



TECHNICAL DATA SHEET

CATEGORY: **WATER SOLUBLE SOLDER PASTE**
 NAME: **WS-483**
 ALLOY: **Sn63/Pb37 & Sn62/Pb36/Ag2**

FEATURES

- 48 HOUR STENCIL LIFE
- EXCELLENT PRINTING CHARACTERISTICS
- EXTENDED CLEANING WINDOW
- EXCELLENT ACTIVITY
- HALIDE FREE
- 24 HOUR TACK TIME
- HIGH HUMIDITY RESISTANCE
- SLUMP RESISTANT
- GOOD FOR BATCH OR CONTINUOUS RUNS
- WILL NOT FOAM DURING WASH

DESCRIPTION

WS-483 is an organically activated formulation developed to better resist the effects of increased humidity levels. WS-483 offers improved heat and humidity resistance, while maintaining high tack and resistance to slump. WS-483 also provides an exceptional post-process cleaning window and will not foam during the cleaning process, even in high pressure wash systems.

HANDLING

- WS-483 has a refrigerated shelf life of 6 months at 4°C/40°F. This product must be refrigerated. Do not freeze WS-483.
- Allow the solder paste to completely warm naturally to ambient temperature (8 hours is recommended) prior to breaking seal for use.
- Mix the product lightly and thoroughly for 1 to 2 minutes to ensure even distribution of any separated material resulting from storage.
- Do not store new and used paste in the same container. Re-seal any opened containers while not in use.
- Replace the internal plug in conjunction with the cap of the 500 gram jar to ensure the best possible seal.

PRINTER SETUP

These are suggested starting parameters for your screen printer. Some assumptions were made as to the printer types used in today's applications, and adjustments will vary between equipment, application and facility environment.

SNAP-OFF DISTANCE	ON CONTACT (0.00")	SQUEEGEE PRESSURE	1-1.5 LBS/IN. OF BLADE
PCB SEPARATION DISTANCE	.030-.100"	SQUEEGEE STROKE SPEED	.5 - 8 IN/SEC*
PCB SEPARATION SPEED	SLOW - MEDIUM	*DEPENDENT ON PCB AND PAD DESIGNS	

PASTE APPLICATION

- Apply sufficient paste to the stencil to allow a smooth, even roll during the print cycle. A bead diameter of 1/2 to 5/8 inch is normally sufficient to begin.
- Apply small amounts of fresh solder paste to the stencil at frequent, controlled intervals to maintain paste chemistry and workable properties.
- Cleaning of your stencil will vary according to the application; however, cleaning can be accomplished using AIM 200AX-10 or DJAW-10 Stencil Cleaners. Use these in moderation and remove any excess cleaner from stencil.

REFLOW DATA

See attached Reflow Profile Supplement.

CLEANING

WS-483 can be cleaned easily with normal tap water. Deionized water is recommended for the final rinse. A temperature of 100° - 150°F is sufficient for removing residues. An in-line or other pressurized spray cleaning system is suggested, but is not required.

SAFETY

- Use with adequate ventilation and proper personal protective equipment.
- Refer to the accompanying **Material Safety Data Sheet** for any specific emergency information.
- Do not dispose of any lead-containing materials in non-approved containers.



SIR Qualification Test Report

GENERAL REFERENCES

Surface insulation test (SIR) for solder paste was carried out according to J-STD-004 and IPC-TM-650 method 2.6.3.3.

SAMPLES AND INSTRUMENTATION

Solder Paste Sample: WS 483, lot: WS 483-134

Test Coupons: IPC-B-24 coupons

Environmental Chamber: Thermotron SE-300

Electrical Testing Equipment: ASR SIR tester

TEST METHOD

The test was carried out according IPC-TM-650 from §5.3.3 through §5.4.1 (cleaned boards).

PASS-FAIL CRITERIA

#	Reference	Property	Pass-Fail Criteria	Result
1	IPC-TM-650 §5.5.1	Quality of control coupons	>1E9 Ω at 96 and 168 h	PASS
2	J-STD-004 §3.2.4.5.1	SIR of test coupons	>1E8 Ω at 96 and 168 h	PASS
3	IPC-TM-650 §5.5.2	Post-test visual inspection	No dendrite growth or corrosion	PASS

CONCLUSIONS

The results of the qualification tests indicate that the AIM WS 483 solder paste complies with the requirements of IPC TM-650, Method 2.6.3.3 for Surface Insulation Resistance (SIR).

TEST DATA

Control		Initial	24 hours	96 hours	168 hours
#1	A	2.51E+13	8.98E+11	9.15E+11	1.09E+12
	B	5.03E+13	7.13E+11	7.29E+11	8.11E+11
	C	1.00E+14	7.62E+11	7.62E+11	7.86E+11
	D	5.03E+13	7.29E+11	6.17E+11	6.49E+11
#2	A	1.00E+14	8.38E+11	7.80E+11	8.75E+11
	B	1.10E+14	6.45E+11	6.06E+11	6.29E+11
	C	1.10E+14	5.95E+11	5.62E+11	5.65E+11
	D	1.00E+14	5.35E+11	5.08E+11	4.86E+11
#3	A	3.35E+13	9.49E+11	8.53E+11	8.83E+11
	B	3.35E+13	7.62E+11	6.62E+11	6.66E+11
	C	1.00E+14	7.40E+11	6.13E+11	6.13E+11
	D	1.00E+14	6.37E+11	5.62E+11	5.32E+11
WS 483 #1	A	2.01E+13	5.78E+11	9.06E+11	1.93E+12
	B	2.51E+13	6.06E+11	7.45E+11	1.76E+12
	C	2.01E+13	5.38E+11	6.94E+11	1.29E+12
	D	2.51E+13	4.68E+11	7.34E+11	1.13E+12
#2	A	2.51E+13	4.14E+11	5.03E+11	8.75E+11
	B	2.51E+13	5.10E+11	4.86E+11	8.45E+11
	C	1.00E+14	4.93E+11	4.68E+11	8.38E+11
	D	3.35E+13	4.81E+11	4.63E+11	7.08E+11
#3	A	3.35E+13	5.38E+11	9.32E+11	1.70E+12
	B	1.00E+14	5.47E+11	8.83E+11	1.59E+12
	C	5.03E+13	5.53E+11	7.68E+11	1.30E+12
	D	1.00E+14	4.86E+11	7.40E+11	1.11E+12



Product Development Test Report

CATEGORY	RESULTS	PROCEDURES/REMARKS
PHYSICAL PROPERTIES		
Color	Dark Grey	63Sn/37Pb alloy
	Clear, Colorless Flux Residue	
Specific Gravity	5.19 (water = 1)	
Viscosity	Relative to production batch	J-STD-005
Solderball	Pass < 10 count	IPC J-STD-005
Silver Chromate	Pass	IPC TM-650 2.3.33 (cleaned)
Stencil Life	48 hours	50% rH, 74°F (23°C)
Slump	Pass	IPC J-STD-005 Slump
Printability	Pass	AIM Print Test (Details Below)
Tack	Pass	AIM Tack Test (Details Below)
Tack Force	Pass	IPC TM-650 2.4.44
Tack Time	24 hours	50% rH, 74°F (23°C)
Reflow	Pass	AIM Reflow Test (Details Below)
Residue Cleaning Test	No Foaming	Pass, AIM YY1 Test
CHEMICAL PROPERTIES		
IPC J-STD Classification	ORMO	IPC J-STD-004
Copper Mirror Test	Low	IPC J-STD-004
Halide Content	Halide-free	IPC J-STD-004
Silver Chromate Test	Pass	IPC J-STD-004 (cleaned)
ELECTRICAL PROPERTIES		
SIR (cleaned) (see data sheet page 3)	Pass, >1E9 Ω at 96 and 168 h	IPC-TM-650 §5.5.1
	Pass, >1E8 Ω at 96 and 168 h	J-STD-004 §3.2.4.5.1
	Pass, No dendrite growth or corrosion	IPC-TM-650 §5.5.2
SMT PRODUCTION TESTING DESCRIPTION & RESULTS		
TEST DESCRIPTION		RESULTS
PRINTING		
Paste printed on AIM Test Board 1 in increments of 1"/sec. starting at 1"/sec.		Paste printed up to 8"/second (maximum speed tested)
Paste kneaded for 100 cycles, then printed. IPC slump test used to look for slumping at room temperature.		No Slump
Print test repeated at 85°F, 55rH. Results compared on the IPC slump pattern.		No Slump
Paste left on the printer overnight and printed after pause time of 15 hours		Required three passes to give perfect print.
Boards then printed every hour one board and paused for one hour.		All prints (83) acceptable. Paste always rolled
Pasted returned to the jar. The paste was printed the following week for a three hour test.		All prints acceptable based upon the slump pattern.
Paste randomly checked over a period of 20 days		All prints acceptable based upon the IPC slump pattern. Paste printed .010 mil dots on micro BGA.
PART ACCEPTANCE (TACK)		
Board printed and components placed every 6 hours; boards turned upside down.		No components dropped off.
REFLOW		
Components placed on the board at an angle to the pads. The board was reflowed and inspected for alignment.		All components self-aligned into acceptable limits. No tombstoning observed.
Joints tested for wetting angles and smoothness.		All passed AIM criteria.
CLEANING		
Paste residues reflowed on IPC test coupons (B24) and tested for SIR after cleaning.		All boards passed.
Visual cleaning test was performed with 140°F open head tap water.		Cleaning passed, some random white residue remained.
Foaming tested using AIM test YY1. Solder paste melted in an aluminum weight dish; residue into beaker containing tap water to an approximate 10% solution. A foaming stone is added and foam head is measured to see if it is self-collapsing.		Pass- foam head collapsed.

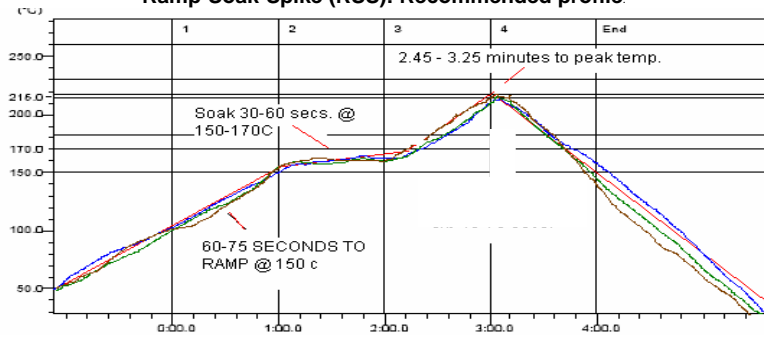


REFLOW PROFILE SUPPLEMENT

ALLOYS:

Sn63/Pb37 and Sn62/Pb36/Ag2

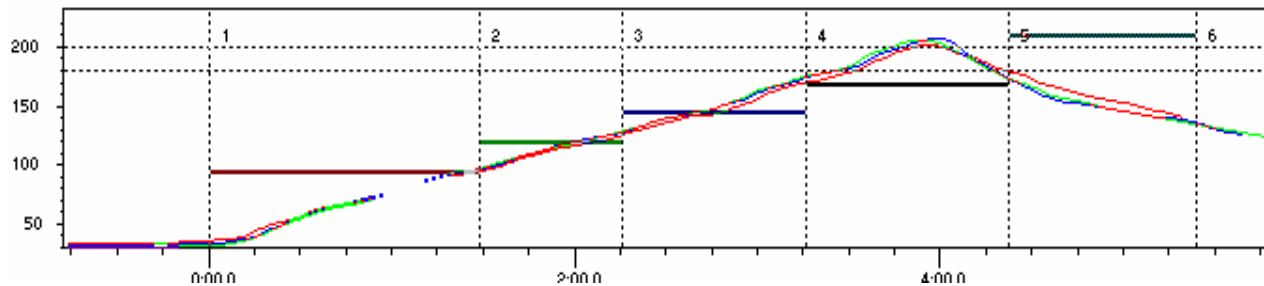
Ramp-Soak-Spike (RSS): Recommended profile



RSS Profile Guidelines

- The typical initial rate of rise for the RSS profile is 1.4 to 1.8°C/second.
- Ramp up to 150°C and then soak the assembly for 30 to 60 seconds.
- The soak zone should be controlled between 150 -170°C. Above this point the paste will lose its activator.
- Proceed to spike immediately once the PCB has reached thermal stability.
- Peak temperature is 215°C ± 5°C.
- Time above liquidus is 45 ± 15 seconds.
- The total profile length should be between 2 ¼ - 3 ½ minutes from ambient to peak temperature.
- Cool down should be controlled within 4°C/second.

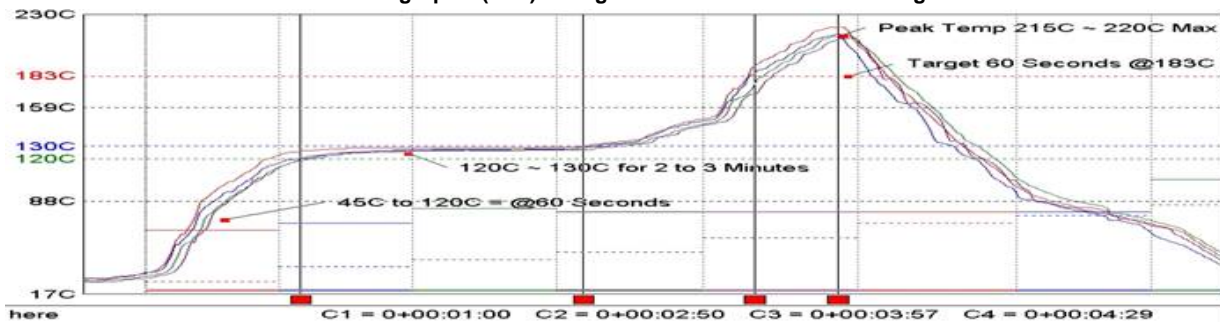
Ramp-to-Spike (RTS)



RTS Profile Guidelines

- The typical rate of rise for the RTS profile is 0.7°C/second.
- The profile should be a straight line or concave; it should not be convex.
- 2/3 of the profile should be below 150°C.
- Peak temperature is 215°C ± 5°C.
- Time above liquidus is 60 ± 15 seconds.
- The total profile length should be between 3 ½ - 4 minutes from ambient to peak temperature.
- Cool down should be controlled within 4°C/second.

Low-Long-Spike (LSP): Designed to eliminate/reduce voiding



LSP Guidelines

- The typical initial rate of rise for the LSP profile is 1.25°C/second.
- Ramp up to 120°C and then soak the assembly for 120 to 180 seconds.
- Proceed to spike immediately after exiting the soak zone.
- Peak temperature is 215°C ± 5°C.
- Time above liquidus is 60 ± 15 seconds.
- The total profile length should be between 4 ½ - 5 minutes from ambient to peak temperature.
- Cool down should be controlled within 4°C/second.