

PRODUCT INFORMATION UPDATE

Ethanol-Blended Gasoline

Distributor / Dealer / Owner

October, 2006

This Product Information Update addresses the use of ethanol blended fuel and its affect on Crusader engines. The implementation of ethanol-based fuel is spreading rapidly throughout the United States. As such, Crusader Engines provides the following information regarding the use of this fuel.

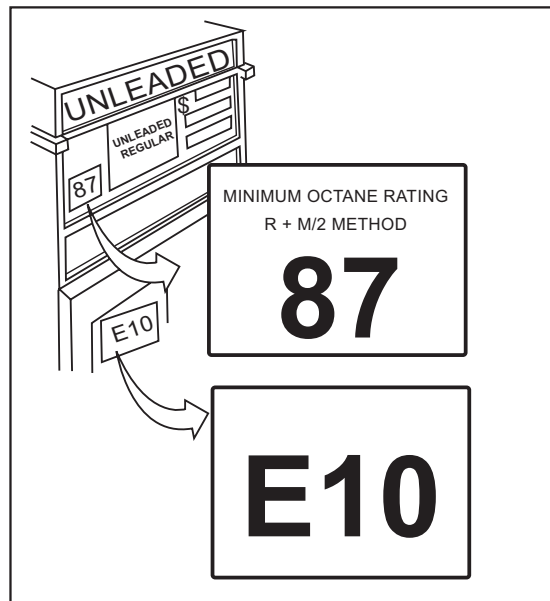
This information addresses the use of ethanol fuels in CRUSADER ENGINES ONLY. It does not address the use of ethanol fuels in vessel related components such as boat gas tanks, boat fuel lines, etc.

Ethanol blended fuel rated E10 or less is acceptable to use. Fuels rated higher than E10 SHOULD NOT BE USED. Ethanol fuels rated higher than E10 could potentially damage the engine and/or present an unsafe boating condition. Damage to the engine resulting from the use of ethanol fuel rated higher than E10 IS NOT covered by the warranty.



CAUTION

Do Not use any gasoline that contains METHANOL. This fuel is very corrosive and will create unsafe operating conditions. Serious damage will result from the continued use of fuel containing METHANOL. Any resulting engine damage will not be covered by the warranty.



If ethanol blended fuel rated E10 or less is used, or if the presence of alcohol is uncertain, more frequent inspections and service of the complete fuel system are required. Any sign of fuel leakage or deterioration must be repaired immediately before further engine operation.

It is important to note that ethanol blended fuel will act as a solvent and will attract and hold moisture. ***Without proper fuel stabilization and fuel filtration, ethanol blended fuel may cause the following:***

- Excessive moisture (water) may cause lean operation to include hard starting and operating difficulties such as, vapor lock, low speed stalling, and shortened fuel shelf life.
- Acting as a solvent, ethanol blended fuel may cause gum, sediment, sludge, and other particles to be loosened and carried through the fuel system to the engine.

Fuel system or engine damage caused by contamination from water, foreign particles, sludge, or gums entering or forming in the fuel system is not covered by the Crusader Limited Warranty.

Fuel Stabilizer Recommendations for Ethanol Blend Fuel

The use of a commercially available fuel stabilizer, such as STA-BIL[®], is recommended when storing ethanol-blended fuel for more than 2 weeks.

New Fuel Filter Recommendations for Ethanol Blend Fuel

Because ethanol blended fuel will act as a solvent and will attract and hold moisture, Crusader Engines recommends the use of a water separating fuel filter, for each engine, between the fuel tank and the engine.

The filter must be rated for use with gasoline and have a 10 micron filtering capability and a minimum rating of 90 gallons per hour. The filter must be approved for inboard installations and be installed in accordance with US Coast Guard regulations and ABYC standards.

Water separating fuel filters should be checked frequently for water and contaminants in accordance with the filter manufacturer recommended service intervals.



WARNING

Accumulation of water and other fuel contaminants may form corrosive compounds that can damage the fuel filter, and result in fuel leakage. Ethanol blended fuel may increase this risk. For this reason, annual replacement of the fuel filter, at a minimum, is required to avoid risk of explosion or fire.

Crusader Engines recommends that the fuel/water separator be mounted as low as possible, relative to the fuel source, away from heat, such as exhaust runs, and in an easily accessed and serviceable area. Upon installation or service of the fuel/water separator, the filter element should be pre-filled with fresh fuel prior to mounting the element to the head.

See your Crusader dealer for information regarding installation of the appropriate water separating fuel filter. Crusader Engines part number RA080033 meets or exceeds the requirements stated above. This is a 3-piece, fuel/water separator unit that allows for the easy draining of water and contaminate inspection between service intervals, without the need to replace the filter element during an inspection.