



APTEK LABORATORIES, INC.

ISO 9001 / AS9100 Certified

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TECHNICAL DATA & INFORMATION

APTEK® 2313-PMF

Premixed-frozen, snap-cure, electrically conductive, adhesive

PRODUCT DESCRIPTION

APTEK 2313-PMF is a one component, premixed-frozen, silver-filled, electrically conductive polymer paste adhesive. It is designed to bond many dissimilar substrates and dissipate device generated heat.

APTEK 2313-PMF is a 100% solids, solvent free system that will not form voids during cure or outgas after being fully cured.

APTEK 2313-PMF has excellent reversion resistance and physical stability when subjected to high heat and humidity environments. This system displays higher ionic purity than epoxy systems minimizing the possibility of corrosion on components and circuitry.

KEY FEATURES AND BENEFITS

- Production-oriented, snap-cure technology for surface mount applications - allows cure during solder reflow operation.
- High thixotropy "tack" strength - holds components with minimal "Z" axis movement during cure
- Stable viscosity for over 4 hours at RT - ideal for robotics
- Low Tg (<-60°C) for excellent low temperature cycling and performance with minimal stress
- Excellent substrate adhesion; superior to silicones: no primer required
- Wide temperature operating range: -60°C - +260°C in an inert atmosphere (i.e. under N₂) and -60°C – +170°C in air.

HANDLING INFORMATION

1. Work life @25°C in 5cc syringe after thaw: >4 hours with less than 50% viscosity increase
2. **APTEK 2313-PMF** syringes are shipped in dry ice. Upon receipt transfer frozen syringes to a storage freezer @-40°C or below.
3. To thaw remove from freezer and allow to warm to room temperature. Do not place in oven or microwave-this will shorten use life.
4. Typical thaw time for 5cc syringe @25°C ambient is approximately 15-30 minutes.

CURE SCHEDULE

For adhesive applications (5-10 mils thickness):

- Through solder reflow process: 30 secs @260°C in conjunction with typical ramp-up and ramp-down oven profiles
- For air-circulating oven (ACO) cures:

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| <u>Temperature, °C</u> | <u>Cure time at temperature, min.</u> |
|------------------------|---------------------------------------|
| 225 | 5 |
| 150 | 30 |
| 125 | 60 |
| 100 | 120 |
| 85 | 240 |

Notes:

1. Cure schedules above are valid when parts/substrates to be bonded and oven/chamber are at the required cure temperature.
2. The above cure schedules were determined by the achievement of lap shear strength for adhesive applications. These schedules are conservative and should be used as guidelines. Achievement of the application requirements/properties should be the determining factor in the selection of cure schedule.

TYPICAL PROPERTIES

(Values not to be used for specification purposes)

| <u>CHARACTERISTICS</u> | <u>APTEK 2313-PMF</u> | <u>TEST METHOD</u> |
|--|------------------------------|---------------------------|
| Color | silver | Visual |
| Specific gravity | 3.0 | ASTM D-1475 |
| Viscosity @25°C, initial cps | thixotropic paste | ASTM D-1824 |
| Flash point, °C | >250 | ASTM D-92 |
| Shelf life @-40°C, months in factory sealed pre-mixed frozen-syringes | 6 | |
| <u>CURED PHYSICAL PROPERTIES</u> | <u>APTEK 2313-PMF</u> | <u>TEST METHOD</u> |
| NOTE: Tests performed on material cured for 60 mins @125°C. | | |
| Lap shear, @25°C, Al to Al, psi | 600 | ASTM D-1002 |
| Glass transition temp., °C | -65 | ASTM E-831 |
| Coefficient of Thermal Expansion | | |
| Alpha 1, in/in/C | 11 | ASTM E-831 |
| Alpha 2, in/in/C | 123 | ASTM E-831 |
| Thermal conductivity, @25°C W/M ² K | 3.8 | ASTM C-518-04 |
| Outgassing @ 10 ⁶ Torr | | |
| TML, % | 0.22 | ASTM E-595 |
| CVCM, % | 0.02 | ASTM E-595 |

CURED ELECTRICAL PROPERTIES**APTEK 2313-PMF****TEST METHOD**Volume resistivity
@25°C, ohm-cm

0.0005

QCP-006

SAFETY AND FIRST AID

APTEK 2313-PMF is a silver-filled hybrid polymer blend which is safe to handle as it is packaged in sealed syringes. There should be no need to touch the adhesive. Avoid contact with skin and eyes and use in a 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 ingested, drink at least one pint of water and call a physician. Refer to Material Safety Data Sheet for more details.

Revised: 1/10/25—mjv

Issued: 1/29/01

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