

## NP505-LT Solder Paste

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

---

### Product Description

NP505-LT Solder Paste is a no-clean, lead-free, zero-halogen solder paste for assemblies that have temperature sensitive substrates and components. Warping 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 to 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 Resistant (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 to 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.

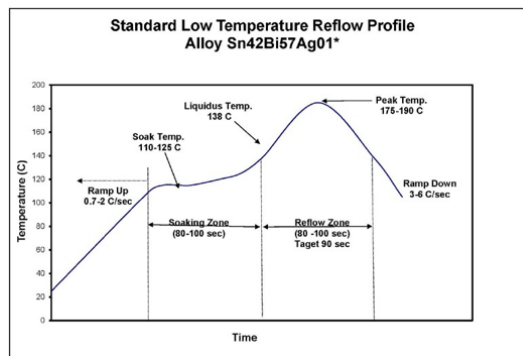
| Printing Process Parameters     | Recommendations                                      |
|---------------------------------|------------------------------------------------------|
| Solder Paste Bead Size          | Initial 2 cm (0.75 in); Add below 1.4 cm (0.5 in)    |
| Squeegee Angle                  | 60 deg. from horizontal                              |
| Speed                           | 25 to 150 mm/sec (1 to 6 in/sec)                     |
| Pressure <sup>1</sup>           | 0.7 to 1.3 Kg/50mm (0.78 to 1.45 lb/in)              |
| Separation Speed                | $\geq 5$ to $\leq 20$ mm/sec                         |
| Underside Cleaning <sup>2</sup> | Solvent, vacuum, and dry wipe recommended            |
| Stencil Life                    | 12 hours at 20 to 25 °C (68 to 77 °F) / 30 to 60% RH |

<sup>1</sup> 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.

<sup>2</sup> 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



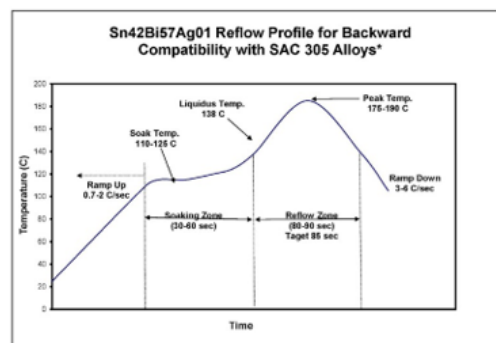
The general recommended convection reflow profile for the NP505-LT formula made with Sn42Bi57Ag01 is shown here as a starting point. Your final profile will depend on your board mass and component combination. NP505-LT has excellent solderability and wetting capabilities in air or nitrogen reflow atmospheres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

## Reflow Profile for Backward Compatibility with Sac305 Alloy\*

| Reflow Process Parameter | Recommendations              |
|--------------------------|------------------------------|
| Ramp Rate                | 0.7 to 2.0 °C/sec            |
| Soak Temperature         | 110 to 125 °C                |
| Soak Time                | 30 to 60 sec                 |
| Peak Temperature         | 175 to 190 °C                |
| Time Above Liquidus      | 80 to 90 sec (target 85 sec) |
| Cooling Rate             | 3 to 6 °C/sec                |

\* This profile is simply a guideline. 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 the one shown based on your oven, component sphere size, sphere alloy and printed solder paste volume.



## 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.

## 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

Refrigeration (0 to 10 °C/32 to 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 this [link](#).

## Contact Information

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

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

© 2019 MacDermid, Inc. and its group of companies. All rights reserved. "®" and "™" are registered trademarks of MacDermid, Inc. and its group of companies in the United States and/or other countries.