

KESTER® NP510-LT HRL1 SOLDER PASTE

Lead-Free, No-Clean, Low Temperature Application Paste

DESCRIPTION

Kester NP510-LT HRL1 Solder Paste is a no-clean, lead-free, zero-halogen solder paste for assemblies that have temperature sensitive substrates and components. The need for reduction of warpage induced defects is becoming more evident as complexity of product designs become more complex and packages become thinner. NP510-LT HRL1 addresses these technology needs by enabling lower temperature reflow and enhancing mechanical reliability. All components used with NP510-LT HRL1 must be lead-free to eliminate the formation of tin/lead/bismuth intermetallic which has a melting point under 100 °C.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- Classified ROL0 per IPC J-STD-004B
- Zero-Halogen (none intentionally added)
- Lower reflow peak temperature (180 to 190 °C) compared to traditional lead-free alloys
- Reduction in board-to-package warpage
- Wide reflow profile window with good solderability on various PCB surface finish
- Excellent printability above 0.60 area ratio
- Colorless residues for easy post-reflow inspection
- Low voiding in various packages - BGA, MLG, DPAK, LGA

ROHS COMPLIANCE

This product meets the requirements of the Restriction of Hazardous Substances (RoHS) Directive.

TECHNICAL DATA

Category	Results	Procedure/Remarks
Physical Properties (Typical Values for HRL1, T4)		
Viscosity (Typical)	1900 poise	Malcom Viscometer @ 10 rpm and 25 °C
Initial Tackiness (Typical)	136 grams (GF)	J-STD-005, IPC-TM-650, Method 2.4.44
Cold Slump Test	Pass	J-STD-005, IPC-TM-650, Method 2.4.35
Hot Slump Test	Pass	J-STD-005, IPC-TM-650, Method 2.4.35
Solder Ball Test	Pass	J-STD-005, IPC-TM-650, Method 2.4.43
Wetting	Pass	J-STD-005, IPC-TM-650, Method 2.4.45
Reliability Properties		
Copper Mirror	Low	J-STD-004B, IPC-TM-650, Method 2.3.32
Copper Corrosion	Low	J-STD-004B, IPC-TM-650, Method 2.6.15
Halogen Content	None Detected	J-STD-004B, IPC-TM-650, Method 2.3.81
Electrochemical Migration (ECM)	Pass	J-STD-004B, IPC-TM-650, Method 2.6.14.1 Test Conditions: 65 °C, 85% RH, 25 days, 100V
Surface Insulation Resistance (SIR)	Pass	J-STD-004B, IPC-TM-650, Method 2.6.3.7 Test Conditions: 40 °C, 90% RH, 7 days, 12.5V

PROCESSING GUIDELINES

Process Considerations / Recommendations

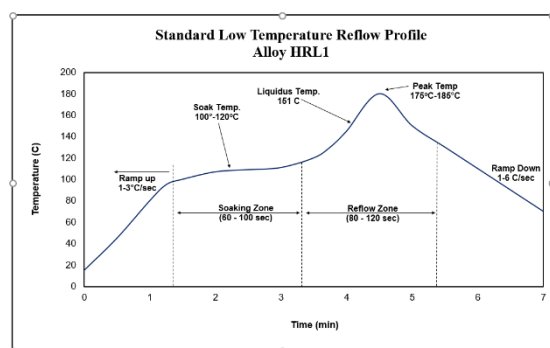
Below information are process guidelines, and it is advisable to note that the optimum setting for a given assembly may vary and this is dependent on the circuit board design, board thickness, components used and equipment used. A design of experiments is recommended to be done to optimize the soldering process.

Printing Process Parameters	Recommendations
Speed	100 to 120 mm/sec (4 to 4.7 in/sec)
Pressure ¹	1.8 Kg/50 mm (target 2 lb/in)
Separation Speed	Target 8 to 12 mm/sec
Stencil Life	8 hours at 23 °C (74 °F) / 50% RH
Lift Height	8 to 12 mm (0.31 in to 0.47 in)

¹ Pressure should be increased with increasing print speed. First set the print speed. Then set the pressure to the minimum required to clean the solder paste off of the stencil.

For mixed solder joint with SAC ball BGAs, use 0.4 to 0.6 paste to sphere volume ratio. In addition, incoming solderability inspection of circuit boards and components is recommended as part of process control to maintain consistent soldering performance and electrical reliability.

Recommended Reflow Profile for Homogeneous Solder Joints

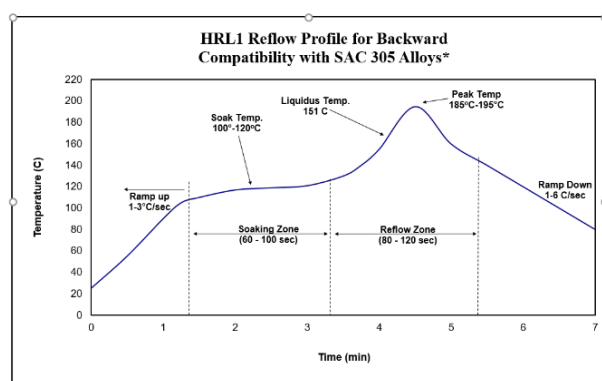


The general recommended convection reflow profile for the NP510-LT HRL1 is shown here as a starting point. Your final profile will depend on your board mass and component combination. NP510-LT HRL1 has excellent solderability and wetting capabilities in air or nitrogen reflow atmospheres reflow equipment. Your optimal profile may be different from the basic graph. Please contact Kester Technical Support if you need profiling advice.

Reflow Process Parameter	Recommendations
Ramp Rate	1 to 3 °C/sec
Soak Temperature	100 to 120 °C
Soak Time	60 to 100 sec
Peak Temperature	175 to 185 °C
Time Above Liquidus	80 to 120 sec

Reflow Process Parameter	Recommendations
Cooling Rate	1 to 6 °C/sec

Reflow Profile for Hybrid Solder Joints with Sn/Ag/Cu Alloy*



The general recommended convection reflow profile for the NP510-LT HRL1 is shown here as a starting point. Your final profile will depend on your board mass and component combination. NP510-LT HRL1 has excellent solderability and wetting capabilities in air or nitrogen reflow atmospheres reflow equipment. Your optimal profile may be different from the basic graph. Please contact Kester Technical Support if you need profiling advice.

Reflow Process Parameter	Recommendations
Ramp Rate	1 to 3 °C/sec
Soak Temperature	100 to 120 °C
Soak Time	60 to 100 sec
Peak Temperature	185 to 195 °C
Time Above Liquidus	80 to 120 sec
Cooling Rate	1 to 6 °C/sec

*This profile is simply a guideline.

For a reliable solder joint, diffusion of the HRL1 alloy in the SAC sphere must occur. Complete sphere collapse is not expected in HRL1 hybrid solder joint. The mixing level between the HRL1 and SAC305 alloy is a function of reflow peak temperature, time above liquidus, component size and sphere alloy. Your optimal reflow profile may be different from the one shown based on your oven, component sphere size, sphere alloy and printed solder paste volume.

Cleaning

NP510-LT HRL1 residues are non-conductive, non-corrosive, and do not require removal. If it is desired to remove the residues, commercially available residue cleaner may be used. Contact your local Technical Support for additional assistance.

Storage, Handling and Shelf Life

Refrigeration (0 to 10 °C/32 to 50 °F) is the recommended storage condition for solder paste to maintain consistent viscosity, reflow characteristics and overall performance. Shelf life is 6 months from the date of manufacture when refrigerated. NP510-LT HRL1 should be stabilized at room temperature before printing. Please contact your local Technical Support if you require additional advice with regards to handling and storage of this material.

AVAILABILITY

NP510-LT HRL1 is available in type 4 powder (20 to 38 µm). Type 4 is recommended for standard applications. NP510-LT HRL1 standard packaging comes in 500 gm jars. The appropriate combination depends on the process variables and the specific application. If other packaging configuration is needed, please contact your Kester representative for additional information.

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.



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

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 8/F., Two Sky Parc 51 Hung To Road Kwun Tong, Kowloon, Hong Kong, SAR China 852.2500.5365
---	---	--

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

DISCLAIMER: All statements, technical information and recommendations contained herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed. No statement or recommendation shall constitute a representation unless set forth in an agreement signed by officers of seller and manufacturer. NO WARRANTY OF MERCHANTABILITY, WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY IS MADE. The following warranty is made in lieu of such warranties and all other warranties, express, implied, or statutory. Products are warranted to be free from defects in material and workmanship at the time sold. The sole obligation of seller and manufacturer under this warranty shall be to replace any noncompliant product at the time sold. Under no circumstances shall manufacturer or seller be liable for any loss, damage or expense, direct, indirect, incidental or consequential, arising out of the inability to use the product. Notwithstanding the foregoing, if products are supplied in response to a customer request that specifies operating parameters beyond those stated above, or if products are used under conditions exceeding said parameters, the customer by acceptance or use thereof assumes all risk of product failure and of all direct, indirect, incidental and consequential damages that may result from use of the products under such conditions, and agrees to exonerate, indemnify, defend and hold harmless MacDermid, Incorporated and its affiliates therefrom. No suggestion for product use nor anything contained herein shall be construed as a recommendation to use any product in a manner that infringes any patent or other intellectual property rights, and seller and manufacturer assume no responsibility or liability for any such infringement.

© 2019 MacDermid, Inc. and its group of companies. All rights reserved. "(R)" and "TM" are registered trademarks or trademarks of MacDermid, Inc. and its group of companies in the United States and/or other countries.