TECHNICAL BULLETIN

alpha ASSEMBLY SOLUTIONS™

ALPHA® OM-550 Solder Paste

Low Temperature, Non-Eutectic, Pin Testable, RoHS Compliant Solder Paste for Assemblies with Temperature Sensitive Substrates, Components, & High Warpage Chips

DESCRIPTION

ALPHA's OM-550 is a new low temperature chemistry paired with **ALPHA's HRL1** alloy. This alloy was designed to exhibit improved drop shock and thermal cycling performance versus existing low temperature alloys. Together, the flux and alloy blend to make a product that has the characteristics of a modern solder paste designed for motherboards but with the ability to reflow at lower temperatures therefore minimizing NWO and HIP defects in complex assemblies.

All components used with **ALPHA OM-550** must be lead-free to eliminate the formation of tin/lead/bismuth intermetallic which has a melting point under 100ºC.

FEATURES & BENEFITS

- Low reflow peak temperature ~175°C (~185°C – 195°C for mixed alloy process)
- Reduction of warpage up to 99% (component and board/substrate) vs SAC process
- Excellent NWO Performance
- Excellent HIP Performance
- Improves BGA mechanical reliability compared to other low-temp alloys
- Fine Feature Printing/Reflow Capable
- Long Stencil Life - 12 Hours with continuous printing
- Less residue spread
- Good voiding performance on various packages (BGA, MLF, DPAK, LGA),
- Reflowable in air or nitrogen
- Provides efficiencies in both energy and cost

PRODUCT INFORMATION

Alloys:	HRL1 alloy
Powder Size:	Type 4 & Type 5
Packaging Sizes:	500 gram jars & 30cc syringe
Lead Free:	Complies with RoHS Directive 2011/65/EU
Halogen Content:	Zero Halogen

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TECHNICAL DATA

CATEGORY	RESULTS	PROCEDURES/REMARKS
CHEMICAL PROPERTIES		
Activity Level	**ROL0**	IPC J-STD-004B
Halide Content	**Pass**	IPC J-STD-004B
Fluoride Spot Test	**Pass**	JIS-Z-3197-1999 8.1.4.2.4
Halogen Test	**Pass**	Zero Halogen
Ag Chromate Test	**Pass**	IPC J-STD-004B
	Pass	JIS-Z-3197-1999 8.1.4.2.3
Copper Mirror Test	**Pass**	IPC J-STD-004B
	Pass	JIS-Z-3197-1999 8.4.2
Copper Corrosion Test	**Pass**	IPC J-STD-004B
	Pass	JIS-Z-3197-1999 8.4.1
ELECTRICAL PROPERIES		
SIR (7 days, 40°C/90%RH, 12 V bias)	**Pass**	IPC-TM-650 2.6.3.7 (J-STD-004B)
Bellcore SIR	**Pass**	Bellcore GR-78 Core Issue1, September 1997 (Section 13)
Electromigration	**Pass**	IPC-TM-650 (2.6.14.1) as per J-STD-0 04B
Bellcore Electromigration	**Pass**	Bellcore GR78-CORE (Pass=final > initial/10)
PHYSICAL PROPERTIES		
Color	Clear, Colorless Flux Residue	
Tack Force vs. Humidity	**Pass**	JIS-Z-3284-3:2014, 4.5
	Pass	IPC J-STD-005 TM-650 2.4.44
Solder Ball	**Preferred**	IPC J-STD-005, TM-650 2.4.43
Spread	**>80%**	JIS-Z-3198-3
Wetting Time	**Pass**	Rhesca Test, zero cross time T0
Stencil Life	**>12 Hours**	@ 50% RH 23°C (74°C)
Cold/Printing Slump	**No bridges**	JIS-Z-3284-3:2014, 4.3
	No bridges	IPC J-STD-005, TM-650 2.4.35
Hot Slump	**No bridges**	JIS-Z-3284-3:2014, 4.4
	No bridges	IPC J-STD-005, TM-650 2.4.35
Dryness Test (Talc)	**Pass**	JIS-Z-3197-1999 8.5.1

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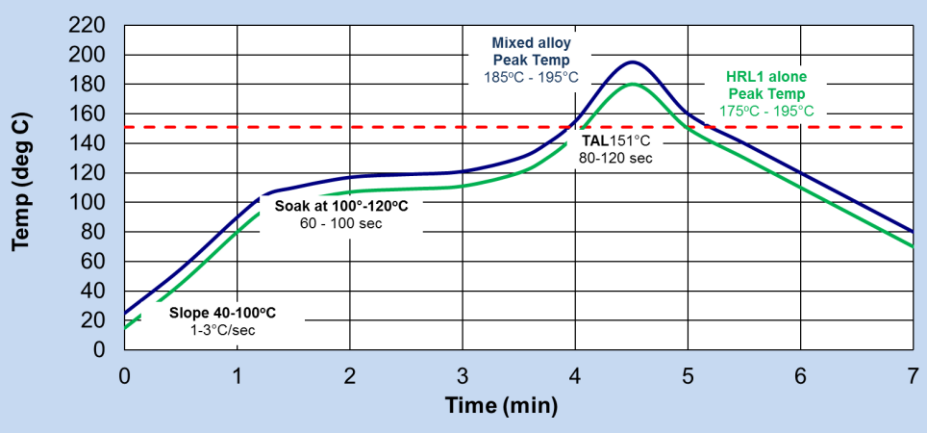
PROCESSING GUIDELINES

STORAGE & HANDLING	PRINTING	REFLOW	CLEANING
1. Refrigerate to guarantee stability @ 0-10°C (32-50°F). When stored in these conditions, shelf life of paste is 6 months. 2. Paste can be stored for 2 weeks at room temperature up to 25°C(77°F) prior to use. 3. When refrigerated, warm up paste container to room temperature for up to 4 hrs. Paste must be 19°C (66°F) before processing. Verify paste temperature with a thermometer to ensure paste is at 19°C (66°F) or greater before set up of printer. 4. Paste can be manually stirred before use. A rotating / centrifugal force mixing operation is not required. If a rotating / centrifugal force mixing is used, 30 - 60 seconds at 300 RPM is adequate. 5. Do not remove worked paste from stencil and mix with unused paste in jar. This will alter the rheology of unused paste. 6. These are starting recommendations and all process settings should be reviewed independently.	**STENCIL**: Recommend Alpha's ALPHA CUT or ALPHA FORM stencils @ 0.050mm - 0.150 mm (4-6 mil) thick for 0.4 - 0.5 mm (0.016" or 0.020") pitch. Stencil design is subject to many process variables. Contact your local Alpha stencil site for advice. **SQUEEGEE:** Metal (recommended) **PRESSURE:** 1.5 lb/in successfully tested at Alpha **SPEED:** 100mm/s tested at Alpha **PASTE ROLL:** 1.5-2.0 cm diameter and make additions when roll reaches 1-cm (0.4") diameter (min). Max roll size will depend upon blade. **STENCIL RELEASE SPEED:** 7 mm/sec successfully used. **LIFT HEIGHT:** 8 – 14mm (0.31- 0.55")	**ATMOSPHERE: Clean-dry air or nitrogen atmosphere.** **PROFILE (HRL1 Alloy):** The following settings have been determined to give optimal result but other settings give excellent results as well. **note 1& note 2* **Slope:** 40°-100°C, 1-3°C/sec **Soak:** 100°C-120°C 60-100 Sec **TAL:** >151°C – 80-120 Sec **Peak:** 185°C–195°C **A 0.4-0.6 paste volume to sphere volume ratio is recommended**	ALPHA OM-550 residue is designed to remain on the board after reflow. Misprints and stencil cleaning may be done with ALPHA SM-110E, ALPHA SM-440, ALPHA BC-2200 cleaners.



Suggested Reflow Profile for HRL1 alloy in mixed alloy process and HRL1 alone.

Note 1: With lower peak temperatures, TAL needs to be adjusted/extended in order to form a proper joint. Fine tuning is needed based on specific board design in order to achieve maximum performance.* ***For the above profile a 0.4-0.6 paste volume to sphere volume ratio is recommended.*

***Note 2: 185°C – 195°C peak reflow applies to mixed solder joints.*

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SAFETY

While the ALPHA OM-550 flux system is not considered toxic, its use in typical reflow will generate a small amount of reaction and decomposition vapors. These vapors should be adequately exhausted from the work area. Consult the SDS for additional safety information.

STORAGE

ALPHA OM-550 should be stored in a refrigerator upon receipt at 0 to 10°C (32-50°F).
ALPHA OM-550 should be permitted to reach room temperature before unsealing its package prior to use (see handling procedures on page 3). This will prevent moisture condensation build up in the solder paste.

CONTACT INFORMATION

To confirm this is the most recent issue, please contact Alpha Assembly Solutions

www.AlphaAssembly.com

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