

# Race-Tec Motorsport

## Upright / Hub Seal Technology

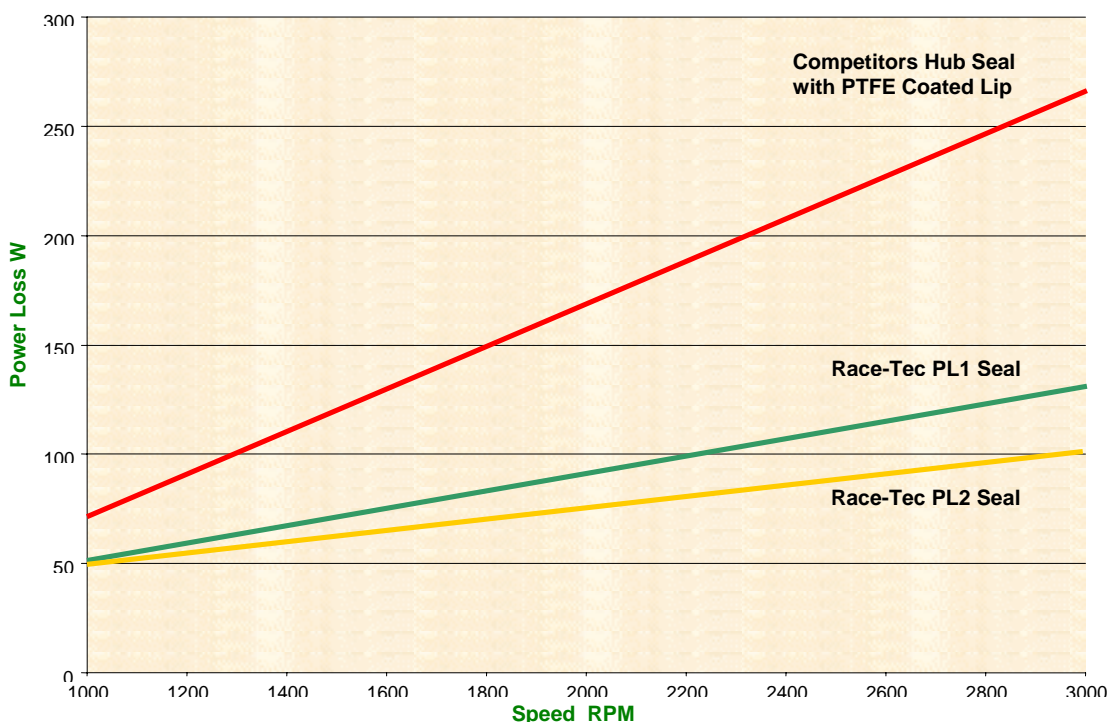
- Low friction
- Ultra Narrow construction
- Spring-loaded Ptfе Lip
- Multiple Lip Designs
- Suitable for soft shaft materials



Race-Tec NAK introduced the low friction, compact PL1 Seals into Formula 1 in 1992 , rapidly becoming the “state-of-the-art” and enabling space & weight savings to be achieved in the uprights. The wide range of designs & technologies make the Race-Tec seals suitable for use with all fabricated upright assemblies and wheel hub components in current season & historic race car applications. The PL1 Seal compact seal range includes VM-PL, VC-PL types and the latest dual lip PL2 Seals.

Race-Tec PL2 Seals are used mainly in F1, Touring Car, GT & Sportscar applications. Featuring two sealing lips, a spring-loaded lip in PTFE and a secondary elastomer lip for optimum performance, they are custom designed to run on soft shaft materials. These are just a small part of this evolving family of high performance seals.

**Friction Test Comparisons**



**Race-Tec Motorsport** race proven custom sealing

Ref.	PDS001
Iss	C
Date	16/03/2006

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## Performance Features

### Materials

The elastomer selected may be any of the common compounds, Nitrile (NBR), Hydrogenated Nitrile (HNBR), Fluoroelastomers (FKM).

The PTFE grade selected may be basic “virgin” PTFE through a range of filled and special grades, which are designed and selected according to the application requirements.

### Technical Features

Ultra-narrow PL1 Seals (VM-PL and VC-PL seals) are 2.7 to 3.2mm wide, and enable the upright design to be reduced in the quest for performance. VC-PL seals feature moulded rubber O/D profiles to give a “soft” fit, while VM-PL series seals have precision-machined cases in Steel, Aluminium Alloy, Titanium, etc to match the thermal expansion properties of the mating upright housings.

The PL2 Seal lip technology may be applied to either VM-PL2 or VC-PL2 style seals with an overall width of typically 3.5mm and have been used in bore diameters upto 130.0 so far.

Developments of the PL2 Seal for severe external environments such as in WRC have been introduced during 2004 and bring together the ultra-low friction performance of the compact F1 / GT car hub seals with additional external protection features.



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Other new PL seal technologies for Hub applications include :-

### PL 3 Seals

These are PL Seals to standard design parameters in which the parameters of the seal lip(s) are adjusted to give optimum racing performance. This is a convenient means of producing "Qualifying Seals".

### PL4 Seals

In the quest to reduce wear on soft shaft materials such as Aluminium Alloy the PL4 Seal was developed with a unique lip design. This has given customers >75% reduction in wear and >50% reduction in friction compared to the original seals and has vastly out-performed any other Ptfе seal in these applications.

### PL5 Seals

The introduction of Ceramic angular contact bearings into F1 and LMES cars in recent years saw the introduction of precision, miniature-section, integral sealing devices housed within the bearings. For these and all other integrally-sealed hub bearing applications Race-Tec have introduced new and unique seal designs which can give upto 90% savings in friction compared to the OEM fitted seals and can be retrospectively fitted to the bearings.

### PL6 Seals

For higher speed hub rotation on non-driven hubs, the PL6 Seal (springless seal) overcomes any CF effects and provides a stable & effective sealing solution for difficult application conditions.

### PL7 Seals

The duplex-lipped PL7 Seal has Ptfе on both contacting lips. These can bring a number of benefits such as lower friction and can be flexibly mounted to accept very high levels of eccentricity and dynamic shaft run-out.

### Seals for Historic Race Cars

Many of the older F1 cars in TGP & EuroBoss, etc and other vintage and historic race cars suffer from the lack of availability of the original seals in many oof the applications. Race-Tec NAK provide a unique service to these customers to design & manufacture alternative but effective seals to suit these applications.

## Applications

Race-Tec NAK seals are used in all forms of top motorsport i.e. F1, F3000, F3, Nascar, Champ Car, IRL, BTCC, WTCC, DTM, LMES, ALMS, LMP675/900, GT, Sportcars, WRC, GP1, GP3, GP500, Karting, etc, where the seal is custom designed to meet the performance demands of the application, whether it be ultra-low friction qualifying, low friction dirt exclusion, etc.

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