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Trelleborg's 2K technology enhances options for medical device manufacturers

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Trelleborg

Liquid silicone rubber components produced using Trelleborg's 2K technology.

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While 2K technology has been on the market for decades, its capabilities continue to push the limit in not only medical devices, but other markets as well.

"We do a lot with automotive electronics," said Ursula Nollenberger, product line director at Trelleborg Sealing Solutions, referencing autonomous driving and sensors, as well as lifestyle products.

"It's much broader than just medical devices, but for medical devices it is really excelling fast because of all the advantages it offers."

Trelleborg Sealing Solutions started embracing 2K technology about 15 years ago and, according to Nollenberger, have become experts at it.

While injection molding with plastics has been around since the 1960s, Nollenberger said Trelleborg entered the scene with silicone rubber, "which made injection molding quite challenging, just because of the different behavior of the material."

With 2K technology, Trelleborg is able to offer customers ways to integrate multiple functions and components; to help them come up with better, safer and more robust options.

All Trelleborg 2K products are custom, Nollenberger said, there are no standard solutions and all require high precision tool making.

Metal and glass were common materials used in various industries, but now many applications are opting for plastic instead.

"What's happening in all industries, take automotive, more and more metals have been replaced by plastic by the point of view of weight," Nollenberger said.

"The same thing in medical devices. It's weight reduction … and size reduction."

This keeps happening because both metal and glass have limitations that plastics do not, she said. Metal is heavy; glass is expensive and fragile.

"It's not that metal is replaced with silicone, or glass is replaced with silicone, it's just in the trend toward multi-component parts. … Silicone is a material that likes to bond to many other substrates," Nollenberger said. "And that's what makes it attractive."

Additionally, silicone and LSR stand out as materials, especially in medical devices, she said, because of their biocompatibility, capabilities as implantable materials and ability to have contact with bodily fluids.

For 2K technology, the components are typically a combination of LSR and plastic, Nollenberger said, because LSR and plastic have similar processing needs, like cure times, so it's a good combination.

"By solving something with the 2K technology, and combining two or more materials into one, we oftentimes are helping a designer to solve a space problem," Nollenberger said.

As components get smaller, it gets more difficult to produce them, she added.

"Whether it's plastic or metal or rubber, all of it. It's just getting to the limit of what is still possible," Nollenberger said.

With the 2K solution, Trelleborg offers a "technically sound solution," she added.

"There is no doubt whether the individual components are properly assembled. We bond them together. There's no risk that there's a misalignment of any sort. … It's one component versus three or four

Ursula Nollenberger

the customer has to put together."

With a 2K solution, a company no longer has the cost of an assembly operation. And "you no longer have the risk of an assembly operation," she said.

The 2K solution is the more robust and lower total cost option, Nollenberger added, especially for high risk, safety critical applications.

"An insulin pump definitely needs to deliver very reliably the proper dose of insulin without fail," she said.

"Or in a car, when it's about a side airbag or a brake booster, which is involved with a sensor, that needs to function reliably. Otherwise, people get injured or worse."

The application use differs from industry to industry. For instance, healthcare and medical devices, biocompatibility is important. Whereas, in automotive, it needs to be nonflammable.

"There's a whole set of requirements that make one material fit for an application or not," Nollenberger said.

Removing the potential for dead space in medical devices is also a significant use case for this technology.

"When we then look at a 2K solution where instead of having an O-ring assembled with a valve, we integrate a sealing element into the valve ... there is no space for any bacteria to get into," she said.

Beyond the medical and automotive markets, Trelleborg is seeing opportunities in electronics and automation.

"Silicone is really a material that lends itself in those areas quite well," Nollenberger said.

No matter the industry, 2K technology is used for applications with high volume, she added. With high volume, you also get into higher cavitation, which gets a bit more complicated and requires a fully-automated setup.

"It is a technology that we've developed over quite a few years. It involves high precision tool making and LSR specialized tool making and process automation," she said.

"These are the two elements that are the foundation of how we work in general and for our 2K technology in particular. ... We're leading across all the market segments that this can be employed in."

Inline Play
