

## NP505-HR Solder Paste

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

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### 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:** PassAll Readings  $>2.0 \times 10^{10} \Omega$  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  $\mu\text{m}$  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 Innot

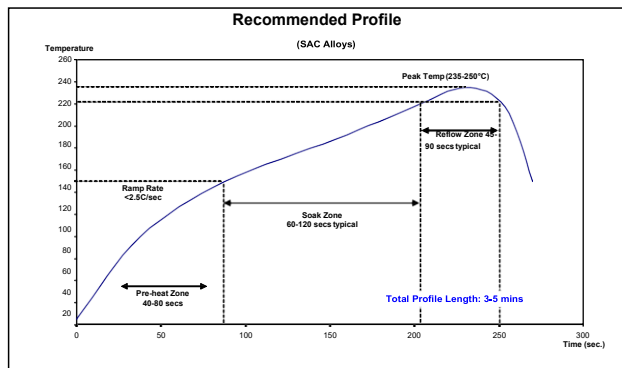
**Availability**

NP505-HR is available in the SAC305 alloy with Type 3, 4 & 5 powder mesh, and Innot 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**

<b>Squeegee Speed</b>	80 to 90 durometer stainless steel or polyurethane
<b>Separation Speed</b>	Capable to a maximum speed of 25 to 150 mm/sec (1 to 6 in/sec)
<b>Stencil Material</b>	Stainless Steel, Molybdenum, Nickel Plated or Brass
<b>Temperature/Humidity</b>	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 Innot 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.

## 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 Innotot 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 <https://www.kester.com/downloads/sds>.

## Contact Information

To confirm this document is the most recent version, please contact [Assembly@MacDermidAlpha.com](mailto:Assembly@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

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