

ALPHA[®] OL-107F(A)

Zero-Halogen, Low Voids, Ultra-Fine Feature, Excellent Pin Testable, High-Temperature-Stability Lead-Free Solder Paste

DESCRIPTION

ALPHA OL-107F(A) is a lead-free, ZERO-halogen no-clean solder paste designed for applications where residue with excellent pin testing property and ability to pass JIS Copper Corrosion test are required.

This product is also designed to enable consistent fine pitch printing capability, up to 200µm circle printed with 80µm thickness stencil. Its excellent print volume deposit repeatability also provides value by reducing defects associated with print process variability.

In addition, it has been innovated from flux chemistry perspective to address the challenge of achieving good coalescence, up to 200µm small circle size of CSP, and excellent IPC Class III ultra-low voids performance in an air reflow environment.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- **Long Stencil Life:** consistent performance for at least 6 hours of continuous printing without addition of new paste
- **Long, High Tack Force Life:** ensures high pick-and-place yields, good self-alignment and a low tomb-stoning defect rate
- **Wide Reflow Profile Window:** allows best quality solderability of complicated, high density PWB assemblies in both air and nitrogen reflow, using ramp and soak profiles, as high as 180 to 190°C
- **Reduced Random Solder Ball Levels:** minimizes rework and increases first time yield
- **Excellent Coalescence and Wetting Performance:** coalesced excellently at small circle level of <200µm, even at high soak profile environment
- **Excellent Solder Joint and Flux Residue Cosmetics:** after reflow soldering, even using long/high thermal soaking, without charring or burning
- **Excellent Voiding Performance:** Meets IPC7095 Class III Requirement
- **Halogen Content:** Zero Halogen
- **Residue:** Excellent Pin Testing property and Pass JIS Copper Corrosion Test
- **Safe and Environmentally Friendly:** Materials comply with ROHS and Halogen Free requirement, as well as TOSCA & EINECS. No toxic material used in the paste

PRODUCT INFORMATION

Alloys: SAC305, SACX0307
 For other alloys, contact your local Alpha Sales Office

Powder Size: Type 4

Packaging Sizes: 500 gram jars, 6" & 12" cartridges

Lead Free: RoHS Directive EU/2015/863; amending Annex II of 2011/65/EU.

APPLICATION GUIDELINES

Formulated for both standard and fine pitch stencil printing, at print speeds of between 25mm/sec (1"/sec) and 140mm/sec (4"/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 0.22 to 0.27 kg/cm of blade (1.25 to 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.

HALOGEN STATUS

ALPHA OL-107F(A) is 'Zero Halogen' product.

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 Solids extraction per IPC TM 2.3.34	Pass
IEC 612249-2-21	Post Soldering Residues contain < 900 ppm each or total of < 1500 ppm		Pass
JEDEC A Guideline for Defining "Low Halogen" Electronic	Post soldering residues contain <1000 ppm Br or Cl from flame retardant source		Pass
Zero Halogens - No halogenated compounds have been intentionally added to this product			

TECHINICAL DATA

Category	Results	Procedures/Remarks
Chemical Properties		
Activity Level	ROL0 = J-STD Classification	IPC J-STD-004A
Halide Content	Halide free (by titration).	IPC J-STD-004A
Fluoride Spot Test	Pass	JIS-Z-3197-1999 8.1.4.2.4
Halogen Test	Pass Zero Halogen	EN14582, by oxygen bomb combustion, Non detectable (ND) at < 50 ppm
Ag Chromate Test	Pass	IPC J-STD-004A
	Pass	JIS-Z-3197-1999 8.1.4.2.3
Copper Mirror Test	Pass	IPC J-STD-004A
	Pass	JIS-Z-3197-1999 8.4.2
Copper Corrosion Test	Pass (No evidence of Corrosion)	IPC J-STD-004A
	Pass (No evidence of Corrosion)	JIS-Z-3197-1999 8.4.1
Electrical Properties		
Water Extract Resistivity	13,400 ohm-cm	JIS-Z-3197-1999 8.1.1
SIR (7 days, 40 °C/90%RH, 12 V bias)	Pass	IPC J-STD-004B TM-650 2.6.3.7 (Pass ≥ 1 x 10 ⁸ ohm)
Electromigration (Bellcore 500 hrs @ 65 °C /85%RH 10V)	Pass	Bellcore GR78-CORE (Pass=final > initial/10)
JIS Electromigration (1000 hours @ 85 °C/85%RH 48V)	Pass	JIS-Z-3197-1999 8.5.4
Physical Properties		
Color	Clear, Colorless Flux Residue	
Tack Force vs. Humidity	Pass -> 100gf over 24 hours at 25%, 50% and 75 % Relative Humidity	JIS Z-3284-1994, Annex 9
Tack Force at 32 °C/35%RH, measured after 0, 1, 2, 3 & 4 hours print duration	> 100gf	JIS Z-3284-1994, Annex 9

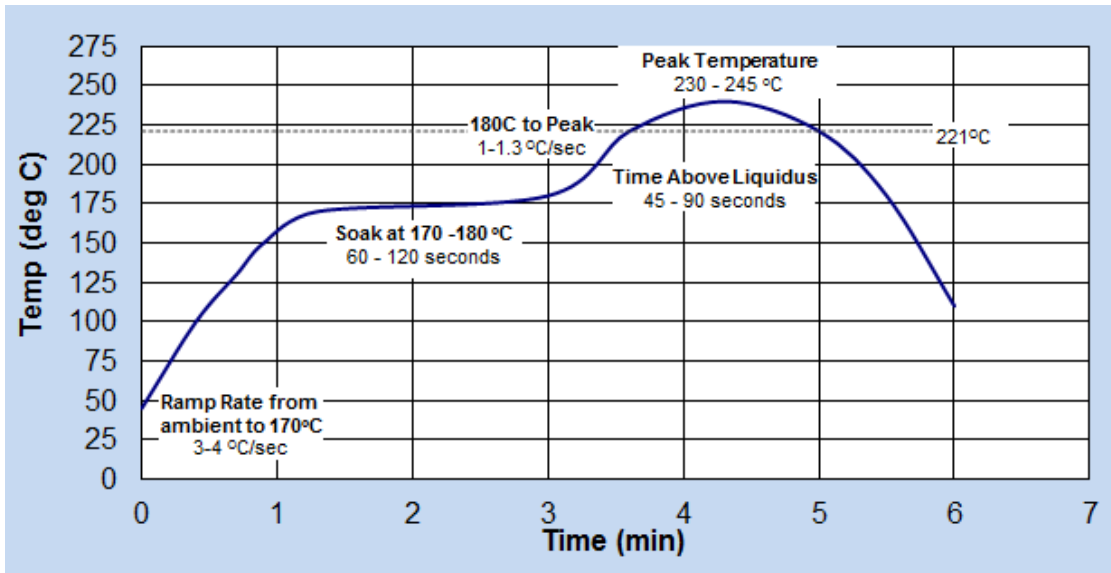
Category	Results	Procedures/Remarks
Viscosity Stability at 25 °C for 20 days	Pass	Malcom Spiral Viscometer
Continuous Viscosity Measurement at 25 °C for 24 hours	Pass	Malcom Spiral Viscometer
Coalescence Test	Able to reflow at > 200 µm Cu pad circle size	Internal
Solder Ball	Preferred	IPC TM-650 2.4.43
		JIS Z 3284 Annex 11
Wetting Time	Pass 0.34 second	Rhesca Test, Test Time T2, 3 seconds
Spread	80%	JIS Z 3197:1999 8.3.1.1
Cold Slump	No bridge for 0.2 mm space	JIS Z 3284:1994
Hot Slump	No bridge for 0.4 mm space	JIS Z 3284:1994 Annex 8
Dryness Test (Talc)	Pass	JIS Z 3197:1999 8.5.1

PROCESS INFORMATION

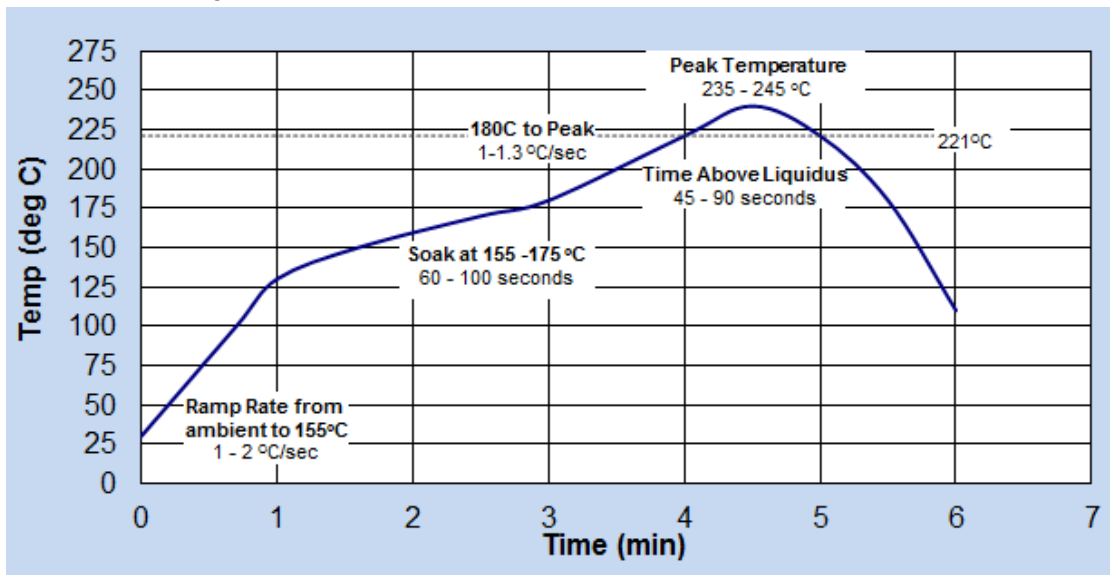
Storage Handling	Printing	Reflow (See Fig 1)
<ol style="list-style-type: none"> 1. Refrigerate to guarantee stability @ 0 to 10 °C (32 to 50 °F). When stored under these conditions, the shelf life of ALPHA OL-107F(A) is 6 months. 2. Paste can be stored for 4 weeks at room temperature up to 25 °C(77 °F) prior to use 3. 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 setup of printer. 4. 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. 5. Do not remove worked paste from stencil and mix with unused paste in jar. This will alter the rheology of unused paste. 6. These are starting recommendations and all process settings should be reviewed independently. 	<p><u>Stencil:</u> 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”) pitch. Stencil design is subject to many process variables. Contact your local ALPHA stencil site.</p> <p><u>Squeegee:</u> Metal (recommended)</p> <p><u>Pressure:</u> 0.22 to 0.27 kg/cm of blade (1.25 to 1.5 lbs/inch)</p> <p><u>Speed:</u> 25 to 140 mm per second (1 to 6 inches per second).</p> <p><u>Paste Roll:</u> 1.5 to 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><u>Stencil Release Speed:</u> 1 to 5 mm/sec. Lift Height: 8 to 14mm (.31 to .55”)</p>	<p><u>Atmosphere:</u> Clean-dry air or nitrogen atmosphere.</p> <p><u>Profile:</u> <u>Soak:</u> 155 to 175 °C, 60 to 100 sec soak profiles have been determined to give optimal results, please see profile chart, ALPHA OL-107F-A SAC305 Typical Reflow Profile. If required, good results are also achievable with high soak temperature profiles of 170 to 180 °C for 60 to 120s, especially in N₂. Typical peak temperature is 235 to 245 °C.</p> <p><u>NOTE 2:</u> Keeping the peak temperature below 241 °C may reduce the number and size of BGA and QFN voids.</p> <p><u>NOTE 3:</u> Refer to component and board supplier data for thermal properties at elevated temperatures. Lower peak temperatures require longer TAL for improved joint cosmetics.</p>

REFLOW PROFILES

**Fig 1: ALPHA OL-107F-A SAC305
Typical Reflow Profile (High Soak)**



**Fig 2: ALPHA OL-107F-A SAC305
Typical Reflow Profile (Low Soak - Preferable)**



NOTE 4: These are profiles that were tested in the lab with acceptable reflow and coalescence performance. 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

www.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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