TECHNICAL DATA SHEET

CATEGORY: **NO-CLEAN SOLDER PASTE**
NAME: **293+**
ALLOY: SAC (Tin-Silver-Copper)

FEATURES

- ENHANCED PRINTING CHARACTERISTICS
- LOW RESIDUE
- 14-16 HOUR STENCIL LIFE
- 8-12 HOURS TACK TIME
- IMPROVED IDLE TIMES / RESPONSE TO PAUSE
- EXCELLENT WETTING
- PRINTS UP TO 8 INCHES/ SECOND
- AIR REFLOW / NITROGEN NOT NECESSARY

* Passes BELLCORE and IPC (product testing results available upon request); passes Northern Telecom's copper mirror test

DESCRIPTION

293+ is a mildly activated, resin-based formulation developed to offer enhanced printing characteristics and improved idle times. 293+ also offers excellent activity and wetting characteristics (even for hard-to-wet alloys such as palladium, nickel/gold, organic coatings, etc.) and superior slump resistance, even during high-speed printing. In addition, 293+ offers high humidity tolerance, cleanable, low post-process residues, and a chemistry developed for use in air reflow. Slump and humidity tolerances found in 293+ extend the solder pastes useable life in facilities where environmental control is not at its optimum. 293+ has been utilized on various assemblies with RF designs without cleaning; however, the compatibility of flux residues on RF assemblies is strongly dependent upon circuitry design.

STANDARD PASTE COMPOSITION

Application Method	IPC Powder Type	Metal Load
Standard Stencil Printing	3	88.5%
Fine Pitch Stencil Printing	5	88%
Ultra-Fine Pitch Stencil Printing	5	87.5%
Dispensing syringes	3	84%
Note: These are typical starting guidelines. To achieve optimal performance, actual metal load and particle size may vary per process, application, and environment.		

HANDLING

- 293+ has a refrigerated shelf life of 1 year, at 4°C; (40° F), and a non-refrigerated shelf life of 6 months at 22°C; (72° F). Do not freeze this product.
- Allow the solder paste to warm completely and naturally to ambient temperature; (8 hours is recommended), prior to breaking seal for use. Do not force warm the paste as separation of the product may occur.
- Mix the product lightly and thoroughly for 1 to 3 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.

PRINTER SETUP

Suggested starting parameters for your screen printer. 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	**.75-1.25 LBS/IN. OF BLADE**
PCB SEPARATION DISTANCE	**.030-.050"**	SQUEEGEE STROKE SPEED	**.5 - 8 IN/SEC ***
PCB SEPARATION SPEED	**MEDIUM/SLOW (.010 ~ .015)**	*** DEPENDENT ON PCB AND PAD DESIGNS**	

05.06.05

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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, it can be accomplished using AIM's 200AX-10 or DJAW-10 stencil cleaners. Use these in moderation and remove any excess cleaner from the stencil surface.
- 293+ 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.

REFLOW DATA

See attached Reflow Profile Supplement.

PASTE TECH-TIPS

PROBLEM	POTENTIAL CAUSE
• **BRIDGING:**	EXCESS SOLDER DEPOSITION, COMPONENT ALIGNMENT, PAD/COMPONENT SOLDERABILITY
• **LEACHING:**	EXCESSIVE REFLOW TIME OR TEMPERATURE
• **SOLDER BALLS:**	LOW PREHEAT TEMPERATURE, EXCESSIVE HEAT RAMP-UP, OXIDIZED PASTE, EXCESS PASTE
• **TOMBSTONING:**	EXCESSIVE HEAT RATE, COMPONENT TO PAD SIZE MISMATCH, PASTE REGISTRATION
• **WHITE RESIDUE:**	SOLDER PASTE OXIDATION, EXCESSIVE TIME AT TEMPERATURE
• **DISCOLORED JOINT:**	PASTE OXIDATION, BOARD/COMPONENT CONTAMINATION, EXCESSIVE SOAK TIME

CLEANING

293+ can be cleaned, if necessary, with a saponified tap water. AIMTERGE-520 is recommended. DI-water is recommended for the final rinse. A temperature of 120 - 150ºF is sufficient for removing any 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 **M**aterial **S**afety **D**ata **S**heet for any specific emergency information.
- Do not dispose of any lead-containing materials in non-approved containers.

PRODUCT TESTING RESULTS

CATEGORY: **NO-CLEAN SOLDER PASTE**
NAME: **293+**

This Product has been tested in accordance with following specifications.

INDEPENDENT LABORATORIES

Surface and Insulation Resistance - PASS

Bellcore GR-78	35/85, 4 Days (1.75 x 10^{10} minimum)	Pattern Up (Uncleaned) 3.89 x 10^{11}
		Pattern Up (Cleaned) 1.00 x 10^{12}

Electromigration - PASS

Bellcore GR-78	65°C/85%RH, 20 Days (Rf/Ri > 0.1)	Taiyo PSR4000 3.16 x 10^{11}/4.15 x 10^{11}
		Ciba Geigy Probimer 52 8.07 x 10^{10}/2.08 x 10^{11}

Silver Chromate - PASS

Bellcore GR-78	RT	PASS- No white ppt.

Copper Mirror- PASS

Bellcore GR-78	24 hrs, 25°C, 50% RH	PASS- No Copper Removal

AIM LABORATORY

Tack - PASS

IPC	TM-650 2.4.44	Initial Tack = 43gm

Viscosity - PASS

IPC	J-STD-005	Relative to production batch

Silver Chromate

IPC	TM-650 2.3.33	PASS

Solder Ball Test

IPC	J-STD-005	PASS

The information contained herein is based on data considered accurate and is offered at no charge. Product information is based upon the assumption of proper handling and operating conditions. All information pertains to solder paste produced with 45-micron powder. No warranty is expressed or implied regarding the accuracy of this data. Liability is expressly disclaimed for any loss or injury arising out of the use of this information or the use of any materials designated.

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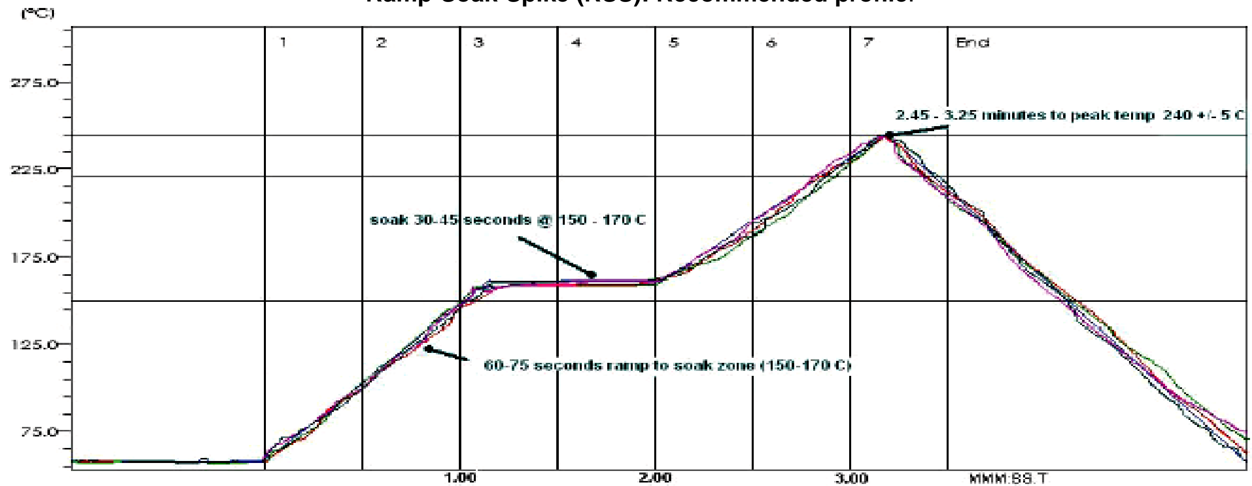
REFLOW PROFILE SUPPLEMENT

ALLOY: **Sn/Ag/Cu**

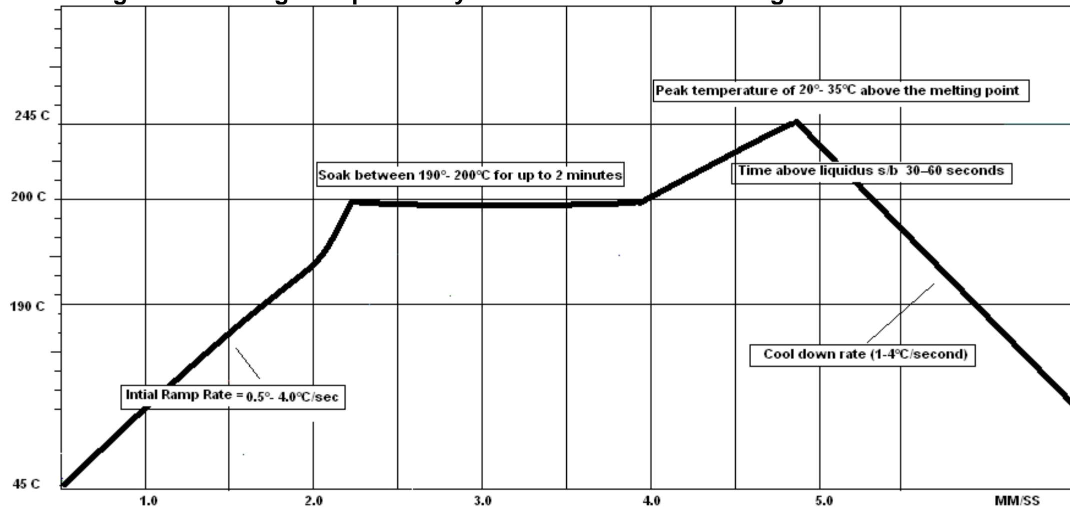
Ramp-Soak-Spike (RSS): Recommended profile.



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 45 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 240ºC ± 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.

Low-Voiding Profile: Designed specifically to eliminate/reduce voiding with BGA and CSP devices



Profile Guidelines

- The initial rate of rise is 0.5 to 4°C/second.
- Ramp up to 190°C and then soak the assembly between 190 to 200°C for up to 120 seconds.
- Proceed to spike immediately after exiting the soak zone.
- Peak temperature is 238 to 253ºC.
- Time above liquidus is 30 to 60 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.