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INFLUENCE OF DIESEL BIOFUELS ON ENGINE OILS DETERIORATION – EXTENDED METHODS OF ENGINE OILS ASSESSMENT

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ABSTRACT

Increasing Diesel biofuels usage have an impact on engine oil durability taking into account not always beneficial interactions between the two types of products. The paper describes significant problems related to influence of Diesel biofuels on engine oils deterioration demonstrated by monitoring the engine oil aging during its operation in heavy duty (HD) and modern high speed direct injection (HSDI) light duty (LD) engine through the use of bench tests. Have been presented selected set results of Diesel engine simulating test bench experiments and chemical analysis, aiming to study of engine oils deterioration process course correlation with the level of bio-components contents in Diesel fuel. Subject to the tests were both mineral and synthetic engine oils different as well base oil as packages of improved additives which were blended to base oil and also lubricating viscosity range. Hitherto existing study points to varied, very complicated physical-chemical processes proceeds between modern engine oils and biofuels. In this case, assessment of oil performance loss, only on the base of change of its standard physical-chemical properties is not sufficient. So, essential is search additional evaluation test methods. In our study, to determine when and how the engine lubricants properties have been depleted, taking advantage of standard oil analysis as well as in house innovative method, made extensive analysis of engine lubricants oxidation stability tests, thin lubricant film oxidation tests and bulk lubricant oxidation tests. Searching for a more suitable method a new means of thin lubricant film oxidation monitoring was proposed based on the modified ASTM D 4742 procedure. Utilization of this innovative research approach permitted more precisely and univocally point out oil degradation processes. We can state that this proposed method of oil oxidation monitoring is of practical value. On the basis of the obtained results we can state that kind of base oil, contained in engine oils additives components and RME as well engine design and its operating conditions are very essential factors influencing for engine oil performance. It follows from our experiments that the presence of bio-components in the fuel has significant impact for multidirectional hastening of engine oil destruction processes. In this case for intensity of processes proceeds in an engine oil, adversely influences limited possibilities of bio-components evaporation from engine oil and initiation of accelerated, deeper engine oil degradation.