

Adhesives: A Hidden Powerhouse

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Adhesives have revolutionized the auto industry by replacing mechanical fasteners, lowering a car's weight, and improving fuel efficiency. The aircraft manufacturing industry has seen similar results, and adhesives today join up to 30 percent of all components in modern aircraft. And stress- and heat-free bonding has quietly replaced soldering in the area of electronics. For many, adhesives may not be the most noticeable part of industrial manufacturing, but they are certainly among the most important, and for the manufacturers that provide this vital bonding material, the world of adhesives is bursting with technological breakthroughs that can have a dramatic effect on the end-user's bottom line. "Many things are new and creating exciting opportunities in the market," according to Gary Johnson, co-owner of Adhesive Systems, Inc. He says adhesive suppliers today are developing products that cure faster and stronger, and offer tremendous aging and weathering properties. "Many adhesives will eliminate welding, mechanical fasteners, and other sophisticated fastening systems," he adds, while providing "improved profitability to our customers."

Rohit Ramnath, technical consultant, Master Bond, agrees: "Light cure adhesives already have a compelling value proposition thanks to their easy application and fast cure." He explains a recent technology breakthrough that makes these adhesives even more valuable: the cure can now take place under a visible light wavelength of 405 nanometers, while traditional light cure adhesives cure under ultraviolet light sources with wavelengths between 250 and 365 nanometers. "A few dozen nanometers of wavelength may not seem like a big deal, but the implications are profound from both design and production standpoints," Ramnath says. "For design engineers, the ability to fully cure adhesives under visible light opens up a range of bonding, encapsulating, and sealing applications that were previously not suitable for light cure products." By driving down the cost and complexity of production light sources, the ability to cure with visible light can eliminate the expense of buying, installing, and maintaining production UV lamps. "These lamps, which can cost thousands of dollars, represent one of the biggest capital equipment barriers to using UV adhesive systems," he adds. "And moving to visible light sources eliminates a potential safety hazard from the shop floor."

Eliminating costly and potentially hazardous UV sources is just one of the safety advantages that industrial adhesives can offer. Other adhesives, such as epoxies filled with steel powder, are able to eliminate welding work, which requires skilled personnel and a hot work permit — and possible rework due to distortion and discoloration during welding. "The epoxy provides adhesion to the worn surfaces, and the steel provides durability and allows the part to be ground down to a smooth surface — mimicking the original contours of the machinery," explains Mathew Faino, technical service manager, ITW Devcon. "The product bonds strongly to

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metal surfaces, cures at room temperature, does not require training to mix and apply, and the putty offering can be formed to any shape as required by the specific repair.”

“Materials and processes have definitely advanced,” stresses Johnson, “which allows us to create new products that offer better performance and value for our customers.”

While there is a growing need for highly specialized adhesives, Johnson says that the biggest challenge is raw material supply. “Many companies have been bought, consolidated, or went out of business in the last four to five years,” he says. “Keeping up good relationships and finding quality oriented suppliers is something we are always looking for.” Many adhesive manufacturers offer turn around times as quick as 24 hours — sometimes for custom orders — so this relationship can be critical.

“We can custom formulate an adhesive for [customers] to give them the exact product they need for their particular application,” Johnson explains. But this is just one option for industrial customers looking for the perfect adhesive. “They should take into consideration specific substrates, desired cure speed, end user environment, and the types of stresses the part will be subjected to,” Faino explains. “When we work with a customer we not only talk with them about the adhesive,” Johnson adds, “but also about the process.” To help customers make the right decision, adhesive manufacturers need to know exactly how the adhesive will be applied to a part, and know what their customer wants to improve — whether it’s the performance properties or the characteristics of their existing adhesive, their process, or both. And if those aren’t enough options — the right dispensing system also needs to be decided on. For this, Faino says, manufacturers should consider the volume of adhesive used per day, and whether the adhesive will be applied in a single location or at multiple end user sites within the plant. Johnson says he’s not joking when he says just to “call us,” as the supplier can provide the best information that can make the difference in how the evolving bonding market fits into your plant’s bottom line.

Johnson says, “Having the product that is an exact fit for your application streamlines the process, reduces time, and increases reliability and performance.”

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