# EPO-TEK® T7109
## Technical Data Sheet
### For Reference Only
*Thermally Conductive Epoxy*

| | |
|---|---|
| Number of Components: | Two |
| Mix Ratio By Weight: | 10:1 |
| Specific Gravity: | |
| Part A | 1.33 |
| Part B | 1.02 |
| Pot Life: | 4 Hours |
| Shelf Life: | One year at room temperature |

Minimum Bond Line Cure Schedule*:

| | |
|---|---|
| 150°C | 10 Minutes |
| 100°C | 4 Hours |
| 80°C | 8 Hours |

*Note: Container(s) should be kept closed when not in use. For filled systems, mix the contents of Part A thoroughly before mixing the two parts together. *Please see Applications Note available on our website.*

**Product Description:**

EPO-TEK® T7109 is a two component, thermally conductive epoxy designed for die attach and heat-sinking applications found in the semiconductor, hybrid, medical and optical industries.

**EPO-TEK® T7109 Advantages & Application Notes:**

- Reliability report available describing its performance; see Technical Paper #42 - http://www.epotek.com/technical-papers.asp
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  - Thermal resistance compared to three other epoxies
  - Thermal resistance and how it relates to overall thermal conductivity
  - Strength measurements plotted versus pot-life, versus Tcycles and damp heat (85°C/85%RH).
- Thixotropic paste allows for application by automatic dispensers or screen printers. It can also be applied by hand or spatula.
- Excellent adhesion to Aluminum, ferrous and non ferrous metals, and most plastics including Kapton.
- Suggested Applications:
  - Semiconductor - Thermally conductive underfill / Electrically non conductive die-attach, low stress for large die exceeding 500 mil x 500 mil.
  - Hybrid Micro-electronics - Large die attach, adhesion to GaAs devices, ceramic substrate attach to housing
  - Fiber Optic Packaging - Substrate attach of optical bench; TECooler attach; good adhesion to Au, Kovar and ceramic; can be used for laser diode and photo-diode attach.
  - Liquid Crystal Displays - die-attach micro-LCDs onto flex circuits like Kapton, or rigid carriers like FR4, ceramic, or silicon.
  - Medical - Heat sinking electronics found in ultrasound and CT Detectors, and other radiation devices.
- Low temperature cure between 80°C and 150°C allows use on lower cost plastics and temperature sensitive devices.
- Can be suggested as a lower stress, more resilient alternative of EPO-TEK® 930-4.

**Typical Properties:** ***(To be used as a guide only, not as a specification. Data below is not guaranteed. Different batches, conditions and applications yield differing results; Cure condition: 150°C/1 hour; * denotes test on lot acceptance basis)***

| Physical Properties: | |
|---|---|
| ***Color:** **Part A:** White **Part B:** Amber | **Weight Loss:** |
| ***Consistency:** Smooth paste | **@ 200°C:** 0.02% |
| ***Viscosity (@ 20 RPM/23°C):** 14,000 - 20,000 cPs | **@ 250°C:** 0.25% |
| **Thixotropic Index:** 1.79 | **@ 300°C:** 0.98% |
| ***Glass Transition Temp.(Tg):** ≥ 45°C (Dynamic Cure 20 - 200°C /ISO 25 Min; Ramp -10 - 200°C @ 20°C/Min) | **Operating Temp:** |
| | **Continuous:** - 55°C to 200°C |
| **Coefficient of Thermal Expansion (CTE):** | **Intermittent:** - 55°C to 300°C |
| **Below Tg:** 46 x $10^{-6}$ in/in/°C | **Storage Modulus @ 23°C:** 258,593 psi |
| **Above Tg:** 239 x $10^{-6}$ in/in/°C | **Ions:** $Cl^-$ |
| **Shore D Hardness:** 83 | $Na^+$ |
| **Lap Shear Strength @ 23°C:** > 2,000 psi | $NH_4^+$ |
| **Die Shear Strength @ 23°C:** ≥ 15 Kg / 5,100 psi | $K^+$ |
| **Degradation Temp. (TGA):** 377°C | ***Particle Size:** ≤ 20 Microns |
| **Thermal Properties:** | |
| **Thermal Conductivity:** 0.7 W/mK (40 mil); 1.5 W/mK (3 mil) | |
| **Electrical Properties:** | |
| **Dielectric Constant (1KHz):** 3.5 | **Volume Resistivity @ 23°C:** ≥ 8 x $10^{12}$ Ohm-cm |
| **Dissipation Factor (1KHz):** 0.004 | |

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Rev. IV
Apr 2010