

CaseHistory

Composites play critical role in 320 million-gallon water plant

Market Segment(s):	-Pipes -Sewer Rehabilitation
Composite Application:	Various storage tanks
Resin(s):	Vipel® K022/ Vipel F010 bisphenol-A epoxy vinyl esters
Manufacturing Process:	Hand Lay-up
Media:	Aluminum sulfate Polyaluminum chloride Cationic coagulant aid polymer Sodium hypochlorite
Diameter range:	5 to 12 feet (1.5 to 3.7 meters)
Height range:	10.5 to 17 feet (3.2 to 5.2 meters)
Installed:	2010
Location:	Brooklyn, New York, U.S.A.



An-Cor tanks are certified to standards of the American Society of Mechanical Engineers and the Fiberglass Reinforced Plastics Institute.

A new water filtration plant under construction in The Bronx is the centerpiece of the largest single construction project in the history of New York City.

The filtration plant is designed to ensure that water from the Croton System watershed is aesthetically pleasing and meets or exceeds all drinking water quality standards. When completed in 2012, the plant will provide roughly 10 percent of New York City's 1.4 billion gallon average daily demand for water. During drought or other conditions affecting other watersheds servicing New York, the new plant can deliver up to 30 percent of in-City water needs.

To achieve a design capacity of 320 million gallons (1.2 million cubic meters) per day, each link in the filtration process chain has been engineered for the optimum in reliability and performance. That is why An-Cor Industrial Plastics made 38 fiberglass-reinforced polymer (FRP) composite tanks for the filtration plant to standards set by the American Society of Mechanical Engineers (ASME) and the Fiberglass Reinforced Plastics Institute (FRPI).

How the tanks were made

To achieve performance requirements, An-Cor used Vipel® vinyl ester resins from AOC. The inner corrosion barriers

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Horizontal and vertical tanks await delivery at the An-Cor facility.

of each vessel were made with Vipel F010 bisphenol-A epoxy vinyl ester because of its excellent corrosion resistance and U.S. Food and Drug Administration (FDA) compliant properties. The barrier liners were formed using hand lay-up of the resin with veils and fiberglass mats. In addition to the standard barrier, each tank designed to hold sodium hypochlorite added a 116 mil (2.95 millimeter) thick corrosion allowance for extending the equipment life.

Structural laminates were manufactured with Vipel K022 bisphenol-A epoxy vinyl ester. The high performance resin meets project specifications for high strength, excellent chemical resistance and, with synergist addition, Class I fire-retardant properties per ASTM E84. The corrosion barriers of the cylinders were made using the hand lay-up method utilizing fiberglass taped goods.

Depending upon the diameter of the tank, the structural portion of the cylinders were built using mechanical applications of chop strand mat, woven roving, and/or winding glass.

The top and bottom heads of the 10- and 12 -foot (3- and 3.7-meter) tanks were resin-infused using Vipel K022-EBB resin. Balsa wood cores were encapsulated into the glass fiber-reinforced laminate to achieve higher stiffness. The heads of the smaller tanks were made by hand lay-up of fiberglass and resin. All tanks were post-cured in a convection oven prior to shipment.

Double-Certified

The tanks that An-Cor delivered to the Croton Project were backed by certification from two prestigious industry associations -- the American Society of Mechanical Engineers (ASME) and the Fiberglass Reinforced Plastics Institute (FRPI). An-Cor is the first composite manufacturer to be certified by both organizations.

ASME is a not-for-profit professional organization whose mission includes the establishment and maintenance of engineering codes and standards. An-Cor is among the elite group of composite fabricators that meets certification requirements for ASME RTP-1 “Reinforced Thermoset Plastic Corrosion Resistant Equipment.”

“The Vipel resins were selected for their ability to meet critical end-use performance specifications,” said Rob Merrill, An-Cor (Vice President-Operations). “The technical support that AOC provided with the resins was excellent. AOC Corrosion Specialist Bill Holtzclaw’s

Quantity	Function/Media	Diameter U.S. feet (meters)	Height U.S. feet (meters)	Capacity gallons (liters)
14	Bulk storage of aluminum sulfate or polyaluminum chloride coagulant	12 (3.7)	14.5 (4.4)	12,267 (46,435)
4	Bulk storage of cationic coagulant aid polymer	10 (3.0)	14 (4.3)	8,225 (31,135)
8	Bulk storage of sodium hypochlorite	12 (3.7)	14 (4.3)	11,844 (44,834)
4	Day tanks for sodium hypochlorite (pre-filter feed)	7 (2.1)	10.5 (3.2)	3,023 (11,443)
4	Day tanks for sodium hypochlorite (post-filter feed)	5.5 (1.7)	10.5 (3.2)	1,866 (7,064)
4	UV cleaning system waste storage	5 (1.5)	17 (5.2)	2,490 (9,426)

Composites play critical role, continued

knowledge of FRP processing and quality standards was very helpful. Both Bill and AOC Product Leader Scott Lane were quick to respond when we needed to optimize processing.” ASME certification ensures design rules, fabrication methods, testing procedures and quality control programs are followed. Each tank was successfully hydro tested after installation at 5 psi (0.3 bar) to validate designs in accordance with the standard.

FRPI is a non-profit membership organization that audits and tests laminates of corrosion-resistant equipment on a job-by-job basis. “The versatility of FRP composites allows corrosion-resistant equipment to be custom-designed to meet specific project needs,” said Gary Arthur, Executive Director and President of FRPI.

“FRPI certification tells specifiers and buyers that the FRP equipment materials for their project meet their specification,” Arthur said. “This provides confidence that the equipment will meet objectives for quality, consistency, reliability and performance.”

In addition to meeting manufacturing standards, tanks, subassemblies and components that come into contact with stored products or the process stream meet FRPI food-grade standards.

Engineer and Construction

The project sponsor was the New York City Department of Environmental Protection, who will ultimately be responsible for running the plant. The main contractor is a Skanska/Tully Construction joint venture. Haley & Aldrich was geo-technical consultants, digital automation architecture was provided by Emerson, and a Hazen & Sawyer/Metcalf & Eddy joint venture acted as client consultant. URS provided support in construction management, cost estimating plus resident engineering, geotechnical engineering and tunneling inspection.

About An-Cor

Based in North Tonawanda, NY, USA, An-Cor Industrial Plastics specializes in the design, engineering, manufacturing, installation and maintenance of custom fiberglass-reinforced polymer (FRP) composite industrial equipment. Applications include tanks, scrubbers, pipe and fittings, ductwork, stacks and chimney liners. An-Cor is part of Group DKG. For more information, phone (716) 695-3141, e-mail info@an-cor.com or go to www.an-cor.com.

About FRPI

Established in 2003, FRPI is the industry’s only fiberglass reinforced plastic materials certification non-profit organization, In providing certification, FRPI educates FRP manufacturers and specifiers and buyers of FRP equipment through seminars and publications. For more information, phone (508) 380-2232, e-mail contact@frpi.org, or go to www.frpi.org.

About AOC

AOC is a leading global supplier of resins, gel coats, colorants, additives and synergistic material systems for composites and cast polymers. AOC knows technology, lives quality and delivers service better than any other composites resin supplier. For more information, e-mail corrosionresins@aoc-resins.com, phone (901) 854-2800 or go to CorrosionResins.com.

