

## PRESS RELEASE

### **iComposite 4.0: Self-regulating manufacture of FRP parts**

Joint IKV and AZL project examines productivity increases with the aid of Industry 4.0

During the International Colloquium Plastics Technology of the Institute of Plastics Processing (IKV), a project will be presented entitled "iComposite 4.0", which can achieve an enormous productivity increase in the production of fibre-reinforced plastic parts and a cost saving of up to 50 percent. The keys to the success are the paradigm change from tolerance-controlled production to a production that is oriented to self-regulation of the product function, as well as the combination of part manufacture without rejects or off-cuts.

As part of the research project iComposite 4.0 funded by the German Federal Ministry for Education and Research (BMBF), two Aachen-based research teams from the Institute of Plastics Processing (IKV) in Industry and the Skilled Crafts at RWTH Aachen University and from the Aachen Centre for Integrative Lightweight Design (AZL) are working together on the economical large-series production of FRP parts. Fibre-reinforced plastics (FRP) are, because of their very good weight-specific mechanical properties, of great interest for use in lightweight construction applications in the automotive industry and in aviation. Until now, however, component production has been characterised by complex and cost-intensive production processes with a low level of automation, inefficient material deployment due to offcut wastage and high reject rates, and thus high costs per part. This, in turn, means good potential for productivity increases that can, in the sense of Industry 4.0, be achieved with the digitisation of production and the linking up of production machines. That is precisely the aim of iComposite 4.0. The project pursues the approach of building up an intelligent, self-regulating production system for the economical large-volume production of FRP parts.

The basis for this resource-efficient production system is the 3D fibre spraying process developed at IKV. With this process, fibre rovings are cut automatically and with high volume throughput to a desired fibre length and, in an oriented state, applied to a complex lay-up mould. The process makes it possible to efficiently produce, without wasting expensive semi-finished fibre materials and without complex draping processes, a preform with near net-shape contours and taking into account the load paths of the component. Nevertheless, process-related fluctuations in the fibre orientation can occur during the preforming process as well as fluctuations in the fibre weight per unit area that cause deviations in the mechanical properties of the part. So that the 3D fibre spraying process can be effectively used for series production despite these fluctuations, it is, as part of iComposite 4.0, integrated into a self-regulated production system. Through inline monitoring of the fluctuations with regard to fibre orientation and fibre distribution in each preform, these fluctuations can be balanced out with inserts of continuous fibre so that, despite individual properties of the semi-finished products, a quality-assured part with constant mechanical properties is produced after impregnation, tailored to the respective preform, in the resin transfer moulding process.

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### About IKV

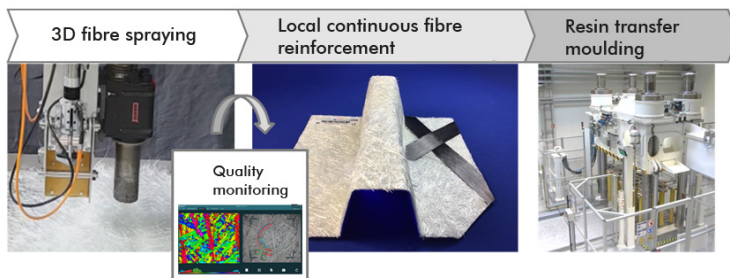
IKV, the Institute of Plastics Processing at RWTH Aachen University, is Europe-wide the leading research and education institute engaged in the field of plastics processing enjoying outstanding reputation. More than 300 staff are employed in finding solutions to problems connected with processing, materials technology and part design in the plastics and rubber industries. IKV's close contacts with industry and science, together with its outstanding facilities, enable cutting-edge research in plastics technology and ensure that students benefit from a comprehensive, practically oriented course of study. Plastics engineering graduates from IKV are thus sought-after experts in industry. In organisational terms, IKV is divided up into the four specialist departments of Injection Moulding, Extrusion and Rubber Technology, Part Design and Materials Technology, and Composites and Polyurethane Technology. The institute also takes in the Centre for Analysis and Testing of Plastics, and the Training and Further Education department. IKV is run by an Association of Sponsors, which currently has a membership of about 290 plastics companies from all over the world. Univ.-Prof. Dr.-Ing. Christian Hopmann is Head of the Institute and Managing Director of the Association of Sponsors. He also holds the Chair of Plastics Processing at the Faculty of Mechanical Engineering at RWTH Aachen University.

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Intelligent and self-regulating production system (photos: IKV, AZL, Apodius, Schuler)

Photo in high resolution to find on our website [www.ikv-aachen.de/en/news](http://www.ikv-aachen.de/en/news).