DEVELOPMENTAL PRODUCT TECHNICAL DATA SHEET

CATEGORY: **NO CLEAN PIN PROBE TESTABLE SOLDER PASTE**
NAME: **NC254**
ALLOY: **SAC305 (Sn96.5/Ag3.0/Cu0.5)**

FEATURES

- BROAD PRINTING PROCESS WINDOW
- CLEAR, PIN-PROBE TESTABLE RESIDUES
- 24 HOUR STENCIL LIFE
- EXCELLENT WETTING
- REDUCES VOIDING UNDER MICRO-BGA'S
- 12-14 HOUR TACK TIME

DESCRIPTION

NC254 has been developed to offer extremely broad process windows for printing, wetting and pin probe testing. The superior wetting ability of NC254 results in bright, smooth, shiny, solder joints. NC254 offers very low post process residues, which remain crystal clear and probable even at the elevated temperatures required for today's lead free alloys. NC254 has shown to reduce or eliminate voiding under micro-BGAs. NC254 also offers high humidity tolerance and a chemistry developed for use in air reflow. Slump and humidity tolerances found in NC254 extend the solder pastes useable life in facilities where environmental control is not at its optimum.

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	88%
Dispensing syringes	3	84.5%

Note: These are typical starting guidelines. To achieve optimal performance, actual metal load and particle size may vary per process, application, and environment.

HANDLING

- NC254 has a refrigerated shelf life of 1 year, at 4°C (40°F)
- Allow the solder paste to warm completely and naturally to ambient temperature; (8 hours is recommended), prior to breaking seal for use.
- Mix the product lightly and thoroughly, (1 to 2 minutes max.), 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

Below are the 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	**.6 - .7 LBS/IN. OF BLADE**
PCB SEPARATION DISTANCE	**.030-.050"**	SQUEEGEE STROKE SPEED	**.5 - 6 IN/SEC ***
PCB SEPARATION SPEED	**MEDIUM**	* **DEPENDENT ON PCB AND PAD DESIGNS**	

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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 200AX-10 stencil cleaner. Use 200AX-10 in moderation and remove any excess cleaner from the stencil surface.
- NC254 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.
- For technical advice, consult the AIM web page at www.aimsolder.com or contact AIM.

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

Visit www.aimsolder.com for additional information

CLEANING

NC254 can be cleaned, if necessary, with saponified water or an appropriate solvent cleaner. Please refer to the AIM No-Clean-Cleaner Matrix for a list of suitable cleaning materials.

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: **NC254**

Surface Insulation Resistance Testing

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 bare copper coupons were cleaned according to IPC-TM-650 method 2.6.3.3. §5.2.3. Solder paste was stencil printed on to the coupons, and then printed sample boards were reflowed in convection oven by using standard AIM thermo-profile NC-J. Prepare the sample for chamber according to IPC-TM-650 method 2.6.3.3. §5.3.3 to §5.3.5, and measurements were made according to IPC-TM-650 method 2.6.3.3. §5.4.1

Pass Fail Criteria and Data Evaluation

Reference	Property	Pass-Fail Criteria	Result
IPC-TM-650 method 2.6.3.3. §5.5.1	Control coupons	>1E9 O at 96 and 168 h	**PASS**
J-STD-004 §3.2.4.5.1	Sample coupons	>1E8 O at 96 and 168 h	**PASS**
IPC-TM-650 method 2.6.3.3. §5.5.2	Post-test visual inspection	No dendrite growth or corrosion	**PASS**

Conclusions
The result of the qualification test indicates that the AIM NC254 solder paste complies with the requirements of IPC TM-650, Method 2.6.3.3 for Surface Insulation Resistance.

Telcordia GR-78-CORE (Bellcore) Testing

Abstract
This report summarizes the test results of copper mirror, halide ion, surface insulation resistance (SIR), and electromigration for AIM NC254 solder paste and paste flux. The tests were conducted according to the requirements of Telcordia GR-78-CORE (Bellcore) Generic Requirements.

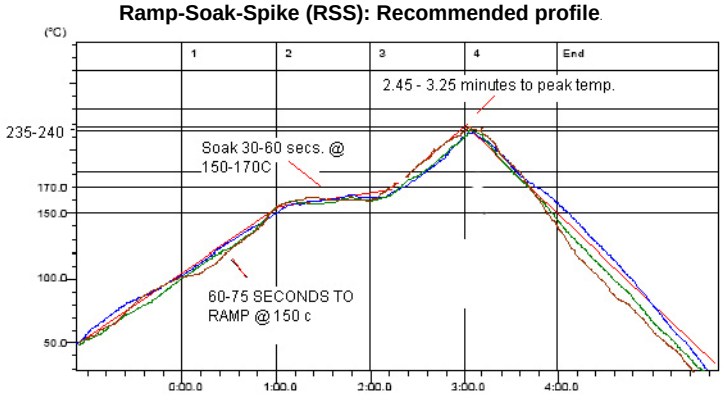
Test	Conditions	Results	Spec.
Copper Mirror	24 Hrs., 25C, 50%RH	**Passed**	low; no holes in mirror
Halide Test (Silver Chromate)	ambient condition	**Passed**	no white ppt.
SIR	35°C/85%RH, 4 days, bare copper IPC-B-25A coupon		
	Initial	8.34E+12 Ohms	
	Final	9.65E+12 Ohms	1.00E+10 min.
		Passed	
Electromigration	65°C/85% RH, 500Hrs., bare copper IPC-B-25A coupon		
	Initial	3.05E+10 Ohms	
	Final	1.57E+10 Ohms	$R_f / R_i > 0.1$
		Passed	

Conclusions
The results of the qualification tests indicate that AIM NC NC254 solder paste meets the requirements of Telcordia GR-78-CORE (Bellcore) Generic Requirements. This material is approved for use.

REFLOW PROFILE SUPPLEMENT

ALLOYS: **Sn/Ag/Cu**

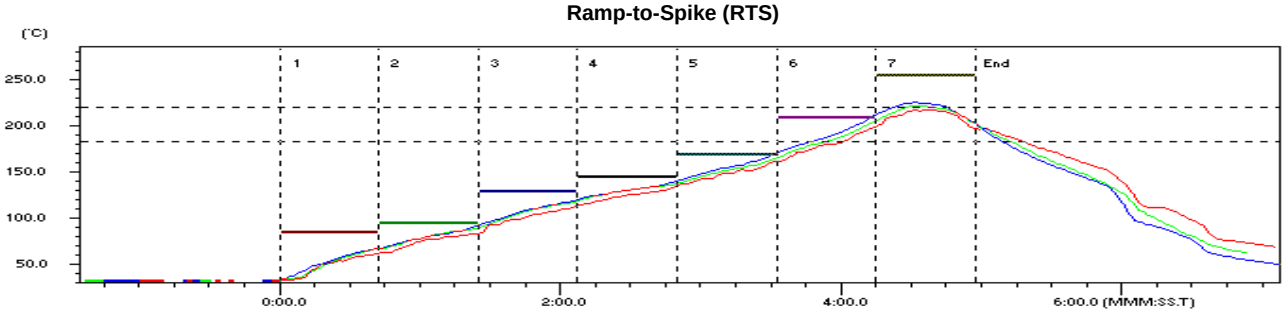
Ramp-Soak-Spike (RSS): Recommended profile



RSS Profile Guidelines

- The typical initial rate of rise for the RSS profile is 1.7 to 2.1°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 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.

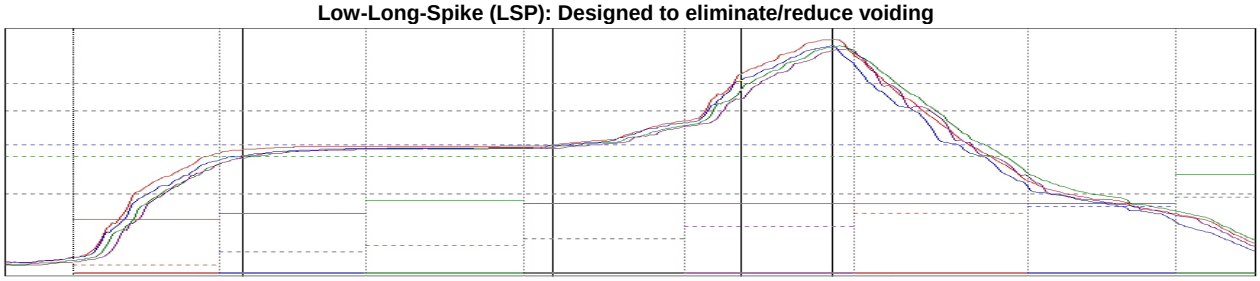
Ramp-to-Spike (RTS)



RTS Profile Guidelines

- The typical rate of rise for the RTS profile is 0.8 to 0.9°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 240ºC ± 5ºC.
- 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 240ºC ± 5ºC.
- 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.