



World's First Fiber-Reinforced PPS Rear Pressure Bulkhead

Images source: Premium AEROTEC

Premium AEROTEC has recently developed an innovative thermoplastic rear pressure bulkhead, using Toray Cetex® thermoplastic composite materials, meeting the challenge of increased build rates whilst lightweighting the existing generation of single-aisle aircraft.

Producing large aircraft components to meet the increasing build rates of OEMs is the challenge facing Tier 1 suppliers. Converting existing aluminum components into thermoplastic composites is seen as one of the solutions.

Using over a decade of experience in Toray Cetex® thermoplastic composites, Premium AEROTEC designed and manufactured a rear pressure bulkhead demonstrator in just 4 months.

Premium AEROTEC's Project Objectives Were:

1. Increased build rate
 2. Enabler for low recurring costs and low capital investment
 3. Less parts, reduced assembly efforts, short production times
 4. Increased weight performance
 5. Technology development to enable "Fuselage of Tomorrow"
 6. First to market for a large, thermoplastic primary structure
- ▶ Innovative integration of doublers
 - ▶ Delivered weight performance. Thermoplastic part composite weight of 35 kg/77 lb compared to aluminum component 41 kg/90 lb
 - ▶ Reduced processing and assembly time by 75%
 - ▶ Enabled higher rate of manufacturing units. In excess of one hundred units per month is feasible
 - ▶ Lower overall costs to >10%
 - ▶ Composite material solution is competitive in comparison to aluminum

Solution

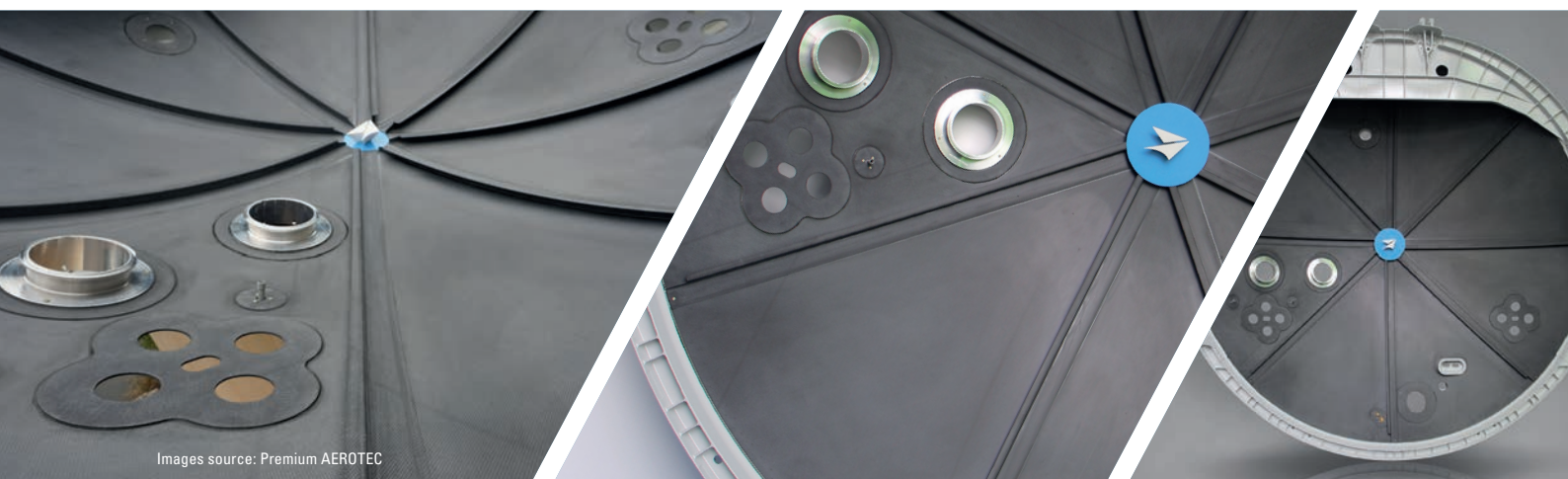
By utilizing Toray Cetex® TC1100 Carbon/PPS reinforced thermoplastic laminates and a highly automated volume production process, Premium AEROTEC:

- ▶ Used cutting-edge welding of 3D-shaped components
- ▶ Used cutting-edge thermoforming process for large and complex shapes; bulkhead built up of eight identical segments of equal size
- ▶ Stringers are integral part of the design superseding assembly efforts

With the combination of Toray Cetex® materials and Premium AEROTEC's expertise, the foundations are laid for the next generation of primary structure components. Technology and part refinement continue and serial application should be available within a couple of years.

Features

Choosing Toray Cetex® thermoplastic composites delivered better mechanical performance of the part and the opportunity to recycle at the end of product life.



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