LOCTITE

Technical Data Sheet

LOCTITE WS 200

July 2016

PRODUCT DESCRIPTION

LOCTITE WS 200 provides the following product characteristics:

Application	Soldering
Technology	Water Washable Solder Paste

LOCTITE WS 200 is a water washable solder paste for printing and reflow in air or nitrogen atmospheres where process yield is critical. This material offers excellent open time, greatly extended abandon times and good soldering activity over a wide range of reflow profile types and surface finishes. LOCTITE WS 200 is available with Sn62, Sn63 and 63S4 anti-tombstone alloys alloys.

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 Powder

Careful control of the atomization process for production of solder powders for LOCTITE WS 200 solder pastes ensures that the solder powder is produced to a quality level that exceeds IPC/J-STD-006 and EN 29453 requirements for sphericity, size distribution, impurities and oxide levels.

Minimum order requirements may apply to certain alloys and powder sizes.

Particle Size Distribution (PSD) *(J-STD 005A)*

Henkel Powder Description	Powder Particle Size Distribution	IPC EQUIVALENT
AGS	45-20 µm	Type 3
ACP	45-10 µm	-
DAP	38-25 µm	Type 4

Solder Alloy *(J-STD 006)*

Henkel Code	Alloy	Melting Point,ºC
Sn62	Sn62Pb36Ag2	179ºC
Sn63	Sn63Pb37	183ºC
63S4	Sn62.8Pb36.8Ag0.4	179 to 183ºC

SOLDER PASTE PROPERTIES

Alloy	Sn62, Sn63
Powder Size Coding	AGS
Metal Content, %	89.5
Brookfield Viscosity @ 25ºC, mPa.s Spindle TF, Speed 5 rpm, 2 minutes	780,000
Malcom Viscosity @ 25ºC, Pa.s @ Shear Rate of 6 s^{-1}, Speed 10 rpm	1,460
Thixotropic Index (Ti) @ 25 °C Ti = log (1.8/18 s^{-1})	0.59
Slump J-STD-005, IPC A21 Pattern ***RT, 15 minutes*** 0.33 x 2.03 mm pads 0.63 x 2.03 mm pads ***150°C, 15 minutes*** 0.33 x 2.03 mm pads 0.63 x 2.03 mm pads	 0.15 0.33 0.15 0.33
Initial tack force, gF	38.5
Useful open time, hours	>24

Alloy (Anti-tombstone)	63S4
Powder Size Coding	ACP
Metal Content, %	89.5
Brookfield Viscosity @ 25ºC, mPa.s Spindle TF, Speed 5 rpm, 2 minutes	800,000
Malcom Viscosity @ 25ºC, Pa.s @ Shear Rate of 6 s^{-1}, Speed 10 rpm	1,525
Thixotropic Index (Ti) Ti = log (1.8/18 s^{-1})	0.6
Slump J-STD-005, IPC A21 Pattern ***RT, 15 minutes*** 0.33 x 2.03 mm pads 0.63 x 2.03 mm pads ***150°C, 15 minutes*** 0.33 x 2.03 mm pads 0.63 x 2.03 mm pads	 0.15 0.33 0.15 0.33
Initial tack force, gF	38.5
Useful open time, hours	>24

Henkel

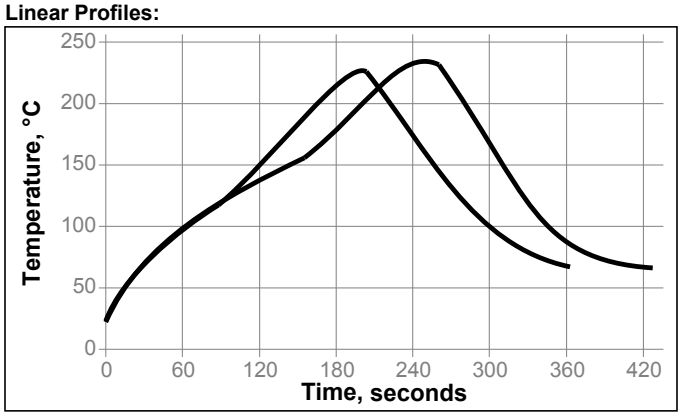
Alloy	Sn63
Powder Size Coding	DAP
Metal Content, %	89.5
Brookfield Viscosity @ 25ºC, mPa.s Spindle TF, Speed 5 rpm, 2 minutes	850,000
Malcom Viscosity @ 25ºC, Pa.s @ Shear Rate of 6 s^{-1}, Speed 10 rpm	1,525
Thixotropic Index (Ti) Ti = log (1.8/18 s^{-1})	0.6
Slump J-STD-005, IPC A21 Pattern ***RT, 15 minutes*** 0.33 x 2.03 mm pads 0.63 x 2.03 mm pads ***150°C, 15 minutes*** 0.33 x 2.03 mm pads 0.63 x 2.03 mm pads	 0.15 0.33 0.15 0.33
Initial tack force, gF	38.5
Useful open time, hours	>24

DIRECTIONS FOR USE

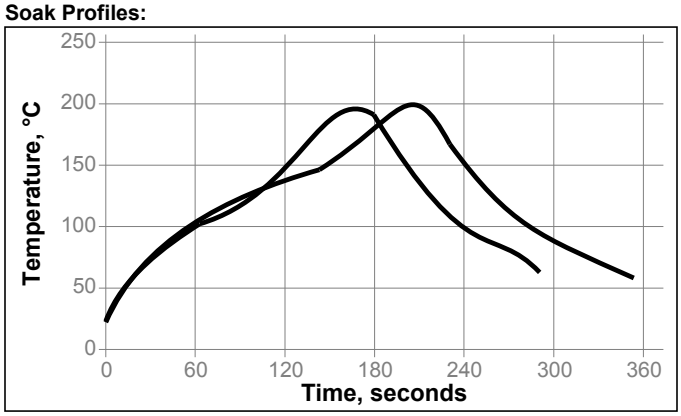
Reflow:

LOCTITE WS 200 has been formulated for reflow in air over a wide range of temperature profiles. The diagrams below show example reflow profiles that has been used successfully. Other profiles may also give good results, depending on board design factors.

Linear Profiles:



Soak Profiles:



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 200 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 200 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 20 to 100 mm/s. 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 200 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 200 medium contains stable resin system and includes solvents with high boiling rangesThe formulation has been tested to the requirements of J-STD-004 and Telcordia (formerly known as Bellcore) after water cleaning.

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

STORAGE AND SHELF LIFE

Shelf Life:

Provided LOCTITE WS 200 is stored tightly sealed in the original container at 0 to 10°C, a minimum shelf life of 183 days can be expected. Air shipment is recommended to minimize the time the containers are exposed to higher temperatures.

LOCTITE WS 200 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

Not for Product Specifications

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

Disclaimer

Note:

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