NP505-HR Solder Paste

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

Product 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.

Performance Characteristics:

- 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.

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
Tested to J-STD-005, IPC-TM-650, Method 2.4.44

Slump Test: Pass
Tested to J-STD-005, IPC-TM-650, Method 2.4.35

Solder Ball Test: Preferred
Tested to J-STD-005, IPC-TM-650, Method 2.4.43

Reliability Properties

Copper Mirror Corrosion: Low
Tested to J-STD-004B, IPC-TM-650, Method 2.3.32

Corrosion Test: Low
Tested to 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
Tested to J-STD-004B, IPC-TM-650, Method 2.3.41 (ref. EN 14582)

Electrochemical Migration (ECM): Pass
Tested to 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 >$2.0x10^{10}$ Ω Tested to GR78 Core 13.1.3
Test Conditions: 35 °C/95 °F, 85% RH, 4 days, 100V

Surface Insulation Resistance (SIR): Pass
Tested to 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
Tested to J-STD-004B, IPC-TM-650, Method 2.6.3.7
Test Conditions: 40 °C/104 °F, 90% RH, 7 days, 12V

Surface Insulation Resistance (SIR): Pass
Tested to 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
Tested to 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

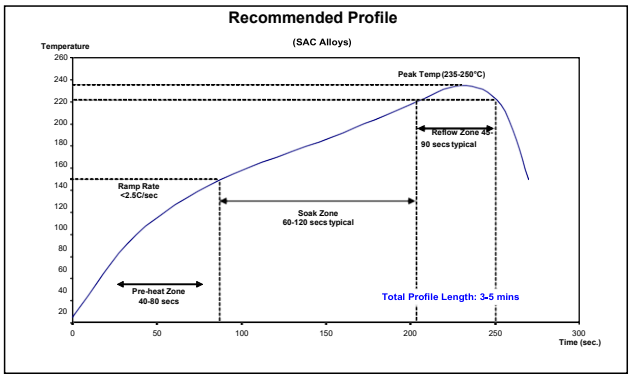
Availability

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.

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 Kester 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.

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 or link here.

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 prior to use. Please contact Kester Technical Support if you require additional advice regarding storage and handling of this material.

Health and Safety

This product, during handling or use, may be hazardous to your health or the environment. Read the Safety Data Sheet and warning label before using this product. Safety Data Sheets are available at this link.

Contact Information

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

North America	Europe	Asia Pacific
109 Corporate Blvd. South Plainfield, NJ 07080, USA 1.800.253.7837	Unit 2, Genesis Business Park Albert Drive Woking, Surrey, GU21 5RW, UK 44.01483.758400	8/F., Paul Y. Centre 51 Hung To Road Kwun Tong, Kowloon, Hong Kong 852.3190.3100

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.