

## ALPHA<sup>®</sup> OM-550 Solder Paste

No Clean, 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 100 °C.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

### FEATURES & BENEFITS

- Low reflow peak temperature ~175 °C (~185 to 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**

<u>Alloys:</u>	HRL1 alloy
<u>Powder Size:</u>	Type 4 & Type 5
<u>Packaging Sizes:</u>	500 gram jars & 30cc syringe
<u>Lead Free:</u>	RoHS Directive EU/2015/863; amending Annex II of 2011/65/EU
<u>Halogen Content:</u>	Zero Halogen

**TECHNICAL DATA**

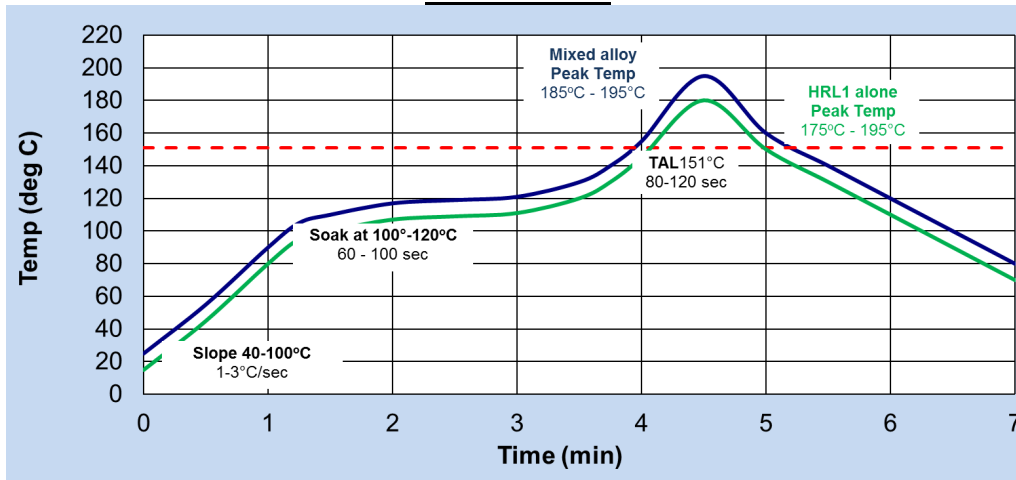
Category	Results	Procedures/Remarks
<b>Chemical Properties</b>		
Activity Level	<b>ROL0</b>	IPC J-STD-004B
Halide Content	<b>Pass</b>	IPC J-STD-004B
Fluoride Spot Test	<b>Pass</b>	IPC J-STD-004B
Halogen Test	<b>Pass</b>	Zero Halogen
Ag Chromate Test	<b>Pass</b>	IPC J-STD-004B
	<b>Pass</b>	JIS-Z-3197-1999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

**PROCESSING GUIDELINES**

Storage & Handling	Printing	Reflow (See Fig. 1)	Cleaning
<ol style="list-style-type: none"> <li>1. Refrigerate to guarantee stability @ 0 to 10 °C (32 to 50 °F). When stored in these conditions, shelf life of paste is <b>6 months</b> for T4 paste and <b>3 months</b> for T5 paste.</li> <li>2. Paste can be stored for 2 weeks at room temperature up to 25 °C (77 °F) prior to use.</li> <li>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 setup of printer.</li> <li>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 to 60 seconds at 300 RPM is adequate.</li> <li>5. Do not remove worked paste from stencil and mix with unused paste in jar. This will alter the rheology of unused paste.</li> <li>6. These are starting recommendations and all process settings should be reviewed independently.</li> </ol>	<p><b>STENCIL:</b> Recommend Alpha's ALPHA CUT or ALPHA FORM stencils @ 0.050 to 0.150 mm (4 to 6 mil) thick for 0.4 to 0.5 mm (0.016" or 0.020") pitch.</p> <p>Stencil design is subject to many process variables. Contact your local Alpha stencil site for advice.</p> <p><b>SQUEEGEE:</b> Metal (recommended)</p> <p><b>PRESSURE:</b> 1.5 lb/in successfully tested at Alpha</p> <p><b>SPEED:</b> 100mm/s tested at Alpha</p> <p><b>PASTE ROLL:</b> 1.5 to 2.0 cm diameter and make additions when roll reaches 1-cm (0.4") diameter (min). Max roll size will depend upon blade.</p> <p><b>STENCIL RELEASE SPEED:</b> 7 mm/sec successfully used.</p> <p><b>LIFT HEIGHT:</b> 8 to 14mm (0.31 to 0.55")</p>	<p><b>ATMOSPHERE: Clean-dry air or nitrogen atmosphere.</b></p> <p><b>PROFILE (HRL1 Alloy):</b> The following settings have been determined to give optimal result but other settings give excellent results as well. *note 1 &amp; note 2</p> <p><b>Slope:</b> 40 to 100 °C, 1 to 3 °C/sec  <b>Soak:</b> 100 to 120 °C 60 to 100 Sec  <b>TAL:</b> &gt;151 °C – 80 to 120 Sec  <b>Peak:</b> 185 to 195 °C</p> <p><b>A 0.4 to 0.6 paste volume to sphere volume ratio is recommended</b></p>	<p>ALPHA OM-550 residue is designed to remain on the board after reflow.</p> <p>Misprints and stencil cleaning may be done with ALPHA SM-110E, ALPHA SM-440, ALPHA BC-2200 cleaners.</p>

REFLOW PROFILES

**Soak Profiles**



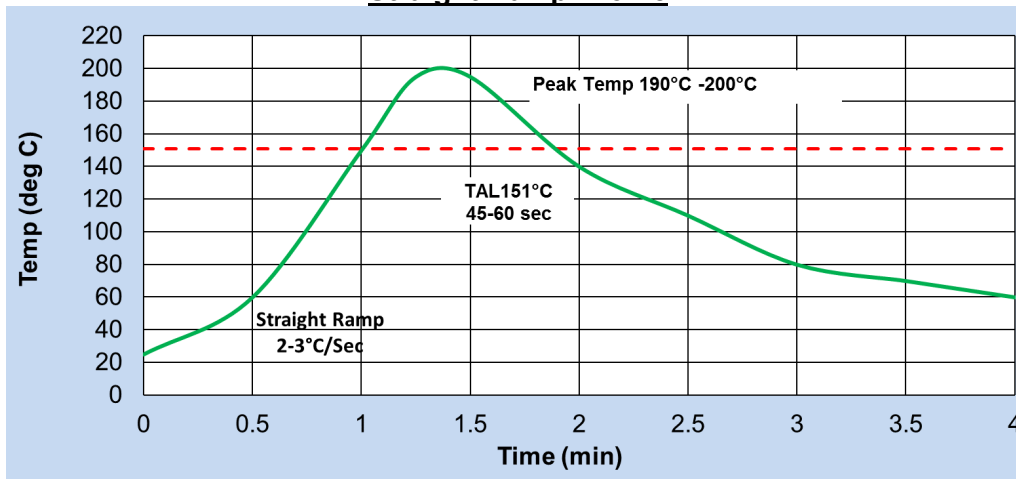
Suggested Reflow Profile for HRL1 alloy in mixed alloy process and HRL1 alone.

**\*Note 1:** With lower peak temperatures, TAL recommendation is a general guide for total combined reflow exposure time. TAL needs to be adjusted/extended in order to form a proper joint. Reflow profile suggested above represents single exposure to achieve optimized joint. Please consult your local Alpha representative for assemblies requiring more than a single reflow exposure.

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

For the above profile a 0.4 to 0.6 paste volume to sphere volume ratio is recommended.

**Straight Ramp Profile**



**\*\*\*Note 3:** Straight ramps profile is meant for pure joints only.

**RECYCLING SERVICES**

We provide safe and efficient recycling services to help companies meet their environmental and legislative requirements and at the same time, maximize the value of their waste streams.

Our service collects solder dross, solder scrap, and various forms of solder paste waste. Please contact your local sales representative for recycling capabilities in your area or [link here](#).



**SAFETY & WARNING**

It is recommended that the company/operator read and review the Safety Data Sheets for the appropriate health and safety warnings before use. **Safety Data Sheets are available at [MacdermidAlpha.com/assembly-solutions/knowledge-base](http://MacdermidAlpha.com/assembly-solutions/knowledge-base).**

**STORAGE**

ALPHA OM-550 should be stored in a refrigerator upon receipt at 0 to 10 °C (32 to 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 document is the most recent version, please contact [Assembly@MacDermidAlpha.com](mailto:Assembly@MacDermidAlpha.com)**

[www.macdermidalpha.com](http://www.macdermidalpha.com)

<p><b>North America</b> 109 Corporate Blvd. South Plainfield, NJ 07080, USA 1.800.367.5460</p>	<p><b>Europe</b> Unit 2, Genesis Business Park Albert Drive Woking, Surrey, GU21 5RW, UK 44.01483.758400</p>	<p><b>Asia</b> 8/F., Paul Y. Centre 51 Hung To Road Kwun Tong, Kowloon, Hong Kong 852.3190.3100</p>
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Also read carefully warning and safety information on the Safety Data Sheet. This data sheet contains technical information required for safe and economical operation of this product. READ IT THOROUGHLY PRIOR TO PRODUCT USE. Emergency safety directory assistance: US 1 202 464 2554, Europe + 44 1235 239 670, Asia + 65 3158 1074, Brazil 0800 707 7022 and 0800 172 020, Mexico 01800 002 1400 and (55) 5559 1588

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