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Alternative Fuel Information Series

# Alternative Fuel

# Fact Sheet



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U.S. DEPARTMENT of ENERGY  
OFFICE of ENERGY EFFICIENCY and RENEWABLE ENERGY

## Do You Own a Flexible-Fuel Vehicle?

Did you know that you might be one of the millions of Americans who are already driving cars that can run on something other than gasoline? More than 2 million of today's private- and corporate-owned vehicles are flexible-fuel vehicles (FFVs), which can run on ethanol, gasoline, or a mixture of the two. You may have bought an FFV without even realizing it!

Why find out if your vehicle is an FFV? The United States imports more than half of its oil. That threatens our domestic and energy security. As a nation, our petroleum consumption increases every year. If you drive an FFV and ethanol is available near you, you can fuel with ethanol and help reduce petroleum consumption while supporting American farmers and protecting the environment.

### What is Ethanol?

Ethanol is an alcohol-based fuel produced by fermenting and distilling crops that have been converted into simple sugars. In the United States, it's typically made from starch crops, primarily corn. It can also be made from sugar crops or from agricultural waste and "cellulosic biomass" such as trees and grasses. Ethanol is cleaner burning than gasoline because of its high oxygen content. It is a completely renewable, domestically produced, environmentally friendly fuel. It degrades quickly in water and poses much less risk to the environment than an oil or gasoline spill.

Ethanol is sold in two very different gasoline blends: E85 (formulated for FFVs), and E10 (formulated for conventional gasoline cars). E85 is 85% ethanol and 15% gasoline, while E10 is 10% ethanol and 90% gasoline. E10 accounts for more than 98% of ethanol sales in the United States, while E85 is a small but growing presence.

Ethanol is included in E10 to boost its oxygen content and to help reduce emissions of carbon monoxide. In E85, it has many other environmental benefits as well. According to the U.S. Environmental Protection Agency (EPA), compared to gasoline, E85 produces fewer total toxics and lower levels of ozone-forming volatile organic compounds. Also reduced are emissions of oxides of nitrogen and particulate matter. More information on the environmental characteristics of ethanol

and E85 is available from the EPA at [www.epa.gov/otaq/consumer/fuels/altfuels/ethanol.pdf](http://www.epa.gov/otaq/consumer/fuels/altfuels/ethanol.pdf).

### What is an FFV?

Like a conventional gasoline vehicle, an FFV has a single fuel tank, fuel system, and engine. The engine and fuel system are adapted slightly to be able to run on gasoline, E85, or any mixture of the two. (Today's light-duty FFVs generally require at least 15% gasoline in the mixture, mainly for cold start purposes.) A sensor in the system analyzes the fuel composition and adjusts the fuel injection and ignition.

### Partial List of Vehicles Capable of E85 Fueling

Make & model	Engine
Chevrolet S10 2WD pickup	2.2L
Chevrolet Silverado pickup	5.3L
Chevrolet Suburban	5.3L
Chevrolet Tahoe	5.3L
Chrysler Sebring sedan and convertible	2.7L
Chrysler Town and Country	3.3L
Chrysler (formerly Plymouth) Voyager	3.3L
Dodge Caravan	3.3L
Dodge Cargo minivan	3.3L
Dodge Grand Caravan	3.3L
Dodge Stratus	2.7L
Ford Explorer (4 door)	4.0L
Ford Explorer Sport	4.0L
Ford Explorer Sport Track	4.0L
Ford Ranger pickup (2WD and 4WD)	3.0L
Ford Ranger Supercab 2WD pickup	3.0L
Ford Taurus sedan	3.0L
Ford Taurus wagon	3.0L
GMC Sierra pickup	5.3L
GMC Sonoma 2WD pickup	2.2L
GMC Suburban	5.3L
GMC Yukon	5.3L
Isuzu Hombre 2WD pickup	2.2L
Mazda B3000 pickup	3.0L
Mercury Mountaineer	4.0L
Mercury Sable	3.0L

For full list, see [www.afdc.doe.gov](http://www.afdc.doe.gov).

## How does E85 affect vehicle performance?

The U.S. Department of Energy compared a Dodge Caravan and a Ford Taurus, both fueled with E85, to otherwise-identical gasoline models. (The test results, published in 1999, can be viewed at [www.ott.doe.gov/otu/field\\_ops/nve/pdfs/caravan.pdf](http://www.ott.doe.gov/otu/field_ops/nve/pdfs/caravan.pdf) and [www.ott.doe.gov/otu/field\\_ops/nve/pdfs/taurus.pdf](http://www.ott.doe.gov/otu/field_ops/nve/pdfs/taurus.pdf).) The Caravan and Taurus were timed from a standing stop to 60 miles per hour (mph) and from 40-60 mph. Also tested were their quarter-mile acceleration times. There were no significant acceleration differences between the two fuels.

In fuel economy testing, the E85 vehicles achieved fewer miles per gallon (mpg) than their gasoline-fueled counterparts. The Caravan got 16.4 mpg in combined city and highway driving, compared to 22.5 mpg for an otherwise-identical Caravan fueled by gasoline. Testing of the Taurus produced comparable differences between the two fuels. The Fuel Economy Guides for 2002 and 2003, published jointly by DOE and EPA, support similar fuel economy expectations for most FFVs.

Ethanol contains less energy per gallon than gasoline, which is one reason for the lower fuel economy of E85. But fuel economy is affected by a variety of factors including driving habits, weather, fuel composition at the pump, and the percentage of E85 vs. gasoline in the fuel tank.

## What are the costs of using E85?

The reduced fuel economy of E85 usually is offset in whole or in part by its lower price per gallon. Fuel suppliers receive a federal tax credit for blending E85, which helps to lower its price at the pump.

When buying a new car, you'll find that E85 fueling capability adds little or nothing to the purchase price. In some cases it is standard, or offered as a no-cost option. Automakers' costs to modify a vehicle for E85 fueling are minimal.

FFVs have been used in private and government fleets for years. The technology is proven, and the knowledge base about them is strong. Manufacturers stand behind them with standard warranties equal to those of gasoline vehicles. Dealer maintenance practices for FFVs are very similar to those followed for gasoline vehicles.

## How do I tell if my vehicle is an FFV?

For most FFV manufacturers, high-volume production began in the late 1990s. By the end of the 2002 model year, the nation's FFV population was estimated to be in excess of 2 million. As many as 750,000 new FFVs may be manufactured annually. Check the owner's manual to see if E85 fueling is available as an option in your car or truck. E85 compatibility sometimes is indicated by a sticker inside the fuel cover or a logo elsewhere on the vehicle. It may be possible to determine if your car is an FFV by checking its Vehicle Identification Number. For guidelines, consult the National Ethanol Vehicle Coalition at [www.e85fuel.com](http://www.e85fuel.com).

Each year, the Clean Cities Program posts a list of alternative fuel vehicles including FFVs. Visit [www.afdc.doe.gov/afvehicles.html](http://www.afdc.doe.gov/afvehicles.html) and click on the current model year.

FFVs from Ford Motor Company include the Taurus, Ranger, and Explorer. General Motors has offered several full-size trucks with E85 compatibility including the Chevrolet Silverado, Suburban, and Tahoe. Daimler-Chrysler expanded its FFV line-up in 2003, offering not only its popular minivans such as the Dodge Caravan, but also the Chrysler Sebring sedan and convertible. If you're considering a purchase, be sure to ask the dealer if E85 fueling is available in the vehicle.

## Is there an E85 station near me?

The ethanol production and distribution infrastructure across the nation continues to expand. As of early 2003, E85 was sold at approximately 154 stations in 22 states. You can find the nearest site with the Clean Cities Program's online station-locating tool at [www.afdc.doe.gov/refueling\\_mapsite.shtml](http://www.afdc.doe.gov/refueling_mapsite.shtml). A related site linked to the station locator will help you plot a map from point to point, either across town or across the country, showing E85 stations along the way.

## For more information...

U.S. Department of Energy  
Office of Energy Efficiency  
and Renewable Energy

Alternative Fuels Data Center  
[www.afdc.doe.gov](http://www.afdc.doe.gov)

National Alternative Fuels  
Hotline  
1-800-423-1DOE

Alternative Fuel Station  
Locator  
[www.afdc.doe.gov/refueling\\_mapsite.shtml](http://www.afdc.doe.gov/refueling_mapsite.shtml)

Clean Cities Program  
[www.cities.doe.gov](http://www.cities.doe.gov)  
1-800-CCITIES

Biofuels for Sustainable  
Transportation  
[www.ott.doe.gov/biofuels](http://www.ott.doe.gov/biofuels)

Vehicle Buyer's Guide  
[www.cities.doe.gov/vbg](http://www.cities.doe.gov/vbg)

**National Ethanol Vehicle  
Coalition**  
[www.e85fuel.com](http://www.e85fuel.com)  
1-877-485-8595

**Renewable Fuels Association**  
[www.ethanolrfa.org](http://www.ethanolrfa.org)  
1-202-289-3835

**American Coalition for  
Ethanol**  
[www.ethanol.org](http://www.ethanol.org)  
1-605-334-3381

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