MacDermid Alpha ELECTRONICS SOLUTIONS

TECHNICAL DATA SHEET

ALPHA® OM-338-PT SOLDER PASTE

Fine-Feature, Zero-Halogen, Pin-Testable, Lead-Free

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 ALPHA OM-338 without compromising electrical reliability.

An 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-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, with mechanical reliability equal to or greater than with 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 0.225 mm (0.011 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 150 mm/s (6 in/s), enabling a fast print cycle time and a high throughput.
- Wide reflow profile window with good solderability on various boards / 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 3.
- Excellent reliability properties, halide-free material.
- Compatible with either nitrogen or air reflow.

PRODUCT INFORMATION

Alloys:	SAC305, SAC350, SAC387, SAC405, SACX Plus 0307 & SACX Plus 0807, e1 alloys per JESD97 Classification
Powder Size:	Type 3, Type 4, Type 4.5
Residues:	Approximately 5% by (w/w)
Packaging Sizes:	500 gram jars, 6 inch and 12 inch cartridges, DEK ProFlow® cassettes, and 10 cc and 30 cc dispense syringes.
Flux Gel:	ALPHA OM-338-PT Flux Gel is available in 10 cc or 30 cc syringes for rework applications.
Lead Free:	Complies with RoHS Directive EU/2015/863; amending Annex II of 2011/65/EU

NOTE 1: For other alloys, powder sizes, and packaging sizes, contact your local sales office.

APPLICATION GUIDELINES

Formulated for both standard and fine pitch stencil printing, at print speeds of between 25 mm/sec (1 in/s) and 150 mm/sec (6 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 0.18 to 0.27 kg/cm of blade (1.0 to 1.5 lb/in), 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 a high soldering yield with good cosmetics and minimized rework.

HALOGEN STATUS

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

Halogen Standards			
Standard	**Requirement**	**Test Method**	**Status**
JEITA ET-7304 *Definition of Halogen Free Soldering Materials*	< 1000 ppm Br, Cl, F in solder material solids	**TM EN 14582**	Pass
IEC 612249-2-21	Post Soldering Residues contain < 900 ppm each or total of < 1500 ppm Br or Cl from flame retardant source		Pass
JEDEC *A Guideline for Defining "Low Halogen" Electronics*	Post soldering residues contain < 1000 ppm Br or Cl from flame retardant source		Pass
Halogen Free: *No halogenated compounds have been intentionally added to this product*			

TECHNICAL DATA

Category	Results	Procedures/Remarks
Chemical Properties		
Flux Classification	ROL0	IPC J-STD-004A
Halide Content	Halide free (by titration)	IPC J-STD-004A
Ag Chromate Test	**Pass**	IPC J-STD-004A
Copper Corrosion Test	**Pass**, No Evidence of Corrosion	IPC J-STD-004A
Electrical Properties		
SIR (7 days @ 85 °C /85% RH, 12V)	**Pass**, $\geq 10^8$ ohms for 7 days	IPC J-STD-004C TM-650 2.6.3.7
SIR (7 days @ 85 °C /85% RH)	**Pass**, 4.1 x 10^9 ohms	IPC J-STD-004A (Pass ≥ 1 x 10^8 ohm)
SIR (96 hrs @ 35 °C /85%RH)	**Pass,** 8.4 x 10^{11} ohms	Bellcore GR78-CORE (Pass ≥ 1 x 10^{11} ohm)
Electromigration (500 hrs @ 65 °C /85%RH 10V)	**Pass,** Initial = 3.8 x 10^9 ohms Final = 1.9 x 10^9 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)

PROCESSING GUIDELINES

Storage and Handling	Printing	Reflow (See Fig 1 & 2)	Cleaning
• Refrigerate to guarantee stability 0 to 10 °C (32 to 50 °F) • The shelf life of refrigerated paste is 6 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. • Paste can be manually stirred 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 the worked paste from the stencil and mix with unused paste in jar. This will alter rheology of unused paste. • Temperature working range (on the stencil): 19 to 32 °C	**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 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 (0.4 in) 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:** 0.5 to 0.7 kg/in of blade length **Speed:** 25 to 150 mm per second (1 to 6 inches per second). **Stencil Release Speed:** 3 to 10 mm/s. Setting done under microscope. Poor release settings: results in icicles or missing paste in small apertures.	**Atmosphere:** Clean-dry air or nitrogen atmosphere. **Profile (SAC Alloys):** Acceptable reflow / coalescence and IPC-7095 Class 3 voiding were obtained for the range of profiles depicted below. NOTE 2: Refer to component and board supplier data for thermal properties at elevated temperatures. Lower peak temperatures require longer TAL for improved joint cosmetics.	ALPHA OM-338-PT 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 the following cleaners: ALPHA SM-110E, ALPHA SM-440, ALPHA BC-2200 and ZESTRON SD 301 cleaners.

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

REFLOW PROFILES

Figure 1: Typical Ramp Reflow Profile for SAC Alloys

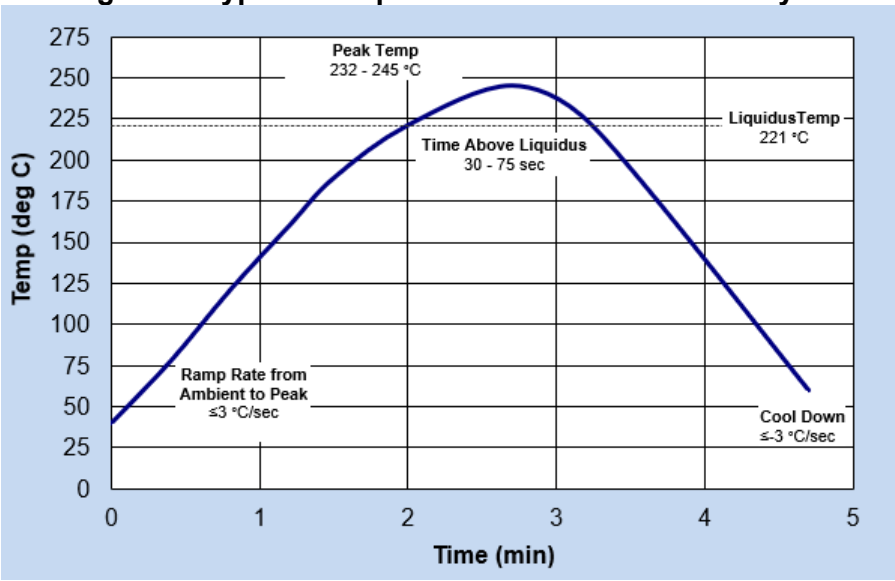
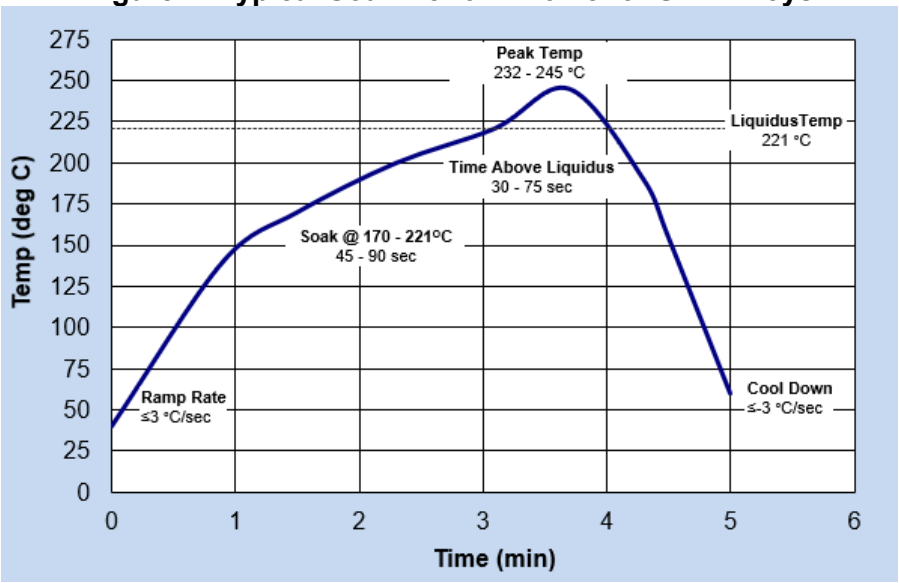


Figure 2: Typical Soak Reflow Profile for SAC Alloys



Note 3: These are processing guidelines that were tested in the lab with acceptable performance. Optimization to each board application should still be carried out by users to ensure best results. (Graphs not strictly to scale, for illustration purposes only.) During reflow profile setup, ensure that thermal profile measurements are taken across an entire assembly, particularly at component locations of heavy thermal mass, solder joints in the shadow of component bodies, large components & Bottom Terminated Components.

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.

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.**

STORAGE

ALPHA OM-338-PT should be stored in a refrigerator upon receipt at (0 to10 °C), (32 to 50 °F). Paste should be permitted to reach room temperature before unsealing its package prior to use (see handling procedures on page 5). This will prevent moisture condensation build-up in the solder paste.

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