

# ALPHA<sup>®</sup> NCP-LR002

No-Clean, Lead-Free Low Residue Solder Paste

## DESCRIPTION

**ALPHA NCP-LR002** is a No clean low residue solder paste designed for a broad range of applications. **ALPHA NCP-LR002** broad processing window is designed for stencil printing and dispensing application.

Outstanding reflow process window delivers good soldering on NiAu & CuOSP with excellent coalescence on a broad range of deposit sizes, and excellent random solder ball resistance performance. **ALPHA NCP-LR002** is formulated to deliver excellent visual joint cosmetics due to its low residue formulation. Additionally, **ALPHA NCP-LR002** capability of IPC Class III for voiding ensures maximum long-term product reliability.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

## FEATURES AND BENEFITS

- Excellent print consistency with high process capability index across all board designs.
- 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.
- Almost “no residue” cosmetic appearance
- Excellent reliability properties, halogen-free material.

## PRODUCT INFORMATION

<u>Alloys:</u>	SAC305 (96.5%Sn/3.0%Ag/0.5%Cu) Sn5Sb (95.0%Sn/5%Sb) Sn10Sb (90.0%Sn/10%Sb) For other alloys, contact your local sales office.
<u>Powder Size:</u>	Type 3 (25 to 45µm) PSD Type 4 (20 to 38µm) PSD Type 5 (15 to 25µm) PSD Type 6 (5 to 15µm) PSD Other powder sizes please check with the product manager for availability
<u>Metal Loading</u>	Typical 85 to 89% depending on printing or dispensing application
<u>Packaging Sizes:</u>	500 grams jar / 150 grams cartridge / 30cc syringe
<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 in/sec) and 150 mm/sec (6 in/sec), with stencil thickness of 0.100mm (0.004 in) to 0.150mm (0.006 in), particularly when used in conjunction with ALPHA Stencils. Blade pressures should be 0.18 to 0.27 kg/cm of blade (1.0 to 1.5 lb/in), depending upon the print speed. The higher the print speed employed, the higher the blade pressure that is required. ALPHA NCP-LR002 dispensing solder paste is also recommended to be used on time-pressure dispensing system for dispensing applications.

## TECHNICAL DATA

Category	Results	Procedures/Remarks
<b>Chemical Properties</b>		
Flux Type	Organic	
Activity Level	ORL-0 = J-STD Classification	IPC J-STD-004
Copper Corrosion Test	Pass	IPC J-STD-004
<b>Electrical Properties</b>		
SIR (IPC 7 days @ 85 °C/85% RH)	Pass	IPC J-STD-004 {Pass ≥ 1 x 10 <sup>8</sup> ohm min}
<b>Physical Properties</b>		
Tack Force	>100gf	IPC J-STD-005
Viscosity	~ 1760 Poise (Typical) (Sn5Sb T3) ~ 1900 Poise (Typical) (Sn5Sb T4)	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)

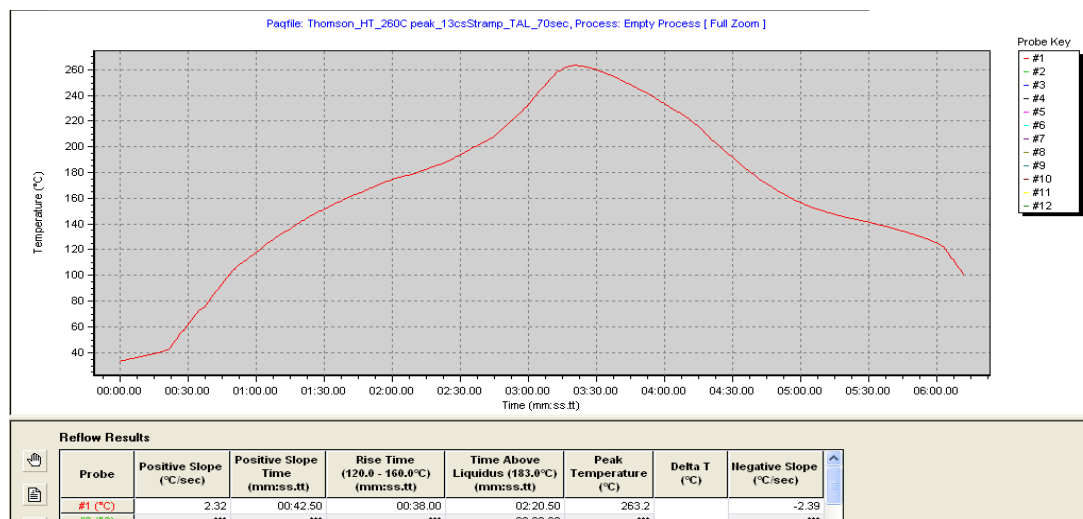
### PROCESSING GUIDELINES

Storage & Handling	Printing	Reflow (See Figure #1 )	Cleaning
<ul style="list-style-type: none"> <li>Refrigerate to guarantee stability @ 0 to 10 °C (32 to 50 °F) Shelf life of six months in refrigerated conditions.</li> <li>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).</li> <li>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.</li> </ul>	<p><u>STENCIL</u>: Recommend ALPHA CUT or ALPHA FORM stencils Stencil design is subject to many process variables.</p> <p><u>SQUEEGEE</u>: Metal (recommended) <u>PRESSURE</u>: 0.18 to 0.27 kg/cm of squeegee length (1.0 to 1.5 lbs. /inch).</p> <p><u>SPEED</u>: 25 to 150mm per second (1 to 6 inches per second).</p> <p><u>PASTE ROLL</u>: 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. <u>STENCIL RELEASE SPEED</u>: 1 to 5 mm/sec.</p> <p><u>Lift Height</u>: 8 to 14mm (.31 to .55 in) Printing process is subject to many process variables. Contact your local Macdermid Alpha technical support for advice.</p>	<p><u>ATMOSPHERE</u>: Clean-dry nitrogen atmosphere.</p> <p><u>PROFILE</u>: Acceptable reflow / coalescence and IPC Class III voiding were obtained for the range of profiles depicted below.</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.</p>	<p>ALPHA NCP-LR002 is a no clean solder paste that leaves almost no residue on board. Cleaning is not required after reflow</p> <p>If cleaning of the flux residues is desired it can be cleaned with saponifier or solvent cleaner. For the best results, follow commercially available cleaners cleaning recommendations</p>

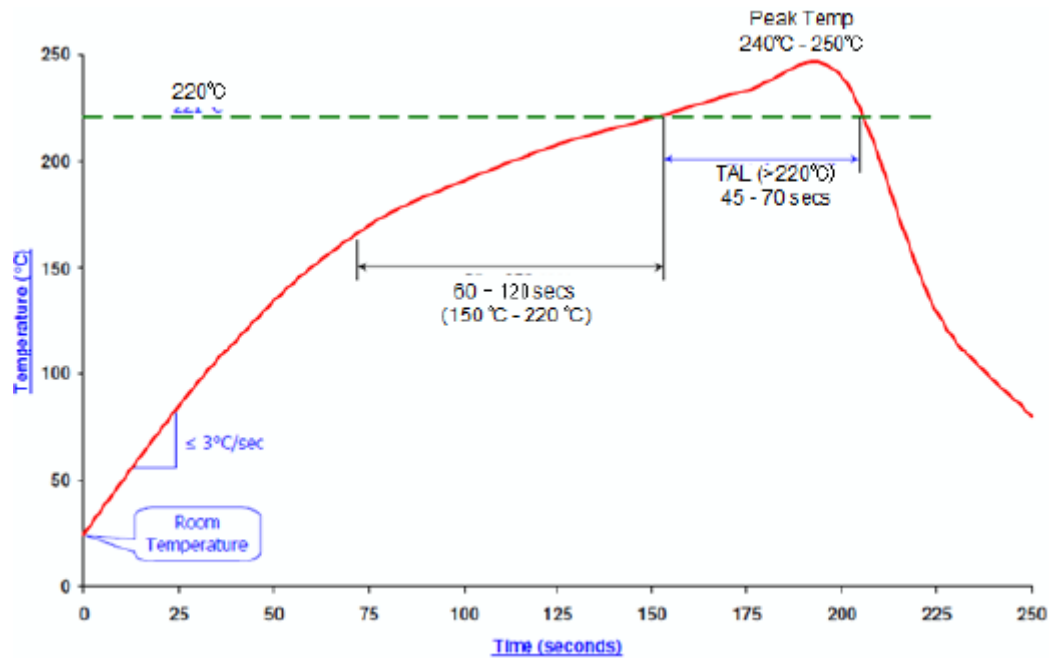
Parameter	Guideline	Additional Information
Atmosphere	N <sub>2</sub>	Mass production verification both in N <sub>2</sub> .
Sn5Sb & Sn10Sb alloy melting ranges. Lower temperature=solidus; higher temperature = liquidus	Sn5Sb: 235 to 240 °C Sn10Sb: 240 to 250 °C	Use for reflow above liquidus setting
SAC305 alloy melting ranges. Lower temperature=solidus; higher temperature = liquidus	SAC305: 217 to 225 °C	Use for reflow above liquidus setting

## REFLOW PROFILE

### Typical Sn5Sb / Sn10Sb Reflow Profile



### Typical SAC305 Reflow Profile



Note: This is just an illustration. Graph not strictly to scale

Reflow profile is for reference only and highly dependent on customer boards and substrates. Please contact MacDermid Alpha Electronics Solutions technical support if reflow profile help is required.

### 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.**

### STORAGE

ALPHA NCP-LR002 should be stored in a refrigerator upon receipt at 0 to 10 °C (32 to 50 °F). ALPHA NCP-LR002 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.

### CONTACT INFORMATION

To confirm this document is the most recent version, please contact  
**techinfo@MacDermidAlpha.com**

[www.macdermidalpha.com](http://www.macdermidalpha.com)

<b>North America</b> 3950 Johns Creek Ct, Suite 300 Suwanee, GA 30024 USA 908.791.2300	<b>Europe</b> Unit 2, Genesis Business Park Albert Drive Woking, Surrey, GU21 5RW, UK 44.01483.758400	<b>Asia</b> 14 Joo Koon Crescent, Singapore 629014 65.6430.0700
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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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