ALPHA® OL-107F (A)-T4 SOLDER PASTE

No-Clean, Lead-Free, Zero-Halogen, ROL0, Zero-Halogen, Ultra-Fine Feature Printing & Reflow Capable Solder Paste

DESCRIPTION

ALPHA OL-107F (A)-T4 is designed for blend with Type 5 (15 to 25 µm) powder to meet market segments requiring ultra-fine application features. It has been tested to give excellent printing performance down to 180 to 190 µm pad size dimension with a 60° angled squeegee on stencil at 50 mm/s speed, 2 mm/s release speed and 0.18 N/m pressure printing parameters. **ALPHA OL-107F (A)-T4** is also available in Type 4 (20 to 45 µm) powder size distribution.

ALPHA OL-107F (A)-T4 has been shown to yield good coalescence for 190 µm circle deposits using an air reflow high soak preheat of 170 to 180 °C for 120 seconds, >230 °C for 62 seconds, 247 °C peak temperature. With a lower soak profile of 150 to 180 °C for 85 seconds, good coalescence for 170 µm circle deposits is achievable. It has also exhibited excellent Head-In-Pillow performance.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES AND BENEFITS

- **Long Stencil Life:** engineered for consistent performance in warm/humid production climates, reducing variations in print performance and paste dry-out
- **High Tack Force Life:** ensures high pick-and-place yields, good self-alignment
- **Wide Reflow Profile Window:** enables quality soldering of complex, high density PWB assemblies in an N2 environment, using high ramp rates and soak profiles as high as 170 to 180 °C
- **Reduced Mid Chip Solder Balling, Head-in-Pillow:** minimizes rework and increases first time yield
- **Excellent Coalescence and Wetting Performance:** coalesces well for 170 µm small circle deposit at low soak air environment
- **Excellent Solder Joint and Flux Residue Cosmetics:** residue does not char or burn after reflow soldering, even when using long/high thermal soaking
- **Excellent Voiding Performance:** Pass IPC-7095 Class 3 requirement for BGA
- **Halogen Content:** Zero-Halogen, no halogen intentionally added
- **Reliability:** Pass JIS Copper Corrosion Test and all standard SIR Tests
- **Safe and Environmentally Friendly:** Materials comply with ROHS, TOSCA, EINECS and Halogen-free requirements (Zero-Halogen, see table below)

PRODUCT INFORMATION

Alloys:	SAC305 (96.5%Sn/3.0%Ag/0.5%Cu), SACX0307
Powder Size:	Type 4 (20 to 38 µm), Type 5 (15 to 25 µm)
Packaging Sizes:	500 gram jars, 6 inch & 12 inch cartridges
Flux Gel:	Flux gel is available in 10 and 30 cc syringes for rework applications
Lead Free Content:	Complies with RoHS Directive EU/2015/863

HALOGEN STATUS

Halogen Standards			
Standard	**Requirement**	**Test Method**	**Status**
JEITA ET-7304A Definition of Halogen Free Soldering Materials	< 1000 ppm Br, Cl, I, 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
Zero-Halogen: No halogenated compounds have been intentionally added to this product			

TECHNICAL DATA

Category	Results	Procedure/Remarks
Chemical Properties		
Flux Classification	ROL0	IPC J-STD-004B
Halide Content	Halide-free (by titration), < 0.05%	IPC J-STD-004B
Fluoride Spot Test	Pass	JIS Z 3197:1999 8.1.4.2.4
Halogen Test	Pass, Zero-Halogen - No halogen intentionally added	EN14582, by oxygen bomb combustion, Non-detectable (ND) at < 50 ppm
Ag Chromate Test	Pass	IPC J-STD-004B
	Pass	JIS Z 3197:1999 8.1.4.2.3
Copper Mirror Test	Pass	IPC J-STD-004B
	Pass	JIS Z 3197:1999 8.4.2
Copper Corrosion Test	Pass (No evidence of Corrosion)	IPC J-STD-004B
	Pass (No evidence of Corrosion)	JIS Z 3197:1999 8.4.1
Electrical Properties		
Water Extract Resistivity	11,500 ohm-cm	JIS Z 3197:1999 8.1.1
SIR (7 days, 40 °C/90% RH, 12V bias)	Pass	IPC J-STD-004B TM-650 2.6.3.7 (Pass ≥ 1 x 10^8 ohm)
JIS Electromigration (1000 hours @ 85 °C/85% RH 48V)	Pass	JIS Z 3197:1999 8.5.4 (Pass ≥ 1 x 10^9 ohm)

Category	Results	Procedure/Remarks
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
	Pass, Change of <1 g/mm2 over 24 hours at 25% and 75 % Relative Humidity	IPC J-STD-005 TM-650 2.4.44
Viscosity Stability at 25 ºC for 14 days	Pass	Malcom Spiral Viscometer
Coalescence Test @ Cu surface finish, 10 0µm stencil , N_2 reflow high soak profile environment	170 µm	Internal Test Method
Solder Ball	Preferred	IPC J-STD-005 TM-650 2.4.43
Spread	>80%	JIS Z 3198-3
Wetting Time	Pass, 1.6 second	Rhesca Test, zero cross time T0
Stencil Life	>8 hours	@ 50% RH 23°C (74°C)
Cold/Printing Slump	No bridge for 0.3 mm space	JIS Z 3284:1994 Annex 7
	No bridge for 0.3 mm space	IPC J-STD-005 TM-650 2.4.35
Hot Slump	No bridge for 0.3 mm space	JIS Z 3284:1994 Annex 8
	No bridge for 0.3 mm space	IPC J-STD-005 TM-650 2.4.35
Dryness Test (Talc)	Pass	JIS Z 3197:1999 8.5.1

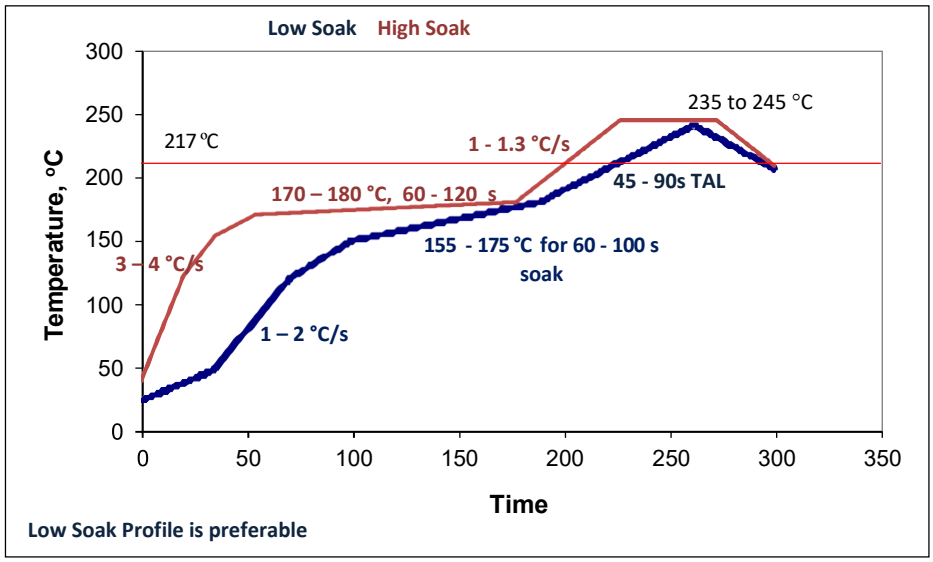
PROCESSING GUIDELINES

Storage & Handling	Printing	Reflow (see Fig. 1)	Cleaning
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)-T4 is 6 months. 2. Paste can be stored for 2 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 set up 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.	**STENCIL:** Recommend ALPHA CUT™, ALPHA NICKEL-CUT™, ALPHA TETRABOND™, or ALPHA FORM stencils @ 0.100 to 0.150 mm (4 to 6 mil) thick for 0.4 to 0.5 mm (0.016 to 0.020 in) pitch. Stencil design is subject to many process variables. Contact your local stencil site for advice. **Squeegee**: Metal (recommended) **Pressure**: 0.21 to 0.36 kg/cm of blade (1.25 to 2.0 lbs/inch) **Speed**: 25 to 150 mm/s (1 to 6 in/s) **Paste Roll**: 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 **Stencil Release Speed**: 1 to 5 mm/s **Lift Height**: 8 to 14 mm (0.31 to 0.55 in)	**ATMOSPHERE**: Clean-dry air or nitrogen atmosphere. **PROFILE**: **Soak**: 155 to 175 °C, 60 to 100 seconds soak profiles have been determined to give optimal results, please see profile chart, 'ALPHA OL-107F (A)-T4 SAC305/SACX Plus 0307 Typical Reflow Profile'. If required, good results are also achievable with high soak temperature profiles of 170 to 180 °C for 60 to120 seconds, especially in N2. Typical peak temperature is 235 to 245 °C. **Note 1**: Keeping the peak temperature below 241 ºC may reduce the number and size of BGA and QFN voids. **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 OL- 107F (A)-T4 residue is designed to remain on the board after reflow. If reflowed residue cleaning is required, Vigon A201 (in line cleaning), Vigon A 250 (Batch Cleaning) or Vigon US (Ultrasonic Cleaning) are recommended. Vigon is a registered trademark of Zestron Misprints and stencil cleaning may be done with IPA, ALPHA SM- 110E, and ALPHA SM-440 cleaners.

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

REFLOW PROFILE

ALPHA OL-107F (A)-T4 SAC305/SACX 0307
Typical Reflow Profile



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.**

STORAGE

ALPHA OL-107F (A)-T4 should be stored in a refrigerator upon receipt at 0 to 10 ºC (32 to 50 °F). ALPHA OL-107F (A)-T4 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

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