

New Conductive Adhesive Technology Lights the Way for Efficient Manufacturing

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You've heard it before: "revolutionary", "one of a kind", "ground-breaking". All of these terms are frequently used to describe new technologies introduced to the marketplace. And, while the claims are often true – there is *some* new feature or unique application – in many cases the product benefits come with a tradeoff. There are a few instances, however, where what you see is what you get – neither performance nor ease of use nor cost efficiencies have to be sacrificed.

Once such "no tradeoff" conductive adhesive technology has recently been introduced to the marketplace, delivering dramatic improvements in thermal performance, drop test reliability and providing significant personnel and equipment cost savings. With this new technology, the traditional mixing and measuring of previous adhesive systems (not to mention the issues associated with managing pot life) is completely eliminated. The advanced adhesive technology, called Bead-On-Bead™, is a remarkable new product from the materials experts at Henkel and, with all of its proven benefits, has the potential to completely change the way the market thinks about adhesive systems.

Loctite® Bead-On-Bead technology is a two part system based on proprietary technology that enables simple, yet incredibly strong, bonding of heat-dissipating devices to heat sinks and spreaders. Ease of use is one of the premiere benefits of this extraordinary system: Bead-On-Bead requires no meter mixing, no volumetric measuring, no management of pot life and, because of its color characteristics, visual inspection is a breeze. Each part – parts A and B – are applied to the electronic device and heat dissipating device separately, so no mixing is required. When parts A and B combine during assembly, cure is achieved and fixture strength is realized within seconds.

Here's the no tradeoff part: All of these process enhancements come with the added benefit of improved thermal performance. Loctite Bead-On-Bead products have a thermal conductivity of 1.75W/m²K, which is a 40% improvement over older generation products.

In fact, some users of the new Loctite Bead-On-Bead adhesive system have seen as much as a 25% yield improvement over that delivered by their previous material. One such manufacturer tried the new technology and truly "saw the light." A well-known manufacturer of LED (light emitting diode) flashlights was producing products that needed a thermal solution to dissipate the heat from the LED. To do this, the company was attaching a small heat sink using an older adhesive system, which involved an acrylic adhesive and a solvent activator applied through liquid spray. The 3-part process – dispensing, seating the LED onto the heat sinks, applying the solvent activator – was very time-intensive and inefficient. To top it all off, the manufacturer was getting very high failure rates – in the neighborhood of 30% -- with this system. The spray system was inconsistent – some parts received ample solvent activator, others did not. But, because

the solvent is clear, the operators couldn't see how much or how little solvent was applied. Plus, the bond line for some of the parts was extremely thin – less than 0.001” (0.03mm) — and, of course, those assemblies failed. Suffice it to say, this process was rife with problems.

Henkel's Loctite Bead-On-Bead was the perfect solution. With no messy spray systems, the two-part Bead-On-Bead adhesive technology was applied to each part – the LED and the heat sink. Henkel's technology experts recommended several process changes, one of which was adjusting the pressure for the seating of the LEDs to the heat sink. This change, combined with the robust Bead-On-Bead adhesive system, now yields bond lines that are close to 0.005” (0.13mm) thick. In addition, because these flashlights are often dropped, the company had stringent drop test requirements of 50 feet, which Bead-On-Bead satisfied, delivering very high reliability.

But those aren't the only benefits. The previous system was impossible to inspect, and Henkel's new technology provided a solution for that, too. Bead-On-Bead's unique color coded system delivers increased manufacturing control. The adhesives are colored part yellow and part blue and when the parts are assembled, the bondline becomes green, allowing for very simple visual inspection. Plus, this next-generation adhesive technology has also enabled the manufacturer to eliminate the spray system and accompanying operator staff requirements completely. Throughput has improved dramatically and the company has realized significant savings on equipment and personnel costs.

For this flashlight manufacturer, Henkel's Bead-On-Bead adhesive technology is “lighting the way” toward end-of-the-line yield improvement and resource efficiencies. There are no tradeoffs – only benefits.

For more information on the innovative Bead-On-Bead adhesive system, log onto www.loctitebeadonbead.com.