Technical Data Sheet

Water Soluble Solder Paste
WS353 SN100C®

Features:

- Broad Printing Process Window
- Easily Cleaned Residues
- Reduces Voiding Under BGAs
- Excellent Wetting
- Lengthy Stencil Life and Tack Time
- Low Foaming during Washing

Description:

WS353 SN100C® water soluble solder paste has been developed in response to electronics manufacturers demand for an all-purpose, reliably consistent water-soluble solder paste. WS353 SN100C® offers extended stencil life and tack time, robust environmental tolerance and printing characteristics, excellent activity, a broad cleaning process window, and compatibility with both tin-lead and lead-free solder alloys. WS353 SN100C® can be used in fine pitch printing applications and has proven effective in the assembly of 0201 components. WS353 SN100C® provides consistent printing characteristics and slump resistance during high-speed printing. The excellent activity of WS353 SN100C® makes it a suitable choice when soldering to standard or difficult-to-wet parts, including lead-free alloys and finishes. In addition, WS353 SN100C® has proven to substantially reduce voiding under micro-BGAs. The residues of WS353 SN100C® may be cleaned easily in straight water, with the result being exceptional electrical reliability. In addition, WS353 SN100C® is designed to not foam during washing, even in high-pressure wash systems.

Handling and Storage:

- WS353 SN100C® has a refrigerated shelf life of 6 months at 4° C (40° F).
- Allow the solder paste to warm up completely and naturally to ambient temperature (8 hrs.) prior to breaking the seal for use. Do not force warm.
- Mix the product lightly and thoroughly (1-2 mins. max) to ensure even distribution of any separated material.
- Do not store new and used paste in the same container, and reseal any opened containers while not in use.
- Replace the internal plug and cap of the 500 gram jars to ensure the best possible seal.

Paste Application:

- Apply sufficient paste to the stencil to allow a smooth, even roll during the print cycle (a bead diameter of ½ to 5/8 inch is normally sufficient to begin).
- Apply small amounts of fresh solder paste to the stencil at controlled intervals to maintain paste chemistry and workable properties. WS353 SN100C® provides the necessary tack time/force for today's high-speed placement equipment.
- Ensuring proper support of PCBs during assembly and handling will enhance product performance and reliability.

Printing:

- Snap-off distance = on contact (0.00")
- PCB Separation Distance = .030-.100"
- PCB Separation Speed = Slow-Medium
- Squeegee Pressure =1-1.7lbs/ In. of blade
- Print Speed .5 – 4 inches per second

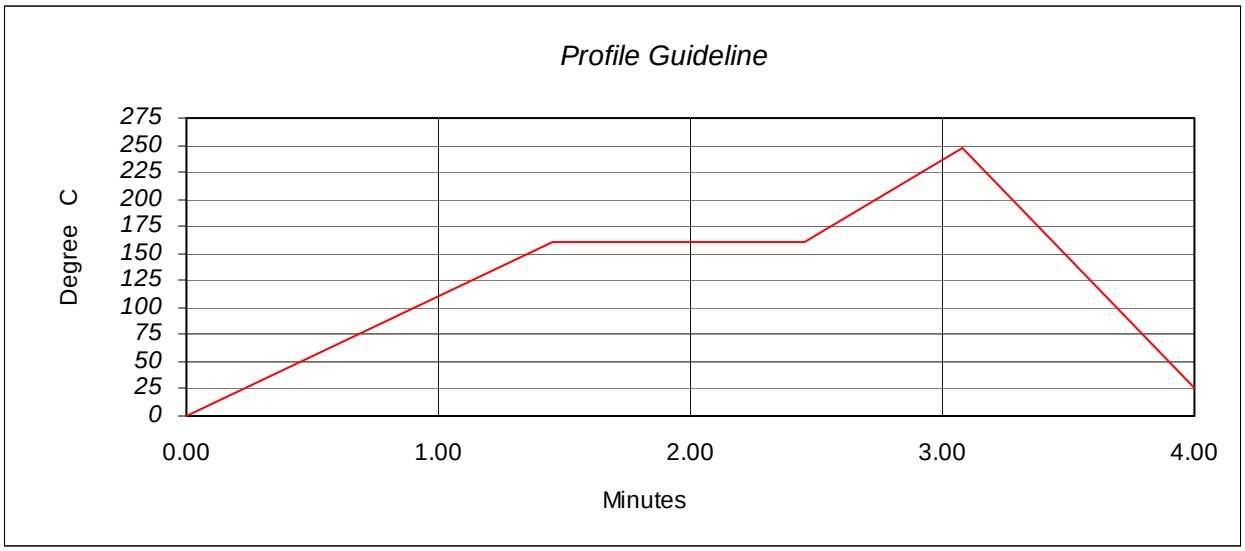
Cleaning:

- WS353 SN100C® can be cleaned easily with normal tap water. Deionized water is recommended for the final rinse. A temperature of less than 120° F is sufficient for removing residues. An in-line or other pressurized spray cleaning system is suggested, but is not required.

Paste Tech Tips: Problems and Possible Causes:

- Bridging - Excessive solder, pad component solder ability, alignment
- Solder Balls - low Preheat temperature, oxidized or excess paste, too rapid initial ramp up
- Tomb Stoning - excessive delta temperature, rapid heat rate, component to pad mismatch, paste registration
- Discolored Joints - excessive peak temperature, board paste component contamination, excessive soak time
- White Residue – Solder paste oxidation, excessive time at temperature
- Beading – Excess solder paste, component placement
- Leaching – Excessive reflow time or temperature

Reflow 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.
Proceed to spike immediately once the PCB has reached thermal stability.
Peak temperature is 245ºC ± 5ºC.
Time above liquidus is 45 ± 15 seconds.
The total profile length should be between 2 ¾ - 3 ½ minutes from ambient to peak temperature.
Cool down should be controlled within 4°C/second.

WS353 Compatible Products:

- Electropure Solder Bar
- WS353 Tacky Flux
- WS715; WS735 Spray Flux
- WS482 Cored Wire
- Epoxy 4044 – Chip Bonding Epoxy
- 200AX – Stencil Cleaner

Surface Insulation Resistance Testing – Two Week Delayed Cleaning

General References:

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

Procedure:

IPC-B-24 coupons were cleaned according to IPC-TM-650 §5.2.3. Solder paste was stencil printed onto the coupons and reflowed in convection oven using standard AIM thermo-profile WS-J for water-soluble paste. After reflow, the coupons were left for 2 weeks at ambient conditions before cleaning under tap water at 55-58oC for 120 seconds. The coupons were then dried for 30 minutes at room temperature before testing.

Pass Fail Criteria and Data Evaluation:

#	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	-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 WS353 solder paste complies with the requirements of IPC TM-650, Method 2.6.3.3 for Surface Insulation Resistance (SIR) with two weeks between reflow and cleaning.

Test Data:

Control		Initial 24 hours 96 hours	168 hours
#1	A B C D	1.00E+14 3.77E+10 2.48E+10 1.10E+14 4.38E+10 2.72E+10 1.10E+14 4.24E+10 2.60E+10 1.00E+14 4.01E+10 2.52E+10	2.14E+10 2.27E+10 2.14E+10 2.16E+10
#2	A B C D	1.10E+14 4.13E+10 2.55E+10 1.00E+14 4.39E+10 2.66E+10 1.00E+14 4.13E+10 2.49E+10 1.10E+14 4.23E+10 2.56E+10	2.15E+10 2.23E+10 2.05E+10 2.13E+10
#3	A B C D	1.00E+14 3.95E+10 2.60E+10 1.01E+12 4.29E+10 2.63E+10 1.00E+14 4.32E+10 2.51E+10 1.00E+14 4.55E+10 2.68E+10	2.21E+10 2.23E+10 2.07E+10 2.24E+10
WS353 (2 weeks standing before cleaning)			
#1	A B C D	2.34E+12 7.98E+08 2.41E+09 1.97E+12 6.06E+08 2.30E+09 1.65E+12 6.50E+08 2.50E+09 2.96E+12 6.81E+08 2.35E+09	3.87E+09 3.64E+09 3.75E+09 3.73E+09
#2	A B C D	2.34E+12 6.40E+08 2.05E+09 1.04E+12 4.46E+08 1.91E+09 2.18E+12 3.79E+08 1.56E+09 1.25E+12 4.73E+08 1.69E+09	3.34E+09 3.15E+09 2.73E+09 3.01E+09
#3	A B C D	4.79E+12 8.38E+08 2.46E+09 4.19E+12 5.28E+08 2.04E+09 5.24E+10 5.78E+08 2.09E+09 4.93E+10 6.51E+08 2.21E+09	3.81E+09 3.26E+09 3.34E+09 3.63E+09

Slump Test IPC-TM-650 2.4.35:

Stencil IPC –A-20 (0.1mm thick)			
Pad size 0.33 x 2.03mm		Pad size 0.2x2.03mm	
Cold 10-20min T: 25°C ± 5°C RH: 50% ±10%	Hot 10-15min T:150°C ±10°C	Cold 10-20min T: 25°C ± 5°C RH: 50% ±10%	Hot 10-15min T : 150°C ± 10°C
Bridging	**Bridging**	**Bridging**	**Bridging**
Max :0.25mm	**Max :0.30mm**	**Max :0.175mm**	**Max :0.20mm**

Stencil IPC-A-21 (0.2mm thick)			
Pad size 0.63 x 2.03mm		Pad size 0.33x2.03mm	
Cold 10-20min T: 25°C ± 5°C RH: 50% ±10%	Hot 10-15min T : 150°C ± 10°C	Cold 10-20min T: 25°C ± 5°C RH: 50% ±10%	Hot 10-15min T:150°C ± 10°C
Bridging	**Bridging**	**Bridging**	**Bridging**
Max :0.56mm	**Max :0.63mm**	**Max :0.25mm**	**Max :0.30mm**

Powder Test IPC-TM 650 2.2.14:

Particle Size Distribution	
<25µ	3%
25µ-45µ	97%
45-50 µ	0%
>53 µ	0%
ASPECT RATIO <1.3	98%

Other Test Data:

VISCOSITY: IPC-TM 650 2.4.34	**698 Kcps**
SOLDER BALLS: IPC-TM-650 2.4.43	**Pass**
TACK: IPC-TM 650 2.4.44	**Time: 8hrs./ Avg. Value 11.0 gf**
WETTING: IPC-TM-650 2.4.45	**Pass**

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AIM IS ISO9001:2000 CERTIFIED