

## **THE EFFECT OF BIODIESEL BLENDS WITH DIFFERING RME CONTENT ON EXHAUST EMISSIONS FROM A LIGHT DUTY VEHICLE WITH DIESEL ENGINE COMPARED TO STANDARD DIESEL FUEL AND PURE RME**

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### ABSTRACT

The use of biofuels (biodiesel and gasoline-alcohol blends) as a fuel for vehicle powertrains has grown in recent years in European Union countries, the United States, Japan, India, Brazil and many other countries, due to finite fossil fuel resources and the necessity of a reduction in anthropogenic CO<sub>2</sub> emissions. European car manufacturers have approved up to 5 per cent biodiesel content in diesel fuel (B5 biodiesel blend) which meets European fuel standards EN 14214 and EN 590. The European Union has approved the sale of diesel fuel with higher fatty acid methyl ester (FAME) content. The research goal is to achieve higher biodiesel content in diesel fuels – B10 and B20 – without resorting to larger diesel engines and fuel feed system modernisation.

This paper evaluates the feasibility of using different proportions of FAME in biodiesel blends (a mixture of diesel fuel and Fatty Acid Methyl Esters) in modern Euro 4/Euro 5 direct-injection, common-rail, turbocharged, light-duty diesel engines. The influence of different RME biodiesel blends (B5, B20, B30, B50 and B100) on emissions of gaseous pollutants, such as: carbon monoxide (CO), hydrocarbons (HC), oxides of nitrogen (NO<sub>x</sub>), carbon dioxide (CO<sub>2</sub>) and particulate matter (PM) for a light-duty vehicle (LDV) during the NEDC cycle was analysed on a chassis dynamometer. All test results are presented in comparison to standard diesel fuel with 5% RME content.

The measurements and analyses performed show that exhaust emissions are affected by the proportion of RME in biodiesel, due to the differing physical and chemical properties of different fuel blends.

The tests subject to the analyses presented in this paper were performed in the Engine Research Department of the BOSMAL Automotive Research and Development Centre in Bielsko-Biala, Poland within a test programme evaluating biofuels' influence on light-duty diesel engines in passenger cars and light-commercial vehicles. This is the continuation of previous research.