CARBON SERIES TEST DATA

A critical aspect of any high performance racing oil is *coefficient of friction* between internal engine component surfaces. By reducing surface friction it is widely accepted that an increase in usable power is realised.

Furthermore, it is possible in most cases, to move to a lower SAE grade than would normally be employed; thus releasing even more engine power without the associated increase in component wear.

We selected a laboratory instrument which has the ability to very accurately measure friction coefficient with varying load and temperature, between two steel components.

The test conditions were designed to reflect that of a high performance (racing) engine environment. They were as follows:

Load	50 N
Temperature	150°C
Duration	2 Hours
Stroke	1mm
Frequency	50 Hz

The temperature was selected because it reflects common surface temperatures within racing engines.

To obtain a baseline we ran some 'conventional' racing oils of the viscosity (SAE 10W-50) we intended to perform initial development work on.

The resulting coefficient of friction of these products was in the region of **0.120** (no unit of measure).

We then ran a market leading competitor's 'Nano Technology' 10W-50 racing oil.
This oil contains very high concentrations of Molybdenum (Mo) and Tungsten (W).

The resulting coefficient of friction was, as expected, much lower at around **0.070.**

Something we didn't expect was the very erratic coefficient of friction, with friction increasing and decreasing significantly throughout the test duration.

Another area of slight concern with the very high friction modifier loading was how it would impact other important aspects of the lubricant performance, such as oxidation stability.

We decided to run RPVOT as an accelerated measure of oxidation stability with the following result:

149 minutes

We then ran our new CARBON 10W-50 which incorporates a proprietary friction modification / reduction additive technology at less than 50% of the treat rate of the competitor racing oil friction modifier content. (The idea being that we hope to achieve superior coefficient of friction without the negative impact in other areas of performance)

The coefficient of friction was **0.045** which is over 36% lower than the 'Nano Technology' competitor racing oil.

The other important aspect is that the coefficient of friction of this product is very consistent and stable throughout the test unlike the competitor product.

The RPVOT oxidation test result was **310** minutes, an advantage of 108% over the competitor product.

Allied to *Coefficient of Friction*, we investigated *wear scar diameter and area* generated during testing. As expected, *wear is directly proportional to coefficient of friction* in this test.

Results:

Product	**Wear Scar Diameter**	**Wear Scar Area**
'Conventional' 10W-50	0.372mm	0.109mm²
'Nano Technology' 10W-50	0.334mm	0.088mm²
CARBON 10W-50	0.280mm	0.062mm²

CARBON 10W-50 produces a wear scar diameter 24% lower than a 'conventional' racing oil, and over 15% lower than a market leading 'nano technology' racing oil of the same viscosity.

Wear scar area is even more impressive as the overall wear area of CARBON 10W-50 is 43% lower than the 'conventional' product and over 29% lower than the 'nano technology' product.