Review Article

AN OVERVIEW OF THE EFFECT OF OXYGENATED AGENTS ON THE PERFORMANCE AND EMISSION OF IC ENGINES

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ABSTRACT

IC Engines have good fuel efficiency, high power output, good thermal efficiency, but generate undesirable emissions during the combustion process. Currently many techniques are available for improving the combustion processes of Diesel engines like fuel engine retarding, exhaust gas recirculation, high pressure injection and air intake supercharging. From the study of previously published articles, the addition of oxygenated agents with the fuel is the best suitable one for reducing the above said pollutants. This paper describes a detailed overview on the effect of the addition of oxygenated agents with the fuel in IC engines. From the study of previously published articles, the addition of oxygenated agents is an effective approach for reducing CO, NOx and HC emissions.

Keywords: oxygenating agent, IC engine, Emission, CO, NOx and HC

INTRODUCTION

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OXYGENATED AGENTS

Oxygenated agent is nothing more than fuel that has a chemical compound containing oxygen. It is used to help fuel burn more efficiently and cut down on some types of atmospheric pollution. Most of the cases, it is used to reducing the smog problem and carbon monoxide emissions. Oxygenated agent works by allowing the gasoline in vehicles to burn more completely. In addition to being complete burning, oxygenated agent also helps to cut down the amount of non-renewable fossil fuels consumed. Dimethyl carbonate (DMC), having the oxygen content is up to 53.3 wt%. So it is usually used as an oxygenated agent to blend with diesel fuel to improve combustion and reduce emissions of diesel engines. However, the low heating value and the boiling point of DMC results, the low heating value of EGM is higher than that of DMC and the boiling point of EGM is near to that of diesel (180-360°C). Therefore, it can enhance the properties of diesel engines that DMC in blends is partially replaced by EGM.

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Engine Performance

From the previously published articles, as the blends containing DMC and EGM decrease, the engine power outputs are reduced. The thermal efficiency increases when fuel with DMCEGM diesel blends.

Emission

Smoke emission

It is very effective to reduce exhaust smoke by adding oxygenated agents in diesel according to the previously published articles. Figure 2 shows that the smoke emission can be reduced with the addition of DMC and EGM to diesel.
As per the previously published articles, the addition of DMC and EGM in diesel has little effects on the NOx emission. For high loads, NOx emissions increase little as shown in Figure 3.

Generally, CO emissions will increase suddenly when diesel engines are run under very high load conditions. The previously published articles clear that the CO emissions can be reduced significantly by using DMC-EGM-diesel blends, especially at higher loads. Figure 4 shows the CO emission characteristics of various fuels used.

The HC emissions decrease notably, when using DMC and EGM in blends increases as shown in figure 5.

From the available oxygenated agents, DMC and EGM have added oxygen content compared to diesel. The addition of the above said oxygenated agents to diesel notably enhances the physicochemical properties. The above results declare the prospective of the DMC-EGM-diesel blends for complete combustion in diesel engine. So, if the above said agents are added in diesel at right quantity it will enhance the engine performance and emission characteristics. If the quantity of the above said agents is high, then engine performance declines as the agents have lesser calorific value compared to diesel.

REFERENCES


