

JEC Innovation Report

Production

JECeurope
COMPOSITES SHOW & CONFERENCES

Multi-sector "Clean" filament winding technology

A UK consortium has developed an environmentally-friendly filament winding technology for the production of high-performance composites. Using this new technology, a conventional resin bath is replaced by a custom-designed resin impregnation unit; resin and hardener are stored separately, metered electronically and delivered on-demand to a static mixer connected to the impregnation unit, typically mounted on the traverse-arm of the filament winding machine, close to the mandrel. A precise volume of mixed resin is applied by the system to impregnate the fibre bundle, minimising over-impregnation. This new "clean" technology significantly reduces the volume of solvent required to clean equipment, up to an 80% reduction in solvent consumption has been achieved, along with an equivalent reduction of mixed resin waste. This environmentally-friendly production technique can be retro-fitted to existing filament winding machines. A variety of thermosets, including faster curing resins, have been successfully trialled with this new filament winding technology, which is adaptable for other manufacturing processes such as pre-pregging and pultrusion. The consortium members are the University of Birmingham, Pultrex, Mouldlife, Halyard Marine, Luxfer Gas Cylinders, PPG Industries, CTM and Bruker. Their aim is to market this technology under license globally. The project started in 2010 with funding from the Technology Strategy Board.

> Booth U39



www.pultrex.com

Multi-sector Induction welding machine for thermoplastic composites > Booth B02

A new induction welding machine was developed by SINERGO and CETMA for continuous and automated welding of advanced thermoplastic composites for different industrial sectors. This machine is provided with a fine control system (patent pending), which can simultaneously control different parameters, such as working power, compacting force, feed velocity and cooling rate. Thanks to this control system, the induction welding machine can weld all advanced thermoplastic composites reinforced with both glass and carbon fibre, with high and constant properties. Moreover, the developed technology can be applied to components with complex shapes, also in the proximity to edges, and to thick laminates. The mechanical properties of the joints obtained with the new induction welding machine, optimized through an FEM analysis carried out with Comsol Multiphysics, were evaluated through a wide experimental characterization that produced the following results:

- Single-lap shear strength: 30 MPa;
- T-joint strength (pull-out tests): 10 N/mm.



www.cetma.it

Multi-sector Maxtronic Multiaxial machine > Booth T66

With the well-known Malitronic® Multiaxial and biaxial machines, Karl Mayer Malimo has firmly positioned itself in the global glass and carbon fibre composite market over the past years. Contributing to this was also their recent development of a fibre spreading line for the manufacture of dry UD tapes from carbon fibres, and in particular "heavy-tow" fibres.



The growth potential of the glass fibre composite market for wind power in Asia and its customers there have motivated the company to develop a new generation of Multiaxial machines – the Maxtronic® Multiaxial.

This concept offers a multiaxial machine with an outstanding price-to-performance ratio.

www.karlmayer.com

Multi-sector Dow to present next-generation composite solutions > Booth P14

At JEC 2013, The Dow Chemical Company will present its most recent developments of composite systems. Building on Dow's leadership in material science, and combining polyurethane and epoxy chemistry, these solutions for stronger, lightweight and more durable composites enable efficient fabrication in several industrial sectors, such as construction, infrastructure, wind energy, and automotive.

Visitors can look forward to seeing new composite developments for established fabrication processes such as:

- Pultrusion: VORAFORCE™ TP 1200 polyurethane system.
- Long fibre injection: new 800 mm diameter, D 400 manhole cover made with VORAFORCE™ KN.
- Vacuum infusion: enhanced AIRSTONE™ epoxy infusion system and an innovative adhesive technology addition for wind blade composites.
- Rotational moulding: ROTAKOTE™ P – a new elastomer, designed particularly for the paper industry and steel manufacturing.
- Resin transfer moulding: next-generation, fast-cure, VORAFORCE™ 5000 and 7000 series resin formulations, and BETAMATE™/BETAFORCE™ adhesives for automotive composites.
- Carbon fibre: the joint venture between Dow and Aksa offers significant advantages to develop, manufacture and globally market carbon fibre and derivatives to support the rapidly expanding carbon-fibre-based composites industry.

www.dow.com