

A test procedure to investigate lubricant-surface combinations for high-performance racing transmissions

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The high performance automotive transmission is a refined subsystem capable of transmitting high power and torque. During the past century significant improvements in efficiency and reliability have been achieved. The lubricant-surface system still however provides an area with significant potential improvement. The extreme operating conditions determine that the lubricant which services the mixed thermo-elastohydrodynamic conjunction operates at the limit of its capability. Failure of the diminished bulk lubricant film gives ever greater importance to the surface active lubricant additives. The synergy of the mechanical components and lubricant determines an optimal system which can only be achieved if the pair is developed in tandem. This study will focus on developing understanding through representative tribometry, surface chemistry analysis and atomic force microscopy. This forms the basis for a detailed test protocol to study the salient parameters affecting the system. The aim is to use this procedure to benchmark lubricant additive packages and surface combinations for improvements in operational stability and efficiency.