

Joint news release on the occasion of the JEC Europe Composites Show, March 8 to 10, 2016, Paris

Innovation Corner: hall 6

BASF: hall 6, booth L39

Teufelberger: hall 6, booth P45

P142/16e

Optimal combination of lightweight construction, mass production and cost-effectiveness

- Joint project of KTM Technologies, H2K Minerals, TEUFELBERGER and BASF wins JEC World Innovation Award
- Technology demonstrator for hollow components combines the latest processing techniques and materials for large-scale production process

Salzburg/Ludwigshafen, March 7, 2016. This year's winner in the RTM category at the JEC World Innovation Awards shows how complex hollow parts can be mass-produced in an automated process at competitive prices. The joint project of KTM Technologies, H2K Minerals, Teufelberger and BASF takes an integrative view of the process chain – from core formation and the manufacturing of the preform with braided carbon fibers, via the HP-RTM process (high pressure resin transfer molding) using reactive polyurethane resin to the dissolving of the core material. The project called “Cavus” implemented a geometrically complex hollow part with undercuts by producing a mountain bike handlebar. The technology demonstrator combines the latest processing technologies with mature materials in a procedure that can be applied for the mass production of competitive lightweight parts in the automotive and other industries.

The project was initiated by KTM Technologies, which is responsible for project lead, part development, mold construction and the manufacturing of the parts.

H2K Minerals developed and produced the materials for the HP-RTM compatible cores. The braided preform was developed, optimized and manufactured by the composite part producer Teufelberger. Process simulation and the PU system used are from BASF.

Integrated construction: from the sand core to the hollow component ready for serial production

The starting point for the component is a specially developed pressure and temperature resistant core. It consists of sand as well as water-soluble additives and can be formed into many different geometries. Preforming is accomplished in a fully automated carbon fiber braiding process. With the braiding technology complex geometries can be realized at high material throughput. Because of the good drapability the preform thus produced already has the final contour of the finished component.

The subsequent HP-RTM process is distinguished by short injection times and a highly reactive, compact polyurethane resin system from BASF, which drastically reduces the cycle time to two to three minutes. Due to the high internal mold pressure the carbon fibers can be fully wetted, complex component geometries can be produced with high fiber volume contents. The fast-hardening Elastolit® R 8819 PU matrix system for continuous fiber composite parts shows outstanding mechanical qualities, including excellent continuous loading, impact strength and high damage tolerance. The BASF simulation tool Ultrasim® helped to find the optimal process management and to reduce the mechanical loading of the core during injection.

At the end of the process, the core material is dissolved with water, a method which is also possible with small component cavities. Depending on the core manufacturing method, up to 98% of the core material can be reused for subsequent production.

Lightweight construction – from the challenge to the solution

Hollow components have a huge potential for lightweight construction. The greatest challenge are complex geometries with variable diameters and undercuts. The high proportion of manual production steps that is still required, together with the necessary subsequent processing work and long cycle times, lead to high unit costs. “Until now, traditional technologies have only been able to implement ambitious designs in a limited way or at high costs for serial production,” says Hans Lochner, head of technology development and prototyping at KTM Technologies. “Our unique “Cavus” project solves this problem with an innovative, rapid and reliable process which can revolutionize the mass production of complex hollow parts in unit numbers of more than 10,000. The combination of lightweight composite construction and reasonable costs has become tangible. Close collaboration between the companies involved, their know-how and their love of innovation made a decisive contribution to this success.”

Further information online: <http://www.ktm-technologies.com/projekte/cavus>

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About KTM Technologies

KTM Technologies – a subsidiary company of KTM AG, Europe’s leading sports motorcycle manufacturer – acts as the group’s think tank and joins forces with other partners from the industry as a developer and technological driving force. Concept and product development are the core of the service range, KTM Technologies further specializes in the technological development of lightweight solutions based on composite materials. Most recently, product development focused on innovative lightweight vehicles for future mobility, ranging from e-bike, urban vehicle to a hybrid

super sportscar. The unique blend of 2-wheeler and 4-wheeler know-how, motor sports experience and composite expertise puts KTM Technologies on the technical cutting edge for products and technologies of the future! For further information: www.ktm-technologies.com.

About H2K Minerals

We accompany you from the first idea to serial production. As a former systems supplier, we covered the entire production process from development and engineering of cast components to prototype manufacturing, serial production molds and tooling, to inorganic bindings and molding technology. H2K is familiar with your requirements and it is our approach to cooperate closely with you already from the pre-development phase. Development is no end in itself – with your goal in view, we want to reach the best possible result. We offer you innovative foundry chemistry, latest chemical know-how and a wealth of experience in mechanical engineering, construction and process technology. Even the most exceptional idea has to compete with the realities of the application sector, something history has taught us all. We offer you our know-how, state-of-the-art technology and we are ready to realize your individual challenges. Flexible, realistic, independent. For further information: www.h2k-minerals.com.

About Teufelberger

TEUFELBERGER is a globally successful enterprise specializing in the development and production of steel wire ropes, fiber ropes, strapping and hybrid composite parts. In addition to its headquarters at Wels, Austria, TEUFELBERGER operates other manufacturing sites in Austria, the Czech Republic, in the U.S., and in Thailand. A close-knit network of distribution partners ensures its worldwide presence. In 2015, 950 employees generated a total revenue of approx. € 182 million, about 90% of which came from exports.

About BASF

At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. The approximately 112,000 employees in the BASF Group work on contributing to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio is organized into five segments: Chemicals, Performance Products, Functional Materials & Solutions, Agricultural Solutions and Oil & Gas. BASF generated sales of more than €70 billion in 2015. BASF shares are traded on the stock exchanges in Frankfurt (BAS), London (BFA) and Zurich (AN). Further information at www.basf.com.