

# LOCTITE HF 2W

January 2018

## PRODUCT DESCRIPTION

LOCTITE HF 2W provides the following product characteristics:

<b>Technology</b>	Solder paste
<b>Application</b>	Halogen-free, Water washable flux, Pb-based soldering

LOCTITE HF 2W shows excellent solderability when reflowed in both air and nitrogen across a wide range of challenging surface finishes including OSP-Cu, ENIG and Silver.

This material is available with standard tin lead Sn63 eutectic alloy and Henkel proprietary anti-tombstoning 63S4 alloy.

## FEATURES AND BENEFITS

- Water washable, tin-lead solder paste
- Halogen-free flux passes IPC-TM-650 2.3.34/EN14582, flux class '0', J-STD004B ORM0
- Suitable for fine pitch, high speed printing
- Excellent resistance to hot slump @ 150°C
- Good humidity resistance to solder balling
- Excellent solderability in air
- Available with anti-tombstoning alloy technology for improved resistance to tombstone defects
- Residues designed for easy removal when cleaned with water
- Residues designed for easy removal when cleaned with deionized water

## TYPICAL PROPERTIES

### Solder Powder:

The solder powders of LOCTITE HF 2W solder pastes are produced by atomizing alloys conforming to the purity requirements of ANSI/J-STD-006 and EN 29453. The anti-tombstoning alloy 63S4 offers an advantage where tombstoning is a particular process problem. 63S4 is a blend of different melting point alloys with a special mix of solder powder particle sizes. This modification extends the melting range of the alloy reducing the probability that one solder deposit at a component termination can fully reflow before the other.

Careful control of production processes ensure that the solder powder is at least 97% spherical (aspect ratio <1.5) and contains less than a minimum level of contaminants that would adversely affect solder paste performance. A typical maximum oxide contamination level of 80 ppm (expressed as oxygen in the solder) is regularly achieved.

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

Henkel Powder Description	Powder Particle Size Distribution	IPC EQUIVALENT
T3	45-20 µm	Type 3
ACP	45-15 µm	(N/A)

### Solder Alloy (J-STD 006)

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

### Based on T3 powder

#### Solder Paste Typical Properties

Alloy	Sn63
Metal Content, %	90.5
Application Type	Printing
Brookfield Viscosity @ 25°C, mPa.s Spindle TF, Speed 5 rpm, 2 minutes	1,000,000
Malcom Viscosity, 25°C, 10 rpm, Pa.s	225
Thixotropic Index (Ti) Ti = log (1.8/18 s <sup>-1</sup> )	0.55
IPC Slump, mm 25°C, 10 minutes	
0.33 x 2.03 mm pads	0.10
0.63 x 2.03 mm pads	0.33
IPC Slump, mm 150°C, 10 minutes	
0.33 x 2.03 mm pads	0.15
0.63 x 2.03 mm pads	0.33

### Based on Henkel Proprietary Powder

#### Solder Paste Typical Properties

Alloy	63S4
Metal Content, %	90.5
Application Type	Printing
Brookfield Viscosity @ 25°C, mPa.s Spindle TF, Speed 5 rpm, 2 minutes	840,000
Malcom Viscosity, 10 rpm, Pa.s	225
Thixotropic Index (Ti) Ti = log (1.8/18 s <sup>-1</sup> )	0.5
IPC Slump, mm 25°C, 10 minutes	
0.33 x 2.03 mm pads, mm	0.10
0.63 x 2.03 mm pads, mm	0.33
IPC Slump, mm 150°C, 10 minutes	
0.33 x 2.03 mm pads	0.15
0.63 x 2.03 mm pads	0.33

## DIRECTIONS FOR USE

### Application:

1. LOCTITE HF 2W is designed for high volume stencil printing applications at speeds up to 150 mm/sec<sup>-1</sup> (6"/s) using typical stencil and metal squeegees.
2. Sufficient pressure should be applied to achieve a clean wipe of the stencil topside surface.
3. Under laboratory conditions acceptable print quality on 0.8 mm ball devices and 0.4 mm QFP patterns have been achieved after printer abandon times of 2 hours without requiring a knead cycle.

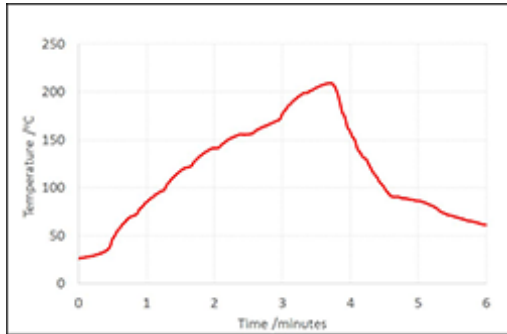
**Reflow:**

LOCTITE HF 2W has been formulated for reflow in air over a wide range of temperature profiles.

Reflow has been assessed using a typical convection reflow oven. Optimal aerobic reflow can be achieved by ramping to a peak temperature of 195 to 225°C at 0.8 to 1.2°C/second and with a soak above the reflow temperature (183°C) for 15 to 60 seconds.

An example profile that has shown good performance for reflow and subsequent cleaning is presented below. Reflow soldering can also be carried out in a nitrogen atmosphere. Other profiles may also give good results, depending on board design factors.

For more information on the appropriate reflow profile contact your local technical service representative.

**Cleaning:**

The post-soldering residues of LOCTITE HF 2W **must** be removed. Residues are designed to be removed from assemblies in an aqueous cleaner without the use of rinse aids and/or saponifiers, typically using water at 40 to 60°C with deionized water for the final rinse. Cleaning can be performed using spray in air, spray under immersion or ultrasonic cleaning methods.

**RELIABILITY PROPERTIES****Solder Paste Medium:**

LOCTITE HF 2W medium contains a stable water-washable resin system and slow evaporating solvents. This formulation has been tested to the requirements of ANSI/J-STD-004B and has the IPC flux classification ORM0.

Copper Mirror	J-STD004B (2.3.32D)	Pass
Corrosion	IPC TM-650-2.6.15c	Pass
Halogen Content	EN 14582, O2 Bomb Test	Pass
SIR (Boards cleaned same day as reflow)	IPC TM-650-2.6.3.3	Pass (cleaned)
SIR (Cleaned after delay of 1 week)	IPC TM-650-2.6.3.3	Pass (cleaned)
SIR (5V/200 µm spacing)	IPC TM-650 2.6.3.7	Pass (cleaned)
Electromigration (ECM) (When cleaned)	IPC TM-650-2.6.14.1	Pass (cleaned)
Flux Activity Classification	J-STD004B, Dec 2008	ORM0

**STORAGE AND SHELF LIFE****Storage:**

Provided LOCTITE HF 2W is stored tightly sealed in its original containers 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.

The material should be removed from cold storage a minimum of 4 hours before use. Do not use forced heating methods to bring solder paste up to temperature.

LOCTITE HF 2W solder paste has been formulated to minimize flux separation in storage but should this occur, gentle stirring will return the product to the correct rheological performance.

It is recommended that cartridges are stored vertically with the cartridge tip facing downwards. To prevent contamination of unused product, do not return any material to its original container.

**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 Technologies Technical Service for assistance and recommendations on specifications for this product.

**Conversions**

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$   
 $\text{kV/mm} \times 25.4 = \text{V/mil}$   
 $\text{mm} / 25.4 = \text{inches}$   
 $\mu\text{m} / 25.4 = \text{mil}$   
 $\text{N} \times 0.225 = \text{lb}$   
 $\text{N/mm} \times 5.71 = \text{lb/in}$   
 $\text{N/mm}^2 \times 145 = \text{psi}$   
 $\text{MPa} \times 145 = \text{psi}$   
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$   
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$   
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$   
 $\text{mPa}\cdot\text{s} = \text{cP}$

**Disclaimer****Note:**

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

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Reference 3