CoolTherm® EP-2000 Thermally Conductive Epoxy Encapsulant

Technical Data Sheet

CoolTherm® EP-2000 encapsulant is a two-component, low viscosity epoxy system designed for encapsulation of motor stators, transformer coils, and other devices with small-diameter, tightly-packed windings. CoolTherm EP-2000 encapsulant provides high-temperature stability combined with excellent electrical insulation.

Features and Benefits:

Excellent Heat Dissipation – provides lower motor end winding temperatures during high-power operation.

Low Viscosity – provides fine-particle filler and low viscosity; self-levels to fill voids in motor stators/rotors, transformer coils and other electrical devices.

Durable – cured material resists cracking during multiple thermal cycles from sub-zero temperatures to 200°C.

UL Rated – approved for use in PDG-H2, Table V insulation constructions (Class H – 180°C).

Application:

Mixing – Pre-heat each component in original container to ≈60°C. Thoroughly mix each component in its original container to ensure complete dispersion of filler material prior to combining resin and hardener. Mix CoolTherm EP-2000 resin with CoolTherm EP-2000 hardener at a ratio of 1:1, by weight or volume, until uniform in color. Automatic meter/mix/dispense equipment may be used for high volume production provided that care is taken to prevent settling in the transfer lines.

Unless a closed-chamber mechanical mixer is used, air may be introduced into the encapsulant system during mixing. Electrical and thermal transfer properties of the encapsulant are best when air bubbles and voids are minimized. Therefore, in critical applications, vacuum processing may be appropriate.

Note: It is critical to ensure that the material is mixed to homogeneity in its original container before each use, and especially if only a portion of the material is to be used. For proper mixing techniques and recommendations for confirming that the material is homogeneous, refer to the Parker LORD Technical Tip – "*Mixing of CoolTherm EP-3500 and EP-2000 Potting Materials*".

Typical Properties*

	EP-2000 Resin	EP-2000 Hardener	Mixed
Appearance	Black Liquid	White Liquid	Gray Liquid
Viscosity, cP @ 60°C 10/sec Shear Rate	6080	1300	1900
Specific Gravity @ 25°C	2.72	2.75	2.73
Gel Time, minutes @ 110°C	–	–	76
Working Life, hours @ 60°C	–	–	>3

*Data is typical and not to be used for specification purposes.

Applying – Apply encapsulant manually or by automatic meter/mix/dispense equipment. Application of a vacuum during the potting process is recommended in most usages.

Curing – Allow encapsulant to cure for 2 hours at 110°C, after which handling strength is achieved, allowing for cooling and removal from mold, if applicable. Complete cure is obtained by heating for 2 hours each at 120°C, 150°C, 180°C and 210°C. In special circumstances where conditions do not permit the use of the typical cure schedule, alternate curing cycles may be determined by consultation with Parker LORD.

Cleanup – Disposable containers and utensils are recommended when working with epoxies. However, when disposable materials are impractical, uncured encapsulant can be removed by cleaning equipment with solvent. Solvent-cleaned utensils should be thoroughly dried before reuse; any remaining solvent can contaminate the next mixture.

Typical Cured Properties**	
Thermal Conductivity, W/m·K	1.9
Coefficient of Linear Thermal Expansion, ppm/°C	14.9
Glass Transition Temperature (Tg), °C by DMA	204
Hardness Shore D, ASTM D 2240	95
Young's Modulus, GPa by DMA	17.5
Volume Resistivity, ohm-cm @ 25°C ASTM D 257	1 x 10^{14}
Dielectric Strength, kV/mm (V/mil) ASTM D 149	18.5 (470)

**Data is typical and not to be used for specification purposes.
Cure schedule of 2 hours each at 120°C, 150°C, 180°C and 210°C.

Shelf Life/Storage:

Shelf life of each component is nine months when stored at 25°C in original, unopened container. CoolTherm EP-2000 resin and hardener must be periodically rotated within original containers to maintain maximum shelf life. Settling will occur. Products must be mixed as directed before use. To achieve properties and minimize hard-packed settling of fillers during storage, follow the general considerations and storage tips recommended in the Parker LORD Technical Tip – "*Mixing of CoolTherm EP-3500 and EP-2000 Potting Materials*".

Cautionary Information:

Before using this or any Parker LORD product, refer to the Safety Data Sheet (SDS) and label for safe use and handling instructions.

For industrial/commercial use only. Must be applied by trained personnel only. Not to be used in household applications. Not for consumer use.

Values stated in this technical data sheet represent typical values as not all tests are run on each lot of material produced. For formalized product specifications for specific product end uses, contact the Customer Support Center.

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