

## FRICITION IN HIGH PERFORMANCE ENGINE

**M. Spuria**

marcospuria@gmail.com

Internal Combustion Engine Engineer

Modena, 41126, Italy

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### ABSTRACT

Since many years there is a continuous trend in engine development for increasing the overall efficiency. This trend is not only limited to passengers cars: also for High Performance Racing Engines, the aim is transferring the biggest amount of energy from fuel to the tyres (and Energy Storage).

To reinforce this statement, it's sufficient to highlight that the regulation of some racing series have dramatically developed to provide a somehow "green" appearance. An example of that is Formula 1, where maximum instantaneous fuel flow rate and total amount of fuel during one race are both limited by regulation.

Power Unit architecture seems also being regulated in order to openly request to Constructors maximizing the amount of

energy extracted from the limited available fuel quantity (energy recovery from braking, from exhausts gases,...). This turns again into the need for researching maximum mechanical efficiency.

Lubricant rheology, different friction mechanisms depending on the specific location where energy loss happens into the engine, ... are all items which must be carefully considered together, since no single-part optimization is really possible but a more harmonious work is needed.

In this work, some considerations are done about possible ways of reducing friction losses. After a first review of existing literature, some additional thoughts will follow by considering the actual case of high performance engine.