

ALPHA[®] JP-501 Solder Paste

Lead-Free, Low Temperature, Zero-Halogen, No-Clean Solder Paste for Jet Printing

DESCRIPTION

ALPHA JP-501 is a lead-free, no-clean solder paste designed for use in jet printers. **ALPHA JP-501** features a rheology capable of standard dispensing or jetting. The low temperature, lead-free alloy in **ALPHA JP-501** has a melting point of 138 °C, and has been successfully used with peak reflow profiles between 155 and 190 °C. The flux residue from **ALPHA JP-501** is clear and colorless and is formulated to offer high electrical reliability in a zero-halogen flux formulation.

Outstanding reflow process window delivers good soldering on CuOSP, lead-free HASL, Immersion Silver, Immersion tin and ENIG surface finishes. Additionally, **ALPHA JP-501** is rated ROL0 per IPC J-STD-004.

All components used with **ALPHA JP-501** 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

- Reduces energy consumption in reflow ovens versus standard lead-free alloys
- Low temperature reflow profiles may enable the use of less expensive printed circuit board substrates, when appropriate
- Excellent deposit consistency with high process capability index across all board designs
- Designed for use with the Mycronic Jet Printers; compatible with Mycronic MY700 jetting equipment
- Zero-halogen (no halogen intentionally added to the formulation)
- Wide reflow profile window with good solderability on various board / component finishes
- Excellent solder and flux cosmetics after reflow soldering
- Reduction in random solderballing levels, minimizing rework and increasing first time yield
- Excellent pin-test yield for single and double reflow
- Excellent reliability properties, zero-halide material
- Capable of high reflow yield without the use of nitrogen

PRODUCT INFORMATION

<u>Alloy:</u>	42%Sn/57.6%Bi/0.4%Ag
<u>Powder Size:</u>	Type 5
<u>Residues:</u>	Approximately 6% by (w/w)
<u>Packaging Sizes:</u>	Iwashita 30 cc dispensers
<u>Flux Gel:</u>	ALPHA JP-501 Flux Gel is available in 10 cc and 30 cc syringes for rework applications
<u>Lead Free:</u>	Complies with RoHS Directive EU/2015/863

APPLICATION GUIDELINES

ALPHA JP-501 is formulated for dispensing and jet printing applications.

TECHNICAL DATA

Category	Results	Procedures/Remarks
Chemical Properties		
Flux Classification	ROL0	IPC J-STD-004
Halide Content	Halide free (by titration); Passes Ag Chromate Test	IPC J-STD-004
Halogen Content	Pass, Zero-Halogen - No halogen intentionally added	EN14582, by oxygen bomb combustion, Non-detectable (ND) at < 50 ppm
Copper Mirror Test	Pass	IPC J-STD-004
Copper Corrosion Test	Pass, No Evidence of Corrosion	IPC J-STD-004
	Pass, No evidence of corrosion	JIS Z 3197:1999 8.4.1
Electrical Properties		
SIR (IPC 7 days @ 85 °C / 85% RH)	Pass	IPC J-STD-004A Pass = 1×10^8 ohm min
SIR (Bellcore 96 hours @ 35 °C / 85% RH)	Pass	Bellcore GR78-CORE Pass = 1×10^{11} ohm min
Electromigration (JIS Z 3197 @ 85 °C / 85% RH 48V DC 1000 hours)	Final Reading > 10^{10} ohms; No Migration After 1000 hrs = Pass	JIS Z 3197:1999

Category	Results	Procedures/Remarks
Physical Properties		
Color	Clear, Colorless Flux Residue	
Tack Force vs. Humidity (t = 8 hours)	Pass - Change of <math><1\text{g}/\text{mm}^2</math> over 24 hours at 25% and 75 % RH	IPC J-STD-005
	Pass - Change of <math><10\%</math> when stored at <math>25\pm 10\%<="" 2\text{="" <math>50\pm="" and="" math>="" rh<="" td="" }^\circ\text{c}<=""> <td>JIS Z 3284 Annex 9</td> </math>25\pm>	JIS Z 3284 Annex 9
Solderball	Acceptable	IPC J-STD-005

PROCESSING GUIDELINES

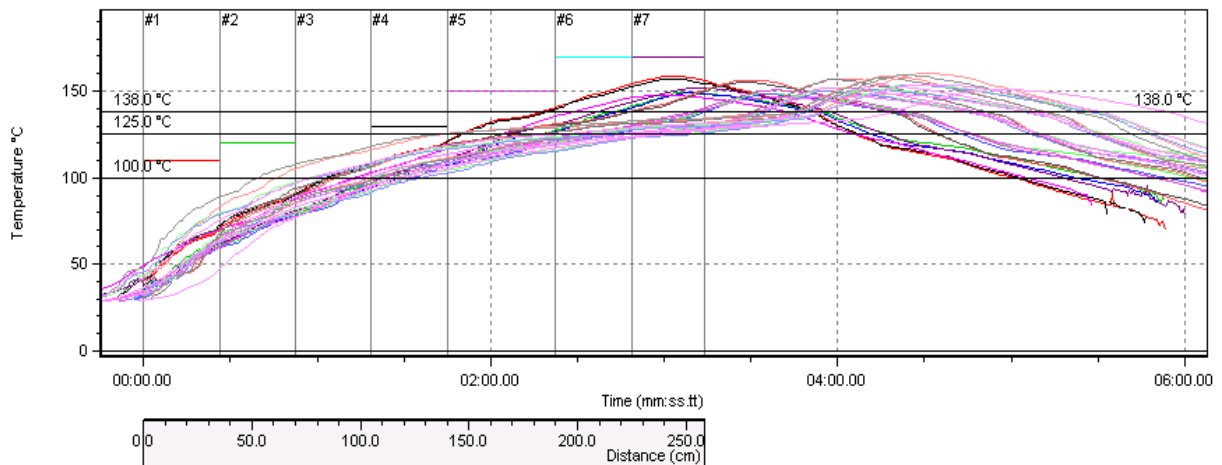
Storage & Handling	Jetting or Dispensing	Reflow (See Pg. 4)	Cleaning
<p>Refrigerate to guarantee stability at 0 to 10 °C, 32 to 50 °F.</p> <p>Shelf life of refrigerated paste is 6 months.</p> <p>Paste can be stored for 2 weeks at room temperature up to (25 °C/77 °F) prior to use.</p> <p>When refrigerated, allow paste container to warm to room temperature for up to four hours. Paste must be \geq (19 °C / 66 °F) before processing. Verify paste temperature with a thermometer to ensure paste is (19 °C / 66 °F) or greater before set-up. Printing can be performed at temperatures up to (29 °C / 84 °F).</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>Working conditions: 19 to 29 °C</p>	<p>Designed for use with jetting or dispensing systems.</p>	<p><u>ATMOSPHERE:</u> Clean-dry air or nitrogen atmosphere.</p> <p><u>PROFILE:</u> See Figure #1</p> <p>Acceptable reflow/coalescence and IPC-7095 Class 3 voiding was obtained with the given profile.</p> <p>Note: 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 JP-501 residue is designed to remain on the board after reflow.</p> <p>If reflowed residue cleaning is required, ALPHA BC-2200 aqueous cleaner is recommended.</p> <p>For solvent cleaning, agitation for 5 min in the following cleaners is recommended: ALPHA SM-110E Kyzen Micronox MX2501</p> <p>Misprints and stencil cleaning may be done with: ALPHA SM-110E ALPHA SM-440 ALPHA BC-2200</p>

These are starting recommendations and all process settings should be reviewed independently.

REFLOW PROFILES

General Reflow Profile Guidelines	
Parameter	Guidelines
Atmosphere	Air or N2
SnBiAg (42/57.6/0.4) alloy	138 °C (near eutectic)
Setting Zone	Optimal Dwell Period
40 to 138 °C	2:10 to 4:00 minutes
125 to 138 °C	0:30 to 1:30 minutes
100 to 138 °C	1:15 to 2:00 minutes
TAL (138 °C)	0:30 to 1:30 minutes
Peak temperature	155 to 180 °C
Joint cool down rate from 170 °C	3 to 8 °C/sec

Figure 1



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**

STORAGE

ALPHA JP-501 should be stored in a refrigerator upon receipt at 0 to 10 °C (32 to 50 °F). ALPHA JP-501 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

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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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