

# LOCTITE 3621

January 2014

## PRODUCT DESCRIPTION

LOCTITE 3621 provides the following product characteristics:

<b>Technology</b>	Epoxy
<b>Chemical Type</b>	Epoxy
<b>Appearance (uncured)</b>	Red viscous gel <sup>LMS</sup>
<b>Components</b>	One component - requires no mixing
<b>Cure</b>	Heat cure
<b>Application</b>	Surface mount adhesive
<b>Key Substrates</b>	SMD components to PCB
<b>Other Application Areas</b>	Small parts bonding
<b>Dispense Method</b>	Syringe
<b>Dispense Speed</b>	Very high 25,000 - 50,000 dots/h
<b>Wet Strength</b>	High

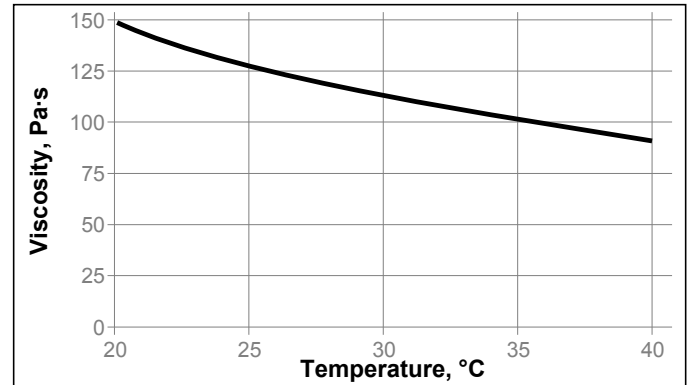
LOCTITE 3621 is designed for the bonding of surface mounted devices to printed circuit boards prior to wave soldering. Particularly suited for applications where very high dispense speeds, high dot profile, high wet strength and good electrical characteristics are required. Particularly suited where dispense speeds greater than 35,000 dots/h are required. LOCTITE 3621 has been used successfully in lead free processes with water and alcohol based fluxes under conditions outlined in the Environmental Resistance section.

## TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.22
Yield Point, 25 °C, Pa	130 to 280 <sup>LMS</sup>
Cone & Plate Rheometer:	
Haake PK 100, M10/PK 1 2° Cone	
Casson Viscosity @ 25 °C, Pa·s	0.5 to 3
Cone & Plate Rheometer:	
Haake PK 100, M10/PK 1 2° Cone	
Particle Size, µm	<150
Flash Point - See SDS	

## VISCOSITY VS. TEMPERATURE

The following graph shows a typical temperature-viscosity curve as measured using a Haake rotoviscometer PK100, M10/PK1 2° Cone system at a shear rate of 2 s<sup>-1</sup> which is representative of the shear rate in the dispense nozzle. Increased cabin or nozzle temperature in the 30°C to 35°C range may aid dispense performance at higher dispense speeds.

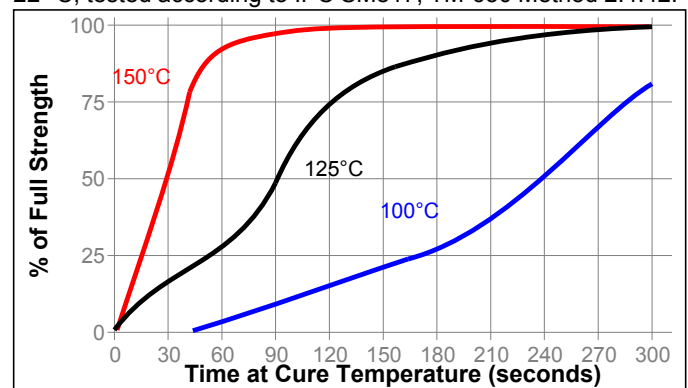


## TYPICAL CURING PERFORMANCE

Recommended conditions for curing are exposure to heat above 100 °C (typically 90-120 seconds @ 150 °C). Rate of cure and final strength will depend on the residence time at the cure temperature.

### Cure Speed vs. Time, Temperature

The following graph shows the rate of torque strength developed with time at different temperatures. These times are defined from the moment the adhesive reaches cure temperature. In practice, total oven time may be longer to allow for heat up period. Strength is measured on 1206 capacitors @ 22 °C, tested according to IPC SM817, TM-650 Method 2.4.42.



### Isothermal DSC Conversion

5 minutes @ 125 °C, %

≥90<sup>LMS</sup>

## TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 30 minutes @ 150 °C

### Physical Properties:

Coefficient of Thermal Expansion,  
ISO 11359-2, K<sup>-1</sup>:

Temperature Range 25 °C to 70 °C

100×10<sup>-6</sup>

Temperature Range 90 °C to 150 °C

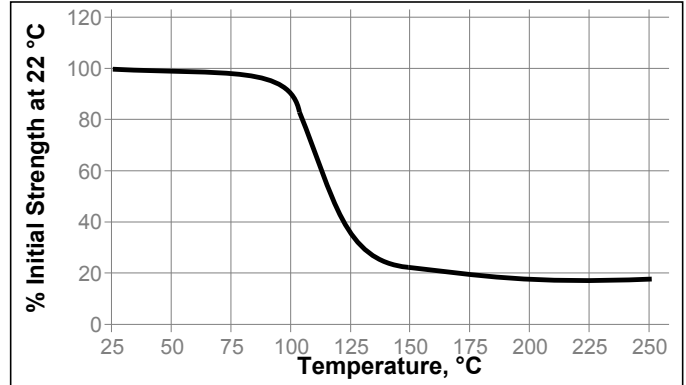
218×10<sup>-6</sup>

Coefficient of Thermal Conductivity, ISO 8302, W/(m·K) 0.3  
 Density, BS 5350-B1 @ 25 °C, g/cm<sup>3</sup> 1.16  
 Glass Transition Temperature, ASTM D 4065, °C 110

**Electrical Properties:**

Volume Resistivity, IEC 60093, Ω·cm 1.3×10<sup>15</sup>  
 Surface Resistivity, IEC 60093, Ω 52×10<sup>15</sup>  
 Dielectric Breakdown Strength, IEC 60243-1, kV/mm 40  
 Electrolytic Corrosion, DIN 53489 A - 1.2  
 Dielectric Constant / Dissipation Factor, IEC 60250:  
 1 kHz 2.94 / 0.005  
 100 kHz 2.87 / 0.003  
 1,000 kHz 2.79 / 0.019  
 10,000 kHz 2.76 / 0.019

**Hot Strength**  
 Tested at temperature



**TYPICAL PERFORMANCE OF CURED MATERIAL**

**Adhesive Properties**

Cured for 5 minutes @ 125 °C

Pull-off Strength, Siemens norm SN59651:  
 C-1206 on bare FR4 board N 50 (lb) (13)

Torque Strength, IPC SM817, TM-650 Method 2.4.42:

C-1206 on bare FR4 board N-mm 60 (in.oz) (9.6)

Cured for 3 minutes @ 150 °C

Push-off Strength:  
 C-1206 on bare FR4 board N ≥27<sup>LMS</sup> (lb) (≥6.0)

Cured for 30 minutes @ 150 °C

Lap Shear Strength, ISO 4587:  
 Mild steel (grit blasted) N/mm<sup>2</sup> ≥15<sup>LMS</sup> (psi) (≥2,175)

Bond strength achieved in practice will vary considerably depending on the SMD component type, adhesive dot size and the type, grade and degree of cure of the solder mask/resist.

**TYPICAL ENVIRONMENTAL RESISTANCE**

Cured for 30 minutes @ 150 °C

Lap Shear Strength, ISO 4587:  
 Mild steel (grit blasted)

**Resistance to Hot Solder Dip**

Cured for 90 seconds @ 150 °C

Hot Solder Dip, IPC SM817, TM-650 Method 2.4.42.1, Pass/Fail:

R-1206 on bare FR4 board:  
 Supported 60 seconds above solder bath @ 260°C and dipped for 10 seconds Pass

**Surface Insulation Resistance (SIR)**

LOCTITE 3621 meets high standards of reliability and environmental resistance, such as SIR testing under electrical bias in high temperature and humidity. The following table shows test parameters and results of such a test under different conditions.

SIR TEST Comb Type	JIS 3197 Type 2 (IPC B25 B-comb)
Comb Dimensions	0.38 mm lines/space
Comb Material	bare copper
Adhesive Coating Thickness	0.1 mm
Adhesive Cure	150 °C, 30 minutes
Applied Bias Voltage / Test Voltage	16 V/250 V
Relative Humidity	85%
Test Temperature	85 °C
Test Duration	1000 hours
Initial Comb Resistance @ 23 °C, 50% R.H., Ω	9×10 <sup>12</sup>
Final Comb Resistance @ 85 °C, 85% R.H., Ω	375×10 <sup>6</sup>
Final Comb Resistance @ 28 °C, 50% R.H., Ω	3.5×10 <sup>12</sup>

**Resistance to Lead Free Solder**

LOCTITE 3621 can be used in lead free wave solder with both water based and alcohol based fluxes

**Lead Free Solder Test Conditions**

Flux Types	Multicore MF200 (alcohol based) and Multicore MF300 (water based)
Wave Condition	100°C pre-heat with dual wave at 260°C
Components	C1608 bonded with twin dot 0.8mm SOD 80 bonded with single dot 1.1mm
Result	No component loss in the wave

**GENERAL INFORMATION**

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

**Directions for use:**

1. LOCTITE 3621 is supplied de-aerated in a range of ready-to-use syringes which fit straight into a variety of air pressure/time dispensing systems commonly available.
2. After storage in a refrigerator the adhesive must be allowed to equilibrate to room temperature before use, typically 2 to 4 hours.
3. Avoid cross contamination with other adhesive residues by ensuring dispense nozzles, adapters etc. are thoroughly cleaned.
4. Do not leave dirty nozzles on dispensing equipment while not in use or soaking in solvents for long periods of time.
5. The quantity of adhesive dispensed will depend on the dispense pressure, time, nozzle size and temperature.
6. These parameters will vary depending on the type of dispensing system used and should be optimised accordingly.
7. Dispensing temperature should ideally be controlled at a value between 30 °C to 35 °C for optimum results, however higher dispense temperatures are possible.
8. LOCTITE 3621 can also be dispensed using positive displacement pump systems.
9. The product is not recommended for dispensing by pin transfer.
10. Uncured adhesive can be cleaned from the board with isopropanol, MEK or ester blends such as LOCTITE® 7360™.

**Loctite Material Specification<sup>LMS</sup>**

LMS dated July 19, 2002. Test reports for each batch are available for the indicated properties. LMS test reports include selected QC test parameters considered appropriate to specifications for customer use. Additionally, comprehensive controls are in place to assure product quality and consistency. Special customer specification requirements may be coordinated through Henkel Quality.

**Storage**

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

**Optimal Storage: 2 °C to 8 °C. Storage below 2 °C or greater than 8 °C can adversely affect product properties. After removal from the refrigerator, LOCTITE 3621 has a floor life at room temperature (22 °C to 28 °C) of 1 month.** Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

**Conversions**

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

**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 1.3

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