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A new tribometer to measure wear and low-friction of high velocity sliding electrical contacts immersed in organic liquids.

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The aim of this paper is to describe a new tribometer which has been designed in our laboratory to study the wear of brush/commutator contacts used in electrical DC motor for automotive fuel pumps. Because of the fuel pumps design, the frictional carbon-brushes/commutator contacts carrying electrical current between static and rotating parts of the motor are totally immersed into fuel. Since several years, the miniaturization of fuel pumps affects brushes and commutator tribological conditions leading to higher sliding velocities and smaller brushes dimensions... Moreover, the increasing use of biofuel in engines leads to change the chemical environment surrounding the contact and the durability of the system. Because of these novelties, the understanding of wear mechanisms involved becomes vital to reduce brush and commutator wear rate by changing materials composition. Despite the fact that friction and wear of electrical brushes has been intensively studied, test benches are usually operating in air, and simultaneous measurements of friction coefficient, electrical contact resistance and wear of brushes and commutators into fuels and biofuels have not yet been done. The tribometer described in this paper permits those measurements with a good accuracy. After describing the apparatus characteristics and performances, some electro-frictional test results are given.

Key words:

Tribometer ; friction ; wear ; carbon-brushes ; fuel.