

Could a Diesel Engine Run on Gasoline?

Running a vehicle with a diesel engine has definite advantages: diesel engines have a longer lifespan, they have high power density, and they are more efficient than regular spark ignition gasoline engines. However, they produce high levels of PM (particulate matter) and NO_x emissions.

The Challenge

To make a regular diesel engine operate on gasoline without generating high levels of PM and NO_x emissions.

The Solution

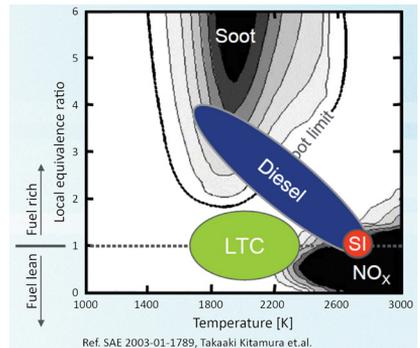
Using residue fuels (crude gasolines with low cetane numbers), Argonne is mixing and measuring fuel chemistry and using fluid dynamics modeling to determine the ideal fuel injection and fuel/air mixture strategies for engine use.

The Results

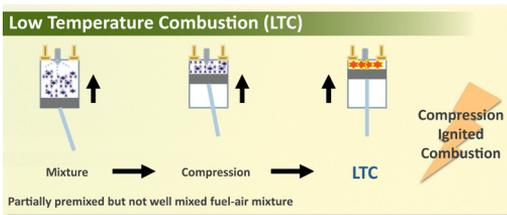
Work to date has shown significant reductions in PM and NO_x emissions. Engine efficiencies have also remained high: close to diesel efficiency, and roughly double that of spark-ignited (regular automotive engine) gasoline at low speeds and loads.



Steve Ciatti tests a diesel engine running on gasoline.



Low-temperature combustion of low-octane gasoline in a diesel engine avoids both soot and NO_x by controlling fuel/air mixing (equivalence ratio) and by slowing down the rates of reaction (peak combustion temperature).



The diesel engine employs a low-temperature combustion process.

“Equipping cars with diesel engines that run on regular gasoline would not only make a more efficient vehicle with a longer lifespan, but it would also reduce emissions and contribute to a greener environment,” says Steve Ciatti, principal mechanical engineer for the project.