



Filled UV Curable Epoxy

Provides Low CTE For Electronic Potting And Encapsulating

Introduction

Low coefficient of thermal expansion (CTE) epoxies play an important role in the engineering and construction of electronic circuit boards as well as having great adhesive properties for other assembly operations. These epoxies are used for a variety of different applications such as encapsulation, glob-tops, coatings, and bonding. Potting is a process where epoxy is poured on top of a circuit board and allowed to cure. This process “encapsulates” the components of the board, protecting them from unwanted damage. Glob-top is a process where epoxy is selectively dispensed onto a vulnerable electronic component to protect it from environmental and mechanical damage. Low CTE epoxies fit these rolls very well as the amount they expand or contract when exposed to different environments is minimal. Until now, many of the commercially available low CTE epoxies were made up of two components, the resin and the catalyst (hardener). Epoxies, Etc... has developed a unique low CTE Ultraviolet Curable Epoxy that has many benefits over its two component counterparts.

Industry Problems

The use of two component epoxy systems come with many drawbacks. Often there are very specific mix ratios that must be followed. A slight deviation from these mix ratios can cause an incomplete cure and reduce the performance of the epoxy system. Two component systems have limited work times and often lead to a lot of waste and unused material. The cure times of two component systems are usually very long. Most of them are on the order of twenty-four hours or longer at room temperature. Cure times can be shortened but require the use of special and expensive ovens. There is also the consideration of energy consumption with thermal ovens. The heat produced by reactions of two component systems can also lead to shrinkage.

The low CTE Ultraviolet Curable Resins that Epoxies, Etc... has developed solve many of these problems. The resin is a one-component system that requires no mixing and will produce very little waste as you can apply as much or as little as needed. Cure times are greatly reduced from hours to seconds or minutes. The type of chemistry used in these systems allow for shadow areas to cure fully on their own without the use of ovens. However, heat as a secondary cure mechanism is an option.



Epoxies, Etc... has developed two low CTE, Ultraviolet Curable Resins using a state of the art proprietary filler. 60-7106 is a thixotropic system with a viscosity of 90,000 cps, a specific gravity of 1.75, a thixotropic Index of 3.0, and a shore D hardness of 90D. This is ideal for glob-topping applications where the material needs to stay where it is dispensed. 60-7107 is lower in viscosity with a value of 30,000 cps, a specific gravity of 1.70, and a shore D hardness of 90. This system is ideal for coating and potting applications where some flowing of the dispensed material is necessary. Typical CTE values for unfilled resin systems are on the order of 80 ppm/°C, while these new UV systems have CTE values on the order of 35 ppm/°C. The lower the CTE value of the system, the less it will expand and contract under temperature changes. This is critical in microelectronic circuitry as expansion and contraction can cause damage to the fragile electronic components. 60-7106 and 60-7107 also have very good electrical insulation properties. These products are formulated to have low ionic impurities and they are free of solvents. Both products are RoHs compliant.

Availability

The 60-7106 and 60-7107 are available in easy to use 10, 30, and 50 cc syringes. Using different disposable needles allow the user to precisely control the amount and location of dispensed material. Both of these systems can be cured in a matter of seconds using commercially available high intensity spot cure or conveyor units. A simple black light fixture can also be used and will cure them in 15 minutes.

These new low CTE Ultraviolet Curable Epoxy systems provide many advantages over their older two component counterparts. They are perfect for applications such as encapsulation, glob-tops, coatings, and bonding. Their fast cure times allow for a significant increase of productivity and saves end users time and money.

Epoxies, Etc... technical service engineers are able to make product recommendations based on the production requirements of the specific application. When necessary, custom formulations are also developed at the ISO 9001:2000 certified Cranston, RI facility.

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