

# ALPHA<sup>®</sup> OM-310

## Lead-Free Solder Paste

### DESCRIPTION

**ALPHA OM-310** is a lead-free, no-clean solder paste designed to maximize SMT line throughput and yields. **ALPHA OM-310** yields excellent fine pitch and high-speed printing properties and maximize cosmetic\* and functional reflow results. **ALPHA OM-310** is also available in a dispensing grade for dispense and rework applications. The flux system has been developed to be effective with all alloys from the Tin-Silver-Copper (SAC) range. Other alloys can be made available upon request. The product is also available in dispense cartridges for rework applications.

\* Although the appearance of these lead-free alloys will be different to that of tin-lead, with mechanical reliability equal to or greater than with that of tin-lead or tin-lead-silver.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

### FEATURES AND BENEFITS

- Maximizes reflow yield for lead-free processing, allowing full alloy fusion at circular dimensions as small as 0.012" (0.3mm).
- Print speeds of up to 6" (150mm/sec) enables a fast print cycle time and a high throughput.
- Wide reflow profile window with good solderability on various board / component finishes.
- Pin-testable, non-brittle residues.
- Excellent reliability properties, halide-free material

### PRODUCT INFORMATION

<u>Alloys:</u>	SAC405 (95.5%Sn/4.0%Ag/0.5%Cu) SAC305 (96.5%/Sn 3.0%Ag 0.5%Cu)
<u>Powder Size:</u>	Type 3, (25 to 45 µm per IPC J-STD-005).
<u>Residues:</u>	Approx 5% by (w/w)
<u>Packaging Sizes:</u>	Small and large jars, 6" & 12" cartridges and DEK ProFlo™ cassettes.
<u>Lead-Free:</u>	RoHS Directive EU/2015/863; amending Annex II of 2011/65/EU

**APPLICATION GUIDELINES**

**Printing:** Formulated for both standard and fine pitch stencil printing, at print speeds of between 1"/sec (25mm/sec) and 6"/sec (150mm/sec), with standard stencil thickness of 0.004" (0.10mm) to 0.006" (0.15mm), particularly when used in conjunction with ALPHA stencils. Blade pressures should be 0.9 to 2lbs/inch of blade (0.16 to 0.34 kg/cm), depending upon the print speed. The higher the print speed employed, the higher the blade pressure will need to be. The reflow process window will give high soldering yield with good cosmetics previously unobtainable with lead-free alloys.

**Dispensing:** 21 gauge needle [larger inside diameter than 0.023" (0.58mm)] is the minimum recommended needle size.

**TECHNICAL DATA**

Category	Results	Procedure/Remarks
<b>Chemical Properties</b>		
Activity Level	ROL-0 = J-STD Classification	IPC J-STD-004A
Halide Content	Halide free (by titration). Passes Ag Chromate Test	IPC J-STD-004A, JIS-Z-3179:1999 8.1.4.2.3
BONO corrosion test (Pass < 8%)	Corrosion factor 2.15%, std dev 1.49%	Pass
Copper Mirror Test	Pass	IPC J-STD-004A, JIS-Z-3179:1999 8.4.2
<b>Electrical Properties</b>		
SIR (IPC 7 days @ 85 °C/85% RH)	> 1.0 x 10 <sup>8</sup> ohms	Pass, IPC J-STD-004A {Pass = 1 x 10 <sup>8</sup> ohm min}
SIR (Bellcore 96 hours @ 35 °C/85%RH)	> 1.0 x 10 <sup>11</sup> ohms	Pass, Bellcore GR78-CORE {Pass = 1 x 10 <sup>11</sup> ohm min}
SIR (168 hours @ 40 °C/90%RH) (168 hours @ 85 °C/85%RH)	Pass. >1.0 x 10 <sup>11</sup> ohms Pass. >5.0 x 10 <sup>8</sup> ohms	JIS-Z-3284:1994 annex 3
Electromigration (Bellcore 500 hours @ 65 °C/85% RH)	Initial 3.8 x 10 <sup>10</sup> ohms, final 1.5 x 10 <sup>11</sup> ohms	Pass, Bellcore GR78-CORE {Pass= final > initial/10}
<b>Physical Properties</b>		
Color	Clear, Colorless Flux Residue	SAC 305, 405 alloy

Category	Results	Procedure/Remarks
Tack Force vs. Humidity (t=8 hours)	2.6 g/mm <sup>2</sup> at 25%RH 2.6g/mm <sup>2</sup> at 50%RH 3.0 g/mm <sup>2</sup> at 75 % RH	IPC J-STD-005
Viscosity	88% metal load designated M11 (2200 to 2850 poise @ 5 RPM)	Malcom Spiral Viscometer; J-STD-005
Solderball	<b>Pass</b> (SAC 305 and SAC405 alloys)	Preferred per IPC J-STD-005
	Class 2, 1 hour Pass, 72 hour Pass	DIN Standard 32 513, 4.4
Stencil Life	> 8 hours	@ 50% RH, 74 °F (23 °C)
Slump	Pass	IPC J-STD-005 (10 min 150 °C)
	Pass	DIN Standard 32 513, 5.3

ProFlo is a registered trademark of DEK. RheoPump is a registered trademark of Speedline Technologies.

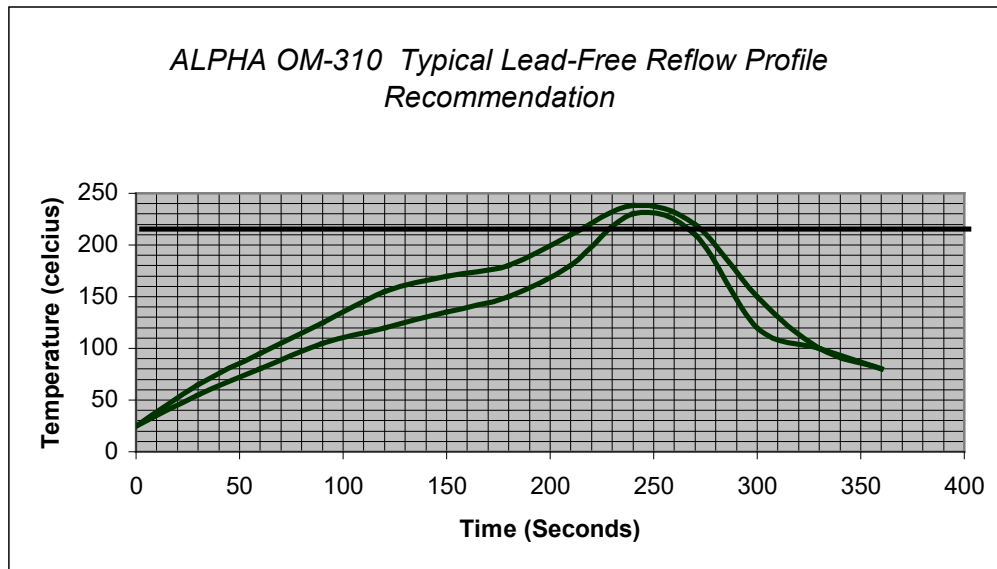
**PROCESSING GUIDELINES**

Storage & Handling	Printing	Reflow (See figure #1)	Cleaning
<p>* Refrigerate to guarantee stability @ 0 to 10 °C (32 to 50 °F).</p> <p>* Shelf life of refrigerated paste is four months.</p> <p>* Required warm-up of paste container to room temperature for up to 8 hours. Paste must be 70 °F (20 °C) before processing. Verify paste temperature with a thermometer to ensure paste is at 70 °F (20 °C or greater) before setup. Printing can be performed at temperatures up to 85 °F (30 °C).</p> <p>* Do not remove worked paste from stencil and mix with unused paste in jar. This will alter rheology of unused paste.</p> <p>* These are starting recommendations and all process settings should be reviewed independently</p>	<p><u>Stencil</u>: Recommend ALPHA CUT Laser Cut Stencil or ALPHA FORM Electroform Stencil @ 0.005" (0.125mm) or 0.006" (0.15 mm) thick for 0.016" or 0.020" (0.4 or 0.5 mm) pitch</p> <p><u>Squeegee</u>: Metal</p> <p><u>Pressure</u>: 0.9 to 2.0 lbs/inch of squeegee length (0.16 to 0.34 kg/cm).</p> <p><u>Speed</u>: 1 to 6 inches (25mm to 150 mm) per second.</p> <p><u>Paste Roll</u>: 1.5-2.0 cm diameter and make additions when roll reaches 0.4" (1 cm) diameter. Max roll size will depend upon blade.</p> <p><u>Print Pump Head</u>: ALPHA OM-310 is suitable for use in both MPM RheoPump and DEK ProFlo systems.</p> <p>To optimize print performance, medium release speed is recommended.</p>	<p><u>Atmosphere</u>: Clean-dry air or nitrogen atmosphere.</p> <p><u>Profile (SAC305/405)</u>: A straight ramp profile @ 0.8 °C to 1.2 °C per second ramp rate is recommended (TAL 35 to 80 sec and peak 230 to 240 °C). Higher density assemblies may require preheating within the profile and may be accomplished as follows:</p> <ul style="list-style-type: none"> <li>- Ramp @ 1 to 2 °C/sec. to 135 to 160 °C.</li> <li>- Slow ramp to 180 to 190 °C over 60 seconds.</li> <li>- Ramp @ 1 to 2 °C/sec to 230 to 240 °C peak temp. Time above 220 °C = 35 to 80 secs</li> <li>- Ramp down to R.T. @ 1.5 to 2 °C per second.</li> </ul>	<p>ALPHA OM-310 residue is designed to remain on the board after reflow. If reflowed residue cleaning is required, the following cleaner can be used: ALPHA BC-2200.</p> <p>Misprints and stencil cleaning may be done with ALPHA SM-110, ALPHA SM-110E, ALPHA SM-440, Bioact SC-10 &amp; SC-10E solvents and Hydre Aqueous cleaners available from Alpha.</p> <p>Soft flux residues remaining on the board after rework may be removed using a brush applied with Bioact EC-8DS.</p>

Bioact and Hydrex are registered trademarks of Petroferm, Inc. ProFlow is a trademark of the DEK Corporation

REFLOW PROFILES

Figure #1 – Reflow Envelope



**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-310 should be stored in a refrigerator upon receipt at 0 to 10 °C (32 to 50 °F). ALPHA OM-310 should be permitted to reach room temperature before unsealing its package prior to use (see handling procedures on page 4). This will prevent condensation build-up of moisture on 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)

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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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