



Unique EPO-TEK® UV Hybrid Adhesives and their Applications

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Conventional epoxy adhesives have been used successfully in a variety of applications since the early 1930's. These very robust and extremely reliable systems are the "go-to" material for many users who require a high-performance adhesive in critical applications. Many optical alignment or fixturing assemblies require precision alignment and find some difficulty with the longer curing times of standard epoxy system.

Epoxy Technology, Inc. has developed an innovative product line that combines the fast tacking of a UV curing system with the long-term reliability of an epoxy. With this new adhesive line, parts can be aligned and positioned; or adhesive flow can be controlled with extreme accuracy. The UV Hybrid adhesive can be tacked in place within seconds, using a short UV cure time. This tack is often a soft tack, but can easily maintain optical alignment. Once the components are properly positioned, a thermal cure of at least 80°C is applied for a permanent bond. This results in an adhesive that is as reliable as a standard, thermal cure epoxy system; including resistance to thermal cycling and damp heat. As an example, these novel UV Hybrid materials can be equally strong as a well-known, autoclave resistant-epoxy, EPO-TEK® 353ND, when exposed to 85°C/85%RH testing. These unique hybrid adhesives are one of EPO-TEK's fastest growing product lines and currently include: EPO-TEK® HYB-353ND, HYB-353ND-LV, HYB-353ND-HV, HYB-353ND-TX2 and HYB-353ND-TX3. These variations were designed as custom formulations, after encouraging customer test results when evaluating the original formulation, HYB-353ND. Epoxy Technology has also begun formulating room temperature curing hybrid materials made especially for assemblies which incorporate temperature sensitive substrates. Although these adhesives were primarily designed for optoelectronics, they have already been used successfully in semiconductor, microelectronics, medical device, as well as general purpose applications.

Here are some recent application examples where these new EPO-TEK® UV Hybrid adhesives can be successfully used.

Pico Projector

Thermal curing epoxies such as EPO-TEK® 323LP-T and TV2001 has been used for many years in several generations of pico projectors. Magnet bonding components used in these projectors always create a bottle-neck due to the extensive fixturing required, which is expensive and time consuming. These magnets are used to focus the projector, but as they naturally attract to each other, keeping them in precise position can be very difficult. Standard UV cure systems were not suitable due to extensive shadowed areas and somewhat lower reliability. A custom hybrid system was created, EPO-TEK HYB-353ND-TX3, that is able to tack the magnets in place within seconds with enough strength to resist their attractive forces, even through a post-tack, oven cure. This eliminated the need for elaborate fixturing and resolved the bottlenecking issue. Instead of bulky jigs taking up oven space for 30+ minutes, they are now able to tack the magnets in 20 seconds, rack up the parts over an entire shift, and cure the parts all together at the end of the day. The projector assembly has been simplified by switching to the UV Hybrid adhesive and will still pass damp heat as well as 500+ thermal cycling.



Fiber stub

EPO-TEK UV Hybrids were originally designed for the optoelectronics industry. One application that illustrates these hybrids' unique advantage is in a fiber stub. Used in ROSA and TOSA assemblies, this stub requires exact alignment of a lens to the end of a fiber. Customers would use two materials for this application: one to tack down and hold the parts in alignment and the second to reinforce the bond for long-term reliability. A standard UV curing system was never able to provide enough strength on its own. With a UV Hybrid adhesive, customers are able to use a single material for what was once a two material solution. This also allows for lower costs and a simpler production process, thus improving productivity.

EPO-TEK UV Hybrid adhesives deliver all of the robust properties of a standard epoxy system, combined with the convenience of a fast, UV curing material. This enables manufacturers to reduce their production costs and increase their efficiency within their product assemblies.