

Sticky Situation

By Charles Plueddeman
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Is winter fuel gumming up your outboard?

Last fall one of our long-term test boats developed an alcohol problem. After delivering trouble-free performance for the entire season, the Yamaha F225 outboards on our Robalo R260 suddenly began behaving erratically. The trouble was revealed to be a mysterious glob that had invaded and clogged the fuel system. Turns out ours were among a number of Yamaha outboards in the Long Island area that suffered the same symptoms, which, like a virus, seemed to spread up the coast to New England. What was going on?

Yamaha was at first baffled by this situation, but after studying clogged fuel injectors and filters from its EFI four-stroke and HPDI two-stroke motors, the company concluded that the problem coincided with the introduction of ethanol into the gasoline supply as winter-blend fuels came on the market in the Northeast.

"To be honest, it's still a bit of a mystery," says Claude Von Plato, manager of the Yamaha Marine Service Division. "We had the material that clogged the filters analyzed, and it contained metallic elements like copper and sulfur that shouldn't be in gasoline. Our theory is that ethanol has been rinsing all kinds of residue from transport trucks, storage tanks, and perhaps even boat fuel tanks, and it gets into the fuel filter and causes a clog."

Ethanol is grain alcohol, produced from crops such as corn and used as an "oxygenate," an additive blended with gasoline to reduce exhaust emissions by introducing additional oxygen molecules to the combustion process. Ethanol has largely replaced another fuel additive, MTBE, in gasoline supplies in urban areas and is appearing more frequently in fuel supplies in rural areas.

Don Schultz, who retired from Mercury Marine in 2001 after serving 14 years as that company's leading expert of fuels and lubricants and today is an independent consultant to the marine industry, agrees with Yamaha's assessment and adds that ethanol in marine fuel poses a number of problems for boaters.

"Ethanol is a fabulous solvent," says Schultz. "I used it to clean tree sap off my car." It also dissolves accumulated deposits in the fuel-supply system, and those could end up in a fuel filter. Also, Schultz points out, gasoline and ethanol are an unhappy marriage. They simply don't mix together. But ethanol loves water and willingly sucks up moisture. This isn't a big problem in the sealed fuel system of a modern car, but most boats have an open-vented fuel tank that breathes as the ambient temperature rises and falls—especially during the cool evenings and warmer days of spring and fall—and introduces humid air to the fuel tank. This can create the formation of strong organic acids as water combines with ethanol and other elements in the fuel, forming sludge and corrosive compounds.

All marine engines sold in the United States are designed to operate on fuel containing no more than 10 percent ethanol. Most of the ethanol-laced gasoline on the market today is what the fuel industry calls "E-10" fuel, a blend of up to 10 percent ethanol that's supposed to be labeled at the pump. But the measuring system is far from accurate. Because ethanol cannot be transported in a pipeline, it must be splash blended at the delivery truck terminal—not an accurate process. A Suzuki Marine rep says that the company recently conducted a test of fuel samples from across the country and frequently discovered fuel that contained ethanol levels higher than 10 percent.

Yamaha has responded with a new 10-micron spin-on element for remote fuel filters (Yamaha P/N MAR-FUELF-IL-TR, \$15) that offers finer filtration than its previous 28-to-35-micron filters and has three times the capacity. "It's a good debris catcher and works better as a water separator because it slows down the fuel flow," says Von Plato. "Our hope is that over time, the fuel supply will clean itself out and this will cease to be a problem." We hope so, too.

