

# Fast Racing Fuels

Automotive Performance Racing Fuel

[www.fastracingfuels.co.za](http://www.fastracingfuels.co.za)

**FAST**  
RACING FUELS™

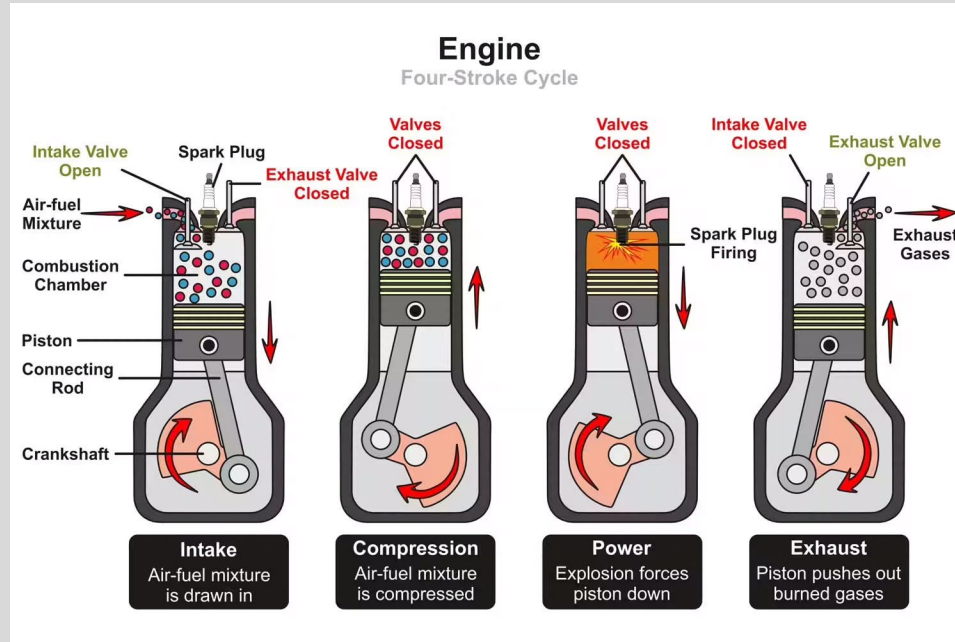


## Discussion Topics

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- Product Description
- Product Attributes & Performance Features
- Recommended Package Treat Rates
- Application Benefits
- Performance Data
- No Harms Tests
- Typical Properties
- Product Handling
- Summary

# Typical Petrol Engine Arrangement



Search for products



R 0.00 (0)

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Title: A-Z

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## FILTER BY DEPARTMENT

- ADDITIVES DIESEL (3)
- ADDITIVES UNLEADED (2)
- ETHANOL PACKED (27)
- METHANOL RACE FUEL (10)
- OCTANE BOOSTERS (2)
- UNLEADED FLEX FUELS (19)
- UNLEADED FUEL PACKED (26)

FILTER BY PRICE R0.00 - R36000.00



MOTORSPORT 102 UNLEADED IN 200L - DURBAN

Code: 5007

R 8470.00



MOTORSPORT 102 UNLEADED IN 200L - GAUTENG

Code: 5017

R 8300.00



MOTORSPORT 102 UNLEADED IN 200L - CAPETOWN

Code: 5032

R 8300.00



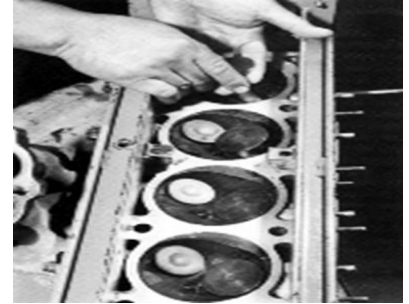
# Unleaded Petrol Engine Fuel System **Problem Areas**



Injector Deposits



Intake Valve  
Deposits



Combustion  
Chamber Deposits

A person wearing a blue racing helmet and a black racing suit with red accents and an Audi logo is pushing a large orange fuel barrel on a hand truck. The person is standing in front of a white race truck with the number '23' visible. The background shows a modern building with large glass windows. The image is framed by a large red diagonal shape on the left and right sides.

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# What makes us ?

Our automotive racing fuel range is designed to provide consistent and reliable performance, allowing drivers to push their engines to the limit without worrying about fuel-related issues. Overall, it is a top-quality fuel range that delivers the performance and reliability that serious racers demand.

**FAST**  
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## Product Description

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- Fast Racing Fuel products are designed to enhance the performance of Petrol engines. It is effective in all types of fuel injection systems.
- “FAST” products contain the following components:
  - **Polymeric dispersant**
  - **Synthetic carrier fluid**
  - **Corrosion Inhibitor**
  - **Friction Modifier**
  - **Aromatic Solvent**
- “FAST” products contain a performance additive detergent package designed for both retail and aftermarket applications.

## Product Attributes & Performance Features

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- Fast Racing Fuel products are non-metallic and does not contain phosphorus.
- At the recommended treat rates, it offers the following performance features:
  - **Controls the level of deposits on injectors, intake valves and combustion chambers to keep the engine clean and maintain its optimum performance**
  - **Provides protection against corrosion, emulsion or haze in wet fuel systems**
  - **Decreases wear coefficient along metal-metal surfaces inside engines resulting in increased efficiencies, improved fuel economy, longer parts life, and restored performance, also does not oxidise engine lubricant during fuel dilution in combustion chamber.**
- Fast Racing Fuel products completely soluble in Unleaded and (FlexFuel) unleaded-ethanol blends and compatible with commonly used engine and fuel system materials.



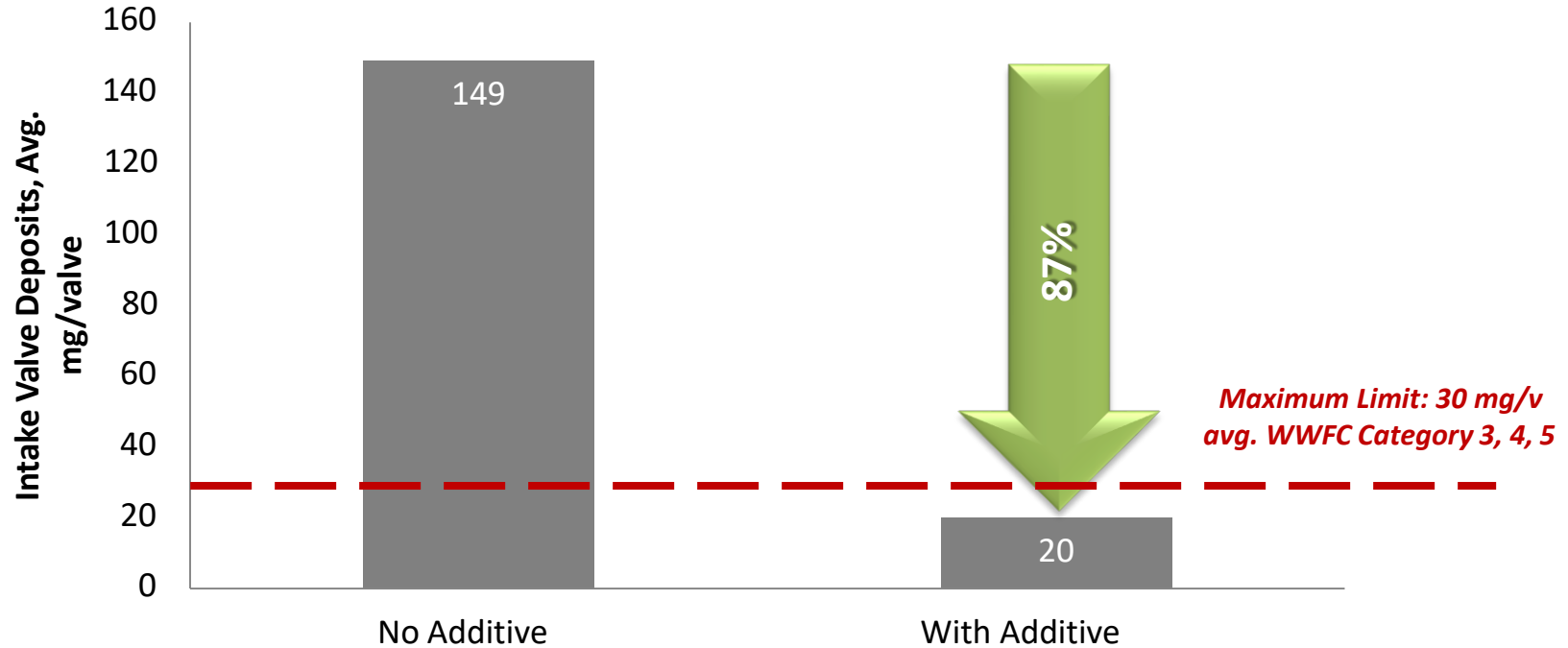
## Application Benefits

Performance Features	Key Benefits
Controls the level of deposits on injectors, intake valves and combustion chamber	Improved driveability, reduced emissions, and improved fuel economy
Cleans up intake valve deposits	Restores lost engine performance
Provides excellent corrosion protection and reduces emulsion or haze formation	No rust, reliable engine, and longer engine life
Reduces engine wear and improved fuel economy	Restored performance, longer parts life and fuel savings

# Performance Data

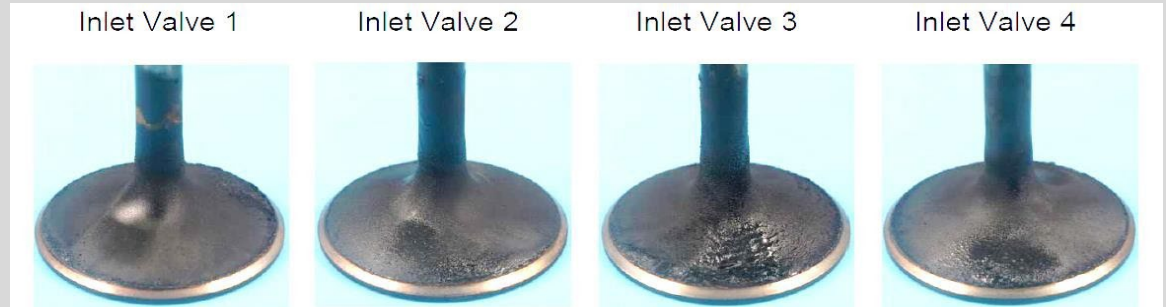


# Intake Valve Deposit Keep Clean Test

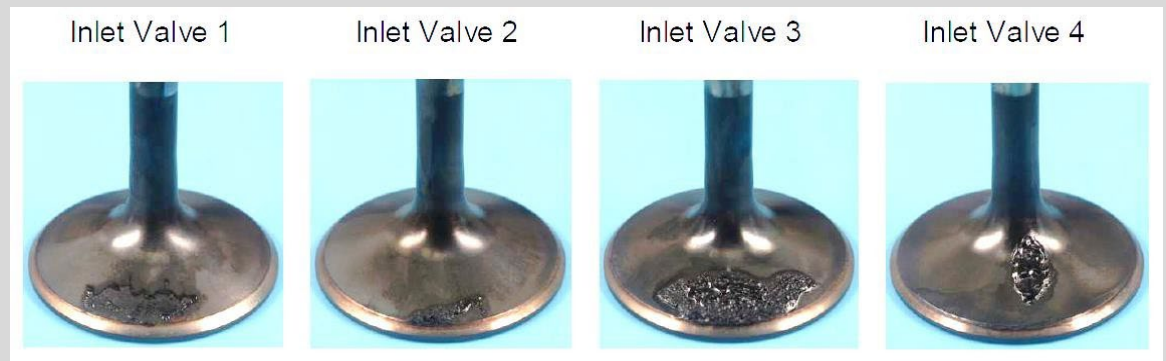


# Intake Valve Deposit **Keep Clean Test**

No Additive



With Additive

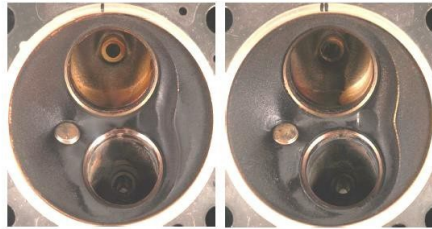


# Intake Valve Deposit Keep Clean Test

Cylinder Head:

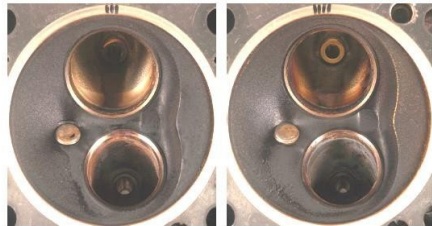
Cylinder 1

Cylinder 2



Cylinder 3

Cylinder 4



No Additive

Cylinder Head:

Cylinder 1

Cylinder 2



Cylinder 3

Cylinder 4

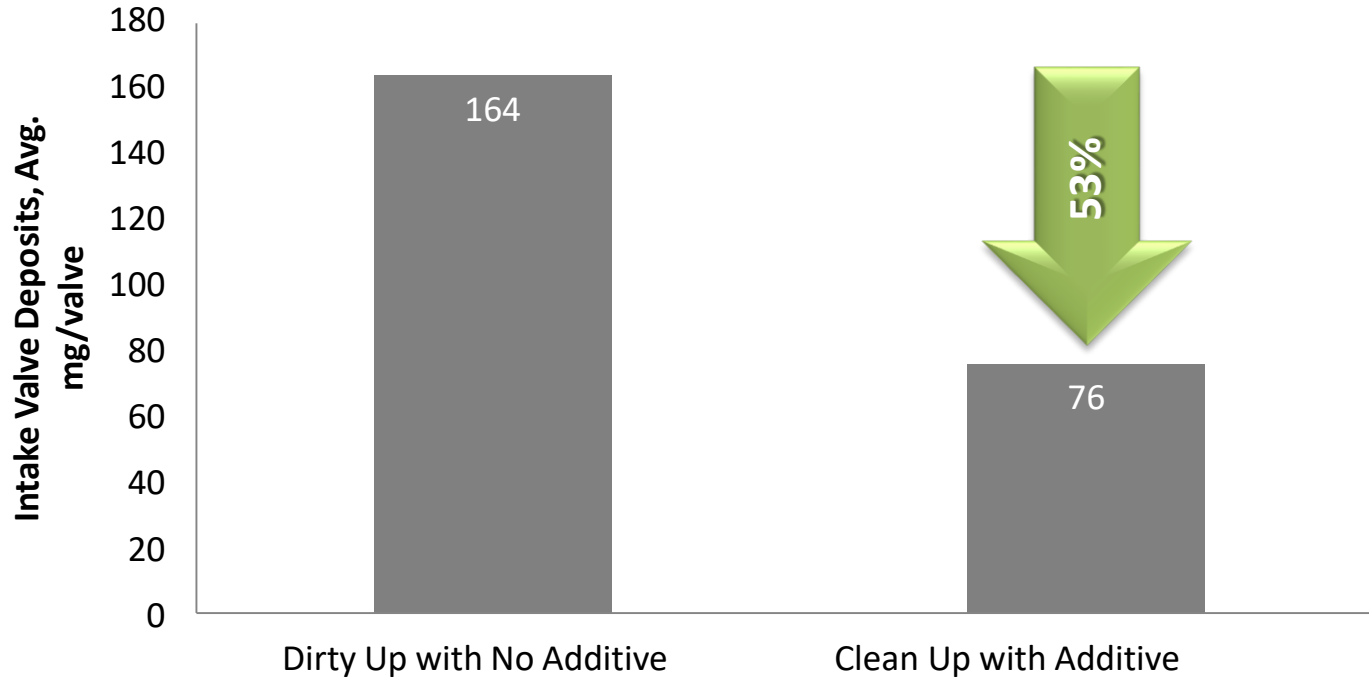


With Additive

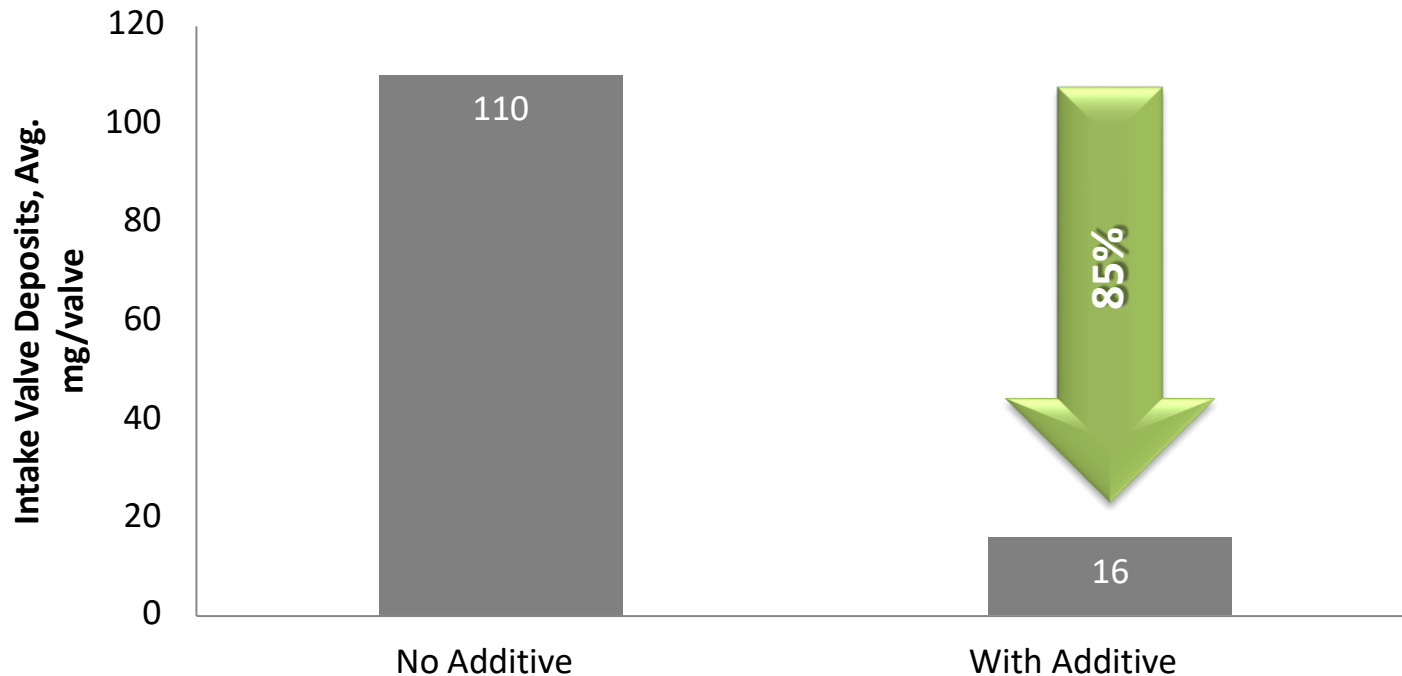
## Injector Keep Clean Test



# Intake Valve Deposit Clean Up Test



# Intake Valve Deposit Keep Clean Test





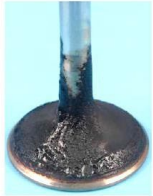
# Intake Valve Deposit **Keep Clean Test**

Inlet Valve 1

Inlet Valve 2

Inlet Valve 3

Inlet Valve 4



No Additive

Inlet Valve 1

Inlet Valve 2

Inlet Valve 3

Inlet Valve 4



With Additive

# Intake Valve Deposit **Keep Clean Test**

Cylinder 1



Cylinder 2



No Additive

Cylinder 1

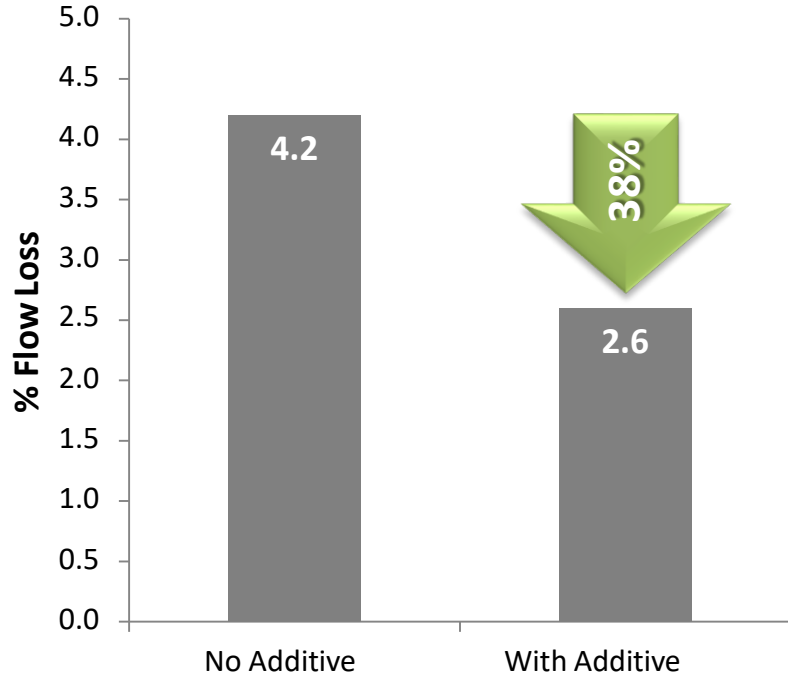


Cylinder 2



With Additive

# Port Fuel Injector Deposit Keep Clean Test (ASTM D6421)



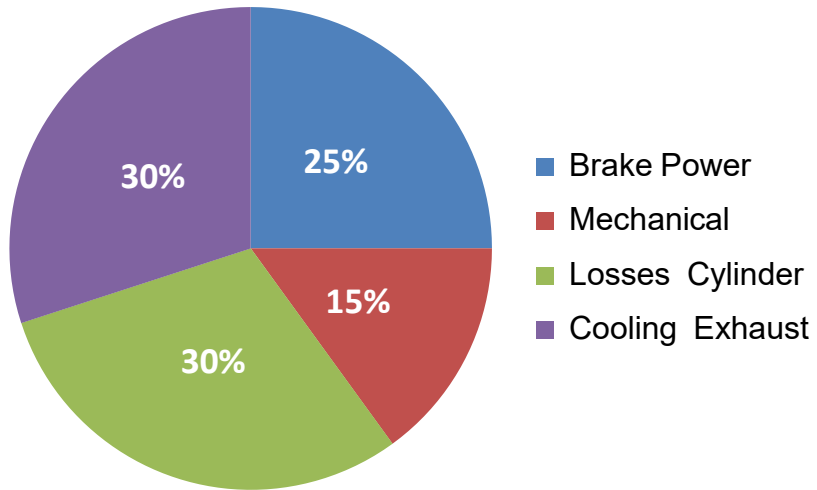
- Port fuel injector deposits were first reported as early as mid-2000's.
- In 2018, an auto manufacturer presented the findings related to the field problems to the Coordinating Research Council (CRC) Deposit Group.
- For the injector fouling test, the test method ASTM D6421 is considered by the CRC as a quicker and much less expensive way of measuring fouling tendency (versus ASTM D5598)

# Friction Modification Test

A person wearing a white racing helmet and a black racing suit is standing in a workshop. They are positioned next to a large red fuel drum that sits on a wooden pallet. The person appears to be working with equipment, possibly a fuel system, as they are holding a hose connected to the drum. In the background, there is a black metal cabinet and a red fire extinguisher. On the wall, there are two signs: one that says 'FUEL DRUM HALF' and another that says 'FUEL DRUM FULL'. The scene is set in a well-lit indoor space, likely a garage or a testing facility. The image is overlaid with a large red diagonal shape on the left side, and the text 'Friction Modification Test' is written in white over this red area.

# Friction Modifiers and **Restoration of Efficiency**

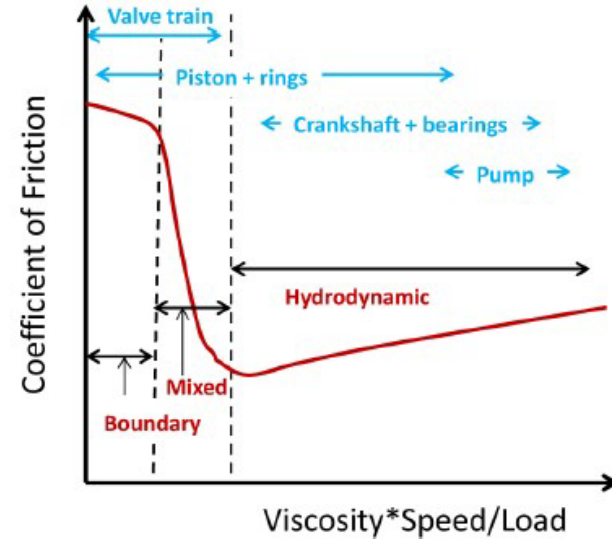
Fuel Energy Distribution



- Only 25% of the fuel energy is converted to useful power output.
- 40 to 60% of the mechanical losses is due to the action of the piston assembly.

# Friction Occurrences in the Engine

- Piston and Rings attribute to the majority of wear in an engine.
- Crank and Bearings, Valve Train and Pump make up the other majority areas.



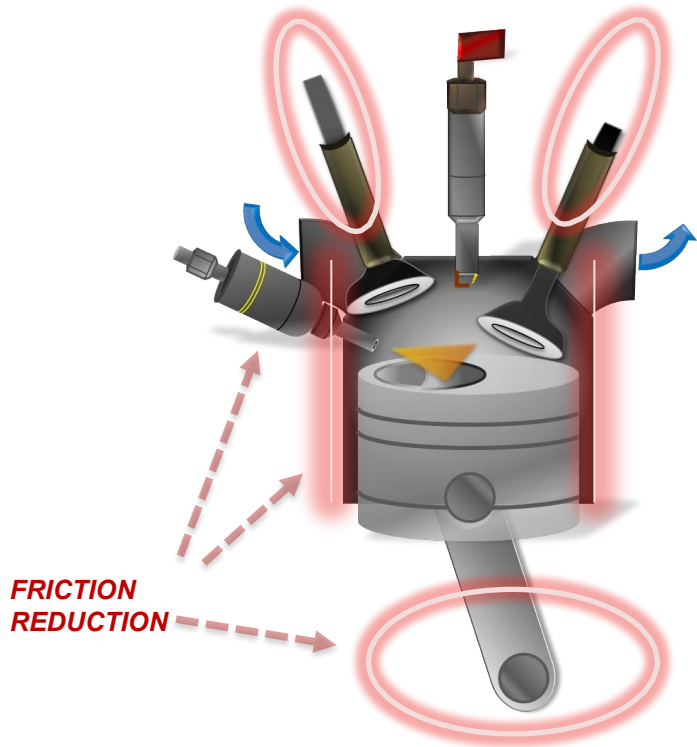
*Remmert et al / SAE Int. J. Fuels Lubr. / Volume 6, Issue 3(November 2013)*

# Friction Occurrences in the Engine

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- Wear at metal-to-metal contact areas:
  - **Along valve stems and valve seats**
  - **Piston head and chamber walls**
  - **Fuel pump and brushing**
  - **Oil Oxidization through fuel dilution**
- Newer engines have higher compression ratios and smaller displacements
- Wear occurring more frequently at shorter engine lifespans
- Results in loss of efficiency
- Today's fuel is not as effective of a lubricant and can wear brushes in the fuel pump quicker

## Friction Modifiers and Restoration of Efficiency



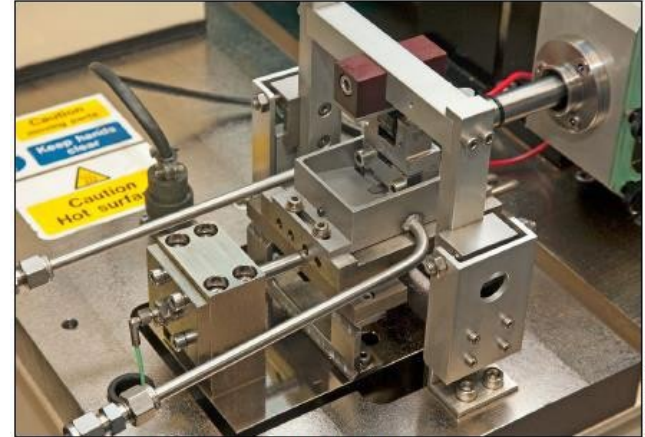
- Fuel wetting along chamber walls and internal surfaces allow for additive contact in these areas
- Reducing contact and prolonging parts
- Naturally occurring fuel dilution into the oil sump allows the friction modifier enhancing oil properties for longer drain intervals
- Results in the restoration of fuel economy and to the longevity of the engine life



# TE-77 Wear Test

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- TE-77 test rig is used to simulate the effects of load and resulting wear as seen in an engine over time.
- By increasing the load capacity on specimen overtime the properties of the fuel are tested for their ability to resist breaking down resulting in a wear on the metal surfaces and a change in the Friction Coefficient.



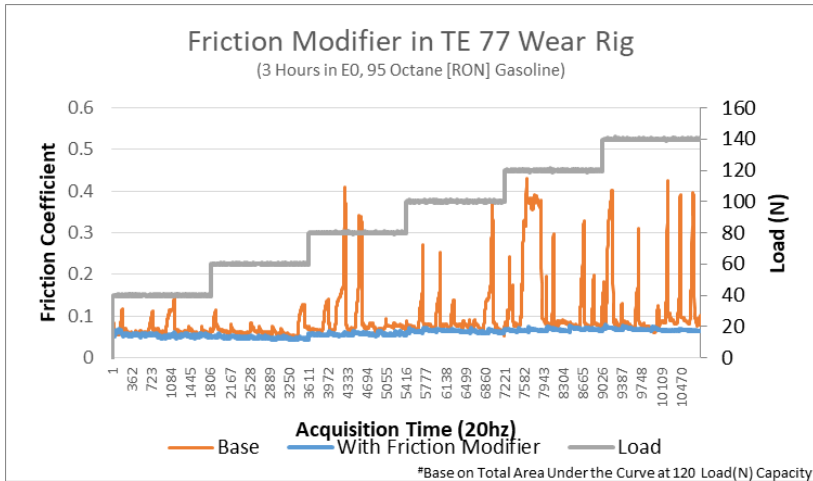
Phoenix Tribology TE 77 with radionuclide tracer test bath

Courtesy of Southwest Research Institute-All Rights Reserved

<http://www.phoenix-tribology.com/at2/leaflet/te77>

# Friction Modification – TE77 Test

**Additive shows ability to build film layer and reduce friction overtime**

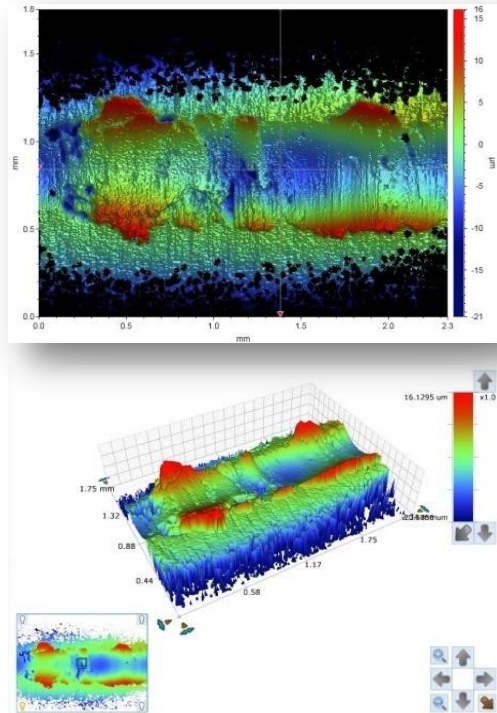


- Load (N) Intervals of 80, 120 and 140N selected
- Median Point of Fuel Pump (~15% of all wear) and Two values corresponding to Piston and Rings (~60% of all wear)

## Average % Difference by Force Load (N) Interval

Load (N)	80N	120N	140N
Improvement over base fuel	38.1%	54.4%	38.7%

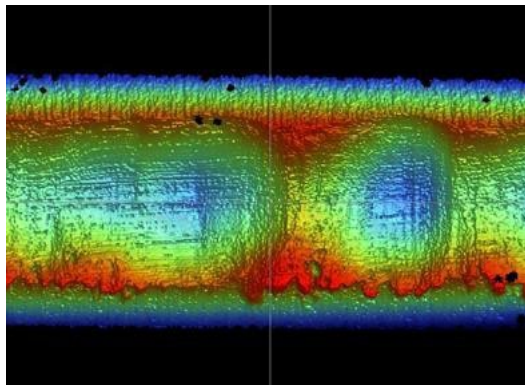
# TE-77 Wear Test



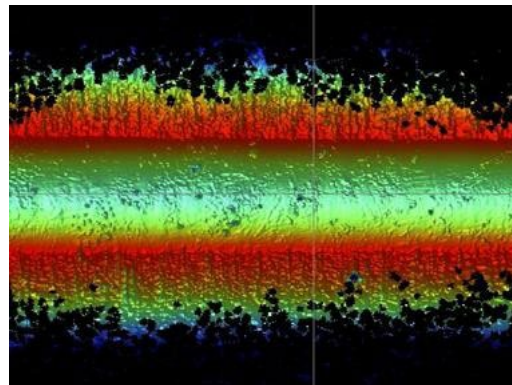
## 3-D Image Microscopy Analysis

- Surface appearance under magnification and white light
- Characterize film efficiency and surface scarring through qualitative analysis
- Analysis done on same axis and reference sample point on metal surface
  - Sample depth is limited to individual measurements at time of analysis

## TE-77 Wear Test Images



No Additive



With Additive

# Controlled Vehicle Tests

A man with grey hair and a beard, wearing a black t-shirt, is focused on working on a red fuel tank. He is using a tool, possibly a wrench or a similar instrument, to adjust something on the tank. The tank is covered with various cables and hoses. The background is a workshop or garage setting with some equipment visible. The image is overlaid with a large red diagonal shape that contains the text.

## Controlled Vehicle Tests

- The test objective is to check the performance benefits derived from additive use in a petrol vehicle
- Test Parameters Measured
  - Fuel Economy & Emissions
  - Power
  - Acceleration



## Power & Acceleration Tests

### Acceleration

- Test vehicle is stabilized at a speed of 60km/h and accelerated with maximum (wide open) throttle to 120km/h.
- The acceleration profile from 60km/h to 120km/h is recorded and the maximum acceleration in  $m/s^2$  is calculated.

### Power

- High speed, wide open throttle at the test stand.



# CHOICE OF CHAMPIONS

# No Harms Tests





## Combustion Chamber Deposits

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- Fuel quality, detergent additives, lubricating oils, engine design and operating conditions are factors that can contribute to formation of deposits in the combustion chamber.
- While detergent additives are known to control deposits formation on the intake valves, it can increase combustion chamber deposits.
  - Detergent packages have components that have higher boiling points as compared to the base fuels that may contribute to deposit build up especially if packages are formulated with mineral oil carrier fluids.
- The combustion chamber deposit (CCD) test was developed as a no harm test to ensure that the deposit contribution from the detergent additives is within acceptable levels.
- In Europe, CCD measurement is conducted according to CEC-F-20-98 test procedure.

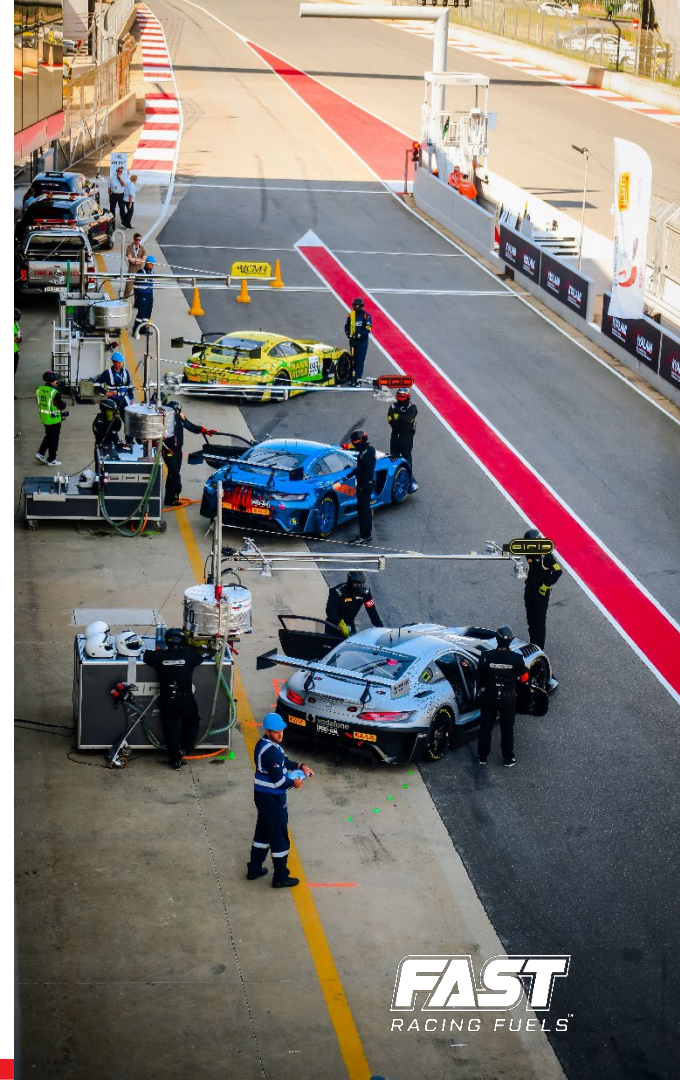
## Unleaded Petrol **Test Engines**

Fuel	Total CCD, mg/engine	% Over base fuel
Base Fuel	3724	
Additized Fuel	4254	114

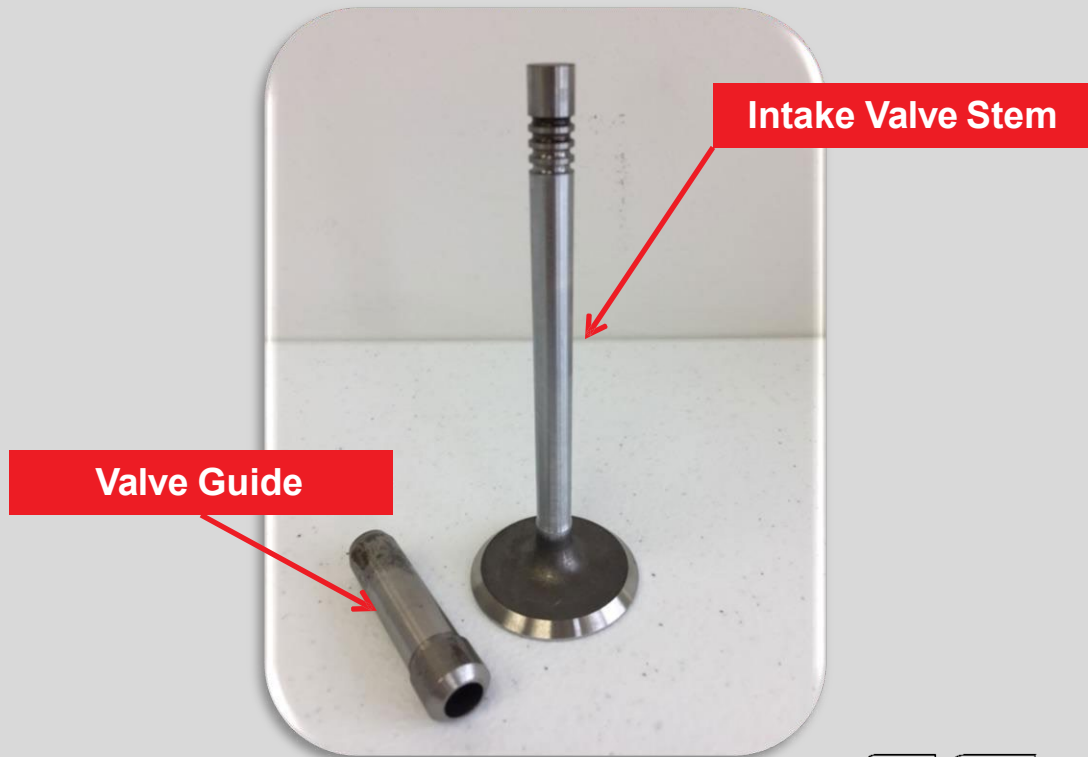
*Note: In Europe, there is no defined specification or limit on CCD levels but anything less than 140% increase over the base fuel (CCD of additized fuel is <140% of the CCD of base fuel) is considered to be acceptable.*

## Intake Valve Sticking Test (IVS)

- Fuel migrates to the annulus between valve guide & valve stem when engine switched off
  - High temperatures can vaporize fuel leaving behind the deposit control additive
  - If incorrect detergent system has been employed this can be viscous and sticky
  - Causes valve to become stuck in the open position
  - When attempt is made to restart the engine no compression can be achieved
  - Engine will not start



## Intake Valve & Valve Guide



# Water Reaction Test

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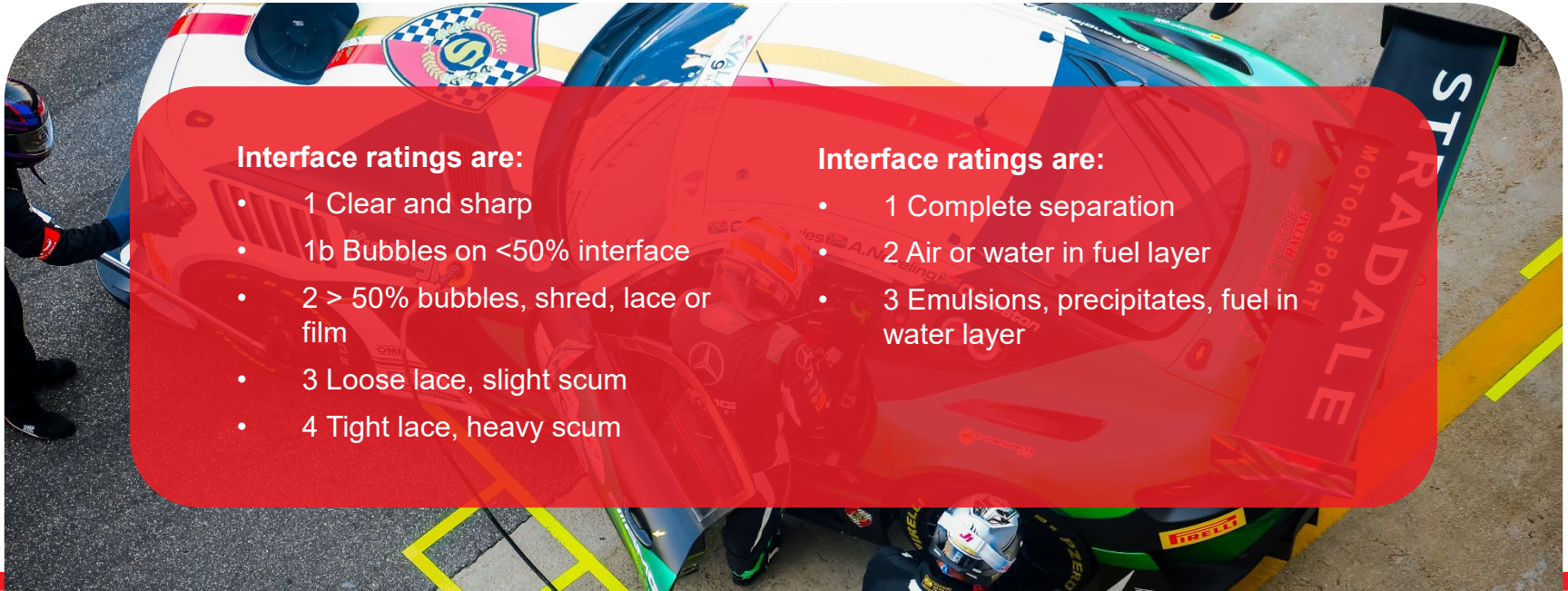
- Mod. ASTM D1094 or ASTM D7451
- 20ml water added to 80ml fuel, shaken for 2 minutes then assessed over 5 minutes
  - Shake the cylinder for 2 min  $\pm$  5s, two to three strokes per second using 5 to 10-in. (12 to 25-cm) strokes

## Interface ratings are:

- 1 Clear and sharp
- 1b Bubbles on <50% interface
- 2 > 50% bubbles, shred, lace or film
- 3 Loose lace, slight scum
- 4 Tight lace, heavy scum

## Interface ratings are:

- 1 Complete separation
- 2 Air or water in fuel layer
- 3 Emulsions, precipitates, fuel in water layer



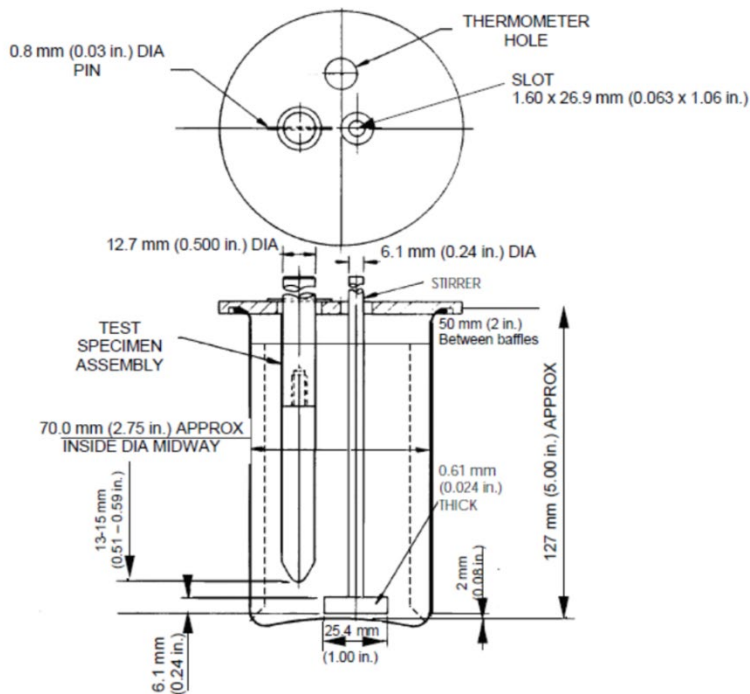
## Water Reaction Test

Test Parameter	Base Fuel	With 400 mg/kg SR 8213
Volume of H2O @ 5 minutes, ml	20	20
Interface Rating	1B	1B
Separation Rating	1	1

# Corrosion Test

**NACE TM 0172-01**  
3.5 hours @ 38°C test  
temperature

**ASTM D665A**  
4 hours @ 60°C test  
temperature



## Corrosion Test Rating

- ASTM D665A/NACE Rating
- Duplicate Test (2 rods)
- Pass means no rust for both rods
- Fail means rusting on both rods

Rating	Percent of Test Surface Corroded
A	0
B++	Less than 0.1 (2 or 3 spots of no more than 1-mm [0.04-in.] diameter)
B+	Less than 5
B	5 to 25
C	25 to 50
D	50 to 75
E	75 to 100





# Product Handling & Summary



Power up your performance  
with **Fast Racing Fuels**

## Handling & Storage

- Fast Racing Fuel products can be used either as a concentrate or in a stock solution.
- Fast Racing Fuel products contains appropriate amount and type of solvents to ensure package stability over prolonged storage periods.
- Fast Racing Fuel products are available in pails, drums, totes, and isotanks.
- Please refer to the Safety Data Sheet for safety, handling and toxicity information.

# Summary

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- Fast Racing Fuel product range is a multifunctional fuel performance additive package that delivers keep clean and clean up performance to remove and control deposits in vital engine parts of petrol engines.
- Product is suitable for both retail and aftermarket applications
- Fast Racing Fuel product range has been tested using industry standard tests. Key parameters include the following:
  - **Detergency**
  - **Water Tolerance**
  - **Corrosion Protection**
  - **Friction Modification (Fuel Economy, Power & Acceleration)**
- Other customized package formulations can be made available depending on customer technical requirements and marketing claims





# Thank you.

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