

Summary of Supporting Research

- [Effects of Intermediate Ethanol Blends on Legacy Vehicles and Small Non-Road Engines, Report 1](#), prepared by Oak Ridge National Laboratory for the U.S. Department of Energy (October 2008) (peer-reviewed study regarding the effects of E-15 and E-20 on motor vehicles and small non-road engines concludes that when E-15 and E-20 were compared to traditional gasoline, there are no significant changes in vehicle tailpipe emissions, vehicle driveability, or small non-road engine emissions as ethanol content increased);
- [Optimal Ethanol Blend-Level Investigation, Final Report](#), prepared by Energy & Environmental Research Center and Minnesota Center for Automotive Research for American Coalition for Ethanol (October 2007) (report studied the effects of ethanol blends ranging from E-10 to E-85 on motor vehicles and found that exhaust emissions levels for all vehicles at all levels of ethanol blend were within the applicable Clean Air Act standards);
- [The Feasibility of 20 Percent Ethanol Blends by Volume as a Motor Fuel, Results of Materials Compatibility and Driveability Testing](#), prepared by the State of Minnesota and the Renewable Fuels Association (March 2008):
 - a. *The Effects of E20 on Metals Used in Automotive Fuel System Components* (study compared the effects of E-0, E-10 and E-20 on nineteen metals and found that the metals tested were compatible with all three fuels);
 - b. *The Effects of E20 on Elastomers Used in Automotive Fuel System Components* (study compared the effects of E-0, E-10 and E-20 on eight elastomers and found that E-20 caused no greater change in properties than E-0 or E-10);
 - c. *The Effects of E20 on Plastic Automotive System Components* (study compared the effects of E-0, E-10 and E-20 on eight plastics and found that there was no significant difference in the properties of the samples exposed to E-20 and E-10);
 - d. *The Effects of E20 on Automotive Fuel Pumps and Sending Units* (study compared the effects of E-0, E-10 and E-20 on the performance of twenty-four fuel pumps and nine sending units and found that E-20 has similar effect as E-10 and E-0 on fuel pumps and sending units);
 - e. *Demonstration and Driveability Project to Determine the Feasibility of Using E20 as a Motor Fuel* (study tested forty pairs of vehicles on E-0 and E-20 and found no driveability or operational issues with either fuel)
- [Fuel Permeation from Automotive Systems: E-0, E-6, E-10, E-20 and E-85, prepared by the Coordinating Research Council, Inc.](#) (CRC Report No. E-65-3) (December 2006) (study evaluated effects of E-0, E-6, E-20 and E-85 on the evaporative emissions rates from permeation in five newer California vehicles and found that there was no statistically significant increase in diurnal permeation rates between E-6 and E-20);
- *Report to the US Senate on E-20 Ethanol Research*, prepared by the Rochester Institute of Technology (October 2008) (study evaluated effects of E-20 on ten legacy vehicles; initial results after 75,000 collective miles driven found no fuel-related failures or significant vehicle problems and documented reductions in regulated tailpipe emissions when using E-20 compared to E-0);
- [Use of Mid-Range Ethanol/Gasoline Blends in Unmodified Passenger Cars and Light Duty Trucks](#), prepared by Minnesota Center for Automotive Research (July 1999) (one-year study evaluated the effects of E-10 and E-30 in fifteen older vehicles in “real world” driving conditions; found no effect on driveability or component compatibility from either fuel and found that regulated exhaust emissions from both fuels were well below federal standards);
- [Blending of Ethanol in Gasoline for Spark Ignition Engines: Problem Inventory and Evaporative Measurements](#), prepared by Stockholm University et. al., (2004-05) (study tested and compared

evaporative emissions from E-0, E-5, E-10, and E-15 and found lower total hydrocarbon emissions and lower evaporative emissions from E-15 than from E-10 and E-5).