MacDermid Alpha ELECTRONICS SOLUTIONS

TECHNICAL DATA SHEET

ALPHA® WS-699CPS SOLDER PASTE

Water Soluble Lead-Free Fine Pitch Solder Paste

DESCRIPTION

ALPHA WS-699CPS is a next generation water soluble solder paste specifically designed for fine pitch and high density applications. **ALPHA WS-699CPS** broad processing window is designed for stencil printing application for either surface mount or solder bumping process.

ALPHA WS-699CPS is formulated to deliver outstanding reflow process window with fine size powders such as Type 5, 6 and 7 solder powders. It delivers good soldering on CuOSP with excellent coalescence on a broad range of deposit sizes, excellent slump resistance performance for fine pitch printing and excellent visual joint cosmetics due to its ease of residue cleaning. Additionally, **ALPHA WS-699CPS** capability of IPC Class III for voiding ensures maximum long-term product reliability.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- Excellent print consistency with high process capability for fine pitch designs
- Type 5, 6 and 7 solder powder compatible
- 008004 passive component capable
- Wide reflow profile window with good solderability on various board / component finishes
- Reduction in random solder balling levels, minimizing rework and increasing first time yield
- The flux residues can be easily removed by warm DI water washing
- Excellent reliability properties, halogen-free material

PRODUCT INFORMATION

Alloys	SAC305 (96.5%Sn/3.0%Ag/0.5%Cu) For other alloys, contact your local Sales Office
Powder Size	Type 5, 6. Type 7 available upon request
Metal Loading	Typical 87 to 89%
Packaging Sizes	500 & 250 gram jars, 12” cartridges
Lead Free	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 100mm/sec (6”/sec), with varying stencil thickness depending on application design. Blade pressures should be 0.18 to 0.27 kg/cm of blade (1.0 to 1.5 lbs/inch), depending upon the print speed and aperture opening. Stencil design and printing parameters settings are subject to many process variables. Contact your local Semiconductor solutions technical support for advice.

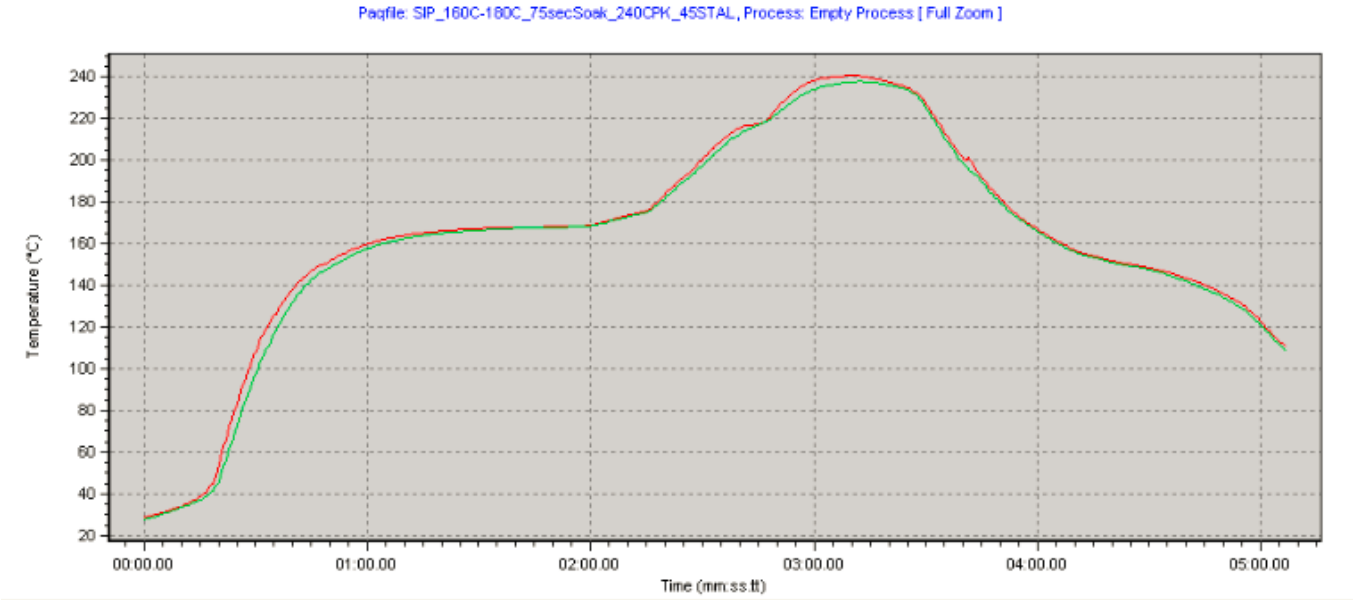
TECHNICAL DATA

Category	Results	Procedures/Remarks
Chemical Properties		
Flux Type	Water Soluble	
Activity Level	ORH-0 = J-STD Classification	IPC J-STD-004
Physical Properties		
Tack Force	>100gf	IPC J-STD-005
Viscosity	~ 200 to 450 Pa.s (Typical) (SAC305 T6)	Malcom Spiral Viscometer; J-STD-005
Solderball	Acceptable	IPC J-STD-005
	Pass, Class 1	DIN Standard 32 513, 4.4
Stencil Life	8 hours	@ 50%RH, 23 °C (74°F)
Spread	Pass	JIS-Z-3197: 1999 8.3.1.1
Slump	Pass	IPC J-STD-005 (10 min 150 °C)

PROCESSING GUIDELINES

Storage-Handling	Printing	Reflow (See Figure #1)	Cleaning
• Refrigerate to guarantee stability @ 0 to 8 °C (32 to 46 °F) • Shelf life for refrigerated unopened solder paste is expected to be three months from date of manufacture. • 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 29 °C (84 °F). • 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.	**Stencil:** Recommend ALPHA CUT or ALPHA FORM stencils @ 0.100 to 0.150 mm (4 to 6 mil) thick for 0.4 to 0.5 mm (0.016" or 0.020") pitch. Stencil design may vary based on design. Consult Alpha Technical support if assistance is required. **Squeegee:** Metal (recommended) **Pressure:** 0.18 to 0.27 kg/cm of squeegee length (1.0 to 1.5 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 to14mm (.31 to .55") Stencil design and printing parameters settings are subject to many process variables. Contact your local Semiconductor solutions technical support for advice.	**Atmosphere:** Clean-dry nitrogen atmosphere. **Profile:** Acceptable reflow / coalescence and IPC Class III voiding were obtained for the range of profiles depicted below. 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.	ALPHA WS-699CPS residue is designed to be cleaned using warm DI water after reflow. The flux residues can be cleaned with DI water. For the best results, warm DI water is recommended. [Cleaning Process] Cleaning Bath #1(50 to 60 °C Temp, Spray) → Cleaning Bath #2 (50 to 60 °C Spray) → Cleaning Bath #3 (50 to 60 °C Rinse) → Dry (Air Blow) For best cleaning results saponifier system are recommended for fine pitch dense packages. Inline spray with pressurized water jets are recommended

Parameter	Guideline	Additional Information
Atmosphere	N_2	Mass production verification both in air and N_2.
SAC305 alloy melting ranges. Lower temperature=solidus; higher temperature = liquidus	SAC305: 217 to 220 °C	Use for reflow above liquidus setting



Reflow profile is for reference only and highly dependent on customer boards and substrates. Please contact semiconductor solutions technical support if reflow profile help is required

STORAGE

ALPHA WS-699CPS should be stored in a refrigerator upon receipt at 0 to 8 °C (32 to 46 °F). **ALPHA WS-699CPS** should be permitted to reach room temperature before unsealing its package prior to use (see handling procedures). This will prevent moisture condensation build up in the solder 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.**

WASTE TREATMENT

Prior to using any recommendations or suggestions for waste treatment, the user is required to know the appropriate local/state/federal regulations for on-site or off-site treatment which may require permits. If there is any conflict regarding our recommendations, local/state/federal regulations take precedent.

CONTACT INFORMATION

www.macdermidalpha.com

North America 140 Centennial Avenue Piscataway, NJ 08854 1.800.367.5460	**Europe** Unit 2, Genesis Business Park Albert Drive Woking, Surrey, GU21 5RW, UK 44.01483.758400	**Asia** 14 Joo Koon Crescent, Singapore 629014 65.6430.0700

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