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IS THE ETHANOL ADDITIVE MORE ENVIRONMENTALLY FRIENDLY FOR AN SI ENGINE OR FOR A CI ENGINE?

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Abstract

Clearly, the purpose of this paper is to find an answer to the question "Is the ethanol additive more environmentally friendly for an SI engine or for a CI engine?". The tests, therefore, were performed in both an SI and a CI engine for the same parameters under the same conditions and laboratory. Ethanol was blended into neat diesel (D100) and gasoline (G100) at the same proportion (10 vol. %) and two blends were prepared, namely D90E10 and G90E10 fuel types, respectively. Then, the tests in this study were conducted at various engine speeds (1750, 2250, 2750 and 3250 rpm). In the achieved experimental results, the most reductions among emissions, compared to reference-D100 and reference-G100 fuel type, were achieved by HC and CO emissions with the additive of ethanol. In SI engine, HC and CO emissions were reduced at the rate of 47.9% and 47.0% respectively; on the other hand, in CI engine, these emissions were reduced 28.5% and 25.1%, respectively. A sharp result from this paper is that NOx emission was slightly reduced (2.3%) for DI engine with the addition of ethanol, whilst an increase of approximately 40% for the CI engine. This study showed that the addition of ethanol can be used in both SI and CI engines and can result in significant reductions in exhaust emissions. In conclusion, this paper distinctly reports that the presence of ethanol into diesel fuel converted into a more environmentally friendly fuel type than the presence of ethanol into gasoline fuel.

Key words: diesel, ethanol, emission, gasoline, greenhouse gas, pollutant

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