

# CaseHistory

## Mountaintop Water Tanks



<b>Market Segment:</b>	Tanks
<b>Composite Applications:</b>	One water holding tank Two water storage tanks
<b>Resin:</b>	Vipel® F701 Isophthalic polyester
<b>Manufacturing Process:</b>	Spray-up Added reinforcing in rib sections
<b>Holding Tank Dimensions:</b>	6-foot (1.8-meter) diameter 3,000-gallon (11,360-liter) capacity
<b>Storage Tank Dimensions:</b>	8-foot (2.4-meter) diameter 7,600-gallon (28,770-liter) capacity
<b>Installed:</b>	1983
<b>Location:</b>	Mount LeConte Great Smoky Mountains National Park

The late Carson Brewer, an international authority on Great Smoky Mountains National Park, used “charisma” to explain people’s attraction to the Park’s 6,593-foot (2,010-meter) high Mount LeConte. For thousands each year, the charismatic appeal includes a stay in rustic LeConte Lodge.

Reached only by strenuous hike, the mountaintop Lodge has no electricity but offers other comforts such as hot meals and beds with blankets and clean sheets. Because of 23-year-old storage tanks made with Vipel® resin technology available today through AOC, guests also enjoy running water.

At outdoor faucets, guests can fill canteens or splash down after the hike up. Some water is propane-heated to provide wash-basin bathing, and the readily available water is essential to food and beverage preparation in the Lodge’s dining hall. However, one of the most welcome amenities running water offers is the availability of flush toilets.

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### Virtually maintenance-free

“The composite tanks have been very dependable ever since they were installed,” said Tim Line, General Manager/Owner of the Lodge. “On occasion we’ve wiped off a film that naturally builds on the exterior over time, but that’s about the extent of any tank maintenance we’ve had to do.”

One of the composite units is a 6-foot (1.8-meter) diameter, 3,000-gallon (11,360-liter) holding tank. The other two are 8-foot (2.4-meter) diameter, 7,600-gallon (28,770-liter) supply tanks installed side-by-side.

The smaller holding tank is near the mountain’s ever-reliable Basin Spring. Spring water naturally accumulates in three adjacent collector units that feed the holding tank. Gravity-powered water from the holding tank activates the hydraulic ram of a pump that transfers water uphill through piping to the supply tanks. “For every ten gallons of water used to move the ram, one gallon is pumped up to the supply tanks,” Line pointed out. “The other nine gallons end up as Roaring Fork River miles downstream.”

When it is sunny enough, the ram can be activated using solar power. In rare cases when holding tank water levels run low and sunlight is insufficient, a gasoline-powered pump is available for back-up.

To create enough head pressure for good water flow, the two supply tanks are at an elevation higher than Lodge facilities. To meet Tennessee State requirements, the water is batch-chlorinated through man



A helicopter airlifted the tanks to the mountain-top 23 years ago.



When available, solar power pumps water from the holding tank.

holes atop the storage tanks. The Lodge water supply has consistently passed monthly State inspections and quarterly Park Service inspections for water quality.

At the end of the Lodge’s March through November season, the tanks are emptied for the winter when temperatures can drop to  $-20^{\circ}\text{F}$  ( $-29^{\circ}\text{C}$ ). The tanks also withstand total annual snowfall accumulations that can exceed 60 inches (150 centimeters), annual rainfall totals that can exceed 70 inches (178 centimeters), and high winds and debris.

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The two supply tanks provide a total capacity of 15,200 gallons.



With a simple lift, water rushes out to fill canteens.

### How the tanks were made

The tanks were made by the former Tank Division of Owens Corning who sold the division to Containment Solutions, Inc., in 1995. Tank end caps and cylindrical shells were manufactured using a resin and chopped fiberglass spray-up process. The resin was an isopoly-ester engineered for potable water use by the Owens

Corning Resins & Coatings Division, which became a co-founding partner of AOC. Each tank has two exterior ribs that allow the tank to be supported by setting the ribs in metal cradles covered with a layer of resilient material. The shell wall thickness was increased in the locations where the ribs were applied.

The ribs were fabricated by wrapping the tank with a hollow rib form over which fiberglass woven roving, chopped fiberglass and resin were applied. The crown or top of the rib form incorporated continuous glass fibers which provide maximum stiffening by creating high modulus at the maximum distance from the shell wall.

To resist ultraviolet degradation, a UV inhibitor was incorporated into the resin for the exterior layers of the tank and ribs. For additional UV protection, the tanks were coated with a gel coat consisting of highly-pigmented resin.

“The proven performance of Vipel® resin at LeConte Lodge is a testament to AOC’s corrosion resin technology,” stated Emilio Oramas, AOC Business Manager for the corrosion market. “Today’s Vipel resin technology can offer the same combination of excellent corrosion resistance, structural properties and potable water code recognition.”

### About LeConte Lodge

LeConte Lodge is the only place in Great Smoky Mountains National Park where a visitor can sleep overnight on a mountaintop in a snug, permanent structure and enjoy hot and hearty meals. The Lodge houses up to 50 guests per night in rough-hewn cabins

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and group sleeping lodges. The facility is managed by LeConte Lodge Ltd., Partnership, an authorized Park concessionaire with offices in Sevierville, Tennessee. Reservations are made months in advance. For more information, phone (865)429-5704, e-mail, [reservations@lecontelodge.com](mailto:reservations@lecontelodge.com), or visit [www.lecontelodge.com](http://www.lecontelodge.com).

### About Containment Solutions

Headquartered in Conroe, Texas, Containment Solutions, Inc., offers the industry's greatest number of innovative products for the storage and handling of liquids. From manufacturing plants in Pennsylvania, Texas and California, Containment Solutions supplies a wide range of fiberglass composite underground vessels, including tanks for petroleum products, water, chemicals, sewage and manholes. For more information about Containment Solutions products and services, call 1-877-CSI-TANK (274-8265) or visit [www.containmentsolutions.com](http://www.containmentsolutions.com).

### 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](mailto:corrosionresins@aoc-resins.com), phone (901) 854-2800 or go to [CorrosionResins.com](http://CorrosionResins.com).

