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ARGUMENTATION OF BIOFUEL COMPOSITION FOR COMPRESSION IGNITION ENGINES THROUGH TRIBOLOGICAL STUDIES

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The purpose of this paper is to experimentally argue the composition of the biodiesel-diesel mixed biofuel for fueling compression ignition engines based on tribological research. That is why diesel (control) and experimental biofuels - pure biodiesel B100 and the mixture B20 (20% vol. biodiesel-80% vol. diesel) served as *the object of the experimental research*.

The tribological researches were carried out in the specialized laboratory of the Technical University of Moldova on the MVPD-1KPI installation, which allowed the modeling of the real operating conditions of the cylinder liner-piston segment coupling by performing alternating rectilinear movements.

The results of our research confirm that the average values of the coefficient of friction ***f***, in the case of using biofuels B20, B100 as the lubricating material, are higher in relation to diesel (***f***=0,03584): by 15,6% (***f***=0,04244) for B20 and by 23,3% (***f***=0,04675) for B100, respectively.

The dynamics of wear ***U*** of the elements of the tribological coupling demonstrates that the value of the wear of the body - the chrome surface, in the diesel environment was 0,6 mg, in the biofuel mixture B20 the wear increased by 0,1 mg in relation to the value of the wear in the diesel environment (i.e. by 14,3%). Increasing the concentration of biodiesel up to 100% (biofuel B100) has as a consequence the decrease of ***U*** wear by 14,3% (ΔU= 0,1 mg) compared to B20 and equal to the wear value in the diesel environment.

Another is the situation with the wear dynamics of the GCI (gray cast iron) counterbody. The obtained results demonstrate that, in the case of using biofuels B20 and B100 for surface lubrication, the *U* wear value of the GCI counterbody decreased by 48,4% and 45,2%, respectively, in relation to the wear value of the diesel lubricated counterbody

Therefore, the results of tribological research indicate that pure B100 biodiesel and biodiesel-diesel blends can ensure the reliable and durable operation of one of the most important joints of the compression ignition engine: the cylinder liner-piston ring. The results of bench research and tests in the exploitation conditions of DC4 11,0/12,5 compression ignition engines (compression ratio ε=16), fed with B20 biofuel, confirmed the veracity of the results obtained in the tribological research.

Keywords: biodiesel, coefficient, Diesel engine, friction, mixture, tribological coupling, wear.