Technical Data Sheet

NP505-HR Solder Paste

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

Product Description

Kester NP505-HR 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 residues even in harsh damp cycling SIR testing. NP505-HR can handle a wide variety of printer variables, including print speed and long idle times with a wide range of temperatures and humidities. NP505-HR is fully capable of printing and reflowing 01005 components in air reflow with minimal graping behavior. Post-soldering, the 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.

Performance Characteristics:

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

RoHS Compliance

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

Physical Properties

Alloy: Sn96.5Ag3Cu0.5 (SAC305)

Percent Metal: 88.5%

Powder: Type 4

Viscosity (typical): 1750 poise
Malcom Viscometer @ 10 rpm and 25°C

Initial Tackiness (typical): 40 grams
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, 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, 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, 85% RH, 4 days, 100V

Surface Insulation Resistivity (SIR): Pass
Tested to J-STD-004B, IPC-TM-650, Method 2.6.3.7
Test Conditions: 40°C, 90% RH, 7 days, 12.5V

Surface Insulation Resistivity (SIR): Pass
Tested to J-STD-004A, IPC-TM-650, Method 2.6.3.3
Test Conditions: 85°C, 85% RH, 7 days, 100V

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Standard Applications:

Stencil Printing: 88.5% Metal

Availability

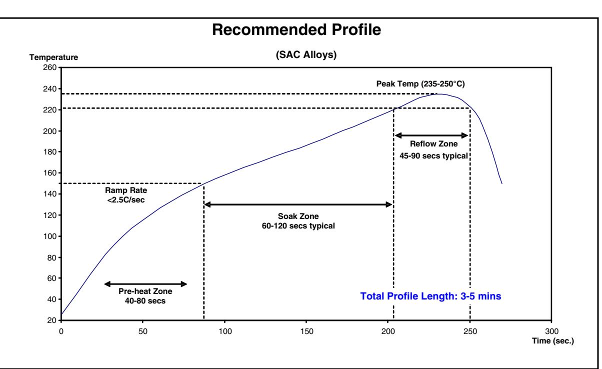
NP505-HR is available in the SAC305 alloy with Type 3, 4 & 5 powder mesh. Type 4 mesh size is recommended for standard and fine pitch applications. NP505-HR is also compatible with other SAC alloys in similar melting range to the listed alloys. For specific packaging information refer to Kester's Solder Paste Packaging Chart for available sizes. The appropriate combination depends on process variables and the specific application.

Printing Parameters

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

Recommended Reflow Profile

The general recommended convection reflow profile for NP505-HR formula made with SAC 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 reflow equipment. 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 do not need to be removed for typical applications. 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. If residue removal is required, call Kester Technical Support.

Storage, Handling and Shelf Life

Under refrigeration (0-10°C / 32-50°F), shelf life for NP505-HR T3 / T4 solder paste is 12 months from the date of manufacture, and T5 solder paste is 6 months from the date of manufacture. Refrigeration (0-10°C/ 32-50°F) is the recommended storage condition for optimal solder paste performance. NP505-HR can be stored up to 4 weeks at room temperature conditions (< 25°C) and up to 7 days at elevated temperatures (<30°C) 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.

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