

Protecting Your Marine Engine from E10 Fuels

There have been numerous articles, technical bulletins, and warnings from a variety of organizations in the marine, aviation, automotive, and power equipment industries about the dangers of ethanol blended fuel. Even so, many boaters have still unknowingly used gasoline blended with ethanol containing unsafe levels of more than the legal 10% alcohol. These high levels will cause performance problems and can cause permanent damage to your marine engine.

Understanding the dangers and effects of ethanol blended gasoline and following all the precautions described in this bulletin are necessary to avoid problems with E10 gasoline.

Common symptoms related to ethanol include, water contamination, phase separation, vapor lock, stalling, hesitation, hard starting, corrosion of fuel system components, premature fuel pump failures, clogged filters, fuel injectors, and carburetor damage.

There has been a lot controversy, misinformation, and confusion as distribution of ethanol gasoline has increased in the United States and throughout the world. Companies marketing fuel additives have confused boaters even more. Some ads claim certain additives can reverse the effects of ethanol water-contaminated fuel but the fact is that phase-separated fuel **can not** be fixed, and it must be properly disposed of.

As E10 usage increases and with the possibility of E15 on the horizon, the necessary precautions needed and the dangers of ethanol are becoming better documented. Boaters looking for instant solutions will not find them, but increased knowledge can prevent many of the problems associated with ethanol gasoline.

Top Reasons Marine Engines Have More Issues with Ethanol Blended Fuels:

- 1. Ethanol absorbs water** - Water molecules combine with fuel in the fuel tank and lines. Ethanol increases the risk of fuel water-contamination due to its ability to absorb moisture from the air. The gasoline pumped into the tank may not contain water initially but condensation due to temperature variation and high humidity will allow water to develop in the tank. Since water is insoluble in gasoline, it sinks to the bottom of the fuel tank. As long as the water remains below the level of the fuel pickup tube it will not affect the engine. The problem occurs when water is absorbed into the ethanol and it will then travel through the engines fuel system. When water/ethanol mixes it settles to the bottom of the fuel tank and causes a reduction in the octane rating of the gasoline remaining on top. This low octane gasoline can cause serious performance issues and can cause severe damage to both 4-stroke and 2-stroke engines. Excess water in engines will also cause internal corrosion and premature failures of fuel system components.
- 2. Ethanol is a solvent and cleansing agent** - High levels of ethanol will damage, deteriorate and cause failures of many parts made from materials including rubber, plastics, fiberglass, aluminum and even steel. Ethanol will also release varnish and rust deposits which will travel through the fuel system and clog fuel filters, carburetor jets and fuel injectors. Ethanol's solvent properties can lead to complete engine failure and expensive repairs.
- 3. Boats with older fiberglass fuel tanks have additional risks when using ethanol blended fuel** –Ethanol will cause fiberglass fuel tanks to deteriorate allowing the dissolved resins to circulate through the fuel system which can destroy the engine.
- 4. Extreme risks exist when ethanol content exceeds 10% in marine engines.** Some gas is illegally supplied at much higher ethanol content. **Check fuel with an ethanol fuel test kit such as the Mallory Marine 9-79816** to make sure ethanol present is less than 10%. Some of the fuel samples tested have been reported to exceed as much as 40 % ethanol and many were above the 10% maximum allowed by law. Newer marine engines are designed to operate on fuel

containing no more than 10 percent ethanol. Engines built before ethanol became a common additive have minimal resistance to the damage alcohol fuels will cause.

How to Prevent Fuel Problems and Engine Damage Caused by Ethanol Blended Fuels:

1. TEST THE FUEL YOU BUY, Check ethanol content in your fuel with an ethanol fuel test kit to assure the ethanol content is at or below 10%.

2. Always use fresh, high-quality gasoline and try to run it out in 2-4 weeks. Avoid storing fuel in your tank for more than 90 days. Gasoline with ethanol has a much shorter shelf life - use it up and replace it quickly. It can be stored longer with fuel stabilizer but avoid stabilizers that are alcohol based; Buy your gas from busy gas stations - the gas will be fresher.

3. Avoid running the fuel tank empty, water accumulates on the bottom of gas tank.

4. Make sure your engine is protected with a high quality 10 micron water separating fuel filter. Most newer engines have them but check, don't assume, it may or may not. The installation of a water separator in the fuel line will help with small amounts of water. Some newer marine engines are also equipped with water sensors. Mallory Marine offers an extensive line of high quality fuel water separators to protect your engine.

5. Periodically Check fuel system for water contamination and replace your fuel filters often. Fuel filters should be replaced at a minimum of every 50 hours or once a season depending on the amount of use and the fuel quality.

We hope this information will help make boating more enjoyable and reduce the amount of fuel related problems boaters experience with the ethanol blended fuel in use today.

Have a Great Boating Season!