

# ALPHA<sup>®</sup> OM-338-PT

## FINE FEATURE PIN-TESTABLE LEAD-FREE SOLDER PASTE

### DESCRIPTION

**ALPHA OM-338-PT** is a lead-free, no-clean solder paste designed for a broad range of applications. **ALPHA OM-338-PT'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-PT** yields excellent print capability performance across various board designs; particularly with ultra fine feature repeatability (11 mil squares) and high "through-put" applications. **ALPHA OM-338-PT** is formulated to offer increased in-circuit pin test yields versus OM-338 without compromising electrical reliability.

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-PT** is formulated to deliver excellent visual joint cosmetics. Additionally, **ALPHA OM-338-PT's** capability of IPC Class III for voiding and ROL0 IPC classifications ensures maximum long-term product reliability.

*\*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.*

### FEATURES & BENEFITS

- Maximizes reflow yield for lead-free processing, allowing full alloy coalescence at circular dimensions as small as 0.225mm (0.011") with 0.100mm (4mil) stencil thickness.
- Excellent print consistency with high process capability index across all board designs.
- Print speeds of up to 150mm/sec (6"/sec), 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
- Excellent pin-test yield for single and double reflow.
- Meets highest IPC 7095 voiding performance classification of Class III.
- Excellent reliability properties, halide-free material
- Compatible with either nitrogen or air reflow

### PRODUCT INFORMATION

<b>Alloys:</b>	SAC305 (96.5%Sn/3.0%Ag/0.5%Cu) SAC357 (95.8%Sn/3.5%Ag/0.7%Cu) SAC387 (95.5%Sn/3.8%Ag/0.7%Cu) SAC396 (95.5%Sn/3.9%Ag/0.6%Cu) SAC405 (95.5%Sn/4.0%Ag/0.5%Cu) e1 alloys per JESD97 Classification For other alloys, contact your local Cookson Electronics Sales Office.
<b>Powder Size:</b>	Type 3, (25-45µm per IPC J-STD-005) and Type 4 (20-38µm per IPC J-STD-005)
<b>Residues:</b>	Approximately 5% by (w/w)
<b>Packaging Sizes:</b>	500 gram jars, 6" & 12" cartridges, DEK ProFlo™ cassettes, and 10cc and 30cc dispense syringes.
<b>Flux Gel:</b>	OM-338-PT Flux Gel is available in 10cc and 30cc syringes for rework applications.
<b>Lead Free:</b>	Complies with RoHS Directive 2002/95/EC.

The information contained herein is based on data considered accurate and is offered at no charge. No warranty is expressed or implied regarding the accuracy of this data. Liability is expressly disclaimed for any loss or injury arising out of the use of this information or the use of any materials designated.

1-19-09



**APPLICATION**

Formulated for both standard and fine pitch stencil printing, at print speeds of between 25mm/sec (1"/sec) and 150mm/sec (6"/sec), with stencil thickness of 0.100mm (0.004") to 0.150mm (0.006"), particularly when used in conjunction with ALPHA® Stencils. Blade pressures should be 0.18-0.27 kg/cm of blade (1.0 -1.5 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.

**SAFETY**

While the ALPHA OM-338-PT flux system is not considered toxic, its use in typical reflow will generate a small amount of reaction and decomposition vapors. These vapors should be adequately exhausted from the work area. Consult the MSDS for additional safety information.

**STORAGE**


ALPHA OM-338-PT should be stored in a refrigerator upon receipt at (1 to10)<sup>0</sup>C, (34-50)<sup>0</sup>F. ALPHA OM-338-PT should be permitted to reach room temperature before unsealing its package prior to use (see handling procedures on page 2). This will prevent moisture condensation build up in the solder paste.

**ALPHA OM-338-PT TECHNICAL DATA**

CATEGORY	RESULTS	PROCEDURES/REMARKS
<b>CHEMICAL PROPERTIES</b>		
Activity Level	ROL-0 = J-STD Classification	IPC J-STD-004
Halide Content	Halide free (by titration). Passes Ag Chromate Test	IPC J-STD-004
Copper Mirror Test	<b>Pass</b>	IPC J-STD-004
Copper Corrosion Test	<b>Pass</b> , (No evidence of Corrosion)	IPC J-STD-004
<b>ELECTRICAL PROPERTIES</b>		
SIR (IPC 7 days @ 85° C/85% RH)	<b>Pass</b> , $4.1 \times 10^9$ ohms	IPC J-STD-004 (Pass $\geq 1 \times 10^9$ ohm min)
SIR (Belcore 96 hours @ 35°C/85%RH)	<b>Pass</b> , $8.4 \times 10^{11}$ ohms	Belcore GR78-CORE (Pass $\geq 1 \times 10^{11}$ ohm min)
Electromigration (Belcore 96 hours @ 65°C/85%RH 10V 500 hours)	<b>Pass</b> , Initial = $3.8 \times 10^9$ ohms Final = $1.9 \times 10^9$ ohms	Belcore GR78-CORE (Pass-final $> initial^{10}$ )
<b>PHYSICAL PROPERTIES</b>		
Color	Clear, Colorless Flux Residue	Using 88.5% Metal, Type #3 Powder. SAC 305, 405 alloy
Tack Force vs. Humidity (t=8 hours)	<b>Pass</b> -Change of $<1$ g/mm <sup>2</sup> 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°C and 50 $\pm$ 10% relative humidity.	JIS Z3284 Annex 9
Viscosity	88.5% metal load designated M15 for printing.	Malcom Spiral Viscometer; J-STD-005
Solderball	<b>Acceptable</b> (SAC 305 and SAC405 alloys)	IPC J-STD-005
	<b>TBD</b> , 1 hour and 72 hour	DIN Standard 32 513, 4, 4
Stencil Life	<b>TBD</b>	@ 50%RH, 23°C (74°F)
Spread	<b>Pass</b>	JIS-Z-3197: 1999 8.3.1.1
Flux Tackiness Test	<b>TBD</b>	DIN 32513 Talc Test
Skump	<b>Pass</b>	IPC J-STD-005 (10 min 150°C)
	<b>TBD</b>	DIN Standard 32 513, 5, 3
	<b>TBD</b>	JIS-Z-3284-1994 Annex 8



## ALPHA OM-338-PT Processing Guidelines

STORAGE-HANDLING	PRINTING	REFLOW (See Figure #1)	CLEANING
<ul style="list-style-type: none"> <li>•Refrigerate to guarantee stability @ (1-10)°C, (34-50)°F</li> <li>•Shelf life of refrigerated paste is six months. Presumed, actual TBD</li> <li>•Paste can be stored for 2 weeks at room temperatures up to 25°C (77°F) prior to use.</li> <li>•When refrigerated, warm-up of 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 setup. Printing can be performed at temperatures up to 29°C (84°F).</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>•These are starting recommendations and all process settings should be reviewed independently.</li> <li>•Working range: 20°C to 32°C on the stencil</li> </ul>	<p><b>STENCIL:</b> Recommend Cookson Electronics ALPHA CUT or ALPHA FORM stencils @ 0.100mm - 0.150 mm (4-6 mil) thick for 0.4 - 0.5 mm (0.016" or 0.020") pitch. Stencil design is subject to many process variables. Contact your local Cookson Electronics stencil site for advice.</p> <p><b>SQUEEGEE:</b> Metal (recommended)</p> <p><b>PASTE ROLL:</b> 1.5-2.0 cm diameter and make additions when roll reaches 1-cm (0.4") diameter (min). Max roll size will depend upon blade.</p> <p><b>PRESSURE:</b> 0.5 – 0.7 kg/inch of blade length</p> <p><b>SPEED:</b> 25 to 150mm per second (1 to 8 inches per second)</p> <p>Release speed: within 3- 10 mm/s. Setting done under microscope. Poor release settings results in icicles or missing paste in small apertures.</p> <p><b>PRINT PUMP HEAD:</b> TBD, PNC0510, which is similar passes DEK pro-flo compatibility test</p>	<p><b>ATMOSPHERE:</b> Clean-dry air or nitrogen atmosphere.</p> <p><b>PROFILE (SAC Alloys):</b></p> <p>Acceptable reflow / coalescence and IPC Class III voiding were obtained for the range of profiles depicted below.</p> <p>Note 1: Refer to component and board supplier data for thermal properties at elevated temperatures. Lower peak temperatures require larger TAL for improved joint cosmetics.</p> 	<p>ALPHAPNC 0513A 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>- Bioact™ SC-10E</li> <li>- Kyzen Micronox MX2501</li> </ul> <p>Misprints and stencil cleaning may be done with ALPHA SM-110E, ALPHA SM-440, ALPHA BC-2200 and Bioact™ SC-10E cleaners.</p>

Bioact™ and Incother™ are registered trademarks of Puh-Con, Inc.



Figure #1 – Reflow Envelope

