Hexcel Product Focus: HexPly® M79 Prepreg
Wind Energy

HexPly® M79 prepreg - a cost effective alternative to infusion for wind blades.
The past few years have seen high growth rates in the wind energy sector, with global installed capacity of wind power now exceeding 500 GW, including the emergence of new regions. Wind turbine manufacturers and installers continue to search for novel solutions to meet the demands of the customers and the requirements of government policies. The real driver is, and will continue to be, the cost reduction of energy produced, thereby strengthening the already competitive position of wind energy within the global energy production market.

Manufacturers have been using composite materials for some time to meet the challenging environmental conditions and performance requirements of wind turbine blades; and in many cases, manufacturers work closely with material suppliers like Hexcel to develop customized construction solutions, rather than purchase standard off-the-shelf materials. We take a look at the composite technology enabling next generation blades and investigate how Hexcel has established itself as the leading force behind new cost-effective prepreg solutions for this sector.

The Hexcel name is synonymous with composite materials and technologies for the wind energy market, having supplied more than 150 million square meters of composite materials to wind turbine blade manufacturers in the last 25 years.

HexPly® M9 was the first prepreg system developed specifically for composite wind turbine blades and remains firmly established as an industry benchmark for both performance and quality. Gradual yet continuous evolution of the HexPly® M9 resin matrix has, however, seen Hexcel perfect an even faster curing prepreg system: HexPly® M79.

HexPly® M79 was specifically developed for the manufacture of very thick laminate sections with reduced exotherm and can be used in combination with a number of unidirectional fibers and multiaxial fabrics. In addition, HexPly® M79 was developed to be a price competitive choice in comparison with other manufacturing techniques, thereby providing customers with a real option for the highest quality prepreg technology in a cost-effective package.

HexPly® M79 represents state-of-the-art technology in wind energy prepregs. After completing intense performance testing, HexPly® M79 glass fiber unidirectional and multiaxial prepregs are proven to enable the manufacture of the latest turbines intended for low wind conditions (which are now a focus for many installers) and have been qualified by large turbine OEM’s.
Rapid cure function delivers a 50% reduction in cycle time

When developing the new HexPly® M79 prepreg system, the technical team focused on three things: reducing the exotherm so that the intermediate dwell time could be eliminated; reducing the overall cure time; and matching or exceeding production attributes of infusion technology. HexPly® M79 offers significant flexibility in terms of cure cycles, so overall production times can be optimized to the manufacturer’s needs.

Contrasting with traditional prepreg systems, which typically require a 10-hour cure cycle at 80°C, HexPly® M79 prepreg can be cured at a lower temperature of 70°C for 8 hours, or can be processed with a more rapid cure cycle of just 4 hours at 80°C. Cure cycle reduction is key to accelerating manufacture throughout – as the cycle times reduce, the cost of blade production is also significantly reduced.

Elimination of the time-consuming dwell period is now possible, with M79 having an extremely low exotherm of approximately 100J/g, allowing even the thickest sections to be cured at low temperatures, without exotherm.

Consequently, the HexPly® M79 prepreg system delivers a highly optimized and efficient blade manufacturing process that is key to accelerating manufacturing output at a much-reduced production cost.

The value of low temp cure and low exotherm

![Diagram showing the value of low temp cure and low exotherm](image)

- **Temperature**
- **Time**
- **Standard exotherm matrix e.g. M9G**
- **Low exotherm, low temp matrix M79**

Even faster ramp rate

No dwell and low temp cure

Further Net reduction in cure cycle
Delivery ‘just-in-time’….  

Hexcel does not look at only the manufacturing processes when optimizing materials to meet both quality and cost requirements; the company takes a holistic approach, which includes logistics and storage. A ‘Just-In-Time’ logistics model is in place, and the material has an outlife of 6 weeks at room temperature (or 6 months at -5°C) – so large, costly, specialised storage areas are a thing of the past for Hexcel's HexPly® M79 wind energy customers.

Expertise in the integration of automated technologies for Wind

As well as being one of the leading composite materials supplier to the wind energy sector, Hexcel has experience and expertise in the integration of its prepregs and other composite materials into the customer’s manufacturing process. With the market’s largest blades now extending out past 80 meters, such large-scale components can no longer be manufactured by manual processes alone. Hexcel’s broad experience across a wide range of heavily automated composite manufacturing sectors, like aerospace and automotive, offers wind turbine manufacturers access to a significant expertise in the integration of automated technologies, thereby allowing further optimization of the blade manufacturing process and further reduction of production costs.

Hexcel’s composite materials and technologies have been instrumental in helping wind turbine manufacturers to develop ever larger turbine blades, as the global wind energy market pushes for taller turbines and the most cost-effective wind power installations possible. Due to the increasing length of blades and continual search for cost efficiencies, Hexcel is anticipating an increase in demand for its new HexPly® M79 prepreg system, with a production ramp-up at its facilities in Austria, China and the US.

By developing the new resin matrix HexPly® M79 Hexcel achieved a major breakthrough in further supporting wind blade manufacturers in their efforts to produce wind turbines in an even more cost-effective way.

Hexcel is already working on the next generation of resin matrices for Prepreg materials for large-scale composite components, with clear targets for further optimized cure speeds, enhanced outlife, together with added functionalities for cost-efficient finishing processes and blade surface durability.
“Our focus on continuous development in wind energy, working alongside our customers on the blade design, the materials used and the manufacturing process, has meant a significant increase in turbine rated output and rotor size. We are extremely excited about our current collaborations and look forward to supporting the future growth of technology-leading blades, and the global wind energy market as a whole”.

~ Timothy Swords, Hexcel President – Industrial
Hexcel Product Family

For more information
Hexcel is a leading worldwide supplier of composite materials to aerospace and industrial markets. Our comprehensive range includes:

- HexTow® carbon fibers
- HexForce® reinforcements
- HiMax™ multiaxial reinforcements
- HexPly® prepregs
- HexMC® molding compounds
- HexFlow® RTM resins
- Redux® & HexBond™ adhesives
- HexTool® tooling materials
- HexWeb® honeycombs
- Acousti-Cap® sound attenuating honeycomb
- Engineered core
- Engineered products
- Polyspeed® laminates

For quotes, orders and product information call our sales office in Austria +43 7229 772-0. For other worldwide sales office telephone numbers and a full address list, please go to:

http://www.hexcel.com/contact/salesoffice

©2018 Hexcel Corporation – All rights reserved. Hexcel Corporation and its subsidiaries (“Hexcel”) believe that the technical data and other information provided herein was materially accurate as of the date this document was issued. Hexcel reserves the right to update, revise or modify such technical data and information at any time. Any performance values provided are considered representative but do not and should not constitute a substitute for your own testing of the suitability of our products for your particular purpose. Hexcel makes no warranty or representation, express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose, and disclaims any liability arising out of or related to, the use of or reliance upon any of the technical data or information contained in this document.