



APTEK LABORATORIES, INC.

ISO 9001 / AS9100 Certified

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TECHNICAL DATA & INFORMATION

UVIKOTE™ 7503LM-PMF

UV Curing, Low Modulus, Low Outgassing, Urethane Conformal Encapsulant/Coating

PRODUCT DESCRIPTION

UVIKOTE 7503LM-PMF is a low viscosity, one component, premixed frozen liquid, electrically insulating, transparent, urethane coating designed for the encapsulation and protection of electrical/electronic components mounted on printed circuit boards. This system provides an excellent combination of flexibility and low modulus for demanding applications where the management of thermomechanical stresses is required.

UVIKOTE 7503LM-PMF coating will become tack free when exposed to the proper UV light radiation. The coating will fully post cure in both the exposed and shaded areas in 14 days at 25°C and 50% relative humidity. As an alternative, the post cure for the coating in both exposed and shaded areas may be accelerated with low to moderate heat.

KEY FEATURES AND BENEFITS

- Qualified to Mil-I-46058C and IPC-C-830B
- Multicure mechanism for complete cure in shaded areas underneath components
- Excellent flexibility and low modulus for reduced stress in the encapsulation of sensitive components (e.g. glass-bodied diodes)
- Meets NASA condensable volatile requirements for high vacuum environments
- Highly reversion resistant for good physical stability under high heat and humidity environments
- Low Tg (-65°C) for excellent low temperature cycling, storage and performance
- Excellent adhesion to plastic/metal components and substrates. Adheres well to itself for multicoat and repair applications
- Ready-to-spray viscosity and long pot life for encapsulation and coating applications
- No TDI, no toxic solvents, no free acrylic acid for safety
- Also available as two component kits that can be stored at room temperature
- Complete companion UV product line available:
 - UVIKOTE™ 7503LMA-PMF for use in automated dispensing equipment (viscosity = 55-70 cps)
 - UVIKOTE 7504LM-PMF – 100% solids for thicker applications like back-side solder joint encapsulation
 - UVISTAKE™ 7205LM-PMF – thixotropic, non-flow adhesive for wire tacking and component staking

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- UVIKOTE T-100 Thinner – non-photosensitive, non-aromatic
- UVIKOTE S-100 Stripper – low viscosity removal of cured coating/adhesive for repair operations
- UVIKOTE S-200 Stripper – thixotropic version for localized removal of cured coating/adhesive

HANDLING INFORMATION

1. Work Life, after thaw @ 25°C, 200 gm mass, hrs. > 8

Note: To thaw remove sealed container from freezer and allow to warm to room temperature. Leave cap on until ready to use. Do not place in oven or microwave to thaw - this will shorten work life. Typical time to thaw 8 oz bottle is approximately 30 minutes.

2. Once thawed, material is ready for use. For automated dispensing equipment pour amount needed into reservoir and purge with dry air or argon. Unused material may be refrozen - however, purge with argon or dry air prior to resealing and placement into freezer @ -40°C or below.

Note: Refrozen material should be used up within 5 days of resealing to minimize moisture contamination, premature polymerization, and degradation of the material's performance.

3. Work life adversely affected by heat and humidity as well as solvent evaporation.
4. Work life can be extended by additions of thinner and/or periodical replenishment of freshly mixed **UVIKOTE 7503LM-PMF**.
5. Bottles of **UVIKOTE 7503LM-PMF** are shipped in dry ice. Upon receipt transfer frozen containers to a storage freezer @ -40°C or below.

CURE SCHEDULE

U.V. Cure with Conveyor Equipment

2 passes under 300 W/in Fusion UV, D-bulb lamp at rate of 1 foot per min. Bulb height above coating surface should be adjusted to expose the coating to approximately ~7.5 joules/cm² of radiation per pass.

U.V. Cure with Spot Cure Equipment

We recommend using an EFOS Novacure or equivalent equipment with similar power generating capabilities. This system is capable of generating the same amount of energy as in cure #1. In some applications, diffusers may be necessary to insure even energy distribution and complete cure. Customer should consult Aptek Laboratories and/or equipment supplier to optimize cure for individual applications.

Postcure

After curing as indicated in steps 1 or 2 above, the coating can be postcured as follows:

- a) 14 days at 25°C and 50% relative humidity
- OR
- b) 4 hours at 100°C, or 6 hours at 85°C, or 12 hours at 65°C

Note: The above cure schedules are conservative and should be used as guidelines only. User should determine proper cure schedule based on application requirements and properties desired.

TYPICAL PROPERTIES
(not for specification purposes)

| <u>CHARACTERISTICS</u> | <u>7503LM-PMF</u> | <u>TEST METHOD</u> |
|---|--------------------------|---------------------------|
| Color | Clear yellow/amber | Visual |
| Specific gravity | 0.89 | ASTM D-1475 |
| Viscosity @ 25°C,cps | 40 | ASTM D-1824 |
| Flash point, °C | >100°C | TCC |
| Shelf life @-40°C, or below, months in factory sealed containers | 6 | |
| <u>CURED PHYSICAL PROPERTIES</u> | <u>7503LM-PMF</u> | <u>TEST METHOD</u> |
| Hardness, Durometer A | 55A | ASTM D-2240 |
| Glass transition temp., °C | -65 | ASTM E831-86 |
| Thermal coefficient of expansion, in/in/°C | | |
| alpha 1 | 82×10^{-6} | ASTM E831-86 |
| alpha 2 | 222×10^{-6} | |
| Outgassing @ 10^6 Torr | | |
| TML, % | 0.80 | ASTM E-595 |
| CVCM, % | 0.02 | ASTM E-595 |
| Young's modulus, psi | | |
| @55°C | 450 | |
| @25°C | 700 | |
| @-40°C | 9500 | |
| Evidence of haze | None | ASTM E-595 |
| Fungus resistance | Non-nutrient | ASTM G-21 |
| <u>CURED ELECTRICAL PROPERTIES</u> | <u>7503LM-PMF</u> | <u>TEST METHOD</u> |
| Volume resistivity, @25°C, ohm-cm* | 4.0×10^{14} | ASTM D-257 |
| Dielectric constant, @1KHz, @25°C* | 3.2 | ASTM D-150 |
| Dissipation factor @1KHz, @25°C* | 0.03 | ASTM D-150 |
| Dielectric strength, 0.003" thick* film, volts/mil | >1500 | ASTM D-149 |
| Insulation resistance, ohms | 1.0×10^{14} | MIL-I-46058C |

* Tested on unsolvated castings @ 0.100" thickness

SAFETY AND FIRST AID

UVIKOTE 7503LM-PMF is an unfilled organic polyol isocyanate/acrylate blend resin containing solvent and is thus considered a flammable liquid and should be treated with caution. Store @ -40°C or below and keep away from flame, sparks, or other sources of ignition. Use in well-ventilated area and avoid breathing vapors. In case of eye contact, flush with fresh clean water for at least 15 minutes; for skin contact, wash thoroughly with soap and water. If swallowed, drink at least one pint of water and call a physician. Refer to Material Safety Data Sheet for more details.

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