaners. When solder paste is left on the stencil unused for more than 4 hours, then the stencil should be cleaned.

Reflowed flux residues should be cleaned within 24 hours after reflow. DI water heated to 120 – 180°F should be used. It is recommend to clean the circuit boards after each reflow cycle. If the flux residues are reflowed more than once, then the