

# ALPHA<sup>®</sup> WS-819 Solder Paste

Water Soluble, Lead-Free

## DESCRIPTION

**ALPHA WS-819** is a lead-free, halide-free solder paste offering the ideal combination of printability under varying environmental conditions, 8-hour stencil life, resistance to BGA voids, high spread combined with cleanability with water based cleaning systems.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

## FEATURES & BENEFITS

- Excellent print volume and print volume repeatability down to 12 mil (0.3mm) features
- 8-hour stencil life at 35% to 65% Relative humidity
- High spread/wetting lead free paste compatible with lead free alloys and surface finishes
- High Reflow Yield with IPC Class III Voiding Performance when used to solder BGA components. Excellent wetting characteristics on all common surface finishes (including ENTEK HT OSP). JIS Spread 88.6% on ENTEK HT OSP
- Cleanable with water based cleaning systems

## PRODUCT INFORMATION

Alloys:	SAC305 (96.5%Sn/3.0%Ag/0.5%Cu), SAC405 (95.5%Sn/4.0%Ag/0.5%Cu)
Application:	Stencil printing
Powder Size:	Type 3 (25µ-45µ), Type 4 (20µ-38µ)
RoHS Status:	RoHS Directive EU/2015/863; amending Annex II of 2011/65/EU

## APPLICATION GUIDELINES

ALPHA WS-819 is formulated to meet the requirements of water soluble solder lead free applications. ALPHA WS-819 is developed to offer best in class resistance to heat and humidity variations in the printing process, while offering exceptional post reflow cleanability and low BGA voiding.

This paste is designed to enable users of ALPHA WS-609; ALPHA WS-709 and ALPHA WS-809 and other leading water soluble paste brands to comply with RoHS and customer based demand for lead free materials.

**TECHNIAL DATA**

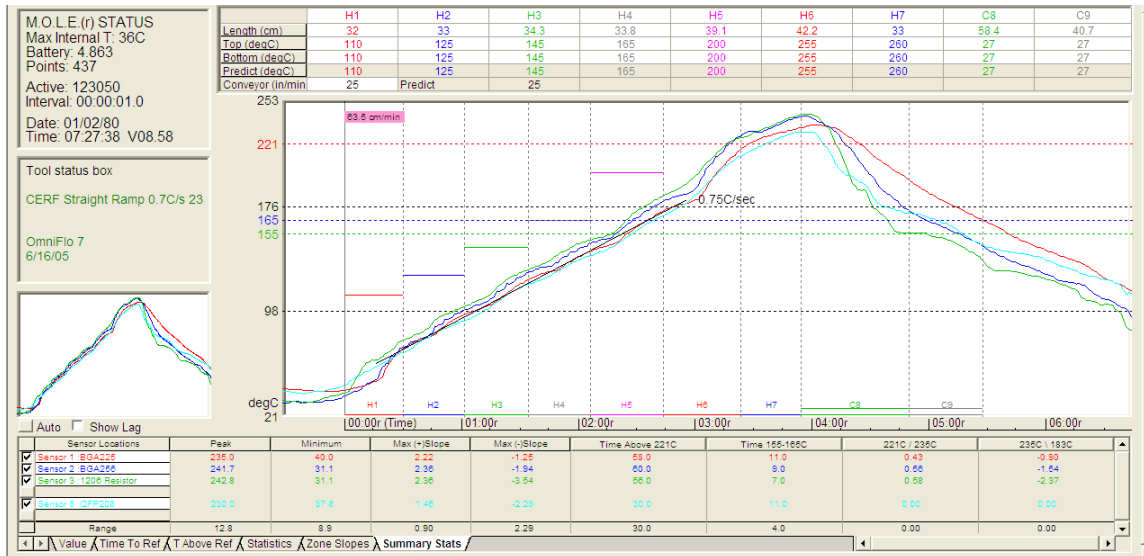
Category	Results	Procedures/ Remarks
<b>Physical Properties</b>		
Appearance (flux residues after reflowed)	Light yellowish color (before water washed)	Visual
Viscosity (Poise, @10rpm)	89% Metal load for Type 3 Designated M17 for stencil printing Viscosity (typical) 1700 poise	Malcom spiral viscometer J-STD-005
	88.5% metal load for Type 4 Designated M18 for stencil printing Viscosity (typical) 1800 poise	
	85% Metal Load for Type 4 Designated M9 for dispensing Viscosity (typical) 900 poise/	
Stencil life (50%+- 15%RH, 25 °C)	>8 hours	ALPHA-GLB-PUT-0012
Printability	Suitable for fine pitch printing applications (Down to 16 mil (0.4mm) pitch QFP components, 12 mil (0.3mm) BGA circles @) up to 100 mm/sec squeegee speed, using 5 mil (125µ) thick laser cut stencil	ALPHA-GLB-PUT-0001
Response to pause	0-1 Knead Stroke Required	ALPHA-GLB-PUT-0008
Tack	Initial 2.0 g/mm <sup>2</sup> ; 1.8 g/mm <sup>2</sup> after 4 hours at 25 °C and 50% R.H.	ALPHA-GLB-PUT-0004
Random Solder Balls	Preferred (Both Initial and after 4 hours at 25 °C and 50% R.H.	ALPHA-GLB-PUT-0005
Slump Resistance	Pass	ALPHA-GLB-PUT-0010
<b>Chemical Properties</b>		
<b>Items</b>	<b>ALPHA WS-819 Flux System</b>	
Halide content (IPC J-Std-004B)	ORH0	
Corrosivity (IPC J-Std-004B)	Not applicable for water soluble solder paste	

**PROCESSING GUIDELINES**

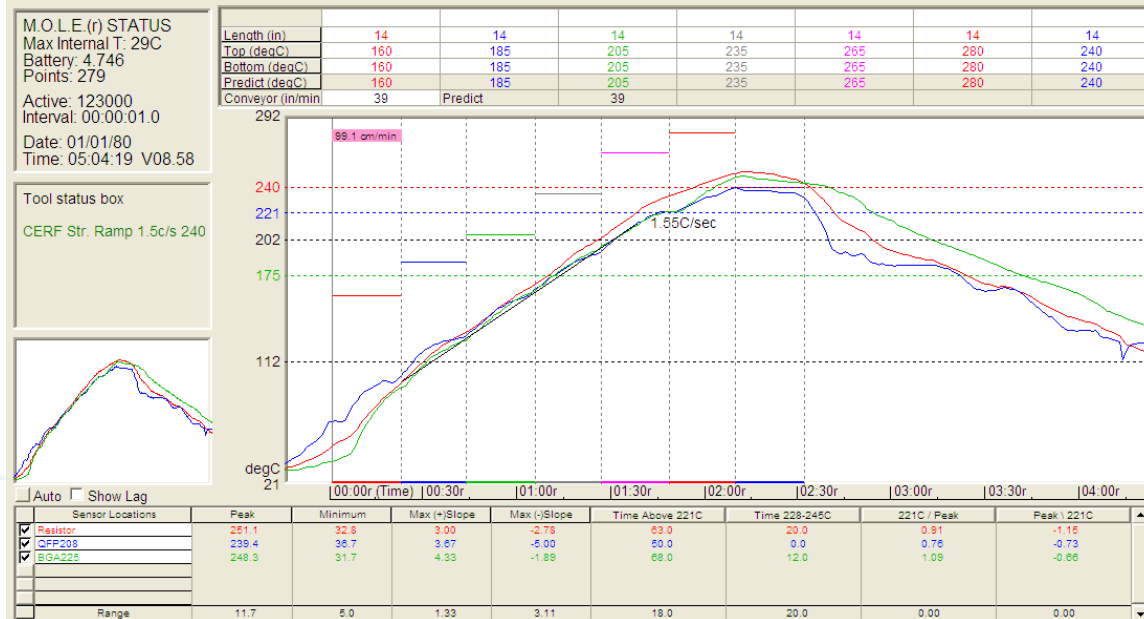
Storage & Handling	Printing / Dispensing	Reflow	Cleaning
<ul style="list-style-type: none"> <li>• Refrigerate to guarantee stability @ 32 to 50 °F (0 to 10 °C)</li> <li>• If refrigerated, shelf life is 6 months. Paste is stable for up to 2 weeks at room temperature (25 °C).</li> <li>• Warm-up of 500g jar to room temperature (should be ~ 6 hours). Set up printer with room temperature paste. Check paste temperature with a thermometer.</li> <li>• Do not remove worked paste from stencil and mix with unused paste in jar. This will alter rheology of unused paste.</li> <li>• Do not shake or mix paste using automatic paste shaking equipment prior to opening jar. The plunger insert used may submerge into paste and produce difficulties with plunger removal.</li> </ul>	<p><u>Stencil:</u> Recommend ALPHA CUT Laser Cut Stencil @ 0.005 inch (5 mil, 127μ) thick for 0.012 inch (.30 mm) pitch QFPs</p> <p><u>Squeegee:</u> Metal (Recommended)</p> <p><u>Print Speed:</u> 2.0 to 4.0 in./sec (50 to 100 mm/s) 4.0 in/s optimal</p> <p><u>Squeegee:</u> Pressure: 1.5 to 2.0 lbs./ linear in. (0357 Kg/cm)</p> <p><u>Stencil Release Speed:</u> 0.02 in/s (0.5 mm/s)</p> <p>Compatible with DEK Pro-Flow Enclosed print head. Report available upon request.</p>	<p><u>Atmosphere:</u></p> <ul style="list-style-type: none"> <li>• Clean-dry air If soak temp ≥ 160 °C and soak time &gt; 45 to 60 seconds Nitrogen recommended for longer soak profiles (60 to 180 seconds).</li> </ul> <p><u>Profile (Printing):</u></p> <ul style="list-style-type: none"> <li>• See profiles evaluated in product development below</li> </ul>	<ul style="list-style-type: none"> <li>• ALPHA WS-819 is designed to be water rinsed in washing operations with minimal foaming in recirculating systems.</li> <li>• The flux residues from ALPHA WS-819 are completely water soluble. This allows for more flexible washing conditions which can be board design specific.</li> <li>• If lower/no foaming is desired in cleaning equipment, ALPHA P-2000 defoamer may be used.</li> </ul>

REFLOW PROFILES

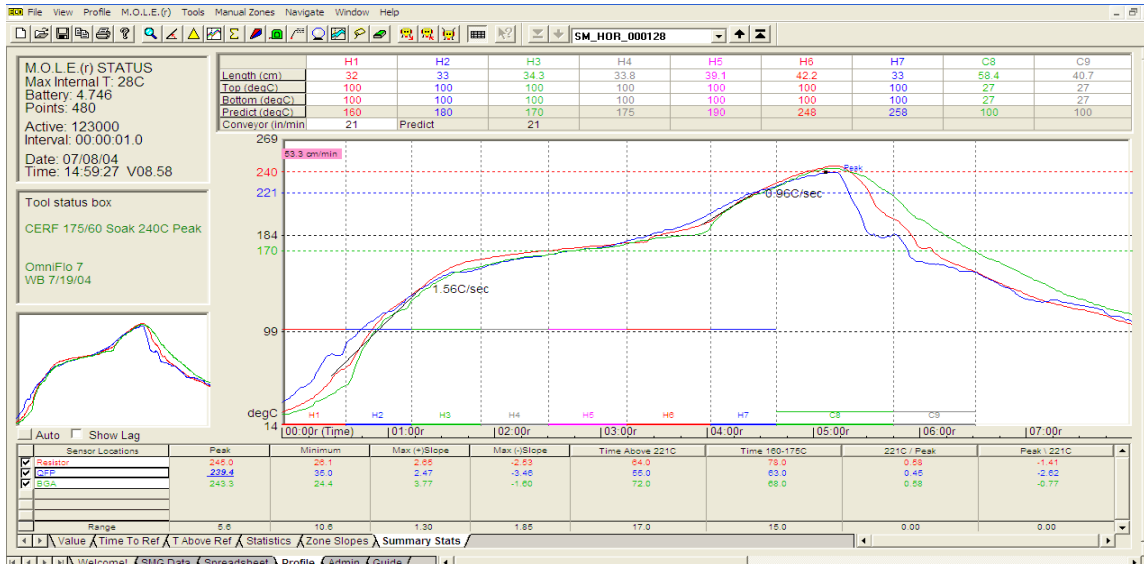
Reflow Profiles Tested, using Clean, Dry AirCERF Straight Ramp 0.7C/s 235C Peak 60s TAL



CERF Straight Ramp 1.5C/s 240C Peak 60s TAL



**CERF 60s Soak @ 175 °C/ 240C Peak 60s TAL**



Note - profiles using a soak time > 60 seconds may require nitrogen for satisfactory results.

Use of air for long soak profiles has resulted in dull, grainy joints, and possible de-wetting of solder joints.

**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 [Assembly@MacDermidAlpha.com](mailto:Assembly@MacDermidAlpha.com)**

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

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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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