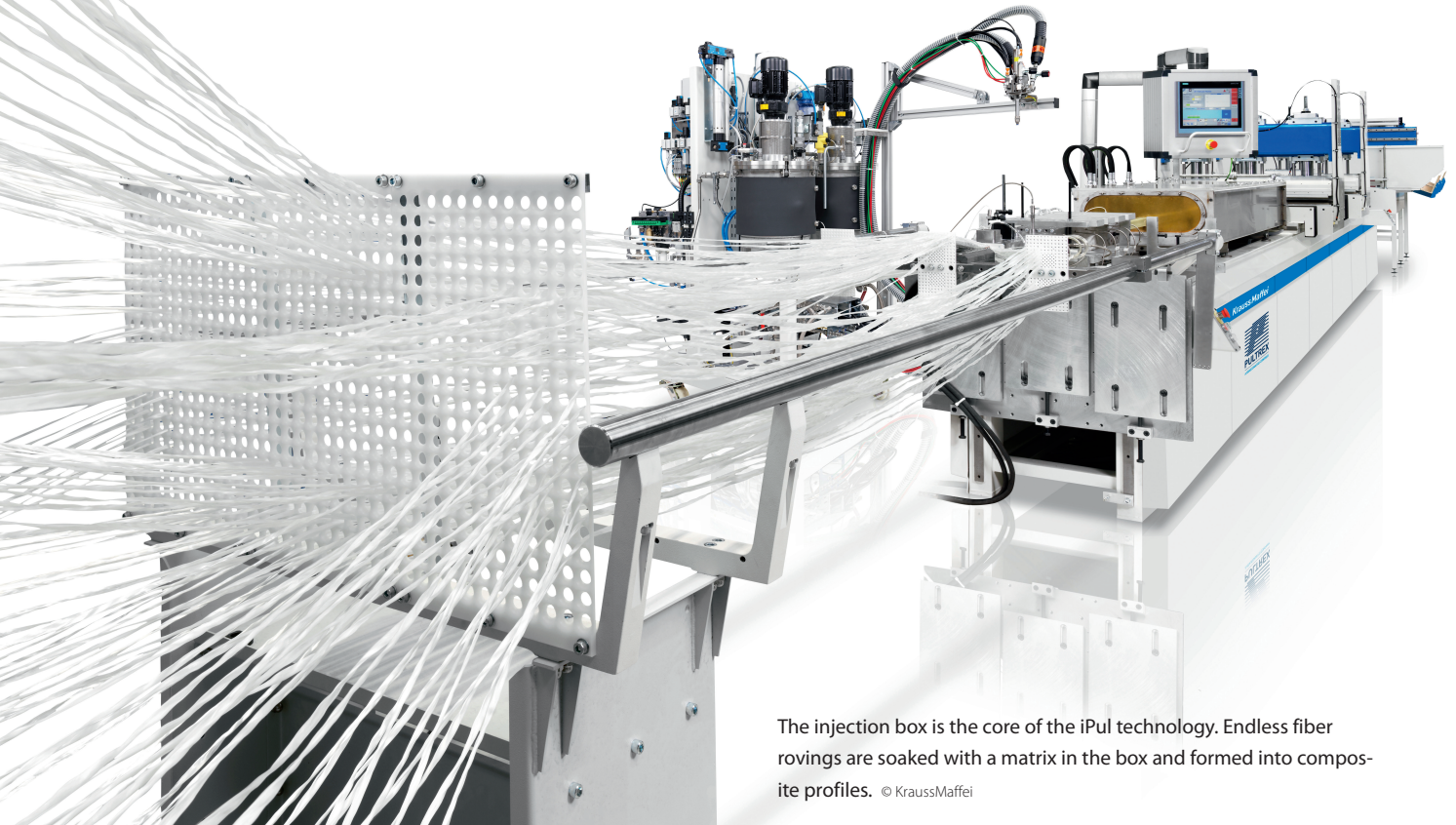


Pultrusion System for Lightweight Profiles

Vehicle Chassis Become 60 Percent Lighter

Carbon Truck & Trailer GmbH invested in a pultrusion system of KraussMaffei subsidiary Pultrex. The iPul pultrusion system for lightweight profiles made of carbon fiber-reinforced plastic (CFRP) produces profile parts for around 70,000 vehicle chassis annually.



The injection box is the core of the iPul technology. Endless fiber rovings are soaked with a matrix in the box and formed into composite profiles. © KraussMaffei

Carbon Truck & Trailer GmbH (Carbon TT) is based in the “CFK (CFRP) Valley” in Stade, Lower Saxony, Germany. The young company specializes in building carbon-fiber-based chassis for lightweight commercial vehicles. Now the CFRP specialists have a new highly automated iPul pultrusion system up and running at their location in Buxtehude near Hamburg, Germany. The system was supplied by Pultrex, a KraussMaffei subsidiary. It produces large CFRP profiles in series, which are used in high-load components for vehicles such as buses, small trucks and mobile homes.

“The new iPul system makes it possible for us to manufacture components

in series at a consistently high level of quality. At the same time, the system gives us another selling point in multi-axial pultrusion – there are only five other systems like this one in the world,” says Gerret Kalkoffen, Managing Director of Carbon TT.

KraussMaffei and Pultrex demonstrated their pioneering spirit – and not just by tailoring the system design to customer requirements. “Despite all the obstacles, we managed to deliver and commission the system on schedule,” explains KraussMaffei Sales Expert Wolfgang Hinz. The unpredictable political situation in the wake of Brexit as well as the consequences and other limitations caused by Covid-19 were

certainly not foreseeable when the system was ordered in mid-2020. “The experience and dedication of the technicians and project managers helped in commissioning the system according to plan,” Hinz continues.

Lower Weight and Higher Payload

“Our carbon lightweight construction solutions help in meeting increasingly rigid requirements for sustainability, efficiency and safety. Especially for vehicles powered by batteries and hydrogen fuel cells, carbon fibers provide more material advantages than just their weight,” explains Kalkoffen. A CFRP chassis is approximately 60 % lighter



The team of Carbon TT is proud of their new Pultrex iPul pultrusion system. On the left: Managing Director Gerret Kalkoffen. © Carbon TT

than comparable steel chassis – this weight reduction lowers CO₂ output and increases both the payload and the cruising range. In addition, the CFRP chassis compensates for the additional weight of batteries in electric vehicles and effectively protects them in the event of a crash.

“Our customers are automotive OEMs with high standards. Our own standards for the technology and service of our production systems are equally high,” says Kalkoffen. “In Pultrex, we’ve found a partner with decades of experience in pultrusion. In collaboration with KraussMaffei, they offer fast and reliable service.”

The innovative gripper concept of the Pultrex system made an especially positive impression. “The grippers operate with precision and without slipping. This is a ‘must’ for ensuring the consistently high quality of our complex CFRP profiles.” And when you do business with Pultrex and KraussMaffei, all system components – both for mixing and metering technology and for injection and pultrusion technology – come from a single source. And when service is required, there is a central contact person.

Customers of Carbon TT set the pace for production with their order quantities and process requirements. This is where

the iPul technology can unleash its full performance potential. Production can run at a speed of up to 2.25 m per minute at 20 t of pulling force. For large and complex profiles, pultrusion can even be carried out at up to 40 t in parallel operation.

Production at High Speeds – Just in Time

For wrinkle-free reforming of multi-axial roving, CarbonTT developed its own roving guide, which is being used for the first time on the new system. The injection box makes it possible to quickly and flawlessly impregnate the exceptionally large profiles with thick walls and a high fiber volume fraction.

The fibers are soaked in the injection box with a polyurethane matrix and then shaped into the approximate final profile form. At the same time, the closed box prevents any unwelcome odors which arise during production with open baths.

The mold was adapted and designed by Carbon TT with spring-in and shrinkage taken into account for the final geometry. The profiles are trimmed down to the final dimensions automatically by the system and then processed further. ■



The chassis made from CFRP components are up to 60 % more lightweight than comparable steel designs that are produced at Carbon TT in Buxtehude, Germany. Pultrusion technology from Pultrex is the technical basis of the new production. © Carbon TT

Info

Company Profile

CarbonTT develops and produces heavy-duty structural components made of carbon fiber-reinforced plastic for the automotive industry. In collaboration with Volkswagen, StreetScooter and Daimler, various chassis designs have successfully made it to the street. CarbonTT holds utility models and patents in component design, joining processes and automated production.

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