

# LOCTITE WS 300

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## PRODUCT DESCRIPTION

LOCTITE WS 300 provides the following product characteristics:

<b>Application</b>	Water-Wash Soldering
<b>Technology</b>	Lead-Free Solder Paste

LOCTITE WS 300 is a lead-free water washable solder paste for printing and reflow in air or nitrogen atmospheres where process yield is critical. LOCTITE WS 300 solder paste offers excellent open time and good soldering activity over a wide range of reflow profiles and surface finishes. LOCTITE WS 300 is available with 96SC & 97SC SnAgCu alloys. Other Pb-free alloys may be available on request.

## FEATURES AND BENEFITS

- Effective over a wide range of printer cycle times and print speeds
- Excellent printer open time and between print abandon time
- Long component tack time
- Excellent slump resistance
- Effective over a wide range of reflow profiles in air or nitrogen
- Residues removed with de-ionized water rinse processing

## TYPICAL PROPERTIES

### Solder Paste Typical Properties

Alloys	96SC, 97SC
Alloy melting range, °C	217
Powder Size Coding	AGS
IPC Equivalent (ANSI/J-STD 005)	Type 3
Powder Particle Size, µm	45-20
Metal Loading (Weight %)	88
Malcom Viscosity at 6 s <sup>-1</sup> @ 25°C, P	1,450
Brookfield Viscosity TF spindle, 25°C, 5rpm after 2 minutes, mPa·s	590,000
Thixotropic Index (Ti), 25°C (Ti = log(viscosity @ 1.8s <sup>-1</sup> / viscosity @ 18s <sup>-1</sup> ))	0.66
Slump, J-STD-005, mm <i>RT, 15 minutes</i>	IPC A21 Pattern
0.33 x 2.03 mm pads	0.15
0.63 x 2.03 mm pads	0.33
<i>150°C, 15 minutes</i>	
0.33 x 2.03 mm pads	0.15
0.63 x 2.03 mm pads	0.33
Initial tack force, gF	39.5

Alloy	97SC
Alloy melting range, °C	217
Powder Size Coding	DAP
IPC Equivalent	Type 4
Powder Particle Size, µm	38-15
Metal Loading (Weight %)	88
Malcom Viscosity @ 25°C, Pa.s @ Shear Rate of 6 s <sup>-1</sup>	1,525
Slump, J-STD-005, mm <i>RT, 15 minutes</i>	IPC A21 Pattern
0.33 x 2.03 mm pads	0.15
0.63 x 2.03 mm pads	0.33
<i>150°C, 15 minutes</i>	
0.33 x 2.03 mm pads	0.15
0.63 x 2.03 mm pads	0.33
Initial tack force, gF	39.5

Alloy	96SC
Alloy melting range, °C	217
Powder Size Coding	AGS
IPC Equivalent	Type 3
Powder Particle Size, µm	45-20
Metal Loading (Weight %)	84
Malcom Viscosity @ 25°C, Pa.s @ Shear Rate of 6 s <sup>-1</sup>	430
Brookfield Viscosity @ 25°C, mPa.s Spindle TF, Speed 5 rpm, 2 minutes	292,000
Thixotropic Index (Ti) Ti = log (1.8/18 s <sup>-1</sup> )	0.68

### Solder Powder:

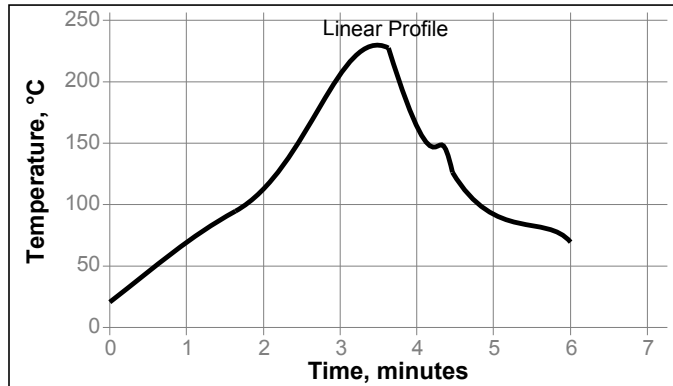
Careful control of the atomisation process for production of solder powders for LOCTITE WS 300 solder pastes ensures that the solder powder is produced to a quality level that exceeds IPC/J-STD-006 & EN29453 requirements for sphericity, size distribution, impurities and oxide levels. Minimum order requirements may apply to certain alloys and powder sizes.

## DIRECTIONS FOR USE

### Reflow:

LOCTITE WS 300 has been formulated for reflow in air over a wide range of temperature profiles. A minimum peak temperature of 230-235°C is required. The diagram below shows a reflow profile that has been used successfully. Other profiles may also give good results, depending on board design factors.

**NOTE:** If boards and/or component leads carrying tin/lead finishes are reflowed with this lead-free solder paste, reflow profiles with lower peak temperatures may possibly be used. The resulting joints will have the same solidification temperature as and similar reliability performance to the Sn62 alloy. This combination of materials is perfectly acceptable but of course does not yield a lead-free assembly.



Due to the higher melting point of lead-free alloy relative to Sn62/63, reflow places increased demands on paste thermal stability. High air flow rates give as even a temperature distribution as possible. However, across the board, this may contribute to exhaustion of paste activity. LOCTITE WS 300 combines excellent printing characteristics with tolerance of hot profiles and high air flow rates, although extreme (long & hot) profiles may still give sub-optimal reflow and cleaning in some oven types.

As with all solder pastes, reflow may be carried out in nitrogen if this is installed and this is likely to lessen the effects of long hot profiles and high gas circulation rates.

#### Application:

LOCTITE WS 300 lead-free solder paste is designed for high volume stencil printing applications with component lead pitches down to 0.4 mm with the AGS (Type 3) powder size. Conventional metal blade squeegees may be used with a contact angle of 60° and sweep speeds of 25 mm sec<sup>-1</sup> up to 150 mm sec<sup>-1</sup>. The best printing performance will be obtained under these conditions. The product can, in some cases, tolerate slow print cycle times because the material resists drying on the stencil and therefore blocking the stencil apertures. There are various methods for testing the ability of a paste to perform after an extended idle time on the stencil and each can produce different times before printing deteriorates. In a real process environment, the paste was left idle for more than 1 hour and still produced a perfect first print.

#### Component Placement:

The paste shows good tack behavior and is capable of holding components in place before reflow. Components may be placed several hours after printing, although this is naturally dependent on the ambient conditions.

#### Cleaning:

LOCTITE WS 300 residues are designed to be removed from assemblies in an aqueous cleaner without the use of any additional chemistries and/or saponifiers. Incomplete removal of the residues can lead to reduced reliability of the device. Hot deionised water is the preferred cleaning agent. Residues are easily removed in batch and in-line aqueous cleaners even up to 3 days after reflow. Cleaning of some assemblies is best conducted in an ultrasonic bath. Tap water is not recommended for rinsing since ionic impurities present in tap water can lead to reduced reliability of the assembly.

## RELIABILITY PROPERTIES

### Solder Paste Medium:

LOCTITE WS 300 medium contains stable resin system and includes solvents with high boiling ranges. The formulation has been tested to the requirements of the following specifications.

Test	Specification	Results
Surface Insulation Resistance (cleaned)	ANSI/J-STD-004	Pass
Electromigration (cleaned)	Telcordia GR-78-Core	Pass
	Telcordia GR-78-Core	Pass

## STORAGE AND SHELF LIFE

### Shelf Life:

Provided LOCTITE WS 300 is stored tightly sealed in the original container at 0 to 10°C, a minimum shelf life of 183 days can be expected. Cold packed air shipment is recommended to minimize the time the containers are exposed to higher temperatures.

LOCTITE WS 300 solder paste has been formulated to reduce separation on storage to a minimum but should it occur, gentle stirring for 15 seconds will return the product to its correct rheological performance.

## DATA RANGES

The data contained herein may be reported as a typical value and/or a range. Values are based on actual test data and are verified on a periodic basis.

## GENERAL INFORMATION

**For safe handling information on this product, consult the Material Safety Data Sheet (MSDS).**

### Not for Product Specifications

The technical information contained herein is intended for reference only. Please contact Henkel Corporation Technical Service for assistance and recommendations on specifications for this product.

### Conversions

(°C x 1.8) + 32 = °F  
 kV/mm x 25.4 = V/mil  
 mm / 25.4 = inches  
 µm / 25.4 = mil  
 N x 0.225 = lb  
 N/mm x 5.71 = lb/in  
 N/mm<sup>2</sup> x 145 = psi  
 MPa x 145 = psi  
 N·m x 8.851 = lb·in  
 N·m x 0.738 = lb·ft  
 N·mm x 0.142 = oz·in  
 mPa·s = cP

### Disclaimer

#### Note:

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Reference **N/A**