

# More Pain at the Pump?

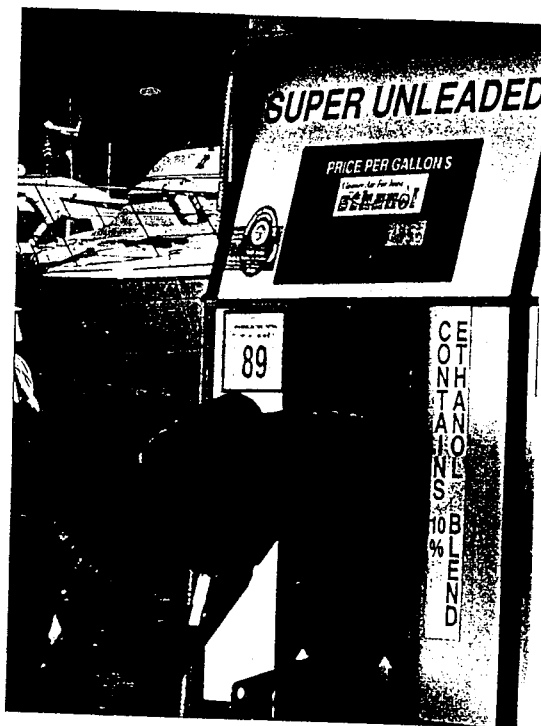
The latest effort to clean up the air may cause trouble on the water. Here are some tips on keeping your boat's engine running strong with E10—the ethanol and gasoline blend.

by J. V. Reistrup

All over the Northeast, gasoline-powered boats will be quenching their thirst from now on with a new cocktail: unleaded gasoline spiked with grain alcohol—ethyl alcohol, or ethanol—to form E10 gasoline or “gasahol.” There may already be a sign at the fuel dock telling you so, and you might have even been warned to check with your engine manufacturer or mechanic about any problems E10 gasoline—a 90 percent gasoline, 10 percent ethanol blend—could cause. So what, you ask, is up with that? Or, more pointedly, why are they putting ethanol in the gasoline, and can it cause engine problems?

The first question is the easiest to answer: The federal government is requiring the gasoline industry to sell 4 billion gallons more of renewable fuel this year, and to meet the goal distributors are using ethanol—a gasoline oxygenate additive that produces a cleaner burn and reduces exhaust emissions—to replace the oxygenate methyl tertiary-butyl ether (MTBE) in reformulated gasoline. Both E10 and MTBE boost octane and contain oxygen, and until recently many distributors—particularly in the Northeast—exclusively used MTBE. But with MTBE under suspicion as a carcinogenic groundwater pollutant, it has been banned in every Northeast state (New York and Connecticut banned it as long as two years ago) except Massachusetts, though this spring Bay State pumps switched to E10 in compliance with federal regulations.

So will E10 cause problems in your boat's engine? Well, if your boat has fiberglass fuel tanks built before a new



fiberglass formula was phased in during the 1980s, the answer is a resounding “yes!”—ethanol is a big problem.

According to one recent study, E10 fuel both weakens the tanks, causing seepage, and pollutes the fuel supply with chemicals leached from the fiberglass, causing serious engine problems. As a result these old fiberglass gas tanks may have to be replaced. Unfortunately, that may be easier said than done in some boats because tanks of differing shapes were built in before decks and interiors were added, presenting what one manufacturer described as “a major, major construction ordeal.” The complete study can be found at [www.boatus.com/seaworthy/fueltest.asp](http://www.boatus.com/seaworthy/fueltest.asp). For the rest of us, the news isn't nearly so bad, though it's fair to say that two particular properties of ethanol—its molecular attraction to water and its tendency to act as a sol-

vent—make it at least a potential troublemaker.

Tiny amounts of water in your fuel don't present a problem; in fact, up to a point, the corn-based alcohol actually removes water by bonding with it and carrying it away in the combustion process. But the operative phrase there is “tiny amounts”; if too much water is present—more than, say, one-half of 1 percent of the fuel volume—it “weighs down” the ethanol, causing it to separate from the fuel and form a layer of non-combustible liquid at the bottom of the tank. If that gets into the fuel line, it can cause the engine to start with difficulty, run poorly or, in the worst case, shut down.

In addition to its love-hate relationship with water, ethanol is a solvent (it's alcohol, after all). That means it can and apparently does loosen gunk and sediment in the tank and fuel line, which also can foul the engine—carburetors in particular. Around Long Island Sound, where E10 has been in use since 2004, mucky carburetors have been a major problem. “People who were rebuilding dozens of carburetors before are rebuilding hundreds,” says Chuck Fort, associate editor of *Seaworthy*, the BoatU.S. damage-avoidance newsletter. He adds that the problem seems worse in smaller engines such as outboards under 10 horsepower.

## What to Do About It

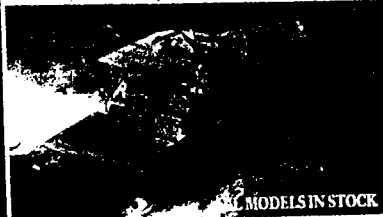
Experts say that after you take a few precautions, most boat engines will run fine with E10. However, if the most recent time you filled up was during the last boating season and you suspect it was

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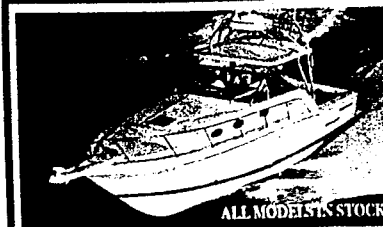
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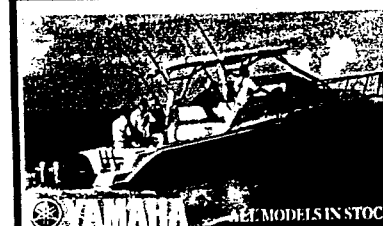
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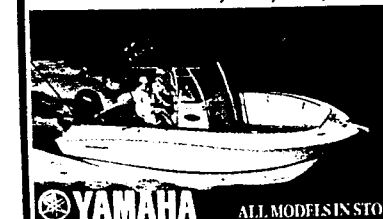
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## NAUTICAL KNOW-HOW

with gasoline containing MTBE—particularly if you live in or were boating in Massachusetts—it's not a bad idea to use up most of the fuel already in your tanks. Why? Because MTBE has slightly different characteristics from E10, and there's a suspicion that mixing the two can lead to engine problems.

The most basic precaution after that is to find any water in the tanks, perhaps from condensation over the winter, and get it out. Several products to find it are available at a few dollars a tube, although they're ordinarily sold in bulk quantities for commercial use by marinas and service stations. One that fuel distributors recommend to marinas is Sar-Gel Water Indicating Paste, made by the Sartomer Co. Another product distributors recommend is Kolor Kut Water Finding Paste. You may luck out and find a consumer-friendly quantity in a marine supply store; you may be able to negotiate with

your boatyard mechanic for the limited amount that you need or you may find the product online. I found a single tube of Kolor Kut online at Marine Services Inc. ([www.marineservicesinc.biz](http://www.marineservicesinc.biz)) for \$3. Kolor Kut also offers a modified water-finding paste that will work with E10 after the changeover, but that's not only more expensive (\$7 and up), it's harder to come by because of the new demand.

Using these products is simple. You coat the end of a straight, clean stick with the paste and thrust it into your gas tank until it touches bottom. If there's water there, the paste will turn color—from white to bright red or from brown to pink, depending on the product. If that happens, the tank needs to be pumped out.

The paste didn't show any water in my tank, but I took this next step anyway to double-check. I used a universal fuel-line assembly for outboards—a primer bulb with a hose at either end—to siphon gas

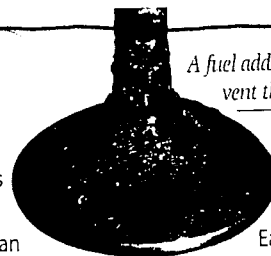
## Miracle Cures?

Major suppliers of additives for boat fuel say they have products that can reduce problems the new E10 gasoline/ethanol mix can cause with water and deposits in the fuel system. While *Offshore* hasn't yet tested them, here's a summary of some of the descriptions and claims.

One product billed as "a revolutionary new type of gasoline additive" is Star Tron. Actually developed in Japan years ago and long marketed for commercial uses worldwide under the names Xbee and Soltron, it's already on shelves at marine supply stores. Updated labels from the U.S. licensee, Star Brite, claim that Star Tron is unique because it contains enzymes that act as catalysts to improve combustion. Marketer Jeff Tieger explains the firm decided to aim Star Tron at ethanol when it was also found to reduce water to tiny particles that burn up with the fuel, while also breaking down deposits in fuel systems. More information is at [www.starbrite.com](http://www.starbrite.com); click on "What's New."

Gold Eagle Co., another major manufacturer, says its product is just as good. "All of

*A fuel additive to E10 gas could help prevent this from forming in your engine.*



those features are already incorporated into Sta-Bil brand fuel stabilizer," says Gold Eagle's R. T. "Tom" Wicks.

The manufacturers differ, however, on the claims they make about the effects on fuel that has been sitting for a long time. A product description for Star Tron says its enzymes "can in fact repair old fuel" and restore octane ratings. A Q&A on the Gold Eagle website says Sta-Bil "will not restore or improve old gasoline. It will, however, stop it from degrading further" ([www.goldeagle.com](http://www.goldeagle.com)).

We'd be glad to hear readers' experiences with these or similar products. But read the labels and check with your mechanic; some other gasoline additives (not these) contain methanol, and common sense would tell you not to add more alcohol to solve a problem caused by alcohol.

Eight ounces of Star Tron costs \$9 at my local West Marine and is advertised as able to treat up to 125 gallons of gas. Ten ounces of Sta-Bil costs \$8 and can treat up to 25 gallons.

—J. V. R.

## NAUTICAL KNOW-HOW

from one of my tanks into the other through a fuel-filter funnel. This simple-looking but technologically advanced device has a fine Teflon-coated stainless-steel filter which blocks the fat water molecules but lets the skinny fuel molecules slip through (see "Clean from the Start," *Chandler's Choice*, March). It's available for \$23 to \$65, depending on capacity, and you can pump up to 15 gallons a minute through the biggest one. I simply took the cap off the second gas tank, dropped in the funnel and pumped fuel from the first tank through the filter instead of directly into the tank.

In my test, the filter performed as advertised, allowing the gas to flow through steadily—although at the end of the process it did allow an ounce or two of gasoline to linger in its bottom, apparently because the filter didn't reach to the bottom of the funnel. You can dump any water you find into a bucket, sop it up with paper towels and dispose of it ashore. The funnel will filter out crud as well as

water, and you can use it from now on to ensure new gas is clean and water-free.

### Check Filters, Fuel Lines

There's still the danger of condensation in your tank, though. Engine manufacturers generally recommend having a fuel-water separator in your boat's fuel line. Sold under various brand names, these vary in design and capacity depending on the size and type of engine. Some can be installed in place of factory fuel filters, others in addition to them. Models to fit your boat and motor should be readily available. Prices range from around \$65 for outboards to around \$140 for inboards.

Even after water is cleared out, ethanol remains a strong solvent that can loosen sediment in tanks, eat away rubber hoses and release crud into the fuel. Keeping engine parts clean is what fuel filters are for, so you need to keep an eye on them and replace them more often—after every 50 hours of engine use, according to some experts. And be sure your fuel hoses

are alcohol resistant—information typically printed on the outside. If you have to replace them, you should specify that the new hoses meet the Society of Automotive Engineers J1527 standard.

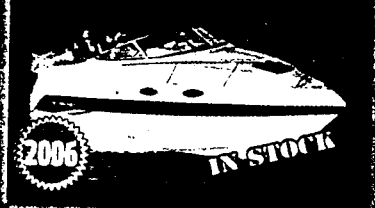
One final precaution: Although boaters used to be advised to top off their tanks when putting their vessels into storage, the word now is to store your boat with *empty* tanks so E10 can't eat away at them or accumulate water. Experts say most boaters should be in good shape if they take all these precautions. In the long run, they may be better off—continuous use of an E10 blend can prevent water accumulation and unnecessary maintenance resulting from water in the fuel system as long as you use your boat often enough. At least now you have a good excuse to go boating more frequently! ■

*J. V. Reistrup is senior editor for Chesapeake Bay magazine, Offshore's sister publication, based in Annapolis, Maryland.*

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