

## INFLUENCE OF TRIBOFILM FORMATION IN DLC-STEEL LINE CONTACTS ON FRICTION

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### KEYWORDS

*DLC; tribofilms; friction; lubrication; efficiency*

### ABSTRACT

Diamond like carbon (DLC) coatings have proven to be a valuable asset for the automotive industry in order to continuously improve the performance of machine elements throughout the last decade [1]. However, detailed understanding for interactions of conventional engine oils, which originally have been formulated for applications in steel-steel contacts, regarding the build-up of tribofilms with DLC is still lacking [2]. In the present study *Stribeck* experiments are conducted with a novel block on ring (BOR) configuration developed for a high speed rotational tribometer under different temperatures. Results reveal, that the amount of formed tribofilms can be linked directly to changes of the boundary friction coefficient (COF). Furthermore, tribofilms can trigger topological surface adaptations, leading to a different frictional behaviour in the fluid friction regime as well. Optical, energy dispersive X-ray (EDX) and thermoelastohydrodynamic (TEHD) numerical analysis are carried out in order to gain a holistic understanding of phenomena taking place in steel-DLC tribosystems operated with conventional engine oil. Findings

indicate, that anticipated positive effects of DLC coatings are suppressed due to these films under certain conditions.

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