

LOCTITE 3517M

April 2018

PRODUCT DESCRIPTION

LOCTITE 3517M provides the following product characteristics:

Technology	Epoxy
Appearance	Black liquid
Product Benefits	<ul style="list-style-type: none"> One component Reworkable Low halogen content
Cure	Heat cure
Application	Underfill
Typical Package Application	CSP, Flip Chip BGA and BGA

LOCTITE 3517M underfill is designed for use as a solder joint protection against mechanical stress in hand held electronic device applications.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Viscosity, HAAKE PK1.2, mPa·s (cP):

@ Shear rate of 36 s⁻¹ 2,600

Flow Rate Glass to Glass, 12.7 mm flow:

@ 25 °C:

0.1 mm gap 8 min 49 s

0.15 mm gap 4 min 56 s

@ 50 °C:

0.1 mm gap 1 min 3 s

0.15 mm gap 53 s

Specific Gravity @ 25°C 1.12

Density @ 25°C, g/cm³ 1.15

Pot Life @ 22°C, days 7

Shelf Life - Refer to package label

Flash Point - See SDS

TYPICAL CURING PERFORMANCE

Cure Schedule

5 minutes @ 120°C or

10 minutes @ 100°C

For best results, substrate should be preheated (typically to 40°C for 20 seconds) to allow for fast capillary flow and facilitate leveling.

The above cure profile is a guideline recommendation. Cure conditions (time and temperature) may vary based on customers' experience and their application requirements, as well as customer curing equipment, oven loading and actual oven temperatures.

TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

Shore Hardness, Durometer D 87

Coefficient of Thermal Expansion, , TMA, ppm/°C:

Below Tg 65

Above Tg 191

Glass Transition Temperature, °C:

(Tg) by DMTA 101

(Tg) by TMA 78

Shrinkage, % 1.4

Water Absorption, ISO 62, %:

24 hours in water @ 25 °C 0.1

Flexural Modulus, ASTM D790 N/mm² 3,500
(psi) (507,632)

Electrical Properties

Volume Resistivity, IEC 60093, ohm-cm 88×10¹⁵

Dielectric Constant / Dissipation Factor, IEC 60250:

@ 100 KHz 3.13/0.01

@ 1 MHz 3.1/0.01

@ 10 MHz 3.06/0.02

Surface Resistivity, IEC 60093, ohms 25×10¹⁵

TYPICAL PERFORMANCE OF CURED MATERIAL

Miscellaneous

Flexural Strength at break, ASTM D790 N/mm² 120
(psi) (17,404)

Shear Strength

Lap Shear Strength, ISO 4587:

Epoxy glass N/mm² 14.4
(psi) (2,088)

GENERAL INFORMATION

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

THAWING:

1. A new package of material can be brought to ambient conditions by allowing container to stand at room temperature for 1 to 2 hours. Actual time required will vary with package size/volume.
2. Do not loosen container lids, caps or covers. Allow syringe packs to equilibrate in tip down orientation.
3. DO NOT attempt to thaw by applying additional heat as partial polymerization (curing) could occur.

DIRECTIONS FOR USE

1. Load product into dispensing equipment.
2. A variety of application equipment types are suitable and include: hand dispense/time pressure valve, auger style valve, linear piston pump or jet valve. Selection requirements should be determined by application requirements.
3. Ensure that air is not introduced to the product during equipment set-up.
4. Dispense product at moderate speed (2.5 to 12.7 mm/s).
5. Needle tip should be about 0.025 to 0.076 mm from the substrate surface and from the chip edge to ensure optimal flow conditions for the underfill.
6. The dispense pattern is usually an "I" pattern along one side or a "L" pattern along two sides, focused at the corner. Application should start at the location furthest away from the chip center to help ensure a void-free fill underneath the die.
7. Each leg of the "L" or "I" pattern should not exceed 80% of the length of each die edge being dispensed.
8. In some cases, a second or third application of product may be necessary.

STORAGE:

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

Optimal Storage: 2 to 8°C. Storage below 2°C or above 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.

Conversions

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

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