

Marine Use of Ethanol Fuel

The Environmental Protection Agency (EPA) regulations require the addition of oxygenates in some regions of the country, as do some local regulations. The most widely used oxygenates are alcohol (ethanol or methanol), Methyl Tertiary Butyl Ether (MTBE), and Ethyl Tertiary Butyl Ether (ETBE).

There is an increasing use of ethanol in automobile gasoline. The Energy Policy Act of 2005 replaces the 2 percent oxygen standard with the Renewable Fuels Standard (RFS), which requires an ever-increasing amount of ethanol and biodiesel to be used across the country through 2012. Ethanol will continue to see increasing use in the United States.

Automobile gasoline containing alcohol may be a problem for some marine applications due to the following reasons:

- Alcohol present in automobile gasoline **is corrosive** and may not be compatible with the rubber seals and some plastic or fiberglass tanks used in some watercraft, which could lead to fuel system deterioration and malfunction.
- Alcohol present in automobile gasoline is subject to phase separation, which happens when the fuel is cooled. When the **alcohol separates** from the gasoline, it will carry water that has been held in solution. (*To see how this works in your tank, check out the test below*) If this water mix is not handled by the fuel feed or filter system, damage may occur to the engine.
- Alcohol present in automobile gasoline reduces the energy content of the fuel. Methanol has approximately 55 percent of the energy content of gasoline, and the more common ethanol has approximately **73 percent of the energy content** of automobile gasoline. The greater the amount of alcohol in the automobile gasoline causes the greater the reduction in the operating range. For example, a boat with a normal burn of 10 GPH may increase to 13.7 GPH when using Ethanol for the same boat speed.

If you are unsure about the presence of alcohol in automobile gasoline purchased at the pump, the following test can be performed:

1. Using a glass or chemical-resistant plastic (such as TPX) container, mark ten equally spaced volumes. A graduated cylinder is ideal; however, a non-tapered glass jar, such as an olive bottle, will work.
2. Add one part water into the container, fill to the first mark, and then add nine parts of automobile gasoline, fill to the top mark. Shake thoroughly, let stand for 10 minutes or until automobile gasoline is again bright and clear. Record the apparent level of the line between the automobile gasoline and water.
3. If alcohol is present in the automobile gasoline, the water will absorb it, and the amount of water will appear to increase, indicating the automobile gasoline should not be used in the watercraft. However, if the water level remains the same, no alcohol is present in the automobile gasoline, and can be safely used in the watercraft.