

A Study of Gasoline-Alcohol Blended Fuels in a Turbocharged DISI Engine

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Abstract

The work was concerned with the use of gasoline–alcohol blended fuel in downsized, turbocharged, direct injection engines. A number of gasolines blended with ethanol or butanol have been considered in concentrations ranging from 10 % to 85 %. Novel data consisting of imaging studies from an optically-accessible single cylinder engine, as well as combustion and emissions data from a multi-cylinder engine running on several gasoline-alcohol blends is presented. The main objective of the work was to determine the effect of different alcohols and alcohol concentrations on the formation of the direct injected fuel spray and on the combustion within such engines. The performance of alcohol blended fuel was compared against three commercial grades of gasoline. Drive cycle simulation was used to determine the level of downsizing required to recover the loss in mileage due to the deficit in calorific value of the fuels, and a discussion of the synergies and challenges of combining alcoholblended fuels with forthcoming engine technologies is provided.