

ALPHA[®] OM-377 SOLDER PASTE

Ultra-Fine Feature Printing, High Electrochemical Reliability, Excellent Solderability, Low Residue, No-Clean Solder Paste

DESCRIPTION

ALPHA OM-377 is a lead-free, no-clean solder paste designed to provide superior electrochemical reliability on fine-pitch, low-standoff components. Engineered to deliver excellent solderability, low post-reflow residue, and >1.33 Cpk transfer efficiency on fine feature pads, as small as 100 μm $\times$ 150 μm (01005). Together, these features, along with excellent HiP and NWO performance, make **ALPHA OM-377** ideal for a broad range of high-density board applications requiring smaller, thinner, and lighter form factor components.

Optimized for ultra-fine pitch assemblies requiring high stencil transfer efficiency and electrical reliability. Designed for consistent performance in nitrogen reflow with T5 powder.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

Features	Benefits
Ultra-Fine Feature Printing and Reflow Solderability	>1.33 Cpk print performance down to 100 μm $\times$ 150 μm (01005), ensuring consistent print volume on complex PCB designs and reliable solderability on brass and nickel surfaces
Superior Electrochemical Reliability	$\geq 10^8$ Ohms for 7 days on 100 μm spaced, glass covered combs to ensure electrical reliability & functionality of fine-pitched low stand-off packages
Excellent HiP/NWO Performance	Ensures excellent first pass yield on high I/O count, fine-pitched packages
Minimal Post Reflow Residue	Designed for residue containment on high-density PCB designs
Halogen-Free	Ensures RoHS compliance for a safe and environmentally friendly assembly process

PRODUCT INFORMATION

Alloy: SAC305, Innolot
Powder Size: Type 5
Packaging Size: 500 gram jar, 600 gram & 1200 gram cartridges
Lead-Free: RoHS Directive EU/2015/863; amending Annex II of 2011/65/EU
Halogen Content: Halogen-Free

TECHNICAL DATA

ALPHA OM-377		
Category	Results	Procedures/Remarks
Chemical Properties		
Activity Level	ROL0	IPC J-STD-004B/004C
Fluoride Spot Test	No fluoride present	IPC J-STD-004B
Halogen Content Test	No halogens detected	BS EN 14582(2016)
Ag Chromate Test	No halides present	JIS Z 3197 & IPC J-STD-004B
Copper Mirror test	Low activity, no breakthrough	JIS Z 3197 & IPC J-STD-004B
Copper Corrosion Test	Low activity, no corrosion	JIS Z 3197 & IPC J-STD-004B
Electrical Properties		
Advanced SIR (004B: 40 °C / 90% RH; 004C: 85 °C / 85% RH)	Pass, $\geq 10^8$ Ohms for 7 days	Alpha Advanced SIR per IPC J-STD-004B/004C (500 μ m gap), modified with glass slide during reflow
EMI Shield SIR (85 °C/85% RH)	Pass, $\geq 10^8$ Ohms for 7 days	Alpha EMI Shield SIR, per IPC J-STD-004C (100 μ m gap) with EMI Shield covering comb pattern during reflow and SIR
IPC SIR (85 °C/85% RH)	Pass, $\geq 10^8$ Ohms for 7 days	Modified IPC J-STD-004A/004C (100 μ m gap)
IPC SIR (40 °C/90% RH)	Pass, $\geq 10^8$ Ohms for 7 days	Modified IPC J-STD-004B (100 μ m gap)
Electrochemical Migration	Pass, no visual evidence of corrosion, discoloration or electromigration for 596 hrs	IPC J-STD-004B

ALPHA OM-377		
Category	Results	Procedures/Remarks
Physical Properties		
Residue Color	Clear & pale yellow flux residue	
Tack Life	Pass, tack force ≥ 100 gf for minimum 24 hrs	JIS Z 3284:1994, Annex 9
Spread Rate	Average spread $> 80\%$	JIS Z 3197
Stencil Life at ambient condition	8 hrs consistent transfer efficiency	@ 25 °C / 50% RH
Stencil Life at elevated condition	8 hrs consistent transfer efficiency	@ 30 °C / 65% RH
Cold Slump (25°C /50% RH)	Pass, no bridging above 0.20 mm	IPC J-STD-005A
Hot Slump (150 °C/10min)	Pass, no bridging above 0.25 mm	IPC J-STD-005A
Dryness Test (Talc)	Pass, non-sticky post reflow residue	JIS Z 3197

HALOGEN STATUS

Halogen Standards			
Standard	Requirement	Test Method	Status
BS EN 14582:2007 Characterization of waste. Halogen and sulfur content. Oxygen combustion in closed systems and determination methods.	< 1000 ppm Br, Cl in solder material solids	Halogen CL, BR - DIN EN-14582	Pass
RoHS	RoHS Directive EU/2015/863; amending Annex II of 2011/65/EU. Permissible Limit $\leq 1000\text{mg/kg}$	IEC 62321:2013 & IEC 62321:2008	Pass

APPLICATION GUIDELINES

The following process settings are offered as a process window guideline based on typical SMT assembly. Due to the variation in the industry, the optimal process settings will need to be developed for each process.

SPEED: Formulated for standard and ultra-fine pitch stencil printing at speeds between 25 mm/s (1.0 in/s) and 100 mm/sec (4.0 in/s) with stencil thickness of 0.040 mm (0.00157 in) - 0.100 mm (0.004 in). A stencil with less roughness ($R_a < 1.0 \mu\text{m}$) or nano-coating on the aperture inner walls is recommended for assemblies with ultra-fine features down to 100 μm x 150 μm (01005).

PRESSURE: Typical blade pressures are between 57 N*mm (0.50 lbf*in) to 25 N*mm (0.22 lbf*in) depending upon the print speed and quality of stencil / substrate gasket. Higher blade pressure could be required to achieve a clean stencil wipe for applications requiring higher print speed.

PASTE ROLL: Paste roll between 1.5 cm (0.60 in) to 2.5 cm (0.098 in) in diameter is recommended for optimal performance with paste additions made when roll reaches 1.0 cm (0.40 in) diameter (Min). Max roll size will depend on squeegee blade.

SQUEEGEE: Metal Squeegee - angle between 45° to 60° is recommended.

STENCIL RELEASE SPEED: 0.5 to 2 mm/s is recommended for ALPHA OM-377 T5. Kneading for 2 to 6 strokes (approximately 6 consecutive prints) at the recommended print speed & pressure at the beginning of the printing process or after any pause in manufacturing should improve print repeatability.

The reflow process window enables high first-pass soldering yield with good cosmetics and minimized rework.

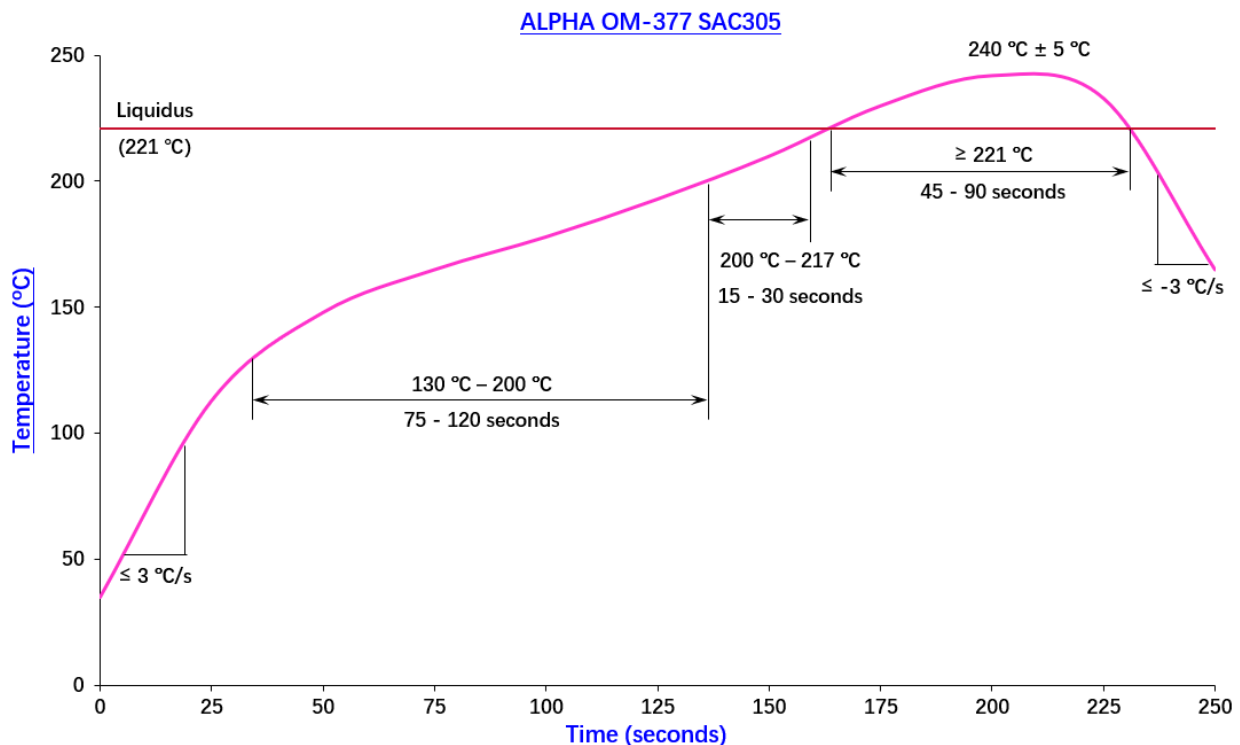
ALPHA OM-377 residue is designed to remain on the board after reflow. Misprint or stencil cleaning may be done with IPA.

REFLOW GUIDELINES

Note: These are only recommendations. Equipment and assembly factors may require adjustments to be made to the reflow profile

ATMOSPHERE: Nitrogen (N_2) atmosphere is required, and $O_2 \leq 1000$ ppm is recommended.

Figure – 1 ALPHA OM-377 SAC305 Typical Reflow Profile Recommendation



Nitrogen reflow is required, $O_2 \leq 1000$ ppm recommended.

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.



STORAGE & HANDLING

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

Refrigerate to guarantee stability at 0 to 10 °C (32 to 50 °F). When stored under these conditions, the shelf life is 6 months. When refrigerated, warm up the paste container to room temperature for up to 4 hrs. Paste must be 19 °C (66 °F) before processing. Verify paste temperature with a thermometer to ensure the paste is at 19 °C (66 °F) or greater before setting up printer. The paste can be stored for a maximum of 2 weeks at room temperature up to 25 °C (77 °F) prior to use.

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. Do not remove the worked paste from the stencil and mix with unused paste in jar. This will alter the rheology of unused paste.

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.**

CONTACT INFORMATION

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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

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