ETHANOL

Ethanol is a renewable fuel made from corn and other various plant materials collectively known as "biomass." Ethanol use is widespread, and more than 98% of gasoline in the U.S. contains some ethanol. Typically E10 (10% ethanol, 90% gasoline), to oxygenate the fuel, which reduces air pollution. Ethanol is also available as E85 (or flex fuel)—a high-level ethanol blend containing 51% to 83% ethanol—for use in flexible fuel vehicles, which helps reduce emissions. E15, another blend. It is approved for use in model year 2001 and newer light-duty conventional gas vehicles.

ETHANOL BASICS:

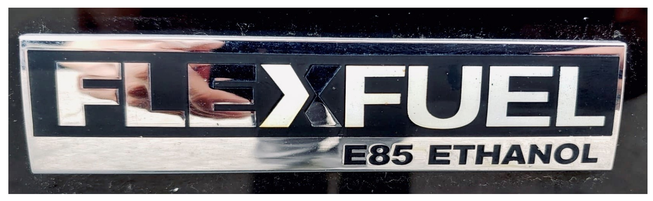
Ethanol (CH_3CH_2OH) is a clear, colorless liquid. It is also known as ethyl alcohol, grain alcohol, and EtOH. Ethanol has the same chemical formula regardless of whether it is produced from starch- or sugar-based feed stocks, such as corn grain (as it primarily is in the United States), sugar cane (as it primarily is in Brazil), or from cellulosic feed stocks (such as wood chips or crop residues).

Ethanol has a higher octane number than gasoline, providing premium blending properties. Minimum octane number requirements for gasoline prevent engine knocking and ensure drivability. Ethanol contains less energy per gallon than gasoline. Denatured ethanol (98% ethanol) contains about 30% less energy than gasoline per gallon. Ethanol's impact on fuel economy is dependent on the ethanol content in the fuel and whether an engine is optimized to run on gasoline or ethanol.

PRODUCTION:

There are several steps involved in making ethanol available as a vehicle fuel:

- Biomass feedstocks are grown, collected, and transported to an ethanol production facility
- Feedstocks are converted to ethanol at a production facility
- Then transported to a fuel terminal or end-user by rail, truck, or barge
- Ethanol is blended with gasoline at the fuel terminal to make E10, E15, or E85, and then distributed by truck to fueling stations (E15 is either sourced directly from a terminal or via a blender pump from the E10 and E85 tanks at a station)



ETHANOL BENEFITS:

Energy Security

- The United States imported 3% of the petroleum it consumed in 2019
- Ethanol is domestically produced and consumed, meaning less to import
- Reduces the impact of international supply disruptions

Fuel Economy and Performance

- A gallon of ethanol contains less energy than a gallon of gasoline, resulting in lower fuel economy when operating your vehicle
- E85 that contains 83% ethanol content has about 27% less energy per gallon than gasoline
- Higher octane number than gasoline, which provides increased power and performance
- Improves engine efficiency through the use of ethanol blends

Emissions

- No emissions are offset when these petroleum products are burned.
- Greenhouse gas (GHG) emissions are reduced on average by 34% with corn-based ethanol produced from dry mills
- GHG emissions are reduced range between 88% and 108% if cellulosic feedstocks are used depending on feedstock type, compared to gasoline and diesel

Job Impacts

- Ethanol production creates jobs in rural areas where employment opportunities are needed.

Equipment and Availability

- High and low-level blends of E10 or less require no special fueling equipment, and they can be used in any conventional gasoline vehicle
- FFVs (which can operate on E85, gasoline, or any blend of the two) are available nationwide as standard equipment with no incremental cost
- Fueling stations offering E85 (flex fuel) are located in 42 states

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