

# ALPHA<sup>®</sup> VAPOR PHASE SOLUTIONS

Solder Pastes formulated for use in Vapor Phase Reflow Processes

## DESCRIPTION

**ALPHA Vapor Phase Solutions** solder pastes are capable of high reflow performance in vapor phase ovens. The paste chemistries were developed to blend with Type 4 & Type 5 powder making these pastes suitable for fine feature printing applications. These pastes have been tested and proven to perform extremely well in print, reflow, and reliability attributes. When used in an ALPHA Vapor Phase oven, these pastes will enable customers to maximize the benefits of their vapor phase reflow oven while reaping the benefits of Alpha engineered pastes.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

## FEATURES & BENEFITS

- **Reflowing:** Suitable for Vapor Phase and Convection reflowing
- **Long Stencil Life:** Engineered for consistent performance in warm/humid production environments, reducing variations in print performance and paste dry-out
- **High Tack Force Life:** Ensures high pick-and-place yields, good self-alignment
- **Wide Reflow Profile Window:** Enables quality soldering of complex, high density PWB assemblies in an N2 environment, using high ramp rates and soak profiles as high as 170 to 180 °C
- **Reduced Mid Chip Solder Balling, Head-in-Pillow:** Minimizes rework and increases first time yield
- **Excellent Coalescence and Wetting Performance:** Coalesces well for 170µm small circle deposit at low soak air environment
- **Excellent Solder Joint and Flux Residue Cosmetics:** Residue does not char or burn after reflow soldering, even when using long/high thermal soaking
- **Excellent Voiding Performance:** Pass IPC7095 Class III requirement for BGA
- **Halogen Content:** Zero Halogen, no halogen intentionally added
- **Reliability:** Pass JIS Copper Corrosion Test and all standard SIR Tests
- **Safe and Environmentally Friendly:** Materials comply with ROHS, TSCA, EINECS and Halogen-free requirements (Zero Halogen, see table below)

**PRODUCT INFORMATION**

Fluxes: ALPHA OM-353  
Alloys: SAC305, SAC105, ALPHA SACX® Plus 0307, Innolot, ALPHA  
Powder Size: Type 4, Type 5  
Packaging Sizes: 500 gram jars, 6 inch & 12 inch cartridges  
Flux Gel: Flux gel is available in 10 and 30 cc syringes for rework applications  
Lead Free: RoHS Directive EU/2015/863; amending Annex II of 2011/65/EU

NOTE 1: For other alloys, powder size and packaging sizes, contact your local Alpha Sales Office.

**HALOGEN STATUS**

Halogen Standards			
Standard	Requirement	Test Method	Status
<b>JEITA ET-7304A</b> Definition of Halogen Free Soldering Materials	< 1000 ppm Br, Cl, I, F in solder material solids	<b>TM EN 14582</b>	Pass
<b>IEC 612249-2-21</b>	Post Soldering Residues contain < 900 ppm each or total of < 1500 ppm Br or Cl from flame retardant source		Pass
<b>JEDEC</b> A Guideline for Defining "Low Halogen" Electronics	Post soldering residues contain < 1000 ppm Br or Cl from flame retardant source		Pass
<b>Zero Halogen:</b> No halogenated compounds have been intentionally added to this product			

**TECHNICAL DATA**

Category	Results	Procedures/Remarks
<b>Chemical Properties</b>		
Activity Level	ROLO	IPC J-STD-004B
Halide Content	Halide free (by titration), < 0.05%	IPC J-STD-004B
Fluoride Spot Test	Pass	JIS Z 3197:1999 8.1.4.2.4
Halogen Test	Pass, Zero Halogen - No halogen intentionally added	EN14582, by oxygen bomb combustion, Non-detectable (ND) at < 50 ppm
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 (No evidence of Corrosion)	IPC J-STD-004B
	Pass (No evidence of Corrosion)	JIS Z 3197:1999 8.4.1
<b>Electrical Properties</b>		
Water Extract Resistivity	11,500 ohm-cm	JIS-Z-3197-1999 8.1.1
SIR (7 days, 40°C/90%RH, 12 V bias)	Pass	IPC J-STD-004B TM-650 2.6.3.7 (Pass $\geq 1 \times 10^8$ ohm)
JIS Electromigration (1000 hrs @ 85 °C/85%RH48V)	Pass	JIS Z 3197:1999 8.5.4 (Pass $\geq 1 \times 10^9$ ohm)
Bono Test 85 °C 85% RH and 50 V bias	Pass	Bono Test
<b>Physical Properties</b>		
Color	Clear, Colorless Flux Residue	
	<b>Pass</b> , > 100gf over 24 hours at 25%, 50% and 75% Relative Humidity	JIS Z 3284:1994, Annex 9

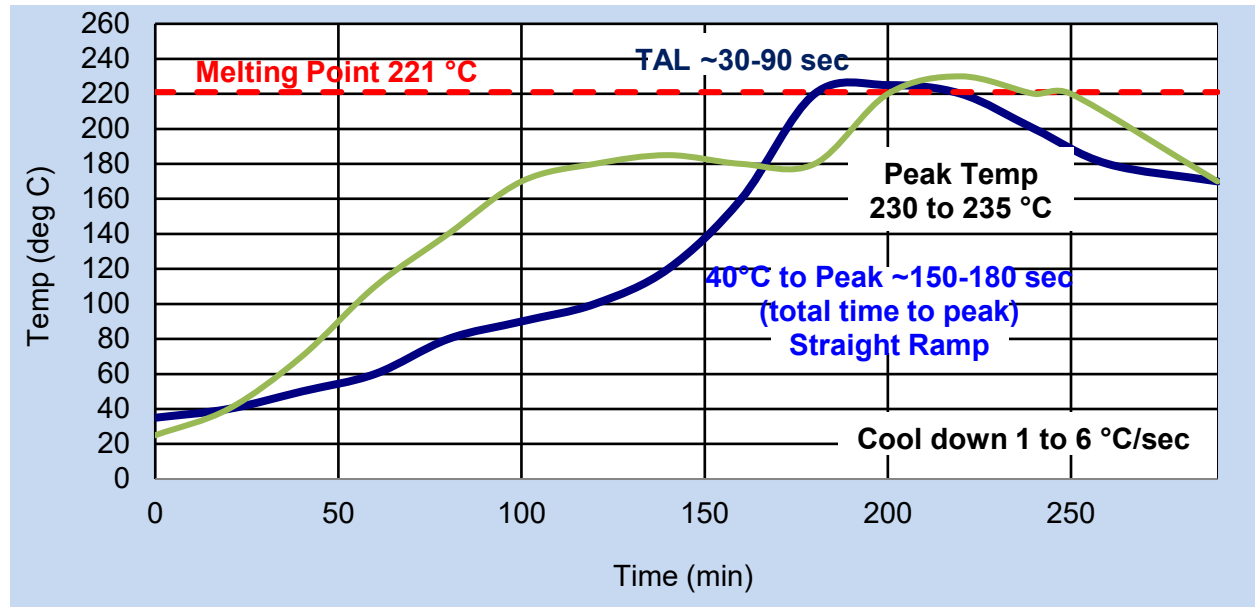
Category	Results	Procedures/Remarks
Tack Force vs. Humidity	<b>Pass</b> , Change of <1g/mm <sup>2</sup> over 24 hours at 25% and 75% Relative Humidity	IPC J-STD-005 TM-650 2.4.44
Viscosity Stability at 25 °C for 14 days	Pass	Malcom Spiral Viscometer
Solder Ball	Preferred	IPC J-STD-005, TM-650 2.4.43
Spread	>80%	JIS Z 3198-3
Wetting Time	Pass, 1.6 second	Rhesca Test, zero cross time T <sub>0</sub>
Stencil Life	>8 hours	@ 50% RH 23 °C (74 °C)
Cold/Printing Slump	No bridge for 0.3 mm space	JIS Z 3284:1994 Annex 7
	No bridge for 0.3 mm space	IPC J-STD-005, TM-650 2.4.35
Hot Slump	No bridge for 0.3 mm space	JIS Z 3284:1994 Annex 8
	No bridge for 0.3 mm space	IPC J-STD-005, TM-650 2.4.35
Dryness Test (Talc)	Pass	JIS Z 3197:1999 8.5.1

**PROCESSING GUIDELINES**

Storage & Handling	Printing	Reflow	Cleaning
<p>1. Refrigerate to guarantee stability @ 0 to 10 °C (32-50 °F). When stored under these conditions, the shelf life of ALPHA OM-353 is 6 months.</p> <p>2. Paste can be stored for 2 weeks at room temperature up to 25 °C (77 °F) prior to use.</p> <p>3. When refrigerated, warm up paste container to room temperature for up to 4 hours. 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.</p>	<p><b>Stencil:</b> Recommend ALPHA CUT, ALPHA NICKEL-CUT, ALPHA TETRABOND, or ALPHA FORM stencils @ 0.100 to 0.150 mm (4 to 6 mil) thick for 0.4 to 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.</p> <p><b>Squeegee:</b> Metal (recommended)</p> <p><b>Pressure:</b> 0.21 to 0.36 kg/cm of blade (1.25 to 2.0 lbs/inch)</p> <p><b>Speed:</b> 25 to 150 mm per second (1 to 6 inches per second).</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> 1 to 5 mm/sec.</p> <p><b>Lift Height:</b> 8 to 14mm (0.31 to 0.55")</p>	<p><b>Atmosphere:</b> Clean-dry air or nitrogen atmosphere.</p> <p><b>Profile:</b> Soak: 155 to 175 °C, 60 to 100 sec soak profiles have been determined to give optimal results, please see profile chart, ALPHA OM-353 SAC305/SACX Plus 0307 Typical Reflow Profile. If required, good results are also achievable with high soak temperature profiles of 170 to 180 °C for 60 to 120s, especially in Vapor Phase and N2. Typical peak temperature of Vapor Phase is 235 °C.</p> <p>NOTE 2: Keeping the peak temperature below 235 °C may reduce the number and size of BGA and QFN voids.</p> <p>NOTE 3: Refer to component and board supplier data for thermal properties at elevated temperatures. Lower peak temperatures require longer TAL for improved joint cosmetics.</p>	<p>ALPHA OM-353 residue is designed to remain on the board after reflow. If reflowed residue cleaning is required, Vigon A201 (in line cleaning), Vigon A 250 (Batch Cleaning) or Vigon US (Ultrasonic Cleaning) are recommended. Vigon is a registered trademark of Zestron.</p> <p>Misprints and stencil cleaning may be done with IPA, ALPHA SM-110E and ALPHA SM-440.</p>

**REFLOW PROFILES**

The vapor phase reflow profiles show below are based on work done by Alpha on R&D Vaportech Machines. Please take note that this is only a recommendation. While it is beneficial to start off with these parameters, equipment and assembly (PCB and parts) may require adjustments be made to the profile to meet other criteria. In normal soldering operations the accepted TAL is in the range 30 to 90 'however vapor phase soldering may allow shorter TAL's to be achieved. Alpha advises customers when reducing the TAL to verify it is suitable for their assembly process taking into consideration equipment, reflow medium boiling point and the assembly mass'.

**Straight Ramp & High Soak Vapor Phase Reflow:**


**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).**

**CONTACT INFORMATION**

To confirm this document is the most recent version, please contact  
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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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