



ALPHA® OM-340 - No-Clean, Lead-Free Solder Paste

FINE FEATURE, ZERO HALOGEN¹, LOW HEAD IN PILLOW DEFECT, HIGHLY PIN TESTABLE

DESCRIPTION

ALPHA OM-340 is a lead-free, no-clean solder paste designed for a broad range of applications. **ALPHA OM-340** 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.

¹Zero halogen is defined as no halogen is intentionally added to the formulation

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

<u>Alloys:</u>	SAC305 (96.5%Sn/3.0%Ag/0.5%Cu) SAC405 (95.5%Sn/4.0%Ag/0.5%Cu) SACX® Plus™ 0307 (99%Sn/0.3%Ag/0.7%Cu) SACX® Plus™ 0807 (98.5%Sn/0.8%Ag/0.7%Cu) InnoLot™ (90.95%Sn/3.8%Ag/0.7%Cu/1.4%Sb/0.15%Ni/3%Bi) For other alloys, please contact your local Cookson Electronics Sales Office.
<u>Powder Size:</u>	Type 3 (25 - 45µm per IPC J-STD-005) Type 4 (20 - 38µm per IPC J-STD-005) Type 4.5 (Proprietary Powder Size Distribution) – available upon request Type 5 (15 - 25µm per IPC J-STD-005) – available upon request
<u>Residues:</u>	Approximately 5% by (w/w)
<u>Packaging Sizes:</u>	500 gram jars, 6" & 12" cartridges, DEK ProFlow® cassettes, and 10cc and 30cc dispense syringes
<u>Flux Gel:</u>	OM-340 Flux Gel is available in 10cc and 30cc syringes for rework applications.
<u>Lead Free:</u>	Complies with RoHS Directive 2002/95/EC.



**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

ALPHA® OM-340 is a Zero Halogen product and passes the standards listed in the Table below:

Halogen Standards			
Standard	Requirement	Test Method	Status
JEITA ET-7304 <i>Definition of Halogen Free Soldering Materials</i>	< 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 <i>A Guideline for Defining "Low Halogen" Electronics</i>	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 most recent MSDS (available at www.alpha.cooksonelectronics.com) for additional safety information.

STORAGE

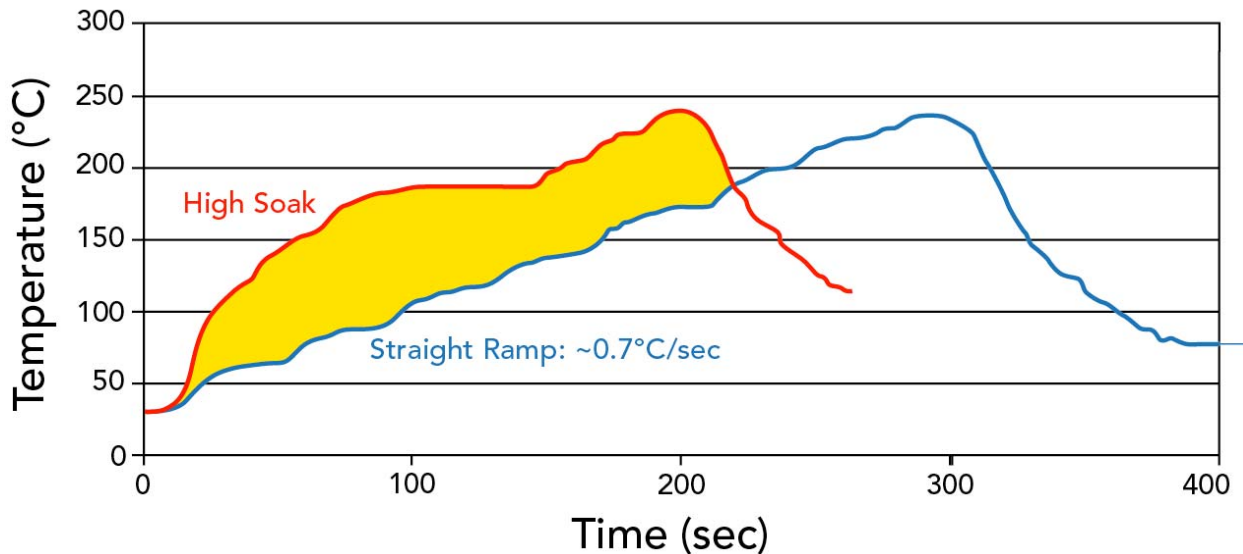
ALPHA OM-340 should be stored in a refrigerator upon receipt at 0 to 10°C (32-50°F). **ALPHA OM-340** should be permitted to reach room temperature before unsealing its package prior to use (see handling procedures on page 3). This will prevent moisture condensation build up in the solder paste.

ALPHA OM-340 Technical Data		
CATEGORY	RESULTS	PROCEDURES/REMARKS
CHEMICAL PROPERTIES		
Activity Level	ROLO	IPC J-STD-004
Halide Content	Halide free (by titration). Passes Ag Chromate Test	IPC J-STD-004
Halogen Content	Pass , Zero Halogen - No halogen intentionally added	EN14582, by oxygen bomb combustion, Non-detectable (ND) at < 50 ppm
Copper Mirror	Pass	IPC J-STD-004
Copper Corrosion Test	Pass	IPC J-STD-004
ELECTRICAL PROPERTIES		
SIR (IPC 7 days @ 85° C/85% RH)	Pass , 8.6 x 10 ⁹ ohms	IPC J-STD-004 (Pass ≥ 1 x 10 ⁸ ohm)
SIR (Bellcore 96 hours @ 35°C/85%RH)	Pass , 2.1 x 10 ¹¹ ohms	Bellcore GR78-CORE (Pass ≥ 1 x 10 ¹¹ ohm)
Electromigration (Bellcore 96 hours @ 65°C/85%RH 10V 500 hours)	Pass , Initial = 3.9 x 10 ⁸ ohms Final = 1.9 x 10 ⁹ ohms	Bellcore GR78-CORE (Pass=final > initial/10)
PHYSICAL PROPERTIES (Using 88.0% Metal, IPC Type 3 Powder, unless otherwise noted)		
Color	Clear, Colorless Flux Residue	
Tack Force vs. Humidity (t=8 hours)	Pass , Change of <1 g/mm ² over 24 hours at 25% and 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
Viscosity	Type 3 powder, 88.0% metal load designated M16 for printing Viscosity (Typical) 1600 poise at 10 RPM Malcom	Malcom Spiral Viscometer; J-STD-005
	Type 4 powder, 88.3% metal load designated M18 for printing Viscosity (Typical) 1800 poise at 10 RPM Malcom	
	Type 4 powder, 84% metal load, designated M06 for dispensing Type 4 powder, 85% metal load, designated M08 for dispensing	
	Type 5 powder, 88.3% metal load designated M19 for printing Type 5 powder, 78% metal load, designated M04 for dispensing	
	Type 6 powder, 78% metal load, designated M04 for dispensing	
Solderball	Acceptable (SAC 305 and SAC405 alloys)	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 (10 min 150°C) TM-650 2.4.35
	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

ALPHA OM-340 Processing Guidelines			
STORAGE and HANDLING	PRINTING	REFLOW (See Figure 1)	CLEANING
<ul style="list-style-type: none"> 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. These are starting recommendations and all process settings should be reviewed independently. 	<p>STENCIL: Recommend Cookson Electronics 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 Cookson Electronics stencil site for advice.</p> <p>SQUEEGEE: Metal (recommended)</p> <p>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</p> <p>PRESSURE: 0.45 to 0.7 kg/inch</p> <p>SPEED: 25 to 150mm per second (1 to 6 inches per second).</p> <p>STENCIL RELEASE SPEED: 3-10mm/sec.</p> <p>PRINT PUMP HEAD: Passes DEK ProFlow[®] compatibility test</p>	<p>ATMOSPHERE: Clean-dry air or nitrogen atmosphere.</p> <p>PROFILE (SAC Alloys):</p> <p>Acceptable reflow / coalescence for feature size down to 8 mil (200 μm). IPC Class III voiding obtained for both straight ramp and soak profiles.</p> <p>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. Keeping the peak temperature below 240°C will lower the amount of voiding.</p>	<p>ALPHA OM-340 residue is designed to remain on the board after reflow.</p> <p>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</p> <p>Manual or solvent cleaning: - ALPHA SM-110 and SM-110E - Bioact™ SC-10 and SC-10E</p> <p>Misprints and stencil cleaning may be done with the following cleaners: ALPHA SM-110E ALPHA SM-440 Zestron Vigon SC200 Bioact™ SC-10E</p>

Bioact™ is a registered trademarks of Petroferm, Inc.

Figure 1: ALPHA[®] OM-340 SAC305 Typical Reflow Profile



**ALPHA OM-340 - General Reflow Profile Guidelines**

Parameter	Guideline	Additional Information
Atmosphere	Air or N2	
SAC305, SAC405, SACX Plus™ 0807	217 - 225°C Melting Range	
SACX Plus™ 0307	217 - 227°C Melting Range	
Setting Zone*	Optimal Dwell Period	Extended window
40°C to 225°C	2:30 to 4:30 min.	< 5:00 min.
170°C to 225°C	0:30 to 2:00 min	< 2:30 min.
120°C to 225°C	1:25 to 3:00 min.	< 3:30 min.
TAL (217 - 225°C)	45 - 90 sec.	Not Recommended
Peak temperature	235 - 245°C	Compatible with most common surface finishes. (Entek HT, Entek OM, Alpha Star, ENIG, SACX HASL)
Joint cool down rate from 170°C	1 - 6°C/second	Recommended to prevent surface cracking issues.

* Above recommendations are for SAC305. For alternative alloys, please follow the liquidus temperature of the respective alloy.