

Markos makes gains in wind energy



Markos workers finish the interior of a 9-meter long nacelle.



Some ventilation system housings are designed to be intergrally molded into the nacelle interior.

Resins:	Altek® R937 Series Low Shrink Unsaturated
	Altek® H834-R Series Low Shrink Unsaturated

Composite Applications:	Nacelles, hubs and ventilator boxes
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Manufacturing Processes:	Resin Infusion Hand Lay-up
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Part Dimensions:	Nacelles up to 29.5 feet long and 14.8 feet high (9 by 4.5 meters)
	Hubs up to 13.1 feet (4 meters) high

Composites technology is contributing to the highest growth in wind energy use since ancient mariners learned to sail. That growth is given a greater boost in the way that Polish manufacturing company Markos is advancing large part production with infusion and open molding.

“Infusion technology has been successfully used in our factory for the last two years,” said Piotr Targowski, Deputy Director, Proxy. “Markos considers infusion to be a strongly pro-ecological technology and a more efficient way of production.” Targowski added that infusion has put more emphasis on resin quality because the process is more demanding than hand lay-up.

For infused and open molded production, Markos relies on the technology, quality and service of global resin supplier AOC. “AOC became a Markos supplier mainly due to the infusion and vacuum qualities of the Altek R937 Series and the Altek H834 Series low-shrink resins. These resins are outstanding and perfectly meet production regimes.”

Markos makes gains in wind energy, continued

For hand lay-up production, AOC supplies an Altek H834 series low profile laminating resin that meets Markos objectives for lower styrene emissions in the workplace. This resin is also engineered by AOC chemists to provide the proper viscosity for excellent fiber wetting. “We found AOC as a well-oriented partner who is flexible and trustworthy,” said Bernard Marciniak, Shareholder.

Components for Wind Energy

For wind energy, Marcos infuses nacelles up to 29.5 feet (9 meters) long and 14.8 feet (4.5 meters) high and hubs (also called spinners) up to 13.1 feet (4 meters) high. Depending on the application, reinforcement materials include glass fiber chopped strand mat, woven roving, woven fabrics, and combination materials.

Sandwich and core construction is used in locations that can benefit from added stiffness at a lower weight. Some hand lay-up parts, such as housings for ventilation systems are integrally molded into the larger parts. Depending on the design specification, several composite wind energy components are manufactured to meet flame retardant requirements.

About Markos

Markos Co. Ltd was created by two Polish Partners Bernardyn Marciniak and Cezary Koseski, both Naval Architects. Few years ago Fassmer of Berne/Motzen, Germany became third Shareholder. Markos has approximately 86,000 square feet (8,000 square meters) of modern production facilities in Globino, Poland. Company specialties include lifeboats and sailing and motor yachts as well as components and systems for wind energy. For more information, go to www.markos.pl.

About AOC

AOC is helping the world turn to the benefits of composites for systems that convert wind into a major resource for clean, efficient energy. Building on experience and expertise, AOC researchers are creating new process and material synergies for manufacturing wind turbine blades and other large composite applications. AOC knows technology, lives quality and delivers service better than any other supplier. To discover more about AOC’s commitment to improving the cost/performance advantages of composites, go to www.aoc-resins.com.



Wind energy hubs await shipment



Markos expertise in large part infusion is well-established in boat hulls.


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