

# Ethanol

*Take caution when using Ethanol enhanced and other Blended Fuels*

### DID YOU KNOW...

The EPA is responsible for setting Federal Guidelines that regulate the content of engine fuels. With a governmental push for blended fuels and bio-fuel development from renewable sources, ethanol has gained the energy spotlight as a fuel additive solution.

Ethanol is a refined grain alcohol produced by the fermentation and distillation process of such renewable crops as corn, sugar cane, and sugar beets and has the potential to produce cleaner engine emissions. Ethanol is also an oxygenated hydrocarbon with the useful potential to increase the octane rating of unleaded fuel.

Currently the EPA is allowing the blending of ethanol with gasoline in quantities of up to 10% for common use. Blended fuels containing any higher percentage of ethanol than 10% are unacceptable for general engine use at this time. With a movement toward higher ethanol percentage fuel use and The Energy Policy Act of 2005 requiring ethanol production to nearly double in the US by 2012, many manufacturers are working diligently to produce ethanol compatible engines. The potential effects of ethanol-blended fuels on existing boat fuel systems however is one to remain wary of.

### HERE'S HOW IT WORKS:

Engine fuel requires a certain octane rating in order to prevent the premature ignition that causes damaging engine knocking. Gasoline alone has a tendency to ignite prematurely during engine compression, which is why additives with a high octane rating must be blended with it.

MTBE, Methyl tert-butyl ether, a common fuel additive in some areas of the country, is gradually being eliminated due to its contamination of ground water systems and soil. Ethanol is a more environmentally friendly additive taking its place. Unfortunately, ethanol has a BTU energy value of nearly 30% less than gasoline, causing an overall decrease in fuel efficiency and engine performance. Additionally, the effect of ethanol on the overall octane rating of blended fuels and the effect of octane on engine horsepower makes it necessary to choose fuels blended with ethanol carefully.

There are currently two main ethanol and gasoline mixtures in use: E-10 and E-85. The E designates the presence of ethanol in the mix, while the number indicates the percentage of ethanol. Thus E-10 represents a mixture of 10% ethanol to 90% gasoline and E-85 that of 85% ethanol to 15% gasoline. E-85 blends should only ever be used in engines manufactured specifically to handle this high ethanol content, such as Flexible Fuel Vehicles.

While ethanol may not pose the environmental hazards of other gas additives, the chemical properties of ethanol are much different than those of other fuels, giving ethanol blends the potential to cause severe damage to some engine systems.

1. Ethanol is a hygroscopic substance, meaning it mixes very easily with water – more easily than with gasoline in fact. The presence of ethanol in fuels may contribute to decreased fuel surface tension, promoting increased fuel tank condensation from air moisture. The increase in water, combined with ethanol's potential to separate from gasoline and mix with available water, can cause fuel separation and octane imbalance, leading to serious damage to some fuel system components. Water separating filters like Moeller's Clear Site™ with Hydro-Shield™ can help the process of fuel system water removal for better fuel system maintenance.
2. Ethanol increases the electrical conductivity of fuels, which can lead to galvanic corrosion of metal engine components, especially in aluminum gas tanks. Ethanol also acts as a detergent that can cause rust and other system contaminants that might otherwise remain relatively inert in a fuel system to detach, including some layers of older fiberglass tanks, causing plugged filters, engine malfunction and potential leakage. Moeller's full line of corrosion free polymer fuel tanks provides a perfect solution for ethanol blended fuels.
3. Ethanol's ability to cause swelling of common gaskets and O-rings materials, such as XX% of Buna-N and XX% of Nitrile, increases fuel flow restrictions causing poor engine performance. Moeller's forward thinking fuel system components have been designed and engineered to withstand many of the harsh deteriorating effects of ethanol blended fuels.

### YOU NEED TO KNOW

- **Exposure to ethanol causes the leaching out of stabilizing fuel system plasticizers and polymers**, causing rigidity, brittleness and shrinkage, which effects tolerances that can create a leak path
- Moeller's new two prong male fittings and fuel system components **have been designed with blended fuels in mind**
- **Monitor fuel systems and components annually for signs of water buildup**, as well as wear and breakdown that could lead to environmental hazards or engine damage
- Moeller's new Clear Site™ filters with Hydro-Shield™ **can ease the process of fuel system water removal**
- **WARNING some manufacturer warranties may be voided by the use of certain blended fuels due to power head failure and engine system capabilities. Check with your engine manufacturer for the octane rating recommended for your engine.**