



ZEPPELIN SYSTEMS

This bulk material handling expert contributes to a circular economy by reducing the environmental impact of its products through recycling with specialist equipment

▼ **TO PRODUCE TIRES THAT PERFORM TO THE HIGHEST LEVEL, IT IS IMPERATIVE THAT, FROM THE START OF THE MANUFACTURING PROCESS, MATERIALS ARE HANDLED WITH THE UTMOST CARE, ACCURACY AND ATTENTION TO DETAIL.**

German bulk material handling specialist Zeppelin Systems ensures that mixtures used in tire production have a high level of consistency, resulting in products that are economical and environmentally friendly while meeting stringent quality standards.

“Naturally, we are very much involved in the handling of raw materials. However, this can be quite difficult because you have to deal with hundreds of powders, pellets, plastics, waxes and liquids,” explains Guido Veit, vice president of sales projects at Zeppelin Systems. “We unload them, store them, convey them, and finally bring them to the mixer. Our business is purely focused on the mixing room itself.”

With sustainability a key focus, Zeppelin’s aim is to use the very latest in functional materials and additives to ensure that each tire can be produced more sustainably in terms of performance and reduced rolling resistance. By implementing these changes, the company is further supporting a circular economy by bringing renewable and recycled raw materials back into the production process.

“This enables the tire producers to have products with a more sustainable footprint,” comments Veit. “In order to use recycled products or sustainably produced products, a dedicated and

specialized handling technology is required. It is not the same as having standard carbon black as a filler in a tire.”

To produce tires with high levels of sustainability and quality, tire manufacturers are opting to use sustainable raw materials such as liquid functional additives. These materials contribute to a lower rolling resistance and improve environmental performance.

“We developed specialist equipment for handling silica and silane 15 years ago when the two raw materials came to the market in a massive way, and since then we have further developed our technologies to handle these,” says Veit. “Our system is a closed conveying system for handling silica securely without any dust emissions because the bulk material is encapsulated and closed in a pipe.

“On the liquid side, silane requires special care when handling because it’s not like other oily ingredients, and it is not self-lubricating,” continues Veit. “Therefore, you need dedicated equipment to dose this material correctly, so we have developed a liquid dosing system for accuracy.”

“Inventing a process is only the first step, you have to build plants, gain practical experience and make these systems perfect”

Below: Raw materials for use within rubber compounds are safely and gently conveyed within Zeppelin systems



Zeppelin has built more than **500** systems around the world

“To support the availability of recycled materials, we help startups bring their technologies to life”

Above: Specialist dosing equipment enables companies to handle recycled materials accurately

Veit explains that a new type of rubber compound – which uses these highly activated functional additives – improves the braking performance of tires and reduces wear, resulting in less tire road wear particles polluting the environment. However, the use of these materials creates its own handling challenges, one with which Zeppelin aims to help other companies.

“You can only handle these materials with a newly designed liquid dosing system such as the one we invented recently,” says Veit. “It is a highly precise system: we’ve locked the liquid in a closed system, which in principle guarantees a high level of control – unlike the old and inaccurate open weighing system. The closed and encapsulated system reduces or completely avoids the cross-contamination of diverse additives.

“The liquid dosing contributes in two ways,” he continues. “Firstly, in principle, it enables the handling of new materials that you cannot handle with old equipment. And secondly, you improve the accuracy of handling all of your liquids with this dedicated technology.”

PINPOINT PRECISION

Material management and accuracy is also key to the material handling process, Veit explains.

“Particularly during the weighing of the raw materials as well as during the filling process of the mixer, dust formation cannot be completely avoided. To prevent this dust entering the production environment, filters and aspiration systems are used. Their design must be precisely tailored to the process in order to prevent two negative effects on the quality of the mixture. First, no components of the mixture should be aspirated out of the

mixture in an uncontrolled manner, which would thus change the quality of the formulation. Secondly, the extracted dust from conventional extraction systems is usually waste and must be disposed of,” comments Veit. “This is what Zeppelin Systems avoids with its systems.”

The company has more than 30 years of experience in the rubber industry. It is also involved in wider rubber sustainability and actively searches for ways to bring new forms of recycling technologies to market.

“Tire manufacturers are our core customer base at the moment, but we are increasingly trying to help startup companies develop recycling technologies,” says Veit. “To support the availability of recycled materials, we help startups bring their technologies to life.”

Zeppelin Systems aims to support a range of recycling technologies, including pyrolysis, purification and waterjet. The waterjet technology enables customers to granulate truck tires up to giant tires (and other large applications) using highly pressurized water.

“We are not the developer of these technologies, but we help make them a reality,” adds Veit. “Inventing a process is only the first step, you have to build plants, gain practical experience and make these systems perfect. Then you have to integrate them into a plant design and scale them up to a reasonable level to make them profitable in an economical field.”

As the industry develops and increases its uptake of sustainably sourced materials, Zeppelin Systems seeks to share its specialist knowledge and highly accurate dosing systems to ensure the environmentally conscious operation of the bulk material handling sector. ●