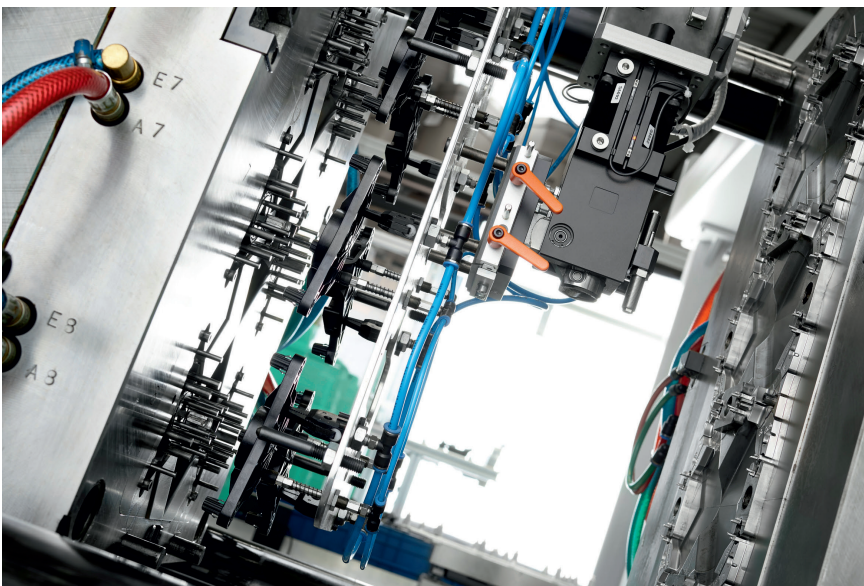


Lightweight Components from the Roll

deller plastics Uses Competitive Advantages of Fiber Direct Compounding

The introduction of fiber direct compounding at deller plastics Uwe Braselmann was driven by tangible economic advantages. The plastics processor uses the lightweight construction process for manufacturing cable drive housings for operating electric power windows in car doors.



The injection molding machine Allrounder 630S is equipped with an 8-cavity hot runner mold. The even distribution of the fibers is confirmed by an incineration test (© Arburg)

Employing a healthy mix of the new and the proven, we have always been innovative", says Jann Braselmann, who runs the family business deller plastics in Breckerfeld (nearby Lüdenscheid), Germany, together with his brother Nils and their father Uwe Braselmann (Fig.1). "Needless to say, the material requirements of our customers play a part in determining the extent to which we eventually embrace innovations. Considerable effort is often required, but for FDC we can only report positive results so far."

FDC means fiber direct compounding and refers to a process developed for Allrounder injection molding machines by Arburg GmbH + Co KG, Lossburg, Germany, together with SKZ in Würzburg, Germany, in which continu-

ous fibers are incorporated directly into the liquid plastic melt on a standard injection molding machine with a special unit. The FDC module on the injection unit comprises a side feeder with integrated cutting device, adapted cylinder and special screw geometry. Cutting lengths from 5.6 to 33.6 mm have proven successful in practice.

The process reduces fiber damage during material preparation. Fiber length, fiber content and material combination can be individually adjusted and thus the component properties can be specifically influenced. In addition, processors can significantly reduce material costs by using roving fibers and a matrix polymer as raw materials instead of fiber-filled compounds. This injection molding process results in lightweight

components with high strength and reduced wall thickness.

Special Procedure Maintains Competitiveness

Nils Braselmann describes the economic side of the process as follows: "Following implementation of the FDC process, we are able to continue production in Germany while remaining internationally competitive. We reduced our product and manufacturing costs to such an extent that we were able to offset our global logistics expenses." The reason for this is simple: by using glass fiber rovings, which are cut to an adjustable length in a lateral feeder and added directly to the melt in the injection unit, compounding made it poss-

ible to achieve greater individuality and to do without expensive ready-to-use materials.

"The system enables us to increase the length of the glass fibers in the component by an average of 50 percent and to match them precisely to the product and its stability", explains Nils Braselmann. "This increases flexibility in development and production. Our customers can specify more individually which original materials are to be used and can combine them according to the component requirements. In this way, longer fibers in the component can be used to achieve higher strength with thinner walls, for example."

Since February 2018 deller plastics has been using fiber direct compounding in high-volume injection molding, making it one of the first companies to include Arburg's lightweight construction process in its portfolio.

Weight Monitoring Ensures Quality

Cable drive housings made of PP with a glass fiber content of 30% are manufactured on an Allrounder 630S injection molding machine (clamping force: 2500kN, **Fig. 2**) in an 8-cavity hot runner mold (**Title figure**). A bonding agent also acts as a coloring agent for the molded part. The robotic system (type: Multilift Select) removes the cable drive housings and sets them down on a scale to check the actual



Fig. 1. Uwe, Nils and Jann Braselmann (from left) are delighted with their FDC system (© Arburg)

weight and thus the correct glass fiber content and forwards the components to the production data acquisition (PDA) system of the injection molding machine. This ensures that each shot weight is assigned to the relevant cycle and documented with all parameters. If the parts are OK, they are picked up and placed into customer-specific part carriers in a conveyor station. At a quality control station, 8-fold shots for sampling and quality checks can be taken at any time during the running process. Series-accompanying testing includes incineration tests (**Title figure**), visual and gauge tests as well as torque-monitored screw-on tests.

80 Kilometers of Fibers per Day

About 193 kg of glass fiber rovings are processed to manufacture around 20,000 parts with 30% glass fiber content per day. Taking into account the fineness of the roving (tex value), this

corresponds to about 80km of glass fibers per day at a cutting length of about 11 mm. "We are convinced of the great potential offered by the FDC process, not only using glass fibers, but also natural or carbon fibers", says Nils Braselmann. "In addition, Arburg's extensive technological expertise and comprehensive support extending to process, technology and software details has been valued by this company for 50 years. That is why the second FDC system was commissioned in September 2019." ■

Company Profile

deller plastics Uwe Braselmann was founded in 1959 by Peter and Hardy Braselmann at the Breckerfeld site, Germany. With 180 employees and 54 injection molding machines, the family business produces technical plastic parts for the automotive, household appliance and electrical industries.

➤ www.dellerplastics.de

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Fig. 2. The FDC system manufactures parts such as cable drive housings made of PP-GF30. After the removal the robotic system sets them down on a scale to check the correct glass fiber content

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