ALPHA® OM-353 SOLDER PASTE

No-Clean, Low-Silver, Lead-Free, Zero-Halogen, RoI0, 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 to 25µm) powder to meet market segments requiring ultra-fine features application. It has been tested to give excellent printing performance down to 180µm 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 to 38µm) powder size distribution.

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

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

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 N_2 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
T5	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 yield
- **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.

PRODUCT INFORMATION

Alloys:	SAC305, SAC105, Sn96.5Ag3.5, SACX Plus 0307 Maxrel (Innolot), Maxrel Plus
Powder Size:	Type 4 (20 to 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.

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	Procedures/Remarks
Chemical Properties		
Activity Level	ROL0	IPC J-STD-004B
Halide Content	Halide free (by I.C.), < 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, 12 V bias)	Pass	IPC J-STD-004B TM-650 2.6.3.7 (Pass ≥ 1 x 10^8 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

Category	Results	Procedures/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 <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 25ºC 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 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 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 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.	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 Sales Rep 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 per second (1 to 6 inches per second). PASTE ROLL: 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. STENCIL RELEASE SPEED: 1 to 5 mm/sec. LIFT HEIGHT: 8 to 14mm (0.31 to 0.55")	ATMOSPHERE: Clean-dry air or nitrogen atmosphere. PROFILE: Soak: 155 to 175 °C, 60 to 100 sec soak profiles have been determined to give optimal results, please see profile chart, **ALPHA OM-353 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 to 120s, especially in N_2. Typical peak temperature is 235 to 245 °C. NOTE 2: Keeping the peak temperature below 241 ºC 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** & **ALPHA SM-440.**

REFLOW PROFILES

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

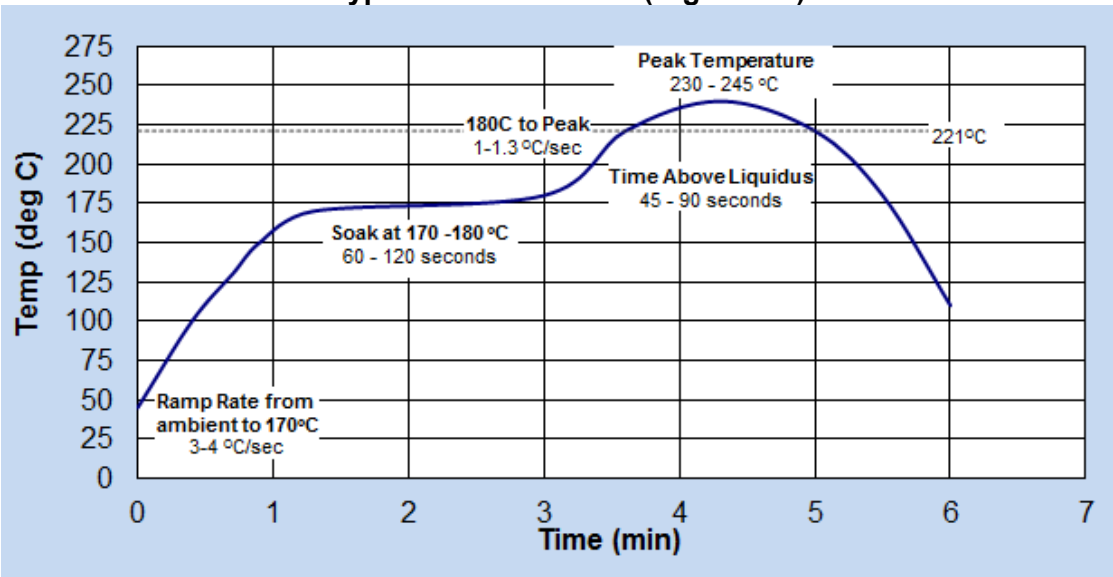
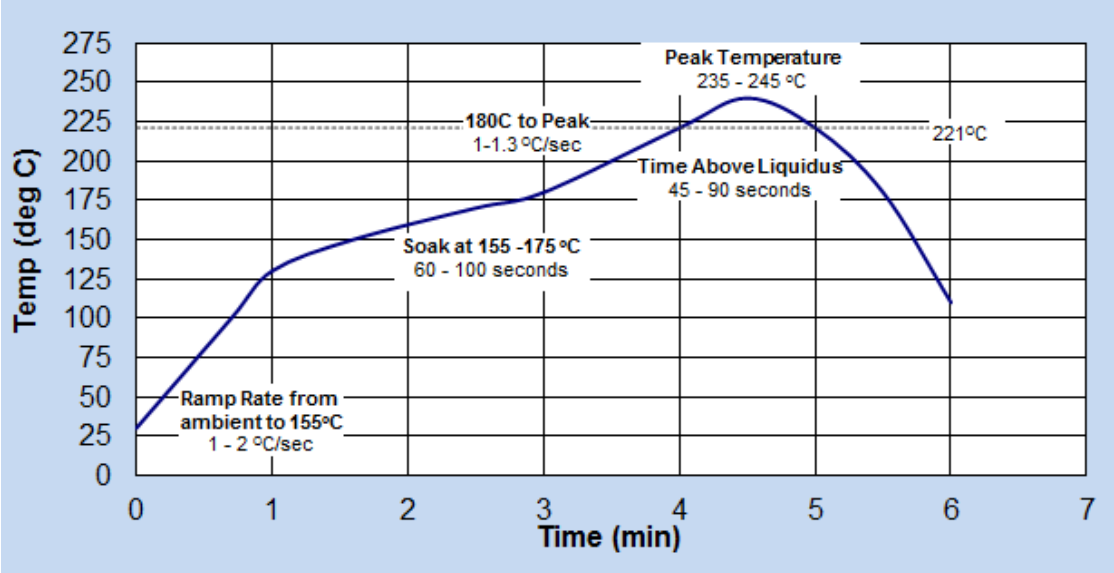


Fig 2: ALPHA OM-353 SAC305/SACX Plus 0307
Typical Reflow Profile (Low Soak - Preferable)



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.

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 AlphaAssembly.com**

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