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THE ROLE OF MODTC TRIBOCHEMISTRY IN ENGINE TRIBOLOGY PERFORMANCE. A RAMAN MICROSCOPY INVESTIGATION.

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ABSTRACT

In order to tackle the new challenges towards the reduction of carbon emissions in transport industry, the present work aims to understand the effect of the friction modifier (FM) molybdenum dithiocarbamate (MoDTC)[1] on the performance of an automobile engine[2].

In particular, a petrol engine has undergone trials in a motored test, measuring the friction torque drop as a function of the engine speed when the FM additive is used in a fully formulated API group III oil. Moreover, the engine has been dismantled after the test, checking the tribochemistry of MoDTC at different key engine components undergoing boundary or mixed lubrication, such as valve train parts, piston assembly and liner, connecting rod and engine auxiliary systems, using Raman microscopy and comparing the analysis

results with literature on tribological bench tests [3].

This work demonstrates that the working conditions, the materials selection and the surface topography plays a crucial role in MoDTC tribochemistry to form a low friction tribofilm, contributing to a global engine friction reduction and fuel economy.

Fig.1 Raman spectra of cylinder liner at different stroke points

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