



News Release

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Covestro, KraussMaffei and IKV win 2017 FSK Innovation Award for polyurethanes

Major advancement in pultrusion

Tremendous potential for the efficient mass production of composite sections

Covestro, together with KraussMaffei and the Institute of Plastics Processing at RWTH Aachen University, was the recipient of a 2017 FSK Innovation Award for polyurethanes. The Specialist Association of Foamed Plastics and Polyurethanes (FSK) elected to honor the partners' achievements in promoting the wider industrial use of pultrusion with polyurethane resins.

For the award in the category "Technology – Processing and Chemistry," the panel of judges commended the increased cost-efficiency of the method for processors and the partnering approach to the project. The award ceremony was held at the International FSK Specialist Conference Polyurethane 2017 in Gurten, Austria.

Tremendous potential

Pultruded composite sections have already proven successful in thermally insulating window frames and in reinforcing rotor blades for wind turbines. The process offers tremendous potential for the continuous manufacturing of composite sections, but more widespread use was prevented until now by the inadequate degree of industrialization.

In close cooperation, the three partners enhanced the chemistry, technology and process to significantly increase productivity as well as process and product quality. Processors can now cut costs significantly compared to the previous method.



Flexible turnkey systems with high automation

The new iPul machines from KraussMaffei are the first turnkey systems to incorporate system, process and die technology all from a single supplier. Critical processing parameters, such as output rate and haul-off rate, are controlled centrally.

In the new systems, the fibers are no longer impregnated in an open process, but rather by a metering machine in a closed injection chamber. Apart from eliminating odor problems for a pultruder's employees, the new technology supports precision temperature management during curing and thus increases production speeds. The systems are sensor-assisted and highly automated.

Another advantage of the iPul machines is their extensive flexibility and precision. Thanks to the injection chamber and metering device with newly engineered mixing head, a wide variety of resins can now be processed, including highly reactive polyurethane systems. The matrix material is injected at low pressure to additionally cut costs.

The polyurethane advantage

Polyurethane resins offer significant advantages over established pultrusion materials, such as epoxy, unsaturated polyester and vinyl ester resins. Their low viscosity, good fiber wetting and high reactivity support faster processing speeds than epoxies, which reduces manufacturing costs. Another advantage is their considerable flexibility: The reaction time and viscosity of polyurethane resins can be varied widely, permitting the reproduction of even very thin component geometries.

Covestro markets the polyurethane systems Baydur® PUL and Desmocomp® for pultrusion. The former are liquid, two-component systems for fabricating highly durable sections that display outstanding thermal insulation properties, among other things. They therefore are perfectly suited for use in insulating window frames. Desmocomp® displays not only good mechanical properties, but also excellent UV and weathering resistance, making it the product of choice for outdoor applications. The aliphatic system won a JEC Innovation Award at this year's JEC World Composites trade show.

How pultrusion works

In pultrusion, glass, carbon or other fibers are fed continuously from rovings into an injection chamber, where they are impregnated with a liquid, thermoset resin system. The fiber composite cures on exposure to heat in a die. The hardened section is pulled continuously in the process, hence its name. After cooling, the profile is trimmed by an integrated saw. The resulting, straight sections display low weight, paired with very high strength and stiffness in the fiber direction.



Covestro and the Institute of Plastics Processing (IKV) at RWTH Aachen University are cooperating closely on pultrusion process development using polyurethanes. The IKV with its long-term experience in the fields of polyurethane processing and pultrusion with reactive resin systems is supporting Covestro in case of development issues regarding pultrusion processes.

The FSK has been sponsoring the Innovation Award every year since 1998 in recognition of outstanding ideas, products and processes in the categories Design, Technology and Process and Chemical Engineering.

About Covestro:

With 2016 sales of EUR 11.9 billion, Covestro is among the world's largest polymer companies. Business activities are focused on the manufacture of high-tech polymer materials and the development of innovative solutions for products used in many areas of daily life. The main segments served are the automotive, construction, wood processing and furniture, and electrical and electronics industries. Other sectors include sports and leisure, cosmetics, health and the chemical industry itself. Covestro has 30 production sites worldwide and employs approximately 15,600 people (calculated as full-time equivalents) at the end of 2016.

About KraussMaffei:

The KraussMaffei product brand is internationally recognized for its groundbreaking, multitechnology system and process solutions for injection and reaction molding technology and factory automation. With its standalone, modular or standardized machinery and systems, and a wide, customizable service offering, KraussMaffei is a full-system partner for customers in many industry sectors. KraussMaffei bundles many decades of engineering expertise in plastics machinery and is headquartered in Munich, Germany.

For more information: www.kraussmaffei.com

About IKV:

IKV, the Institute of Plastics Processing in Industry and the Skilled Crafts 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. 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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