

NP505-LT Solder Paste

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



Product Description

NP505-LT is a no-clean, Pb-free, zero-halogen solder paste for assemblies that have temperature sensitive substrates and components. Warpage is becoming more evident with the trend towards complex boards and the trend of using thinner and larger packages and boards. The defects caused by the warpage may decrease board reliability and increase in rework. NP505-LT is designed to reduce warpage inherent to board-to-package.

Performance Characteristics:

- Classified ROL0 per IPC J-STD-004B
- Zero-Halogen (none intentionally added)
- Low reflow peak temperatures (175-215°C)
- Reduced reflow temperatures improving efficiency in energy and cost
- Reduction in board-to-package warpage
- Low voiding potential under QFNs (< 15%)
- Wide reflow profile window with good solderability on various PCB surface finish
- Excellent activity and printability
- Extremely stable paste properties
- Colorless residues for easy post-reflow inspection

RoHS Compliance

This product meets the requirements of the Restriction of Hazardous Substances (RoHS) Directive. Additional RoHS information is located at <https://www.kester.com/downloads/environmental>.

Physical Properties

(Typical Values for Sn42Bi57Ag01, T4)

Viscosity (typical): 1400 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

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

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

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

Wetting: Pass
Tested to J-STD-005, IPC-TM-650, Method 2.4.45

Reliability Properties

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

Copper Corrosion: Low
Tested to J-STD-004B, IPC-TM-650, Method 2.6.15

Halogen Content: None Detected
Tested to J-STD-004B, IPC-TM-650, Method 2.3.81

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

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

Availability

NP505-LT is available in Sn42Bi57Ag01 alloy with type 4 powder mesh (20-38µm). Type 4 mesh size is recommended for standard and fine pitch applications. NP505-LT standard packaging in 500gm jars and 600gm cartridges. 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.

Process Guidelines

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
Solder Paste Bead Size	Initial 2cm (0.75in); Add below 1.4cm (0.5in)
Squeegee Angle	60 deg. from horizontal
Speed	25-150 mm/sec (1-6 in/sec)
Pressure ¹	0.7-1.3 Kg/50mm (0.78-1.45 lb/in)
Separation Speed	≥ 5-≤ 20mm/sec
Underside Cleaning ²	Solvent, vacuum, and dry wipe recommended
Stencil Life	4 hours at 20-25°C (68-77°F) / 30-60% RH

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.

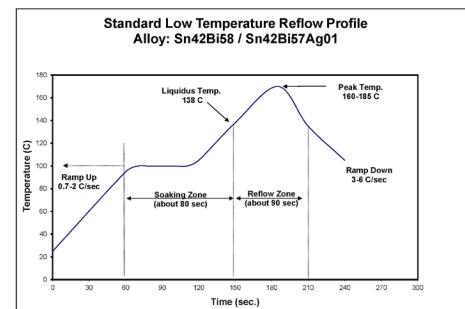
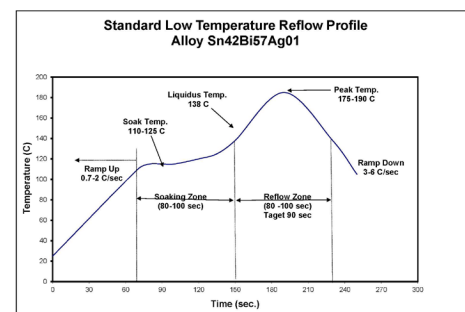
² Some cleaning chemistry can interact with the solder paste and can impact the print performance

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

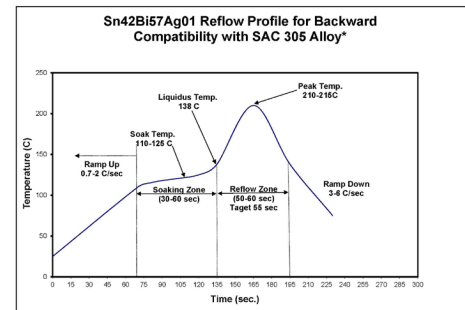
The general recommended convection reflow profile for the NP505-LT formula made with Sn42Bi57Ag01 is shown here as a starting point. Your final profile will depend on your board mass and component combination. NP505-LT has excellent solderability and wetting capabilities in air or nitrogen reflow atmospheres 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	0.7-2.0°C/sec
Soak Temperature	110-125°C
Soak Time	80-100 sec
Peak Temperature	175-190°C
Time Above Liquidus	80-100 sec (target 90 sec)
Cooling Rate	3-6°C/sec



Reflow Profile for Backward Compatibility with Sac305 Alloy*

Reflow Process Parameter	Recommendations
Ramp Rate	0.7-2.0°C/sec
Soak Temperature	110-125°C
Soak Time	30-60 sec
Peak Temperature	210-215°C
Time Above Liquidus	50-60 sec (target 55 sec)
Cooling Rate	3-6°C/sec



*This profile is simply a guideline. For a reliable solder joint the reflow profile must product homogeneous mixing of the Sn42Bi57Ag01 alloy with the SAC305 component sphere. The mixing level between the Sn42Bi57Ag01 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 eh one shown based on your oven, component sphere size and sphere alloy.

Cleaning

NP505-LT 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 Kester Technical Support for additional assistance.

Storage, Handling and Shelf Life

Refrigeration (0-10°C/32-50°F) is the recommended storage condition for solder paste to maintain consistent viscosity, reflow characteristics and overall performance. Shelf life is 6 months from date of manufacture when refrigerated. NP505-LT should be stabilized at room temperature prior to printing. Please contact Kester Technical Support if you require additional advice with regards to handling and storage 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>.