

ZEPPELIN SYSTEMS AND RCB NANOTECHNOLOGIES COMBINE EXPERTISE IN TIRE RECYCLING

Scrap tires go through numerous recycling processes before they become new tires. A distinction is made between material recycling (sorting, separating and granulating), raw material recycling (e.g., pyrolysis process) and chemical recycling as the final finishing step of pyrolysis worldwide. As an integrated solution provider with over 40 years of experience in the tire industry, Zeppelin Systems collaborates with international partners in all aspects of scrap tire recycling.

The German company RCB Nanotechnologies specializes in the finishing of raw-recovered carbon black. The company thus perfectly complements Zeppelin Systems' wide range of services throughout the sustainable circular economy for the tire industry.

March 16, 2023, Friedrichshafen, Germany: Carbon black, commonly known as industrial soot, is found in almost every black rubber or plastic product. A large part of the high-tech industrial material produced – around 70 % of the total worldwide production – is required for the production of tires. To produce one ton of carbon black, manufacturers use around 1.5 tons of fossil raw materials as well as large quantities of water. In addition, the carbon black manufacturing process generates up to three tons of CO₂ emissions. It is estimated that there are currently around four billion scrap tires in landfills worldwide, and one used passenger car tire contains around three kilograms of carbon black. Thanks to innovative technologies for chemically treating scrap tires, this previously unused material could be recycled much better in the future.

"There is promising potential for customers and the environment in the industry-wide recovery of carbon black," says **Dr. Markus Vöge**, CEO of Zeppelin Systems GmbH. "We want to offer our customers sustainable alternatives for tire production – with consistent quality and in sufficient quantity," adds **Guido Veit**, Vice President Sales for Polyolefins, Rubber and Silos at Zeppelin Systems GmbH. This is exactly where the Friedrichshafen-based system engineering company together with RCB Nanotechnologies steps in.

RCB Nanotechnologies developed a revolutionary process in collaboration with the Fraunhofer Institute for Building Physics IBP. In this process, the ash content (of up to 25 %) is separated from the raw recovered carbon black obtained by pyrolysis. The results are a high-quality and extremely pure recovered Carbon Black (rCB). Numerous tests with well-known tire manufacturers confirmed that the rCB quality is absolutely comparable to the original industrial material (conventional Carbon Black for example N660 or N772). Thus, certain standard Carbon Black grades can be 100 percent substituted in the future. In addition, other high-quality products are obtained in the process, such as silicon- or zinc-based compounds. This creates further, sustainable material cycles in the process for the construction and tire industry. As a solution provider and system integrator, Zeppelin Systems can easily integrate RCB Nanotechnologies technology into both current or new pyrolysis plants. As an engineering and implementation partner, we use our many years of experience to create solutions for the challenges of our customers on a daily basis. We Create Solutions!

About RCB Nanotechnologies GmbH:

RCB Nanotechnologies GmbH, Munich (Germany) was founded to commercialise and industrialise a novel technology invented by Fraunhofer IBP (patent filed). This technology has been developed for the elimination of the ash content of raw recovered Carbon Black from end-of-life tires Pyrolysis operations. As this novel "clean rCB" has a purity of 96-99% Carbon content, it can be used as a sustainable 1:1-replacement of certain virgin Carbon Blacks. In the same process, novel Silica- and Zinc-products can be extracted from the removed ash fraction. RCB Nanotechnologies holds the exclusive Global license of this disruptive technology and is in the process of setting up the first commercial plant which will be located in Sarajevo, Bosnia and Herzegovina. In the coming years the company intends to set up multiple plants worldwide.

About Zeppelin Plant Engineering:

Zeppelin Systems is a global leader in plant engineering for the handling of high-quality bulk materials. With over 70 years of experience in process engineering and extensive knowledge in handling countless raw materials, Zeppelin Systems offers complete and reliable solutions. With 22 locations worldwide, the company supports its customers from plant design through implementation and provides all aftersales services locally, from a single source. At Zeppelin Systems, innovative processes are just as important as the clever automation solutions and full range of service they provide to cover the entire life cycle of your plant. Each Zeppelin plant is customized to meet the requirements of each customer be it in the plastic, chemical, rubber and tire, or food industries. With the world's largest technology center network for bulk materials, Zeppelin enables its customers to carry out tests on an industrial scale and verify and optimize their plant design. Zeppelin Systems develops and manufactures its own components for key plant functions, which are also used in third-party plants. For more information, visit zeppelin-systems.com.

About the Zeppelin Group:

The Zeppelin Group offers solutions in the construction industry, drive and energy systems, engineering and plant engineering. The Group provides customers with expertise in a number of areas, from the distribution and service of construction, mining, forestry and agricultural machinery, through rental and project solutions for the construction sector and industry as a whole, to drive and energy systems as well as engineering and plant engineering and enhances its offering with digital capabilities in all areas. Zeppelin is represented at more than 340 sites in 43 countries and regions worldwide. In the 2021 financial year, the Group workforce comprised almost 11,000 employees, which generated sales of EUR 3.7 billion. The Group organizes its activities into six strategic business units (Construction Equipment Central Europe, Construction Equipment Nordics, Construction Equipment Eurasia, Rental, Power Systems, and Plant Engineering) and the Zeppelin Digit Strategic Management Center. Zeppelin GmbH is the Group holding company. It is legally domiciled in Friedrichshafen and has its head office in Garching near Munich. The Zeppelin Group is a foundation-owned company. Its roots can be traced back to the establishment of the Zeppelin Foundation by Graf Ferdinand von Zeppelin in 1908. For more information, visit zeppelin.com.

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