Colombes, February 20, 2018

Wind power, transportation, construction and sport: Arkema showcases its offering of advanced materials for composites at JEC WORLD 2018.

Arkema will showcase at JEC 2018 from 6 to 8 March 2018 its unique range of advanced materials and cutting-edge solutions to meet growing demand for lightweighting structures in the transportation, wind power and construction sectors. With its Elium® resin, the Group offers an innovative alternative to the challenging equation that is the recyclability of these materials.

The result of Arkema's research and development, **Elium®** is the only liquid thermoplastic resin on the market that can be processed with the same manufacturing methods as a thermoset liquid resin.

First showcased at JEC World 2016 in the form of a 6.50 meter prototype sailboat, the **Elium®** resin has since seen many developments and afforded new growth opportunities, in particular in wind power and construction.

Elium®, a choice material for the wind power market

Following the manufacture in 2017 of a 9 meter demonstration wind turbine blade from the **Elium®** thermoplastic resin compatible with existing turbine blade manufacturing technologies, a further milestone has now been reached in the development of this resin in the wind power market.

A 25 meter blade has been manufactured with the company Plastinov, which specializes in infusion molds and processes. This process has helped validate the feasibility of producing these components on an industrial scale.

This project is part of the Effiwind program of the CANOE innovation platform which aims to fit the oldest wind turbines with new more efficient 2 meter longer blades.

"The benefit of using longer blades, without changing the base or the tower of the wind turbine, is that it helps raise energy production by around 15% thanks to optimized operation in medium wind conditions, which tend to be the prevailing conditions for these installations", explains Guillaume Clédat, **Elium®** Product Manager.

The next stage of this project is the certification of the 25 meter blade before the commissioning, for a series of tests, of a wind turbine fitted with these new blades.

JEC awards

The 9 meter demonstration blade made from the **Elium®** thermoplastic resin on the IACMI (Institute for Advanced Composites Manufacturing Innovation) site in the United States has been nominated for a JEC Innovation Award 2018 in the "Sustainable Development" category.

Elium®, for lightweighting in construction

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The **Elium®** thermoplastic resin can be processed using a variety of technologies, including pultrusion. In partnership with the IRT M2P Technological Research Institute in Metz, Arkema has developed optimized grades for this specific converting process that helps produce glassfiber or carbon fiber reinforced profiles.

These new composite products open up promising prospects in construction, with two target applications in particular:

- Concrete reinforcement: used instead of metal rods or thermoset composite rods, these new composites are corrosion-proof and can easily be thermoformed into shape on site to produce complex structural forms.

- Window profiles: the new composites can replace aluminum or PVC or polyester profiles, with their mechanical and insulating properties and their smooth and glossy finish.

Elium®, thermoplastic recyclability

Over and above the mechanical recycling of thermoplastics, Arkema is speeding up the development of sustainable solutions that conserve resources and contribute to the circular economy.

Hence, in 2017, our R&D teams were heavily involved in developing the recycling process for composite parts made from the **Elium®** resin via depolymerization: the parts are ground down coarsely; the **Elium®** resin is then heat-depolymerized so that it can be recovered and purified into a resin with the same properties as the virgin resin. Meanwhile, the remaining carbon or glass fibers can be reused.

Arkema's advanced materials portfolio for composites

A well-known major player in the composites market, Arkema today offers a comprehensive range of solutions for the manufacture of high quality composite parts with exacting technical characteristics.

High performance thermoplastic resins for efficient and recyclable composite matrices

- **Kynar® PVDF** thermoplastic resin features excellent mechanical properties, corrosion resistance and effective fire resistance.
- **Kepstan® PEKK** reinforced with carbon fibers features rigidity comparable to that of certain metals as well as excellent resistance to impact, high temperature, and highly aggressive chemical agents.
- **Rilsan® Matrix** polyamide is a high temperature polyamide reinforced with carbon fiber or continuous glassfiber. Available in the form of unidirectional tapes, it will help manufacture composite parts for the structure of vehicles and so ensure significant weight savings without compromising mechanical strength, in particular impact resistance.
- **Elium®** resin is a liquid thermoplastic resin for the manufacture of recyclable composite parts. It uses the same processing technologies as thermosets with one major bonus: it can be processed at ambient temperature. The mechanical properties of the resulting parts are comparable to those of thermosets.

Additives for more durable thermoset composites

- Clearstrength® impact modifiers: Arkema has developed a new "core-shell" impact modifier grade, **Clearstrength® TX100**. Available as a powder, it is easily dispersible in most liquid resin systems with little impact on their viscosity. It helps improve the mechanical properties and the durability of composite parts as well as their assembly.
- **Nanostrength®** acrylic block copolymers: these additives act at the very heart of the material. They help enhance the impact and cracking resistance of the matrix, while maintaining temperature and UV stability. They can be used both in epoxy prepregs for sports or electronics applications and in structural adhesives.

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- **Orgasol®** ultrafine polyamide powders minimize crack propagation at the fiber-matrix interface in thermoset prepregs. Hence the end-composites are more durable.
- **Luperox®** organic peroxides are crosslinking agents for unsaturated polyester resins that help speed up processing and ensure better control of processes.

Structural adhesives for easy-to-process high-performance assemblies

- MSP Bostik adhesives combine adhesion on a large majority of substrates with long-lasting elastic properties and optimum strength and durability, and are available in an extensive range of solutions in particular for transportation and construction. They offer both the benefits of silicone and the properties of polyurethane.
- Bostik SAF® structural adhesives, based on Arkema's acrylic technologies, are methacrylate adhesives that combine strong adhesion without primer on many substrates, very high elongation at break, excellent durability, and a broad range of setting time (from 5 minutes to 2 hours). Their particularly straightforward application (outstanding thixotropy, low exotherm) makes it a choice solution for the structural assembly of composites as well as for composite/metal hybrid assemblies.

To find out about our range of materials for composites, do come and visit our stand (V39) to talk with our experts, and register on line for your visitor's badge:

https://www.arkema.com/fr/media/evenements/jec-world-2018/venir-au-jec-2018/

*A designer of materials and innovative solutions, **Arkema** shapes materials and creates new uses that accelerate customer performance. Our balanced business portfolio spans high-performance materials, industrial specialties and coating solutions. Our globally recognized brands are ranked among the leaders in the markets we serve. Reporting annual sales of €7.5 billion in 2016, we employ approximately 20,000 people worldwide and operate in close to 50 countries. We are committed to active engagement with all our stakeholders. Our research centers in North America, France and Asia concentrate on advances in bio-based products, new energies, water management, electronic solutions, lightweight materials and design, home efficiency and insulation. www.arkema.com*

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