

Defining Ethanol Compatibility

Vehicle Compatibility with Ethanol

For fuel to be compatible with a vehicle, the fuel must perform its function as part of the integrated fuel-vehicle system:



No Leaks

No catastrophic fuel system leaks



No Corrosion

No corrosion/ degradation of any engine or fuel system components

MATERIAL COMPATIBILITY: The vehicle must be constructed so that the components that come in contact with ethanol are chemically compatible.



Control

Adequate control of air-fuel ratio (A/F)



Normal Drive

Easy start and smooth drive

OPERATIONAL COMPATIBILITY: The vehicle's control system must recognize the presence of ethanol in the fuel and adjust for optimal drivability and emissions.

Ethanol Use Around the World



More than **60 countries** have policies or mandates requiring ethanol blending in gasoline, although not all of these countries blend ethanol.



The most common blend is **E10** (10 vol% ethanol in gasoline), followed by E5.



The **U.S. and Brazil** have the longest history of using ethanol blends in their light-duty vehicle fleets. Both countries began using E10 in the 1970s with no reports of problems. Brazil is currently utilizing E27 and looks to move to E30 in the near future.



Flexible-fuel vehicles (FFVs) now dominate Brazil's fleet. These vehicles are capable of running on fuels ranging from E0 to E85.

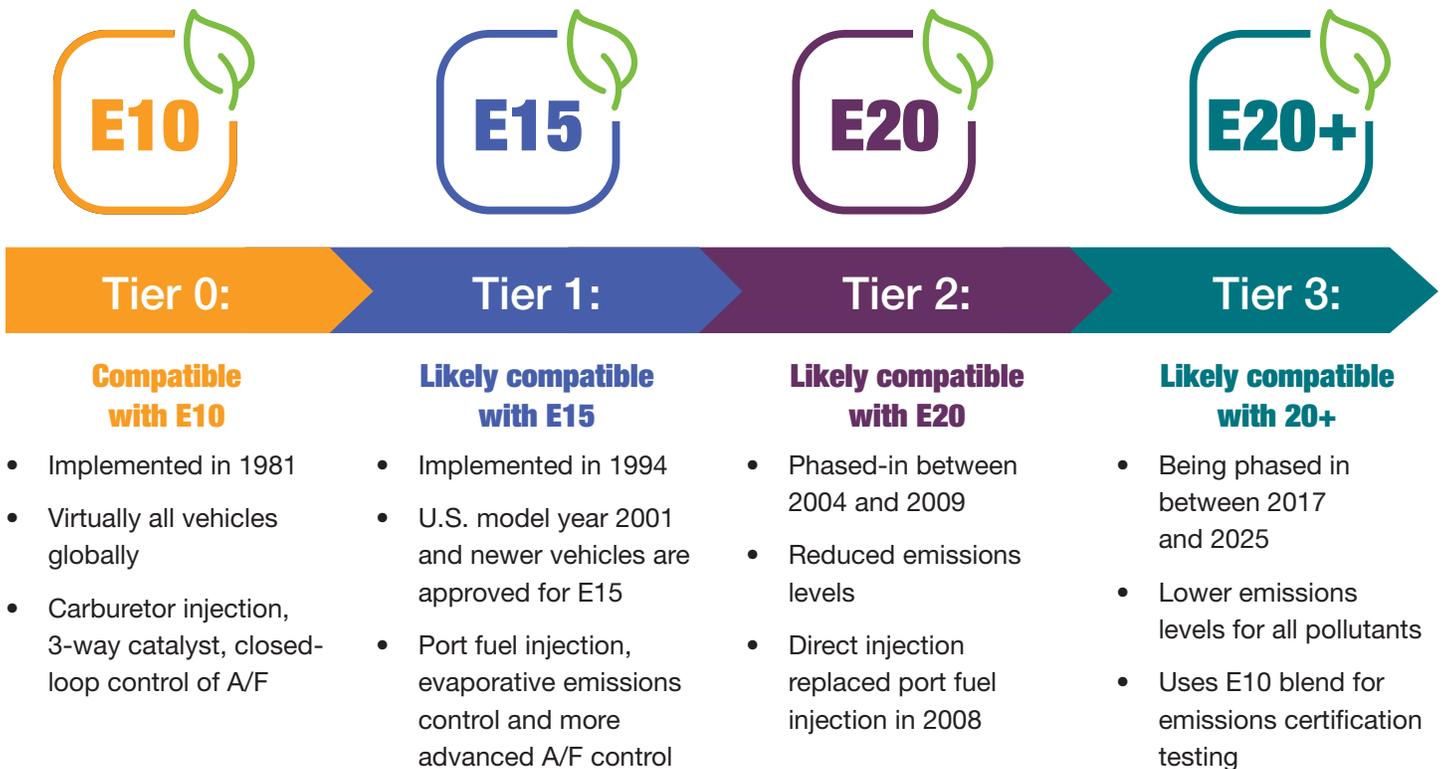


Globally, the majority of light-duty vehicles are compatible with **E10**, if made to international standards in the last 50 years.

Backed by Research

A 2021 study by the National Renewable Energy Laboratory assessed vehicle ethanol compatibility using test data, real-world experience, vehicle profiles, and emissions regulations in seven countries.

It evaluated historical emissions standards and correlated them with U.S. standards to gauge the vehicle technology level. Additional information came from car owner manuals and surveys of fuel oxygenate content. This approach led to conclusions about vehicles meeting international standards:



While Tier 2 and higher vehicles are compatible with E20, there is little real-world experience with E20+ outside of Brazil. However, the analysis of the make-up of the light-duty vehicle fleets in the seven countries studied (Canada, China, India, Indonesia, Japan, Mexico, and South Korea) did not identify any specific engine or vehicle designs or engineering practices that could cause issues when operating with ethanol.

Get Support

Reach out to the U.S. Grains & BioProducts Council's D.C. Team for assistance in evaluating the compatibility of a specific country's vehicle fleet with E15 and higher blends.