

# UNITED STATES COAST GUARD



## ETHANOL & BIODIESEL FACT SHEET

*In order to encourage good marine practice, this fact sheet provides information to help vessel owners/operators make informed decisions regarding the use of fuel alternatives. Improper fuel use onboard motor vessels can potentially lead to engine failure and subsequent vessel casualties. The Coast Guard urges vessel owners and operators to evaluate their fuel selection for the safety of their vessels and crew.*

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### **What is ethanol?**

- Ethanol (*ethyl alcohol*) is a high-octane, alcohol based fuel derived from plant sugars. Most of the time Ethanol is extracted from corn, sugar cane, wheat, and other grain products. It is produced when these plant sugars are fermented and distilled.

### **What are ethanol based fuels?**

- Ethanol has been approved by the US government to be added/blended to gasoline in different concentrations:

**E-10:** This label found on fuel pumps denotes a gasoline-ethanol fuel blend that contains up to 10% ethanol and 90% gasoline.

**E-15:** This label found on fuel pumps denotes a gasoline-ethanol fuel blend that contains up to 15% ethanol and 85% gasoline. The EPA has currently granted a waiver for the sale and use of fuel that contains up to 15% ethanol.

**E-85:** This label found on fuel pumps denotes a gasoline-ethanol fuel blend that contains 85% ethanol and 15% gasoline. E-85 fuel is intended to be used only in engines that are specially designed to accept such a high ethanol concentration. (*There is currently no marine engine on the market that is E-85 compatible*).

### **What are the characteristics of ethanol?**

- Ethanol is added to gasoline as a "cleaner" octane booster. Traditionally, MTBE (methyl tertiary-butyl ether) was used as an octane enhancer in gasoline but was deemed by the EPA as a ground-water pollutant. The United States government has approved ethanol to a suitable replacement for MTBE. Unlike MTBE, ethanol is hygroscopic which means it has an attraction for water. This causes it to mix more readily with water than with gasoline. It also has different solvency properties than MTBE and gasoline which means it may react differently to certain materials (*i.e. - fuel lines, fuel tanks, gaskets, etc.*)

### **What are problems associated with using fuels that contain ethanol?**

- Some common problems that have been experienced when using E-10 fuel in the marine environment have included:
  - o Fuel leaks due to deteriorated rubber-based fuel system gaskets and supply lines.
  - o The introduction of water into the vessel's fuel tank/s due to the presence of ethanol in the fuel.
  - o Severe engine damage in vessels containing fiberglass fuel tanks due to ethanol caused fiberglass resin separation.
  - o Voided marine engine warranties for use of fuel that contains greater than 10% ethanol.

### **Are gasoline powered marine engines considered compatible with E-10 fuels?**

- **YES:** Marine engine manufacturers consider fuel system components of marine engines that were built prior to 1990 to be compatible with fuels that contain up to 10% ethanol (E-10). *It is recommended to check with your marine engine manufacturer to ensure its ethanol compatibility.*

### **Are gasoline powered marine engines considered compatible with E-15 fuels?**

- **NO:** Although the EPA has currently granted waiver for the sale of E-15 fuel and approved its use in model year 2001- newer vehicles, there have not been conclusive testing done to show that its use approved for marine use. Many marine engine manufacturers have stated that use of E-15 fuel will void its warranty.

### **Are gasoline powered marine engines considered compatible with E-85 fuels?**

- **NO:** At this time there are no marine engines manufactured that are compatible with E-85 fuel.

### **How do I know if fuel lines are compatible with ethanol-based fuels?**

- Not all fuel lines are ethanol compatible. Ethanol compatible marine grade fuel lines are marked with the label: **SAE J1527**



*Photo courtesy of wellcallholdings.com*

### **What can I do to help prevent some of the negative effects that have been experienced by using ethanol based fuel in marine engines?**

- It is best to consult your marine engine manufacturer's users/service manual to find further information on how to mitigate the effects of ethanol. Some recommendations include:
    - o Installation of a fine-micron water separation filter system to your vessel's fuel system.
    - o Use of Ethanol-Fuel Treatment additives
    - o Not allowing ethanol-based fuel in your vessel's fuel tank to sit for more than 90 days.
    - o Re-fueling your vessel at marinas or locations that sell ethanol-free fuel.
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### **What is biodiesel?**

- Biodiesel is a petroleum diesel alternative that is produced from vegetable oils and animal fats. Biodiesel is biodegradable and deemed to be less toxic than petroleum diesel. It can be found at select marina's nationwide at generally a higher cost per gallon than petroleum diesel.

### **What are biodiesel based fuels?**

- Biodiesel has been approved by the US government to be added/blended to petroleum diesel fuel in different concentrations.

**B5:** This label found on fuel pumps denotes a fuel blend of 5% biodiesel and 95% petroleum diesel

**B6-B20:** These labels found on fuel pumps denote a fuel blend of 6-20% biodiesel to 94-80% petroleum diesel.

### **What are the characteristics of biodiesel?**

- Biodiesel has a solvent effect that may cause the release of deposits that build up on tank walls and in fuel lines. These deposits are the byproduct of traditional petroleum diesel. Other than having solvent-like properties, biodiesel performs much like petroleum diesel.

### **What are the problems with using biodiesel fuel blends?**

- Some common problems that have been experienced when using biodiesel fuel in the marine environment have included:
  - o Fuel line/filter clogging due to biodiesel's solvent properties.
  - o Degradation of the vessel's rubber fuel lines and gaskets.
  - o Voided marine engine warranties for use of biodiesel blends above what the manufacturer recommends.

## Are diesel powered marine engines compatible with biodiesel?

- Although biodiesel can be used in most diesel engines (marine and non-marine) with no modifications to the engine or the vessel's fuel system, it is highly recommended that you check with your manufacturer before using it. Some problems have been associated with its use in the marine environment, and your engine manufacturer can give you further guidance as to what biodiesel blends are acceptable for use and how to mitigate potential problems.

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### **SOURCES:**

American Petroleum Institute, [www.api.org](http://www.api.org)

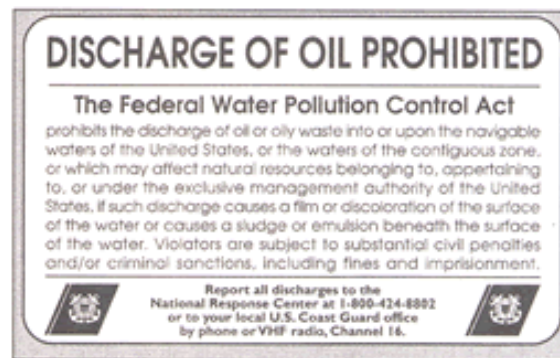
Alternative Fuels and Advance Vehicles Data Center, [www.afdc.energy.gov/afdc/ethanol/](http://www.afdc.energy.gov/afdc/ethanol/)

EPA, [www.epa.gov/otaq/regs/fuels/additive/e15/](http://www.epa.gov/otaq/regs/fuels/additive/e15/)

U.S. DOE, [www.afdc.energy.gov/afdc/fuels/biodiesel.html](http://www.afdc.energy.gov/afdc/fuels/biodiesel.html)

Mercury Marine Engines, [www.mercurymarine.com](http://www.mercurymarine.com)

**NOTE:** The Federal Water Pollution Control Act prohibits the discharge of ALL oil or oily waste (Ethanol & Biodiesel included) into/upon the navigable waters of the United States. All discharges of oil or oil products must be reported in a timely manner to the National Response Center (1-800-424-8802) or to your local U.S. Coast Guard office by phone or VHF radio (Channel 16).



*Photo courtesy of the U.S. Coast Guard*