

Take Risk Out...Put **Advantex®** Glass In



Massive Civil Scale FRP Beams for Coal Gas Bubble Jet Reactor – Made With Advantex® Glass

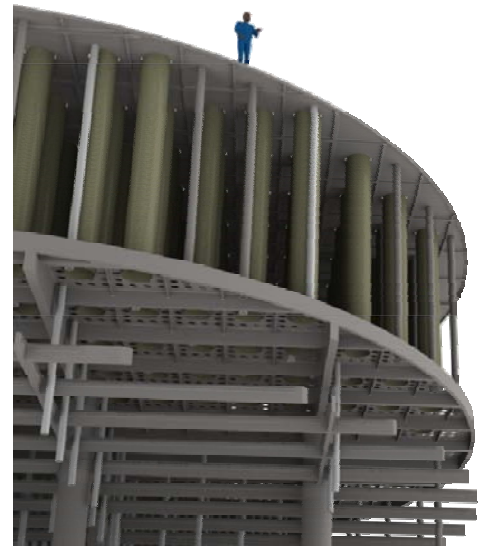


Wet scrubbers remove vast quantities of sulfur dioxide (SO₂) from the exhaust of coal-fired power plants by mixing the flue gasses with water and limestone. They house an unrelenting combination of sandstorm and acid-laced tsunamis.

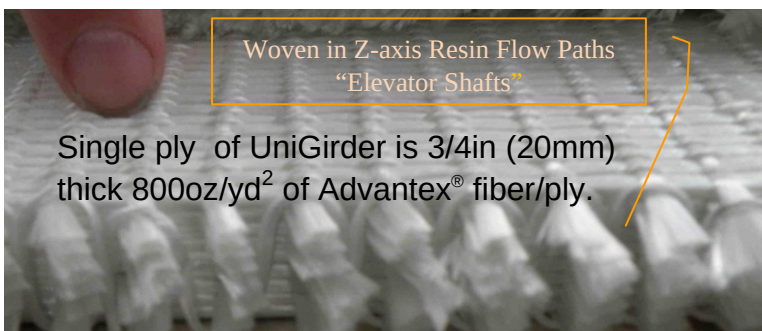
While the exteriors of these 100-foot vessels are massive enough, the interiors are packed with $\frac{3}{4}$ MM lbs of pipes, ducts, decking, baffles, agitators and more...all formed with acid resistant FRP (fiberglass-reinforced polymer).

The FRP supports all that was once trusted only to steel beams (sealed off from the acid by skins of increasingly rare and expensive

nickel alloy). The steel suffered rapid acid erosion once the skins were pierced, and the exceptionally costly downtime to repair the damage demanded a new materials solution.



RPS Composites, Inc. responded with new FRP beams that could match the steel beam's colossal dimensions. The largest of these 40-foot-long beams are over 2 feet tall and 1 foot wide. RPS Composites overcame several barriers to produce the beams. Placing 200+ fluffy plies of thin fabrics into a mold for the 7-inch-thick flanges would alone been a daunting task and infusing resin through all of the fiber nearly impossible. RPS Composites, however, combined specialized designs for vacuum infusion with extremely



scaled-up 3D woven fabrics made with Advantex® corrosion-resistant glass. Advantex® glass fiber reinforcement is a patented boron-free glass formulation that is both a corrosion-resistant E-CR glass fiber reinforcement meeting ASTM Standard D 578 and

CASE STUDY

demonstrating proven performance in the field for more than 15 years. It also offers increased mechanical properties compared to standard E-glass and E-CR glasses.

3TEX, Inc. then used unique 3D weaving machines to assemble nearly 4,000 Advantex® glass direct rovings into a single, enormous, and slab-like industrial scale uniaxial preform branded UniGirder. Despite being so dense that it compresses less than 4% under vacuum, the alignment and organization of the rovings provided Z-axis flow paths allowing vinyl ester resin to pass nearly 40 times faster through the thickness and still yield E11 of 7MSI. RPS

Composites reported that it infused sections thicker than 12 inches in as few as 14 plies of similar 3TEX fabrics made with Advantex® glass fiber reinforcements.



Test beams 30 feet long made by RPS Composites were loaded to failure at North Carolina State University at its CSU Constructed Facilities Lab where immense civil scale test equipment was required to apply loads nearly 1 MM lbs. Some beams included optical SensorBraid ropes woven from Advantex® glass fiber and Luna Innovations sensing fibers so that real-time maps of strain and temperature could be captured without corrosive metal sensors. The surfaces of the naturally acid-resistant beams are additionally protected from the sand in the storm by a special composite abrasion resistant coating further outperforming the steel. Every serialized production beam was measured for rigidity at the molding site then shipped for installation at various coal power plants.

Since 2009, the first of hundreds of RPS Composites' massive FRP beams made with Advantex® glass have been weathering the acid typhoon, turning acid rain into gypsum.

Specify Advantex® Glass for all FRP used in Corrosive Environments.

Take Risk Out...Put *Advantex®* Glass In.

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