Case History

Tank Tech Vessels Protect National Recreation Area After Weathering Torrential Storm

Market Segment:	Infrastructure
Composite Application:	Fuel Storage Tanks
Individual Tank: Dimensions	11.6 m long x 2.44 m in circumference (36 ft x 8 ft)
Tank Weights:	2,800 kg (6,173 lb) for two single-chamber tanks and 3,220 kg (7,100 lb) for one double-chamber tank
Individual Tank Capacity:	45.4 L (12,000 gal)
Resin:	Vipel® F798
Manufacturing Processes:	Spray -up and Hand Lay-up
Location:	Playas, Guayas, Ecuador

Composite underground storage tanks for a new service station in Ecuador help protect the natural environment of Playas Villamil National Recreation Area, a world-class preserve that includes 14 kilometers (8.7miles) of beach. Tank Tech in the Tocancipá Free Trade Zone of Colombia manufactured the tanks with world-best composite technical support and corrosion-resistant Vipel® resin technology from AOC Resins.

The project in Playas, Guayas, specified three 11.26 m long by 2.44 m circumference (36 ft by 8 ft) cylindrical tanks. Each vessel has a 45,425-litre (12,000-gallon) capacity -- two for storing gasoline, one for a gasoline-alcohol fuel blend. The higher strength-to-weight ratio of composites versus steel made it easier to transport the composite tanks over the more than 1,000-mile (1,600 km) route

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between manufacturing and installation locations. The lighter-weight products were also easier to install than steel alternatives.

Before the tanks were covered and buried, Tank Tech's composite construction was challenged by the area's first heavy rains in months. During installation, the torrential rainfall flooded the excavation pit where the tanks were secured to ballast beams. The tanks became buoyant while being subjected to high hydraulic forces from rushing waters.

A post-storm inspection showed no structural damage to the composite walls, and pneumatic testing verified that each tank's composite construction maintained a hermetic seal. The tanks were buried to begin providing high performance and leak resistance under a 30-year limited warranty.

Resisting Corrosion from Inside and Out

According to Edward Alejandro Avendaño, Production Manager for Tank Tech, the performance of Vipel® F798 high-crosslinked polyester played a major role in material selection. "The project location near the beach raised concerns about potential corrosion from the salinity of the environment," he said. "For interior protection, the resin is certified under the UL1316 standard for underground storage of gasoline. This gives the customer peace of mind with the security of having a safe product."

Avendaño pointed out the benefits of Vipel® F798 resin's lower styrene content and higher elongation properties than alternative resins: "The reduction in emissions and the characteristic odor is noticeable and appreciated by members of the production team. The resin also gives laminates with greater hardness, which translates into better performance of the finished pieces."

Tank Tech product performance was coupled with AOC Resins renowned technical service. "Since the beginning of Tank Tech, we have had the support of the AOC team headed by Corrosion Product Leader, Mike Siegel, and Technical Service Manager, Cesar Carrasco, " Avendaño said. "They offer valuable advice on such critical issues as resin working time, post-curing, and final layers."

Superior Design and Manufacturing

Tank Tech composite manufacturing starts by spraying resin-impregnated chopped glass fibers onto a rotating mold to form a semi-cylindrical tank section. The spray-up stream has a high 70-to-30 resin-to-glass ratio to ensure maximum protection against the storage medium. The sprayed composite is applied as two separate wall

sections that integrally encapsulate a special three-dimensional fabric that creates an annular space. For public safety and environmental protection, the space is part of a system that monitors the tank 24/7 for potential leakage.

After the semi-cylindrical component cures, it is demolded and integrally joined with another half-section using hand lay-up of resin-impregnated fiber mat and woven roving. Essential to Tank Tech's design-engineering are trapezoidal cross-section ribs that technicians integrally encapsulate into the tank's outer wall. The trapezoidal ribs provide monolithic structural reinforcement, maintain cylindrical geometry and resist forces acting on the tank.

The vessel's profile is completed by integrating Tank Tech-designed hemispherical domes at each end of the completed cylinder. The end domes are molded using hand-lay up of resin-impregnated fabric and woven roving.

Vipel® Protection Throughout

"Any surface that can come into contact with the hydrocarbon must be able to resist corrosive attack," Avendaño said. "As a result, the entire tank is made of Vipel® F798 resin. The material is also used to mold the access panel, reservoir, rings, and explosive containment boxes. AOC technology and support helps us manufacture in a controlled and safe manner and deliver a product with the high performance our customers deserve."

About Tank Tech

Tank Tech is a leading manufacturer of underground and aboveground composite storage tanks that meet industry standards for flammable and combustible materials. Located in the Tocancipá Free Trade Zone of Colombia, the company is a member of the international Petroleum Equipment Institute and follows the Institute's strict protocols for safety and performance. For petroleum storage tanks designed and manufactured for performance, quality, and durability. For more information about the benefits of choosing Tank Tech for your next storage tank project, go to **www.tanktech.com.co**.

About AOC

AOC is the leading global supplier of resins and specialty materials which enable customers to create robust, durable and versatile products and components. With strong capabilities around the world in manufacturing and science, the company works closely with customers to deliver unrivaled quality, service and reliability for today, and create innovative solutions for tomorrow. To create your partnership for composite excellence, go to **www.aocresins.com.**

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