

ALPHA® OM-353 Solder Paste

No-Clean, Low-Silver, Lead-Free, Zero-Halogen, ROL0, Ultra-Fine Feature Print & Air Reflow Capable Solder Paste

DESCRIPTION

ALPHA OM-353 is a Low Silver & SAC305 capable paste designed for Type 5 ($15-25\mu m$) powder to meet market segments requiring ultra-fine features application. It has been tested to give excellent printing performance down to $160-180\mu m$ 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 OM-353** is also available in Type 4(20-38 μm) powder size distribution.

ALPHA OM-353 has been shown to result in low Non-Wet Open, Head-In-Pillow, low residue. Additional testing demonstrate there is low residue spread and low flux wicking.

FEATURES & 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°C to 180°C
- Good Coalescenece under the following conditions

Powder Size	Reflow Profile (Air)	Alloy	
		SAC305	SACX 0307
Т5	Low Soak	160 microns	170 microns
	High Soak	160 microns	170 microns

- Reduced Mid Chip Solder Balling, Head-in-Pillow: minimizes rework and increases first time vield
- 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 IPC7095 Class III 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, TSCA, EINECS and Halogen-free requirements (Zero Halogen, see table below)
- Low-Silver alloy availability.



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PRODUCT INFORMATION

Alloys: SAC305, SAC105, SACX Plus™0307

Maxrel™ (Innolot), Maxrel Plus™

Powder Size: Type 4 (20 - 38μm), Type 5 (15 - 25μm) Packaging Sizes: 500 gram jars, 6" & 12" cartridges

Flux Gel: Flux gel is available in 10 and 30 cc syringes for rework applications

Lead Free: Complies with RoHS Directive 2011/65/EU

NOTE 1: For other alloys, powder size and packaging sizes, contact your local Alpha Sales Office.

SAFETY

While the **ALPHA OM-353** 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 alphaassembly.com.

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		Pass	
IEC 612249-2-21	Post Soldering Residues contain < 900 ppm each or total of < 1500 ppm Br or Cl from flame retardant source	TM EN 14582	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				



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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), < 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	
Ag Chiomate Test	Pass	JIS-Z-3197-1999 8.1.4.2.3	
Copper Mirror Test	Pass	IPC J-STD-004B	
Copper Militor Test	Pass	JIS-Z-3197-1999 8.4.2	
Conney Corrector Tool	Pass (No evidence of Corrosion)	IPC J-STD-004B	
Copper Corrosion Test	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, 12 V bias)	Pass	IPC J-STD-004B TM-650 2.6.3.7 (Pass ≥ 1 x 108 ohm)	
JIS Electromigration (1000 hrs @ 85°C/85%RH 48V)	Pass	JIS-Z-3197-1999 8.5.4 (Pass ≥ 1 x 10 ⁹ ohm)	
Bono Test 85°C 85% RH and 50 V bias	Pass	Bono Test	



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TECHNICAL DATA (CONTINUED)

CATEGORY	RESULTS	PROCEDURES/REMARKS		
PHYSICAL PROPERTIES				
Color	Clear, Colorless Flux Residue			
Tack Force vs.	Pass, > 100gf over 24 hours at 25%, 50% and 75% Relative Humidity	JIS Z-3284-1994, Annex 9		
Humidity	Pass, Change of <1g/mm2 over 24 hours at 25% and 75% Relative Humidity	IPC J-STD-005 TM-650 2.4.44		
Viscosity	88.2% metal load, Type 5 & 88.5% metal load, Type 4 Both designated M20 for printing	Malcom Spiral Viscometer; J-STD-005		
Viscosity Stability at 25°C for 14 days	Pass	Malcom Spiral Viscometer		
Coalescence Test – finest feature	160 μm (SAC305, T5 powder)	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	No bridge for 0.3 mm space	JIS-Z-3284-1994 Annex 7		
Slump	No bridge for 0.3 mm space	IPC J-STD-005, TM-650 2.4.35		
Hot Clump	No bridge for 0.3 mm space	JIS-Z-3284-1994 Annex 8		
Hot Slump	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		



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PROCESSING GUIDELINES

STORAGE & HANDLING	PRINTING	REFLOW (see Fig. 1)	CLEANING
1. Refrigerate to guarantee stability @ 0-10°C (32-50°F). When stored under these conditions, the shelf life of OM-353 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 - 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.	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) PRESSURE: 0.21 - 0.36 kg/cm of blade (1.25 -2.0 lbs/inch) SPEED: 25 - 150 mm per second (1 - 6 inches per second). 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. STENCIL RELEASE SPEED: 1 - 5 mm/sec. LIFT HEIGHT: 8 - 14mm (0.31- 0.55")	ATMOSPHERE: Clean-dry air or nitrogen atmosphere. PROFILE: Soak: 155 – 175 °C, 60 to 100 sec soak profiles have been determined to give optimal results, please see profile chart, ALPHA OM-353 SAC305/SACXPlus TM 0307 Typical Reflow Profile. If required, good results are also achievable with high soak temperature profiles of 170 – 180°C for 60 -120s, especially in N₂. Typical peak temperature is 235 to 245°C. NOTE 2: Keeping the peak temperature below 241°C may reduce the number and size of BGA and QFN voids. NOTE 3: 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-353 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.



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Fig 1: ALPHA OM-353 SAC305/SACX Plus 0307 Typical Reflow Profile (High Soak)

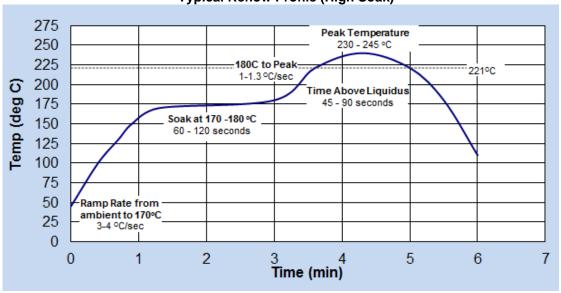
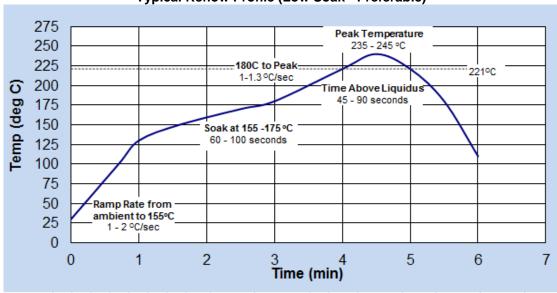


Fig 2: ALPHA OM-353 SAC305/SACX Plus 0307 Typical Reflow Profile (Low Soak - Preferable)



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.



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CONTACT INFORMATION

To confirm this is the most recent issue, please contact Alpha Assembly Solutions

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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.

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Revision History:

Issue Date	Revision	Prepared by	Approved by	Finalized & Uploaded By	Reason for change	Details of Change
21-Jun- 2016	SM1174-6	Chris Colindres	Traian Cucu	Erika Sebens	Updated TB template	AAM tb template.
17-Oct- 2016	SM-1174-7	Chris Colindres	Traian Cucu	Erika Sebens	Added attributes	Added 'air reflow capable' 'low silver' & 'lead free' Added table to features and benefits Made final changes for product launch