

## NP560 Solder Paste

No-Clean, Lead-Free, Low Voiding under QFNs

---

### Product Description

Kester NP560 Solder Paste is a no-clean, lead-free, halogen-free solder paste. It consistently delivers paste transfer efficiencies of 0.50 to 0.55 AR and is fully capable of printing and reflowing 01005 components, even in air, with minimal graping behavior. In addition to its stable, consistent product performance, NP560 has redefined the voiding standard for PCB assembly and has the potential for low voiding performance.

### Performance Characteristics:

- Classified as ROM0 per IPC J-STD-004B
- Halogen-Free
- Low voiding potential under QFNs
- Excellent activity and printability
- Very low graping
- Reflowable in air and nitrogen conditions
- Wide reflow profile window with good solderability on various PCB surface finish

### 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

**Viscosity (typical):** 1300 poise

Malcom Viscometer @ 10 rpm and 25 °C

**Tack Life:** Pass

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-004, IPC-TM-650, Method 2.3.32

**Copper Corrosion:** Medium

Tested per IPC-TM-650, Method 2.6.15

**Halogen Content:** None Detected

Tested per IPC-TM-650, Method 2.3.81

**Silver Chromate:** None Detected

Tested to J-STD-004, IPC-TM-650, Method 2.3.33

**Fluoride Spot Test:** None Detected

Tested to J-STD-004, IPC-TM-650, Method 2.3.35.1

**Electrochemical Migration (ECM):** Pass

Tested per IPC-TM-650, Method 2.6.14.1

Test Conditions: 65 °C, 90% RH, 25 days, 100V

**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

**Surface Insulation Resistance (SIR):** Pass

Tested per IPC-TM-650, Method 2.6.3.7

Test Conditions: 40 °C, 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

## Availability

NP560 is available in Sn96.5Ag3Cu0.5 alloy with Type 3 (T3), Type 4 (T4) and Type 5 (T5) powder mesh. Type 4 mesh size is recommended for standard and fine pitch applications. Type 5 is recommended for ultra-fine pitch applications. NP560 is also compatible with other SnAgCu alloys in similar melting range to the listed alloy. For specific packaging information, refer to this product's Product Offerings tab at kester.com for available sizes. The appropriate combination depends on the process variables and the specific application.

## 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.

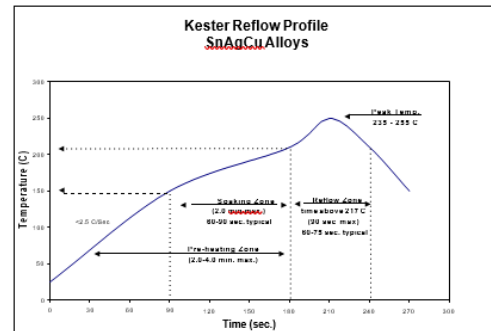
Printing Process Parameters	Recommendations
Solder Paste Bead Size	Initial 2 cm (0.75 in); Add below 1.4 cm (0.5 in)
Squeegee Angle	60 deg. from horizontal; 45 deg. for pin in paste
Speed	25 mm/sec to 150 mm/sec (1 to 6inch/seconds)
Pressure <sup>1</sup>	0.18 to 0.27 kg/cm (1 to 1.5 lb/in)
Separation Speed	2 to 10 mm/seconds
Underside Cleaning <sup>2</sup>	Solvent, vacuum and dry wipe recommended
Stencil Life	8 hours at 65 to 85 °F and 10 to 70% 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 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.

Reflow Process Parameter	Recommendations
Time from 45 °C to peak	3.5 to 4.5 min
Ramp rate	0.7 to 2.0 °C/seconds
Preheat time (130 to 180 °C)	30 to 90 sec (70 sec target)
Peak temperature	235 to 255 °C for SAC alloys
Cooling Rate	3 to 6 °C/seconds



Note: TAL should be calculated based on the liquidus point of the alloy used: SAC305 221 °C. Adding a soak between 180 and 200 °C for 20 to 30 seconds can further reduce voiding and reduce the potential for tombstoning.

The recommended reflow profile for NP560 formula made with SAC alloys is shown here. This profile is simply a guideline. NP560 has excellent solderability and wetting across a wide range of profiles, with similar performance in air and nitrogen. Your optimal profile may be different from the one shown based on your oven, board and mix of defects. For optimal reflow profile for void reduction or additional profiling advice, contact Kester Technical Support.

## Cleaning

NP560 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

The shelf life for NP560 T3 and T4 is 12 months from the date of manufacture when stored in refrigeration and can be stored up to 4 weeks at room temperature (up to 27 °C/80 °F) with minimal impact to overall product performance. NP560 T5 has a refrigerated shelf life of 6 months. 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. When refrigerated, NP560 should be stabilized to room temperature prior to use. 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> 109 Corporate Blvd. South Plainfield, NJ 07080, USA 1.800.253.7837	<b>Europe</b> Unit 2, Genesis Business Park Albert Drive Woking, Surrey, GU21 5RW, UK 44.01483.758400	<b>Asia Pacific</b> 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.

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