LOCTITE®

Product 3621

January 2004

PRODUCT DESCRIPTION

LOCTITE® Chipbonder® 3621 Ultra High Speed Surface Mount Adhesive provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Appearance (uncured)	Red paste[LMS]
Components	One component - requires no mixing
Cure	Heat Cure
Cure Benefit	Production - high speed curing
Application	Surface Mount Adhesive
Specific Application	Bonding electronic components to printed circuit boards (PCB).
Specific Benefit	high on-board reliability and ultra high dispense speed
Other Application Areas	Small Parts Bonding
Dispense Method	Syringe and Jettable
Dot Profile	Ball Point Top
Dispense Speed	High 25,000 - 40,000 dots/h
Strength	High

Product 3621 is designed for maintaining electronic component positioning during wave-solder and solder-reflow process. viscosity characteristics and de-aerated condition makes it suitable for automated dispensing and excellent drop shape control. This product has excellent on-board electrical reliability characteristics. Particularly suited where dispense speeds greater than 35,000 dots/hour are required.

Approvals

Siemens norm SN59651: "Technical Delivery Specifications-Adhesives for SMD Technology" issued by Siemens Central Laboratory, Berlin, Germany.
Sony Laboratories, Japan. Approval specification number SB-M3444

STANDARDS

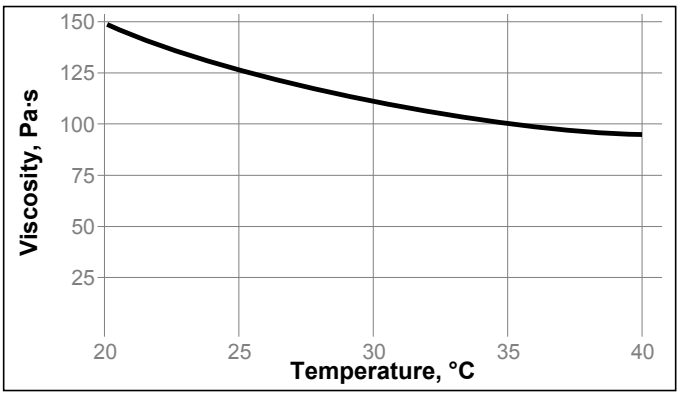
IPC-SM-817 "General Requirements for Surface Mount Adhesives"

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.22
Yield value @ 25°C, Pa:	
Cone & Plate Rheometer	130 to 280[LMS]
Casson Viscosity @ 25°C, Pa·s:	
Cone & Plate Rheometer	0.50 to 3.00
Particle Size, µm	<150
Flash Point - See MSDS	

Temperature - Viscosity Variation

The following graph shows a typical temperature-viscosity curve as measured using a cone and plate viscometer at a shear rate typical of the dispense nozzle. Increased cabin or nozzle temperature in the 30 °C to 35 °C range may aid dispense performance at higher dispense speeds.

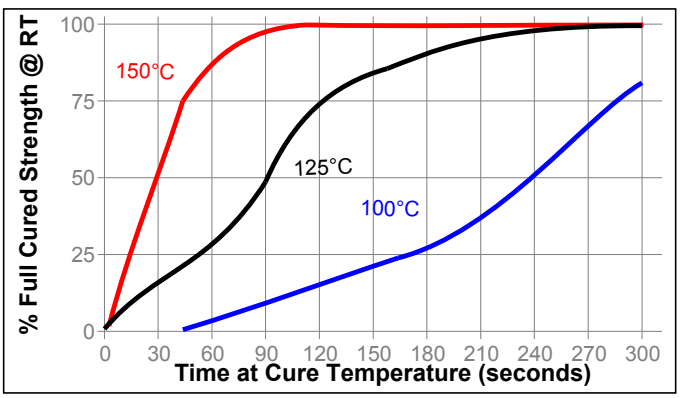


TYPICAL CURING PERFORMANCE

Recommended conditions for curing are exposure to heat above 100°C (typically 90-120 s @ 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 at 22 °C, tested according to IPC SM817, (2.4.42).



Isothermal DSC Conversion

5 minutes at 125 °C, %	≥90[LMS]

TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 30 minutes @ 150 °C.

Physical Properties:	
Density, BS 5350, g/cm³	1.16
Glass Transition Temperature:	
(Tg), ASTM D 4065, °C	110
Coefficient of Thermal Conductivity:	
ASTM C177, W/(m·K)	0.30
Coefficient of Thermal Expansion:	
ASTM E 831, K^{-1}:	
Temperature Range 25 °C to 70 °C	100×10^{-6}
Temperature Range 90 °C to 150 °C	218×10^{-6}

Electrical Properties:

Volume Resistivity, ASTM D 257, Ω·cm	1.3×10^{15}
Surface Resistivity, ASTM D 257, Ω	5.2×10^{16}
Dielectric Strength, ASTM D 149, kV/mm	40
Dielectric Constant / Loss, ASTM D 150:	
1 kHz	2.94 / 0.005
100 kHz	2.87 / 0.003
1 MHz	2.79 / 0.019
10 MHz	2.76 / 0.019
Electrolytic Corrosion, DIN 53489	A - 1.2

PERFORMANCE OF CURED MATERIAL

Cured for 30 minutes @ 150 °C.

Lap Shear Strength, ASTM D 1002/ EN 1465, N/mm² :

Grit Blasted Mild Steel (GBMS), 0 gap	≥13.50[LMS]

Cured for 3 minutes @ 150 °C.

Push-off Strength, IPC SM817, N:

C-1206 on bare FR4 board	≥27.50[LMS]

Cured for 5 minutes @ 125 °C.

Torque Strength, IPC SM817, N·mm:

C-1206 on bare FR4 board	60

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

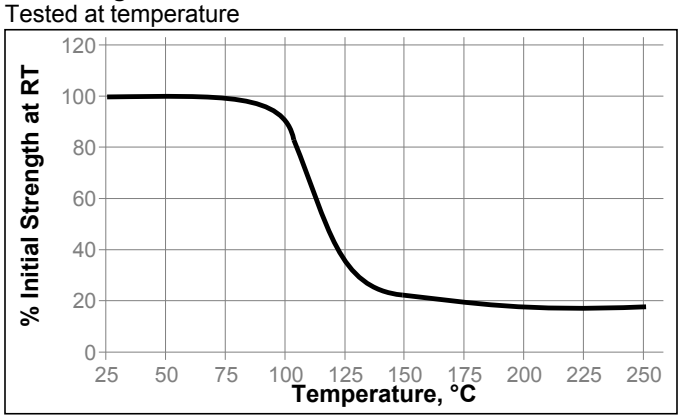
Cured for 30 minutes @ 150 °C.

Lap Shear Strength, ASTM D 1002/ EN 1465:

Grit Blasted Mild Steel (GBMS)

Hot Strength

Tested at temperature



Resistance to Hot Solder Dip

Cured for 90 seconds @ 150 °C.

Hot Solder Dip, IPC SM817:

R-1206 on bare FR4 board:

Supported 60 seconds above solder bath @ 260°C and dipped for 10 seconds	Passed

Surface Insulation Resistance (SIR)

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
Inital Comb Resistance @ 23 °C, 50% R.H., Ω	9×10^{12}
Final Comb Resistance @ 85 °C, 85% R.H., Ω	3.75×10^{8}
Final Comb Resistance @ 28 °C, 50% R.H., Ω	3.5×10^{12}

GENERAL INFORMATION

This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials.

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

Directions for use

1. 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 24 hours.
3. Avoid cross contamination with other epoxy or acrylic adhesives by ensuring dispense nozzels, 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 use 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. 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 glycol ether blends such as Prozone™.

Loctite Material Specification[LMS]
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 Loctite Quality.

Storage
Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.
Products shall be maintained, optimally, at temperatures between 2 °C to 8 °C unless otherwise labeled, or, specified. Storage, at temperatures below 2 °C, or, greater than 8 °C, is not recommended. Temperatures below 2 °C and above 8 °C can adversely affect product properties. **After removal from the refrigerator, Loctite product 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. Loctite 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
(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
mPa·s = cP
N/mm² x 145 = psi
MPa x 145 = psi
N x 0.225 = lbf
N·m = 8.851 lbf·in
N·mm = 0.142 oz·in

Note
The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Loctite Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Loctite Corporation's products. Henkel Loctite Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Loctite Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

Trademark usage

Reference 1