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THE IMPACT OF RME-BASED BIODIESEL BLENDS ON DIESEL LIGHT-DUTY ENGINE EXHAUST EMISSION AND PERFORMANCE

Bielaczyc Piotr, Szczotka Andrzej

Bosmal Automotive R&D Centre, 43-300 Bielsko-Biala, Sarni Stok 93, Poland

KEYWORDS

Biodiesel, engine, exhaust emission, performance, RME, vehicle

ABSTRACT

There is a growing interest to use biofuels (biodiesel and gasoline-alcohol blends) in European Union countries according to Directive 2003/30/EC requirements and due to necessary reduction of CO₂ anthropogenic emissions. European Commission has accepted the target of 20% replacement of conventional fuels by alternative fuels (biofuels, CNG and hydrogen) in road transportation sector by 2020.

The paper evaluates the possibility of using the different biodiesel blends (mixture of diesel fuel and Fatty Acid Methyl Esters) in modern Euro 4/ Euro 5 direct-injection, common-rail, turbocharged, light-duty diesel engines. Influence of different quantity of RME in biodiesel blends (B5, B20, B30, B50) on the emission measurement of gaseous pollutants, such as: carbon monoxide (CO), hydrocarbons (HC), oxides of nitrogen (NO_x), carbon dioxide (CO₂) and particulate matter (PM) for light-duty-vehicle (LDV) during NEDC cycle on the chassis dynamometer as well as engine performance and reliability in engine dyno tests were analysed. All test results have been presented in comparison to standard diesel fuel.

The performed measurements and analysis show capability of modern light-duty European diesel engines of fuelling with low and medium percentage of RME in biodiesel fuel without bigger problems. Engine performance and exhaust emissions are affected by the proportion of RME in biodiesel due to different chemical and physical properties of fuel blends.

The tests subject to analyses presented above have been performed in the Engine Research Department of the BOSMAL Automotive Research and Development Centre in Bielsko-Biala, Poland within the test program evaluating the biofuel influence on light-duty diesel engines for passenger cars and light-commercial vehicles.