

# CaseHistory

## Wet Marine Exhaust Systems

**Diameters:** 6 to 10 inches  
(15.2 to 25.4 centimeter)

**Heights:** 3 to 6 feet  
(7.6 to 5.2 centimeters)

For more than 40 years, Centek Industries has believed that one of the best ways to keep the enthusiasm for boating up is to keep the noise from inboard engines down. Centek has been accomplishing this mission well enough to become the world leader in wet marine exhaust systems.

Vernatone™, Vernalift™, Vernatube™, Combo-Sep™, Gen-Sep™ and Invertaflow™ exhaust systems from Centek are based on high performance, fiber-reinforced polymer (FRP) composite. The composite is engineered to resist the corrosive nature of the raw water and exhaust gas mixture that is injected into the system to muffle sound and provide cooling. The closest material alternative to composite is stainless steel which costs significantly more and has lower sound-dampening properties.

Centek maintains its global leadership in wet marine exhaust systems by continuously finding innovative new ways to improve the design, manufacturing and materials.

The company's latest improvement in materials technology has been a conversion to Vipel® K190 chlorendic polyester resin manufactured by AOC. Vipel K190 polyester is part of resin, fiberglass and adhesive material package put together by Jerry Smith, sales representative for distributor Composites One.



### Vipel Goes Further

“Compared to the resin we used previously, Vipel K190 chlorendic resin goes further toward meeting the stringent performance requirements for the application,” says Ken Harstel, Centek Vice President of Operations.

“We are especially impressed with the resin’s ability to achieve recognition for flame retardance per the ASTM-D-635 standard as well as exceeding the US Navy/USCG MIL-R-21607 and MIL-R-7575 specifications. Initial test results with Vipel K190 were so good that we ordered evaluations from both UL and an independent testing lab to crosscheck the data.” In addition to being UL-listed, Centek products are certified as meeting American Bureau of Shipping specifications.

## Wet Marine Exhaust Systems, continued

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Composites made with Vipel K190 resin are rated to perform at temperatures as high as 350°F (175°C). Vipel K190 also provides outstanding resistance to corrosion, especially for oceangoing vessels with muffler systems that mix exhaust gases with corrosive seawater.

AOC's technical support team helped tailor formulations to Centek's composite capabilities which include hand lay-up, filament winding, resin transfer molding (RTM) and RTM light. "For all our processes, wet out of the glass fiber reinforcement is much better," Harstel says. "And shrinkage with the Vipel material is significantly reduced."

"Centek provided AOC with the kind of application development challenge that brings out the best in our Corrosion Team," says Emilio Oramas, Business Manager Open Mold Reinforced for AOC.

"Working with Centek exemplifies AOC's commitment to offer corrosion fabricators the complete package of technology, quality and support."

