TECHNICAL BULLETIN

alpha ASSEMBLY SOLUTIONS™

ALPHA® OM-340 Solder Paste

No-Clean Lead-Free, Fine Feature, Zero Halogen, Low HIP, Highly Pin-Testable

DESCRIPTION

ALPHA OM-340 is a lead-free, no-clean solder paste designed for a broad range of applications. **It** provides best in class low defect rate for Head in Pillow defects combined with excellent first pass yield on ICT/pin testing. **ALPHA OM-340** also yields excellent print capability performance across various board designs and, particularly, with ultra-fine feature repeatability and high "through-put" applications.

Outstanding reflow process window delivers superior 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-340** is formulated to deliver excellent visual joint cosmetics and best in class in circuit pin test yields. Additionally, **ALPHA OM-340's** capability of IPC Class III for voiding and ROL0 IPC classifications ensures maximum long-term product reliability.

FEATURES & BENEFITS

- Maximizes reflow yield for lead-free processing, allowing full alloy coalescence at circular dimensions as small as 200µm (8 mil) with 100µm (4 mil) thick stencils
- 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
- Best in class low defect rate for Head in Pillow
- Best in class in circuit pin test yield
- Reduction in random solderballing levels, minimizing rework and increasing first time yield
- Meets highest IPC 7095 voiding performance classification of Class III
- Excellent reliability properties, halide-free material
- Compatible with either nitrogen or air reflow
- Zero halogen (No halogen intentionally added to the formulation)

PRODUCT INFORMATION

Alloys:	SAC305, SAC405, Sn96Ag4, SACX® Plus 0307, SACX® Plus 0807, InnoLot, Maxrel™ Plus
Powder Size:	Type 3, Type 4, Type 4.5 (proprietary), Type 5, Type 6 ((≤ 20µm)
Packaging Sizes:	500 gram jars, 6" & 12" cartridges, and 10cc and 30cc dispense syringes.
FluxGel:	OM-340 Flux Gel is available in 10cc and 30cc syringes for rework applications.
Lead Free:	Complies with RoHS Directive 2011/65/EU

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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 100µm (4 mil) to 150µm (6 mil), particularly when used 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.

HALOGEN STATUS

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
Zero Halogen: *No halogenated compounds have been intentionally added to this product*			

SAFETY

While the **ALPHA OM-340** 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 SDS for additional safety information. The most recent version of the SDS is available from www.AlphaAssembly.com.

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TECHNICAL DATA

CATEGORY	RESULTS	PROCEDURES/REMARKS
CHEMICAL PROPERTIES		
Activity Level	ROL0	IPC J-STD-004B
Halide Content	Halide free (by titration). Passes Ag Chromate Test	IPC J-STD-004B
Halogen Content	**Pass**, Zero Halogen - No halogen intentionally added	EN14582
Copper Mirror	**Pass**	IPC J-STD-004B
Copper Corrosion Test	**Pass**	IPC J-STD-004B
ELECTRICAL PROPERTIES		
SIR (IPC 7 days @ 85°C/85% RH)	**Pass**(≥ 1 x 10^8ohm), 8.6 x 10^9ohms	IPC J-STD-004B
SIR (Bellcore 96 hrs @ 35°C/85%RH)	**Pass**(≥ 1 x 10^{11} ohm), 2.1 x 10^{11}ohms	GR78-Core
Electromigration (Bellcore 96 hrs @ 65°C/85%RH 10V 500 hrs)	**Pass**(=final > initial/10), **Initial** = 3.9 x 10^8 ohms **Final** = 1.9 x 10^9 ohms	GR78-Core
PHYSICAL PROPERTIES		
Color	Clear, Colorless Flux Residue	
Tack Force vs. Humidity (t=8 hours)	**Pass,** Change of <1 g/mm^2 over 24 hrs @ 25% & 75% Relative Humidity	IPC J-STD-005 TM-650 2.4.44
	Pass, Change of <10% when stored at 25 ± 2°C and 50 ± 10% relative humidity.	JIS Z3284 Annex 9
Solderball	**Acceptable** (SAC 305 and SAC405)	IPC J-STD-005
	Pass, Class I - 1 hour and 72 hour	DIN Standard 32 513, 4.4
Stencil Life	> 8 hours	@ 50%RH, 25°C (74°F)
Spread	**Pass**	JIS-Z-3197: 1999 8.3.1.1
Slump	**Pass**	IPC J-STD 005 (10min 150°C)
	No bridging 0.2 mm gap & above	JIS-Z-3284-1994 Annex 7
	No bridging 0.3 mm gap & above	JIS-Z-3284-1994 Annex 8

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PROCESSING GUIDELINES

STORAGE and HANDLING	PRINTING	REFLOW (See Fig 1 & 2)	CLEANING
• Refrigerate to guarantee stability @ 0-10°C (32-50°F) • Shelf life of refrigerated paste is 6 months. • 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 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 32°C (89°F). • 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 - 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, ALPHA NICKEL-CUT, ALPHA TETRABOND®,** 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 **ALPHA Stencil** site for advice. **SQUEEGEE:** Metal (recommended) **PASTE ROLL**: 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 **PRESSURE:** 0.45 to 0.7 kg/inch **SPEED:** 25 to 150mm per second (1 to 6 inches per second). **STENCIL RELEASE SPEED:** 3-10mm/sec. **PRINT PUMP HEAD:** Passes DEK ProFlow® compatibility test	**ATMOSPHERE:** Clean-dry air or nitrogen atmosphere. **PROFILE (SAC Alloys):** Acceptable reflow / coalescence for feature size down to 8 mil (200 µm). IPC Class III voiding obtained for both straight ramp and soak profiles. Compatible with most common surface finishes. (Entek HT, Entek OM, Alpha Star, ENIG, SACX HASL) 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. Keeping the peak temperature below 240°C will lower the amount of voiding.	**ALPHA OM-340** residue is designed to remain on the board after reflow. If reflowed residue cleaning is required, the following aqueous cleaners are recommended: In-line or Batch Cleaners - **ALPHA BC-2200** - Zestron Vigon A201 - Zestron Vigon A250 - Zestron Vigon US Manual or solvent cleaning: - **ALPHA SM-110** **- ALPHA SM-110E** Misprints and stencil cleaning may be done with the following cleaners: **ALPHA SM-110E** **ALPHA SM-440** Zestron Vigon SC200

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

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Figure 1: Typical Soak Reflow Profile for SAC305 Alloy

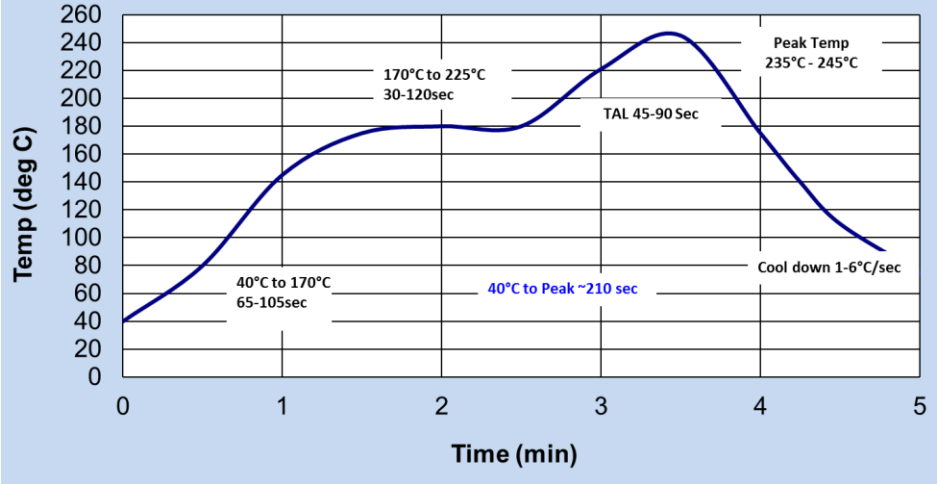
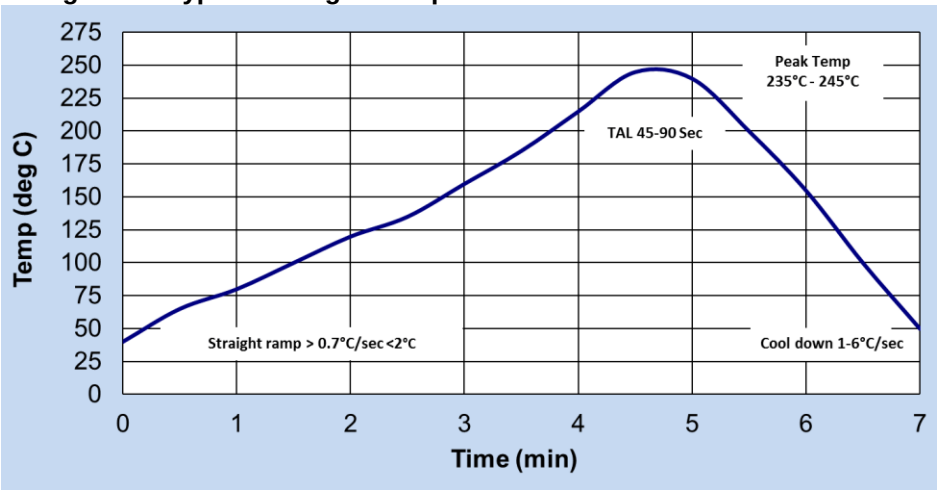


Figure 2: Typical Straight Ramp to 221°C Reflow Profile for SAC305



NOTE 3: The processing guidelines recommended and typical reflow profiles presented were tested in the lab with acceptable performance. Optimization to each board application should still be carried out by users to ensure best results.

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CONTACT INFORMATION

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AlphaAssembly.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 directory assistance Chemtrec 1 - 800 - 424 - 9300.