



Hexcel Case Study: HexPly® M79 Carbon Fiber Prepregs

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- Lightening the Ultralight at Flight Design



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Hexcel has been a major supplier of advanced composite materials to the aerospace market for more than 70 years, supporting some of the world's largest composite commercial aircraft programs such as the Boeing 787 and Airbus A350 XWB. Slightly smaller in scale but no less critical in terms of composite technology, German ultralight aircraft specialist Flight Design has chosen Hexcel as its key supplier, adopting HexPly® M79 low-temperature curing prepreg in its aircraft production.



The first Flight Design CT Light Sport category aircraft took to the skies in 1996, and more than 2000 CT aircraft have been built to date. Flight Design has since introduced the Ultralight Super Series and F2 models, offering a complete range of aircraft options for private and institutional owners.

Flight Design aircraft have always relied on composites for their ultralight construction, with vacuum consolidated wet laminated carbon fiber structures keeping the airframe weight to a minimum while providing maximum strength and passenger protection.

In late 2017, an internal Flight Design review concluded that prepregs could deliver a more consistent final product by ensuring constant material quality and processing parameters and could produce a lighter and stronger aircraft at a more competitive overall cost.

Flight Design began to review the market for available material options with a key part of its strategy to find and qualify a prepreg system that is not traditionally used in higher cost autoclave production for aerospace applications.

HexPly® M79 - A Low Temperature Curing Out Of Autoclave Solution

Lange + Ritter GmbH, long-term composite materials supplier to Flight Design since 1993 and part of Hexcel's distributor network in Europe, immediately took the lead and proposed a low-temperature cure HexPly M79 prepreg material solution for this project.

HexPly M79 prepregs can be cured at temperatures as low as 70°C for eight hours or 80°C for four hours, reducing tooling costs and increasing build rates with reduced heating and cooling times. When combined with Hexcel's innovative air venting Grid Technology, HexPly M79 UD carbon tapes can also be laminated with reduced debulking steps to produce void contents <1% irrespective of laminate thickness. With consistently low void contents and improved mechanical properties, designers and engineers are able to further optimize highly loaded composite aerostructures.

Materials, Technical Support and Training - A Complete Package

The team at Lange + Ritter worked with Hexcel to create several new product codes specifically for Flight Design, and materials were supplied for initial handling trials and prototyping. When the first laminates were tested, Flight Design engineers were delighted to find that mechanical properties exceeded initial expectations, allowing them to further optimize the structural design for the new F2 aircraft.

HexPly M79 prepreg materials were first used at Flight Design in the F2 prototype that was completed at the company's composite prototyping facility in the Czech Republic, along with the manufacture of test panels and coupons required for material testing by European and U.S. certification bodies.

The next step was to ensure that Flight Design's composite production facility in Kherson, Ukraine had all the support required to smoothly transfer to prepreg technology. As part of the material supply package, Lange + Ritter sent a team for on-site training and technical support in January 2018, allowing the team in Kherson to get up to speed with prepreg as quickly as possible.



As more and more of its composite aircraft parts are transferred to prepreg technology, Flight Design is seeing the benefits of its switch to HexPly M79. Lay-up is cleaner and more precise, low temperature oven curing is quick and energy efficient, and the manufacturing process consistently outputs exceptionally high-quality laminates and components. The long-term strategy is to integrate HexPly M79 across the range, with Hexcel materials lightening the ultralight at Flight Design even further.

"The materials and technology package from Hexcel and Lange + Ritter has been a big success for us at Flight Design," said Daniel Günther, Managing Director at Flight Design. *"When we took the decision to switch to prepreg, we looked at many options but only Hexcel and Lange + Ritter could offer us low temperature out-of-autoclave (OOA) curing, globally respected material quality, and the customer service levels we were searching for."*



Hexcel Product Family



**HexTow®
Carbon Fiber**



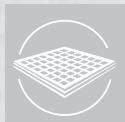
**HexFlow®
Resins**



**HexMC®-i Molding
Composite**



**HexForce®
Reinforcements**



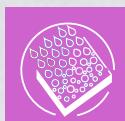
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**HexWeb®
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**HexPly®
Prepregs**



**Redux® & HexBond™
Adhesives**



**HexTool®
Tooling Material**



**HiMax™
Multiaxial
Reinforcements**



**HexAM®
Additive
Manufacturing**

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® prepgres
- HexMC® molding compounds
- HexFlow® RTM resins
- HexBond™ adhesives
- HexTool® tooling materials
- HexWeb® honeycombs
- Acousti-Cap® sound attenuating honeycomb
- Engineered core
- Engineered products
- Polyspeed® laminates & pultruded profiles

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>

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