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## Michelin debuts new high-performance adhesive

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MICHELIN

Michelin's new resin replaces resorcinol and formaldehyde with molecules that are not under regulatory limits.

CLERMONT-FERRAND, France—Michelin will be leaving an old industry standard behind with some of its lines of tires later this year.

After more than nine years of research and development, the company is launching a new high-performance resin adhesive designed for bonding textiles, Michelin's Industrial Director Olivier Furnon said.

"We have been using in the industry, for textile to rubber, a traditional model that has not been changed for more than 80 years," he said. An adhesive of resorcinol, formaldehyde and latex is usually used to bond textiles to rubber in tire production.

"We will be producing and delivering tires made with this new glue, which is based on a new formula that eliminates completely the resorcinol and formaldehyde," Furnon said.

The new resin, which is currently unnamed, will avoid regulatory constraints in industrial settings where the RFL glue would be

produced, as resorcinol and formaldehyde are subjected to regulatory limits, Furnon said.

"Eliminating these two products in the raw materials is a smart solution for the safety of the people," he said.

Replacing the RFL adhesive hasn't been easy for Michelin, he said. The first few years of the R&D process were dedicated to working on new concepts which would work seemingly as well as an RFL adhesive. Michelin then tested the glue with multiple types of fibers in tire applications, such as polyester, nylon and aramids. The company also tested across various sizes and types of tires, from passenger to agricultural, to find a product that could be used across the board as a replacement for RFL.

"What we are aiming at is that we wanted to find a glue that would be a standard for all applications. And we are quite confident that it will be so," he said. "We are not so far that we can announce today that we will make all kinds of tires with this glue. We will still work on that."

But Michelin is moving ahead in mass production of some passenger car and light truck tires, launching the lines with the new glue before the end of 2018, Furnon said. The company is still defining the range of tires and sizes, but will at least produce some sizes of the Michelin Energy Saver and Michelin Alpin tires with the new glue by the end of the year.

Michelin doesn't expect to gain performance with the new glue, but it is expected to be at least as good as RFL, Furnon said. He hopes the company will make progress with the glue in aviation, agricultural and competition tires over the next five years.

The new glue uses polyphenols, with antioxidant properties, and polyaldehydes, regularly used in the perfume industry, to replace the resorcinol and formaldehyde in the glue, respectively, Furnon said.

"We are very confident that these two products won't come under regulatory limits," he said.

The resin at the base of the glue could have many potential uses outside of the scope of tires, Furnon said.

"For example, in timber processing, there's a lot of glue used, and the glue is based on formaldehyde," he said. "To be able to offer glue that works as well as the classical glue, but without formaldehyde, might be a very huge advantage for this industry."

With the resin, Michelin can offer adhesives adapted to various processes where it could present a breakthrough for health and safety, he said.

"It is our goal to make this technology available for all potential applications, either related to tires or not. This will be a new activity for Michelin," he said.

Michelin created a special entity within the company called ResiCare for the marketing, commercialization and industrialization of the resin, he said. The new entity will allow manufacturers who are interested in the technology to benefit by either acquiring the necessary process for production or by purchasing the resin directly. The entity has fewer than 20 employees so far, all staffed from within Michelin. Eventually ResiCare, which is based in Clermont-Ferrand, will produce the resin; currently, it is produced by Michelin.

Furnon said in terms of the glue capacity for Michelin tires in the ramp-up from about September to the end of 2018, the company will have enough



MICHELIN

Olivier Furnon

capacity for about 100,000-200,000 tires this year. Going forward, ResiCare will make sure that Michelin has enough adhesive to supply its tires with the glue.

The new resin shows the growing role of Michelin's high-tech efforts, Furnon said.

"We know that we have know-how in the high-tech material sector," he said. "This is an example. With ResiCare, with this glue, we are showing that we have potential business in this sector that is now a strategic sector for Michelin. It is all possible thanks to our stronger research and development capacity, of course, and our investment in new technologies."

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