

[Tech 101: Ethanol in gasoline and its effects on collector cars](#)



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Like it or not, ethanol in gas is here to stay. Although it does reduce pollution in our atmosphere, it can cause problems for many collector cars, boats, and older outdoor power equipment because of some of the side effects related to its use.

When people talk about ethanol in today's pump gas, they're referring to E10, which is a formulation that contains 90 percent gasoline and 10 percent ethanol. Car manufacturers are now building engines that can run on 51 to 83 percent ethanol, which is often called E85 or flex fuel.

Ethanol is refined from grain alcohol; most specifically, corn, here in the United States; but it can also be made from switch grass, manure, willow trees, and even sugar cane in some countries.

The use of ethanol will only increase. Federal law mandates that the U.S. use 36 billion gallons of alternative fuel per year by 2022. By comparison, the United States used only 11 billion gallons in 2010, and the requirement in the law is that we ramp up to 15 billion gallons per year in 2015. The only way we would get there is to buy more gas – which is unlikely to happen, given the cost of a gallon these days – or increase the ethanol content in each gallon. Unless your car's owner's manual states specifically that it is an E85 or Flex Fuel vehicle (if you don't know for sure, [check the eighth digit of your VIN](#)), you cannot use E85 fuels.

Pros of ethanol-supplemented fuel:

- Ethanol is clean-burning and is a higher-octane fuel than conventional gas.
- Ethanol is produced from renewable sources.
- Ethanol-powered vehicles produce lower carbon monoxide and carbon dioxide emissions, and lower levels of hydrocarbon and nitrogen oxide emissions.
- Ethanol production keeps American farmers in business and creates new farming and ethanol-processing jobs.
- Because ethanol is produced domestically, it reduces U.S. dependence on foreign oil and increases the nation's energy independence.
- Ethanol needs fewer fossil (coal) and petroleum (gas) fuels to produce more BTU of energy than gasoline (although it does require much more water).

Cons of ethanol-supplemented fuel:

- **Ethanol creates 34 percent less energy than unadulterated gasoline per gallon. This equals a loss in fuel economy of up to 3 miles per gallon for E10 fuels.** In terms of heat, ethanol produces 76,330 BTU per gallon, whereas diesel fuel produces 128,450 BTU per gallon, gasoline 116,090 BTU per gallon and LP gas 84,950 BTU per gallon. The fuel economy gets even worse with E85, a loss of 7 to 8 miles per gallon with its higher ethanol content. *Consumer Reports*, testing in 2006, verified a loss in fuel economy of up to 30 percent in a Chevy Tahoe designed to run on flex fuel when it was tested with both unleaded gas and E85. Poor fuel economy can also be attributed to improper fuel system calibration based on computer feedback from oxygen sensors because of the temperatures needed to burn ethanol.
- Virtually any grain considered feedstock can be used to make ethanol, but some grains are better for producing ethanol than others. Corn happens to be one of the worst grains for making ethanol but we produce so much more of it than any other grain that it was the ingredient of choice for U.S. ethanol producers. In South America, ethanol is produced from sugar cane, which is easier to refine and gives a higher yield per acre than corn (1,200 gallons per acre vs. 300 gallons per acre of corn). The U.S. government did impose a 55 cents per gallon tariff to prevent the import of sugar cane-based ethanol into the United States, though that tariff has recently expired).
- **Ethanol is hygroscopic, which means it absorbs water more easily than gasoline. That leads to water condensation inside fuel tanks, carburetor fuel bowls and fuel lines where air spaces are present. Water content in fuel will also swell up the paper filter media inside fuel filters not specifically designed for flex fuels and can thus restrict fuel flow at the filter.**
- **Ethanol also erodes fiberglass tanks, rubber hoses and plastic fuel lines. It contributes to rust in fuel systems by creating condensation in the unfilled portion of gas tanks. It will also dissolve varnish and rust in steel fuel components. These dissolved ingredients sit in the bottom of gas tanks until they are removed or they will enter the fuel system if the fuel level in the tank gets too low.**

So what is a classic car owner to do? Especially when their car is sitting unused in the garage more than it is on the road? It has been stated that you can counteract the poor fuel mileage by

driving at a consistent speed of between 40 and 60 MPH but that doesn't really apply to boats or classic cars that are parked or do not have cruise control in most cases.

Several recommendations of things you can do that should help come from OE marine manufacturers who have been battling these ethanol-related fuel problems:

- Replace any plastic or rubber fuel lines with ethanol-resistant hose or nylon tubing.
- Install a water separator filter in the fuel line leading to the carburetor. Water collects in the filter and can be removed periodically.
- Replace any fiberglass tanks with steel or aluminum.
- Ensure that any O-rings in the fuel system are also ethanol-compatible.
- Keep your tank as full as possible to prevent air space where condensation can form.
- Use specific ethanol-compatible fuel storage additives. These are normally blue in color. Regular fuel stabilizers will not work unless they are labeled ethanol fuel-compatible.
- Shop around for a marina or service station that does not pump E10 or E85. None of these stations will be affiliated with a major gasoline producer, but there are still some out there, especially in areas around lakes and rivers where boating is popular. You can find a "pure gas" map of many of these stations online at the [Historic Vehicle Association website](#)
- Vent your fuel system during storage for extended periods; the moisture your fuel system might absorb from the outside will be less than the moisture created in the air space inside.
- Use a fogging solution in your carburetor during storage to prevent condensation from collecting in fuel bowls.
- Use of isopropyl alcohol-based dry gas will help to absorb system moisture. Regular dry gas is ethanol-based and will only make the problem worse. Isopropyl-based additives actually combine with the water molecules and removing moisture through the combustion chamber.
- Use of a flex fuel-compatible fuel filter where possible will prevent degradation of the paper media in your filter by water in the fuel system.

SEMA has also made ethanol in gasoline one of its legislative priorities, opposing the pending rollout of E15 fuel. For more information on that effort, visit [SEMASAN.com](#).