MacDermid Alpha ELECTRONICS SOLUTIONS

TECHNICAL DATA SHEET

KESTER® NP505-HR SOLDER PASTE

High-Reliability, Zero-Halogen, Lead-Free, No-Clean

DESCRIPTION

Kester NP505-HR Solder Paste is a zero-halogen, lead-free, no-clean solder paste formula developed specifically for high-reliability applications. NP505-HR has been formulated to have reliable post-reflow residues under challenging SIR conditions. NP505-HR offers flexibility in print conditions across a wide range of temperatures and humidity. NP505-HR is fully capable of printing and reflowing 01005 components in air reflow. Post-soldering, NP505-HR offers minimized defects, including head-in-pillow and QFN/BGA voiding. This paste is zero-halogen, exceeding the IPC definition for halogen-free. NP505-HR is classified as ROL0 per IPC J-STD-004B. NP505-HR is compatible with SAC305 and leading high reliability Innolot alloy. For a list of compatible products, visit Kester's website or contact Kester Technical Support.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

FEATURES & BENEFITS

- Zero-Halogen (none intentionally added)
- Reliable residues in harsh SIR testing with forced condensation points
- Reflowable in air and nitrogen
- Consistent print performance to 0.55AR (SAC305) and 0.57AR (Innolot)
- Low QFN/BGA voiding
- Excellent solderability across wide variety of profiles
- Compatible with most conformal coating materials
- Stable paste properties - 12-month shelf life for SAC305 and 6-month shelf life for Innolot

ROHS COMPLIANCE

This product meets the requirements of the Restriction of Hazardous Substances (RoHS) Directive, 2015/863 for the stated banned substances.

TECHNICAL DATA

Category	Results	Procedure/Remarks
Physical Properties (Data given for SAC305, 88.5% metal, Type 3 & 4)		
Viscosity Typical)	1750 poise with SAC305	Malcom Viscometer @ 10 rpm and 25 °C/75 °F
Tack Life	Pass	J-STD-005, IPC-TM-650, Method 2.4.44
Slump Test	Pass	J-STD-005, IPC-TM-650, Method 2.4.35
Solder Ball Test	Preferred	J-STD-005, IPC-TM-650, Method 2.4.43
Reliability Properties		
Copper Mirror Corrosion	Low	J-STD-004B, IPC-TM-650, Method 2.3.32
Corrosion Test	Low	J-STD-004B, IPC-TM-650, Method 2.6.15
Bono Corrosion Test	Pass; Fc=1.1%	Test Conditions: 85 °C/185 °F, 85% RH, 15 days, 12V
Halogen Content	None Detected	J-STD-004B, IPC-TM-650, Method 2.3.41 (ref. EN 14582)
Electrochemical Migration (ECM)	Pass	J-STD-004B, IPC-TM-650, Method 2.6.14.1 Test Conditions: 65 °C/149 °F, 85% RH, 25 days, 100V
Bellcore SIR, IPC	Pass	All Readings >2.0x1010 Ω Tested to GR78 Core 13.1.3 Test Conditions: 35 °C/95 °F, 85% RH, 4 days, 100V
Surface Insulation Resistance (SIR)	Pass	J-STD-004B, IPC-TM-650, Method 2.6.3.7 Test Conditions: 40 °C/104 °F, 90% RH, 7 days, 12.5V
Surface Insulation Resistance (SIR)	Pass up to 100 µm spacing and on MLF	J-STD-004B, IPC-TM-650, Method 2.6.3.7

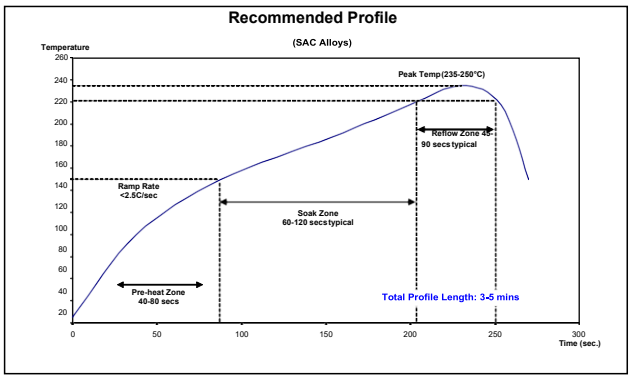
Category	Results	Procedure/Remarks
		Test Conditions: 40 °C/104 °F, 90% RH, 7 days, 12V
Surface Insulation Resistance (SIR)	Pass	J-STD-004A, IPC-TM-650, Method 2.6.3.3 Test Conditions: 85 °C/185 °F, 85% RH, 7 days, 100V
Surface Insulation Resistance (SIR)	Pass up to 100 µm spacing	J-STD-004A, IPC-TM-650, Method 2.6.3.3 Test Conditions: 85 °C/185 °F, 85% RH, 7 days, 10V
Standard Applications	88.5% Metal SAC305, 88.2% Metal Innolot	

PROCESSING GUIDELINES

Printing Parameters

Squeegee Speed	80 to 90 durometer stainless steel or polyurethane
Separation Speed	Capable to a maximum speed of 25 to 150 mm/sec (1 to 6 in/sec)
Stencil Material	Stainless Steel, Molybdenum, Nickel Plated or Brass
Temperature/Humidity	Optimal ranges are 21 to 25 °C (70 to 77 °F) / 35 to 65% RH

Recommended Reflow Profile



The general recommended convection reflow profile for NP505-HR formula made with SAC and Innolot alloys is shown here as a starting point.

Your final profile will depend on your board mass and component combination. NP505-HR has excellent solderability and wetting capabilities in air or nitrogen reflow atmospheres. Your optimal profile may be different from the basic graph.

Please contact your local Technical Support if you need profiling advice.

Cleaning

NP505-HR is a no-clean formula. The residues are designed to remain on the PCB post-reflow. Although NP505-HR is designed for no-clean applications, its residues can be easily removed using automated cleaning equipment (in-line or batch) with a variety of readily available cleaning agents. Contact Kester technical support if residue removal is required.

Storage, Handling and Shelf Life

Under refrigeration (0 to 10 °C / 32 to 50 °F), the shelf life is 12 months for NP505-HR SAC305 alloy (T3 and T4), and 6 months for Innolot T4 and SAC305 T5 from the date of manufacture. Refrigeration (0 to 10 °C/ 32 to 50 °F) is the recommended storage condition for optimal solder paste performance. NP505-HR SAC305 can be stored up to 4 weeks at room temperature conditions (< 25 °C/77 °F) and up to 7 days at elevated temperatures (<30 °C/86 °F) with minimal impact to overall product performance. When refrigerated, NP505-HR should be stabilized at room temperature before use. Please contact your local Technical Support if you require additional advice regarding storage and handling of this material.

AVAILABILITY

NP505-HR is available in the SAC305 alloy with Type 3, 4 & 5 powder mesh, and Innolot high reliability alloy in Type 4. Type 4 mesh size is recommended for standard and fine pitch applications. NP505-HR is also compatible with other SAC alloys in similar melting range to the listed alloys. For specific packaging information refer to this product's Product Offerings tab at kester.com for available sizes. The appropriate combination depends on process variables and the specific application.

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

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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