ALPHA® OM-338 SERIES

Lead-Free Solder Paste

DESCRIPTION

ALPHA OM-338 is a lead-free, no-clean solder paste designed for a broad range of applications. **ALPHA OM-338**'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** 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, exceptional random solder ball resistance and mid-chip solder ball performance. **ALPHA OM-338** is formulated to deliver excellent visual joint cosmetics. Additionally, **ALPHA OM-338**'s capability of IPC-7095 Class 3 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, 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 in) 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 in/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
- Meets highest IPC-7095 voiding performance classification of Class 3
- Excellent reliability properties, halide-free material
- Compatible with either nitrogen or air reflow

PRODUCT INFORMATION

Alloys:	SAC305, SAC387, SAC405 & SACX® for other alloys, contact your Alpha Sales Office
Powder Size:	Type 3 and Type 4
Packaging Sizes:	500-gram jars, 6 & 12 inch cartridges, DEK ProFlow® cassettes, and 10 cc and 30 cc dispense syringes
Flux Gel:	ALPHA OM-338 Flux Gel is available in 10c c and 30 cc syringes for rework applications.
Lead Free:	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 in/s) and 200 mm/sec (8 in/s), with stencil thickness of 0.100 mm (0.004 in) to 0.150 mm (0.006 in), 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.

TECHNICAL DATA

Category	Results	Procedures/Remarks
Chemical Properties		
Flux Classification	ROL-0 = J-STD Classification	IPC J-STD-004
Halide Content	Halide-free, Passes Ag Chromate Test	IPC J-STD-004
Copper Mirror Test	Pass	IPC J-STD-004
Copper Corrosion Test	Pass, (No evidence of Corrosion)	IPC J-STD-004
Bono Corrosion Test	Pass (7.45%)	15 days @ 85% RH, 20V
Electrical Properties		
SIR (IPC 7 days @ 85 °C /85% RH)	**Pass**, 1.9 x 10^{10} ohms	IPC J-STD-004A (Pass ≥ 1 x 10^{8}ohm)
SIR (Bellcore 96 hours @ 35 °C/85% RH)	**Pass,** 8.3 x 10^{12} ohms	Bellcore GR78-CORE (Pass ≥ 1 x 10^{11} ohm)

Category	Results	Procedures/Remarks
Electromigration (Bellcore 96 hours @ 65 °C/85% RH 10V 500 hours)	**Pass,** Initial = 5.3 x 10^{10} ohms Final = 1.5 x 10^{11} ohms	Bellcore GR78-CORE (Pass=final > initial/10)
Physical Properties (Using 88.5% Metal, Type #3 Powder)		
Color	Clear, Colorless Flux Residue	
Tack Force vs. Humidity	**Pass**, Change of <1 g/mm^2 over 24 hours at 25%, 50% and 75% Relative Humidity	IPC J-STD-005
Tack Force vs. Time	**Pass**, Change of <10% when stored at 25±2 °C and 50±10% relative humidity	JIS Z 3284: Annex 9
Solderball	**Acceptable** (SAC 305 and SAC405 alloys)	IPC J-STD-005
Stencil Life	> 8 hours	@ 50% RH, 23 °C (74 °F)
Spread	**Pass**	JIS Z 3197:1999 8.3.1.1
Slump	**Pass**	IPC J-STD-005 (10 min 150 °C)
	Pass	JIS Z 3284:1994 Annex 8

PROCESSING GUIDELINES

Storage & Handling	Printing	Reflow*	Cleaning
• Refrigerate to guarantee stability @ (0 to 10) °C, (32 to 50) °F • Shelf life of refrigerated paste is six months from the manufacturing date. • Paste can be stored for 2 weeks at room temperatures up to 25 °C (77 °F) prior to use. • When refrigerated, warm-up of paste container to room temperature for a minimum of 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. 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). • 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. • Do not remove worked paste from stencil and mix with unused paste in jar. This will alter rheology of unused paste.	**Stencil**: 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 in or 0.020 in) pitch. Stencil design is subject to many process variables. Contact your local ALPHA Stencil site for advice. **Squeegee**: Metal (recommended) **Paste Roll**: 1.5 to 2.0 cm diameter and make additions when roll reaches 1-cm (0.4in) diameter (min). Max roll size will depend upon blade. "Exceeding the maximum diameter may cause curtaining (sticking to the squeegee when it is lifted from the stencil)." **Pressure**: 0.16 to 0.34 kg/cm of squeegee length (0.9 to 2.0 lbs./inch). **Speed**: 25 to 200mm per second (1 to 8 inches per second). **Separation Speed**: Disable slow snap off for fast PCB release	**Atmosphere**: Clean-dry air or nitrogen atmosphere. Profile (SAC Alloys): A straight ramp profile @ 0.8 °C to 1.7 °C per second ramp rate is recommended (TAL 35 to 90 sec and peak 232 to 250 °C). (1) Higher density assemblies may require preheating within the profile and may be accomplished as follows: - From 40 °C to Liquidus: Between 2 min 30 s. and 4 min. (optimum(2) is 3 min.) - From 170 °C to Liquidus: Between 45 and 75 seconds (optimum(2) is 1 min.) - From 130 °C to Liquidus: Between 1 min. 20 s. and 2 min. 15 s (optimum(2) is 1min. 30 s) - Time above liquidus: Between 30 and 90 seconds (optimum(2) is 45 to 70 seconds) 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. Note 2: ALPHA OM-338 is designed to work under a wide range of reflow profiles to find the optimum profile for your process. This can be achieved by balancing: (1) Minimum Delta T's (depending on board mass and thermal oven characteristics) (2) Maximum Reflow Yield (includes voiding, cosmetics, solder balling, etc.) (3) Minimum Stress and Overheat for Components and Boards (refer to suppliers' guidelines and specifications.	ALPHA OM-338 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: - ALPHA SM-110E - Kyzen Micronox MX2501 - ATRON® AC 205 (ZESTRON) Misprints and stencil cleaning may be done with ALPHA SM-110E, ALPHA SM-440, ALPHA BC-2200 and ZESTRON® SD 301 cleaners.

REFLOW PROFILES

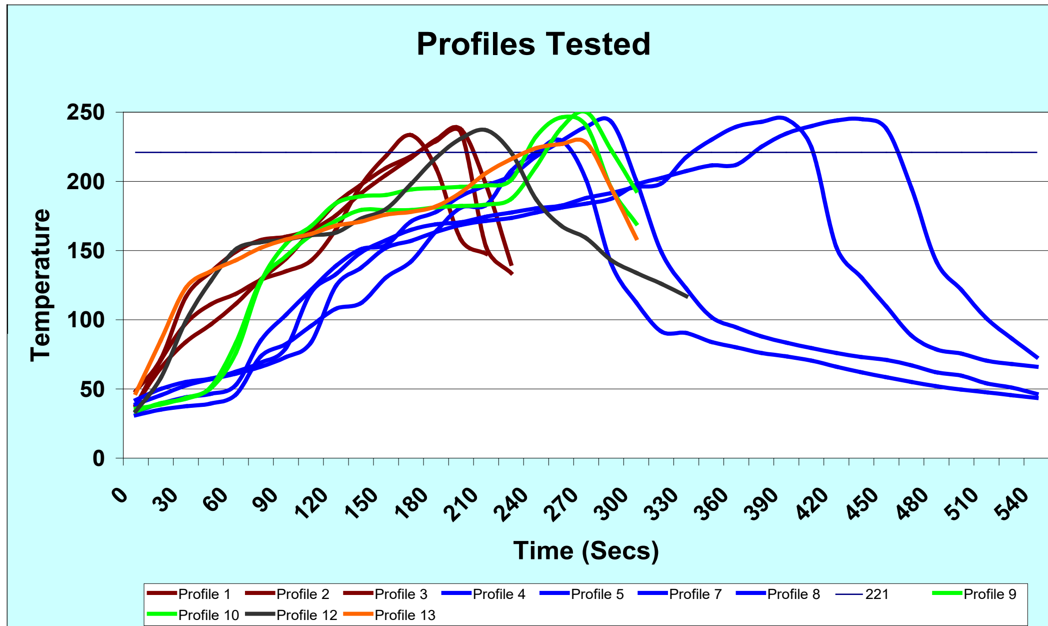

Figure #1 – Reflow Envelope

These are starting recommendations and all process settings should be reviewed independently. Optimization to each board application should still be carried out by users to ensure best results.

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.**

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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