CoolTherm® EP-3500 Epoxy Resin

Technical Data Sheet

CoolTherm® EP-3500 epoxy resin is formulated for use with CoolTherm EP-3500 or EP-2000 hardener to create a two-component system for encapsulation of motor stators, transformer coils, and devices requiring a rigid, high thermal conductivity material with a low coefficient of thermal expansion. The epoxy system provides high-temperature stability combined with excellent electrical insulation.

Features and Benefits:

Superior Heat Dissipation – typically provides 30-50°C lower motor end winding temperatures during high-power operation.

Low Viscosity – provides low viscosity for a highly-filled material; 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 - when mixed with CoolTherm EP-2000 hardener, epoxy system is approved for use in PDG-H2, Table V insulation constructions (Class H – 180°C).

Application:

Mixing – Pre-heat CoolTherm EP-3500 resin in original container to ≈80°C. Depending on hardener being used, pre-heat hardener in original container to ≈80°C for CoolTherm EP-3500 hardener or to ≈50°C for CoolTherm EP-2000 hardener. Thoroughly stir each component within its shipping container prior to combining resin and hardener. Transfer amount of resin needed to clean container and add proper amount of hardener.

Thoroughly mix resin and hardener until uniform in color. Automatic meter/mix/dispense equipment may be used for high volume production provided that care is taken to prevent settling or cooling in the transfer lines.

Typical Properties*	
Appearance	Dark Gray Paste
Viscosity, cP @ 60°C 10/sec Shear Rate	9200
Specific Gravity @ 25°C	2.98

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

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*".

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

Curing – Allow epoxy system 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, or by using a slow heating ramp to 210°C. 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.

Shelf Life/Storage:

Shelf life is nine months when stored at 25°C in original, unopened container. CoolTherm EP-3500 resin must be periodically rotated within its container to maintain maximum shelf life. Settling will occur. Product 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.

Typical Properties* of Resin Mixed with Hardener

	CoolTherm EP-3500 Hardener	CoolTherm EP-2000 Hardener
Mix Ratio, Resin to Hardener by Weight by Volume	 100:100 100:100	 100:72 100:78
Mixed Viscosity, cP @ 60°C	8000	3800
Mixed Specific Gravity	2.98	2.88
Working Life, hours @ 60°C	>3	>3

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

Typical Cured Properties**

	CoolTherm EP-3500 Hardener	CoolTherm EP-2000 Hardener
Thermal Conductivity, W/m·K	3.3	2.6
Coefficient of Linear Thermal Expansion, ppm/°C	10.4	12
Glass Transition Temperature (Tg), °C by TMA	206	205
Hardness Shore D, ASTM D 2240	90	93
Storage Modulus, GPa by DMA	20	–
Volume Resistivity, ohm-cm @ 25°C ASTM D 257	1×10^{14}	1×10^{14}
Dielectric Strength, kV/mm (V/mil) ASTM D 149	15.4 (390)	–

**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.

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