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LOCTITE

Technical Data Sheet

LOCTITE 3515

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PRODUCT DESCRIPTION

LOCTITE 3515 provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Appearance (uncured)	Black paste[LMS]
Components	One component - requires no mixing
Cure	Heat cure
Cure Benefit	Production - high speed curing
Application	Bonding or Underfill
Specific Application	Reworkable underfill for CSP
Dispense Method	Syringe
Key Substrates	SMD components to PCB

LOCTITE 3515 is a one component epoxy adhesive, designed to allow self-alignment of SMT components during the reflow operation. The adhesive is pre-applied to the board at the corners of the CSP pad site using a standard SMA dispenser, a process that speeds assembly by eliminating post-reflow underfill dispense and cure steps. LOCTITE 3515 cures during the solder reflow phase to form a reliable bond, and contriutes to improvements in hand held device reliability. LOCTITE 3515 has excellent dispensing characteristics, good dot profile, and good on-board electrical characteristics. Reinforcement of CSPs with interposers or comerless arrays in portable electronic devices.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.23
Yield Point, 25 °C, Pa	300 to 750[LMS]
Cone & Plate Rheometer:	
Haake PK 100, M10/PK 1 2° Cone	
Casson Viscosity @ 25 °C, Pa·s	2.5 to 10
Flash Point - See SDS	

Recommended Curing Conditions

LOCTITE 3515 is designed to achieve full cure using typical SnPb solder reflow profile. For curing without using solder reflow, following conditions are recommended:

30 minutes @ 150 °C
5 minutes @ 180 °C
30 seconds @ 200 °C
15 seconds @ 220 °C

Note: With all fast cure systems, the time required for cure depends on the rate of heating. Conditions where a hot plate or heat sink is used are optimum for fastest cure. Cure rates depend on the mass of material to be heated and intimate contact with the heat source. Use suggested cure conditions as general guidelines. Other cure conditions may yield satisfactory results.

Isothermal DSC Conversion

8 minutes @ 180 °C, %	≥85[LMS]

TYPICAL PROPERTIES OF CURED MATERIAL

1.2 mm thick samples cured for 30 minutes @ 180 °C

Physical Properties:		
Density, BS 5350-B1 @ 25 °C, g/cm³		1.16
Glass Transition Temperature, °C:		
(Tg) by TMA , ISO 11357-2		73
Coefficient of Thermal Expansion, ISO 11359-2 K^{-1}:		
Pre Tg		49
Post Tg		183
Coefficient of Thermal Conductivity, ISO 8302, W/(m·K)		0.28
Tensile Strength, ISO 527-3	N/mm² (psi)	35.5 (5,150)
Tensile Modulus, ISO 527-3	N/mm² (psi)	2,300 (333,500)
Elongation, ISO 527-3, %		1.88
Shore Hardness, ISO 868, Durometer D		72
Water Absorption, ISO 62, %:		
24 hours in deionized water @ 22 °C		1.05
2 hours in boiling water		8
Extractable Ionic Content, MIL 883 E, µg/g:		
Fluoride		0
Chloride		110
Potassium		24
Sodium		55
Ammonia		250
Electrical Properties:		
Surface Resistivity, IEC 60093, Ω		74.3×10^{15}
Volume Resistivity, IEC 60093, Ω·cm		3.2×10^{15}
Dielectric Breakdown Strength, , kV/mm		26
Surface Insulation Resistance, Ω:		
IPC TM 650 2.6.3.1:		
Test Board: IPC-B-25A, comb pattern D:		
Aged for 7 days @ 50 °C, 90 % RH		0.1×10^{12}

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 30 minutes @ 180 °C, tested @ 22 °C

Lap Shear Strength, ISO 4587:		
Epoxyglass, 0 gap	N/mm² (psi)	≥8[LMS] (≥1,160)
Pull-off Strength, Siemens norm SN59651:		
C-1206 on bare FR4 board	N (lb)	20 to 50 (4.5 to 11.2)
Torque Strength, IPC SM817,TM-650 Method 2.4.42:		
C-1206 on bare FR4 board	N·mm (in.oz)	20 to 50 (2.8 to 7)

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TYPICAL ENVIRONMENTAL RESISTANCE

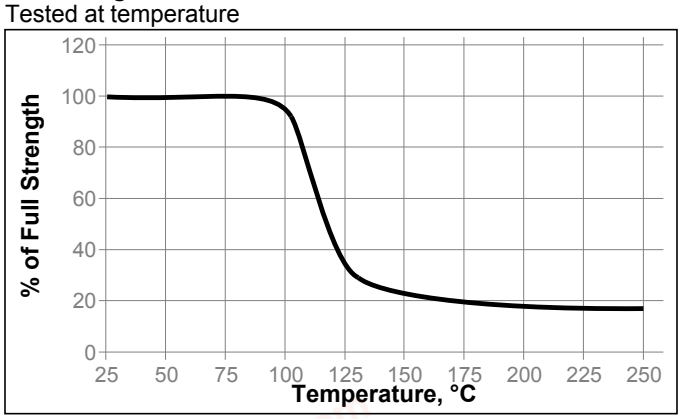
Cured for 30 minutes @ 180 °C

Lap Shear Strength, ISO 4587:

Mild steel (grit blasted)

Hot Strength

Tested at temperature



Multiple Reflow Cycles

Where self alignment and cure has occurred in the first reflow cycle LOCTITE 3515 may be used to help prevent bottom side component loss during subsequent reflow cycles.

Hydrolytic Stability

LOCTITE 3515 meets the highest standards of reliability and environmental resistance, such as hydrolytic stability testing to IPC-TM-650 2.6.11 Class 3. Samples cured on a copper PCB display no degradation or blistering after storage in a saturated salt solution for 28days at 97 °C.

GENERAL INFORMATION

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

Handling Information

1. **Receiving Cold Shipments**
   All shipping boxes are packed with cold gel packs to maintain temperature below 8 °C during transit.

2. **Temperature Equilibration**
   A new package of material can be brought to ambient conditions by allowing to stand at room temperature (22±2 °C) for 1 to 2 hours (actual time required will vary with package size / volume).

   Do not loosen container lids, caps or covers: syringe packs must be allowed to equilibrate in tip down orientation. Heat must never be used as partial polymerization (curing) could occur.

Directions for use:

Load product into dispensing equipment. A variety of application equipment types are suitable and include: hand dispense / time pressure valve; auger style valve; linear piston pump and jet valve. Selection of equipment should be determined by application requirements - for advice on equipment selection and process optimization, users should contact their Technical Service Center.

1. Ensure that air is not introduced to product during equipment set-up.
2. Dispensing temperature should ideally be controlled at a value between 30 to 35 °C for optimum results.
3. The dispense pattern is typically 4 dots at each corner of an IC package. Dispensing "I" along 4 sides of an IC package is also recommended for improved reliability.

Do Not return product to refrigerated storage; any surplus product should be discarded

Loctite Material Specification[LMS]

LMS dated May 23, 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. 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.

Note:
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