

Fiber-Reinforced Fortron® PPS Helps FIBRE Develop Cost-Effective Process for Aerospace Window Frame

Engineered Materials Reduce Cycle Times and Increase Productivity

Sulzbach, Germany, Florence, Ky., Shanghai, PR China, Oct. 16, 2013 – The Faserinstitut Bremen e.V. (FIBRE) has developed a cost-effective and efficient process to manufacture lightweight aerospace components that use a continuous fiber-reinforced structural inlay based on Fortron® polyphenylene sulfide (PPS) from Celanese Corporation (NYSE: CE), a global technology and specialty materials company.

In a pilot project, FIBRE worked with AIRBUS Operations GmbH, KARL MAYER MALIMO Textilmaschinenfabrik GmbH, KraussMaffei Technologies GmbH, Ferdinand Stückerjürgen GmbH and TU Chemnitz to successfully produce aircraft window frames using a thermoform and injection molding process. Thanks to Fortron PPS, which makes much shorter cycle times possible, the development team was able to increase productivity.

Structural components for aircraft made from fiber polymer composites frequently comprise duroplastics shaped in prepreg and resin transfer molding (RTM) processes. The greatest disadvantage of this process is the extensive drying times required for the matrix to cure. which requires extensive drying time for the matrix to cure.

"From a production point of view there is actually a great deal in favor of thermoplastic materials like Fortron PPS, which are often more economical," said Peter Radden, Fortron PPS specialist. "Fortron PPS is more dimensionally stable, chemical and temperature resistant, and has a long tradition in aircraft construction where it is often the material of choice in structural components."

FIBRE uses prepregs that contain additional inlaid thermoplastic fibers, as well as carbon fibers, to lend structure to the window frames. These prepregs are processed to form

structural inlay preforms — versions made from multi-axial fiber inlays (MAG) are used to shorten cycle times. FIBRE also produced Tailored Fiber Placement Preforms (TFP) parallel for precise fiber alignment.

The matrix of knit and weft fibers is formed in the subsequent consolidation in a variotherm press. In this process, the Fortron PPS fibers in the prepreg ensure homogenous matrix distribution. After consolidation, the structure inlays are sprayed with short fiber-reinforced Fortron PPS to add integral stiffening or functional elements which would be much more difficult to implement with continuous fiber-reinforced materials. The combination of thermoforming and injection molding makes the process more cost-effective and allows for higher production volumes in a shorter time.

About Celanese

Celanese Corporation is a global technology leader in the production of differentiated chemistry solutions and specialty materials used in most major industries and consumer applications. With sales almost equally divided between North America, Europe and Asia, the company uses the full breadth of its global chemistry, technology and business expertise to create value for customers and the corporation. Celanese partners with customers to solve their most critical needs while making a positive impact on its communities and the world. Based in Dallas, Texas, Celanese employs approximately 7,600 employees worldwide and had 2012 net sales of \$6.4 billion. For more information about Celanese Corporation and its product offerings, visit www.celanese.com or our blog at www.celaneseblog.com.

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