

# ALPHA<sup>®</sup> OM-338-CSP Solder Paste

Ultra-Fine Feature, Zero-Halogen, Lead-Free Solder Paste

## DESCRIPTION

**ALPHA OM-338-CSP** is a lead-free, no-clean solder paste designed for a broad range of applications. **ALPHA OM-338-CSP's** broad processing window is designed to minimize transition concerns from tin/lead to lead-free solder paste. This material is engineered to deliver the comparable performance to a tin-lead process.\* **ALPHA OM-338-CSP** yields excellent print capability performance across various board designs and, particularly, with ultra-fine feature repeatability (11 mil squares) and high throughput applications.

Outstanding reflow process window delivers good soldering on CuOSP with excellent coalescence on a broad range of deposit sizes, excellent random solder ball resistance and mid-chip solder ball performance. **ALPHA OM-338-CSP** is formulated to deliver exceptional visual joint cosmetics. Additionally, **ALPHA OM-338-CSP's** capability of IPC-7095 Class 3 for voiding and ROL0 IPC classifications ensures maximum long-term product reliability. **ALPHA OM-338-CSP** is also known as ALPHA OM-338 with M11 viscosity.

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

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

## FEATURES & BENEFITS

- Maximizes reflow yield for lead-free processing, allowing full alloy coalescence at circular dimensions as small as 0.25 mm (0.010 inch) with 0.100 mm (4 mil) stencil thickness.
- Excellent print consistency with high process capability index across all board designs.
- Print speeds of up to 200 mm/sec (8 inch/second), enabling a fast print cycle time and a high throughput.
- 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
- Meets highest IPC-7095 voiding performance classification of Class 3.
- Excellent reliability properties, halide-free material
- Compatible with either nitrogen or air reflow
- Zero-Halogen

**PRODUCT INFORMATION**

<u>Alloys:</u>	SAC305 (96.5%Sn/3.0%Ag/0.5%Cu)
<u>Powder Size:</u>	Type 4.5
<u>Residues:</u>	Approximately 5% by (w/w)
<u>Packaging Sizes:</u>	500 gram jar, 6 inch, 12 inch cartridge
<u>Lead Free:</u>	Complies with RoHS Directive EU/2015/863

**APPLICATION GUIDELINES**

Formulated for both standard and fine pitch stencil printing, at print speeds of between 25 mm/sec (1 inch/second) and 200 mm/sec (8 inch/second), with stencil thickness of 0.100 mm (0.004 inch) to 0.150 mm (0.006 inch), particularly when used in conjunction with ALPHA Stencils. Blade pressures should be 0.16 to 0.34 kg/cm of blade (0.9 to 2 lbs/inch), depending upon the print speed. The higher the print speed employed, the higher the blade pressure that is required. The reflow process window will give high soldering yield with good cosmetics and minimized rework.

**HALOGEN STATUS**

ALPHA OM-338-CSP is a halogen free product and passes the standards listed in the Table below:

Halogen Standards			
Standard	Requirement	Test Method	Status
<b>JEITA</b> ET-7304 Definition of Halogen Free Soldering Materials	< 1000 ppm Br, Cl, F in solder material solids	<b>TM EN 14582</b>	Pass
<b>IEC</b> 612249-2-21	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>Halogen Free:</b> No halogenated compounds have been intentionally added to this product			

**TECHNICAL DATA**

Category	Results	Procedures/Remarks
<b>Chemical Properties</b>		
Flux Classification	ROL0	IPC J-STD-004A
Halide Content	Halide free (by titration). <b>Passes</b> Ag Chromate Test	IPC J-STD-004A
Halogen Test	<b>Pass</b> , Halogen Free	By formulation
Copper Mirror Test	<b>Pass</b>	IPC J-STD-004A
Copper Corrosion Test	<b>Pass</b> (No evidence of Corrosion)	IPC J-STD-004A
<b>Electrical Properties</b>		
SIR (IPC 7 days @ 85 °C / 85% RH)	<b>Pass</b> , $1.9 \times 10^{10}$ ohms	IPC J-STD-004A (Pass $\geq 1 \times 10^8$ ohm min)
SIR (Bellcore 96 hrs @ 5 °C / 85%RH)	<b>Pass</b> , $8.3 \times 10^{12}$ ohms	Bellcore GR78-CORE (Pass $\geq 1 \times 10^{11}$ ohm min)
Electromigration (Bellcore 96 hrs @ 65 °C / 85%RH 10V 500 hrs)	<b>Pass</b> , Initial= $5.3 \times 10^{10}$ ohms Final= $1.5 \times 10^{11}$ ohms	Bellcore GR78-CORE (Pass=final > initial/10)
<b>Physical Properties</b>		
Color	Clear, Colorless Flux Residue	SAC 305
Tack Force vs. Humidity (t=8 hours)	<b>Pass</b> -Change of $<1 \text{ g/mm}^2$ over 24 hours at 25% and 75 % Relative Humidity	IPC J-STD-005
	<b>Pass</b> -Change of $<10\%$ when stored at $25 \pm 2 \text{ }^\circ\text{C}$ and $50 \pm 10\%$ relative humidity.	JIS Z 3284 Annex 9
Solderball	<b>Acceptable</b> SAC 305	IPC J-STD-005
	<b>Pass</b> Class 2, 1 hour and 72 hour	DIN Standard 32 513, 4.4
Stencil Life	> 8 hours	@ 50% RH, 23 °C (74 °F)
Spread	<b>Pass</b>	JIS Z 3197:1999 8.3.1.1
Flux Tackiness Test	<b>Pass</b>	DIN 32513 Talc Test
Slump	<b>Pass</b>	IPC J-STD-005 (10 min 150 °C)
	<b>Pass</b>	DIN Standard 32 513, 5.3
	<b>Pass</b>	JIS Z 3284:1994 Annex 8

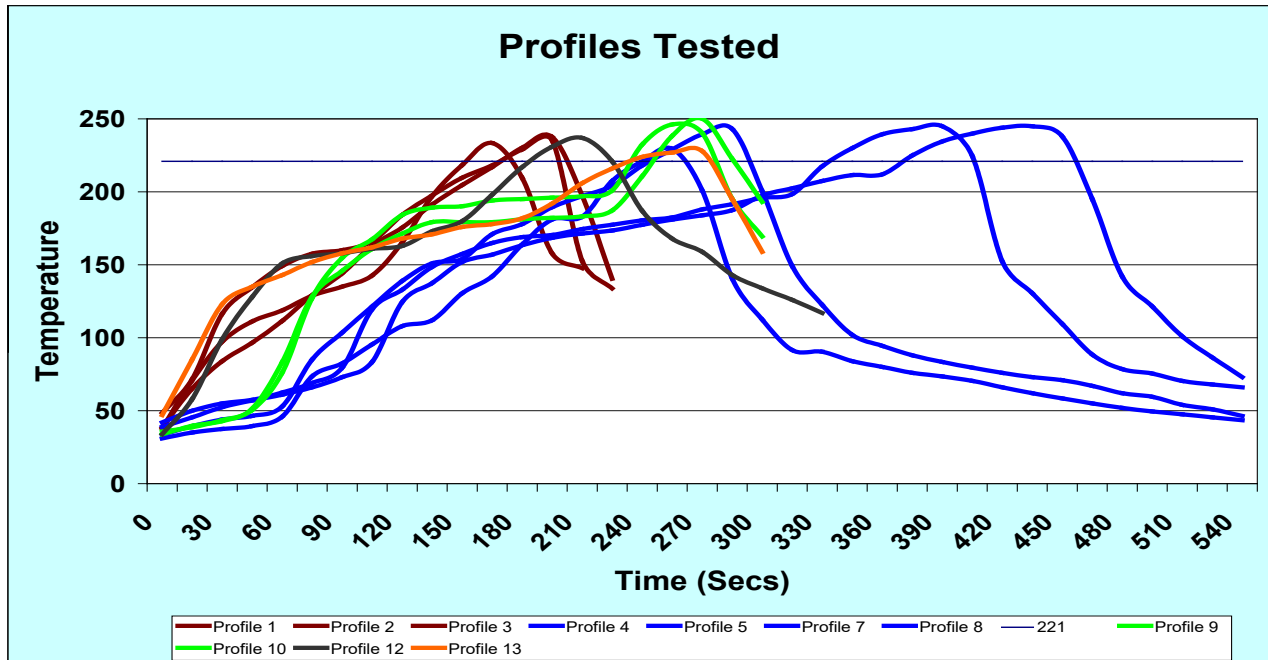
**PROCESSING GUIDELINES**

Storage & Handling	Printing	Reflow (See Fig. 1)	Cleaning
<ul style="list-style-type: none"> <li>Refrigerate to guarantee stability @ 0 to 10°C (32 to 50°F). When stored under these conditions, the shelf life of ALPHA OM-338-CSP is 6 months.</li> <li>Paste can be stored for 2 weeks at room temperature up to 25 °C(77 °F) prior to use.</li> <li>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. In some conditions, up to 8 hours may be necessary to ensure paste temperature is greater than 19 °C prior to use. Printing can be performed at temperatures up to 29 °C (84 °F).</li> <li>Paste can benefit from brief manual stirring 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>Do not remove worked paste from stencil and mix with unused paste in jar. This will alter the rheology of unused paste.</li> </ul>	<p><b>STENCIL:</b> Recommend ALPHA CUT or ALPHA FORM stencils @ 0.100 to 0.150 mm (4 to 6 mil) thick for 0.4 to 0.5 mm (0.016 inch or 0.020 inch) 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> 0.16 to 0.34 kg/cm of squeegee length (0.9 to 2.0 lbs/inch)</p> <p><b>SPEED:</b> 25 to 200 mm/sec (1 to 8 inch/second)</p> <p><b>PASTE ROLL:</b> 1.5 to 2.0 cm diameter and make additions when roll reaches 1-cm (0.4 inch) diameter (min). Max. roll size will depend upon blade.</p> <p><b>STENCIL RELEASE SPEED:</b> 5 to 20 mm/sec</p> <p><b>PRINT PUMP HEAD:</b> Passes MPM 2000 print compaction and DEK ProFlow™ testing.</p>	<p><b>ATMOSPHERE:</b> Clean-dry air or nitrogen atmosphere.</p> <p><b>PROFILE (SAC Alloys):</b> A straight ramp profile @ 0.8 to 1.7 °C/second ramp rate is recommended (TAL 35 to 90 sec and peak 232 to 250 °C).</p> <p>(1) Higher density assemblies may require preheating with within the profile and may be accomplished as follows:                  From 40 °C to Liquidus: Between 2 min 30 sec and 4 min (optimum<sup>(2)</sup> is 3 min)                  From 170 °C to Liquidus: Between 45 sec and 75 sec (optimum<sup>(2)</sup> is 1 min)                  From 130 °C to Liquidus: Between 1 min 20 sec and 2 min 15 sec (optimum<sup>(2)</sup> is 1 min 30 sec).                  Time above liquidus: Between 30 sec and 90 sec (optimum<sup>(2)</sup> is 45 sec to 70 sec)</p> <p>Note 1: 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>Note 2: ALPHA OM-338-CSP is designed to work under a wide range of reflow profiles in order to find the optimum profile for your process. This can be achieved by balancing:                  Minimum Delta T's (depending on board mass and thermal oven characteristics)</p> <p>Maximum Reflow Yield (includes voiding, cosmetics, solder balling, etc.)</p> <p>Minimum Stress and Overheat for Components and Boards (refer to suppliers' guidelines and specifications).</p> <p>Contact your local Alpha Application Engineer for further details.</p>	<p>ALPHA OM-338-CSP residue is designed to remain on the board after reflow. If reflowed residue cleaning is required, ALPHA BC-2200 aqueous cleaner is recommended. For solvent cleaning, agitation for 5 min in the following cleaners is recommended:</p> <ul style="list-style-type: none"> <li>- ALPHA SM-110E</li> <li>- Kyzen Micronox MX2501</li> <li>- ATRON® AC 205 (Zestron)</li> </ul> <p>Misprints and stencil cleaning may be done with ALPHA SM-110E, ALPHA SM-440, ALPHA BC-2200 and ZESTRON® SD 301 cleaners.</p>

NOTE3: These are starting recommendations and all process settings should be reviewed independently.

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).**

**CONTACT INFORMATION**

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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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