



REPSOL



# Moto 4T

## Repsol Lubricants

Discover why we are at the  
forefront of innovation

# Lubricants formulated to meet the **highest demands**

At Repsol we work with the **highest technology** to develop the most innovative lubricants for 4-stroke motorbikes, all of which are able to meet the major challenges faced.

- The main challenge faced by oil for 4-stroke motorcycles is to **protect and lubricate an engine** which operates at **higher revs** and working temperatures than a car engine.
- They also have to meet **another major challenge: responding to the thermal stress** to which motorbike oil is subjected. This is **significantly higher** than that of the oil for a car because of the lower sump capacity.

This enables us to guarantee that **all your demands for your motorcycle are met:** protection against wear, engine cleanliness, durability and a smooth ride with a quick clutch response.

The **Moto 4T Repsol Lubricants** have been formulated by the same team that designed the lubricants for our **MotoGP team**. The result is a range of lubricants which take better care of your engine, providing you with a smoother ride and higher performance for longer.

**We have therefore developed the following study which shows the effectiveness of these lubricants and the benefits they offer your motorbike engine.**



# The highest proven quality in four aspects



At the **Repsol Technology Lab.**, which is at the global forefront of R&D&i, we have performed a set of scientific tests to produce a market study which evaluates the performance of the Repsol Moto 4T oils.

To carry out the study we have analysed and compared the **qualities of 10 competitors' products** based on the **10W-40 and 15W-50 viscosity grades.**

The results of this study focus on the **four aspects** of most concern to motorcycle riders:

**Engine, clutch and gearbox protection.**

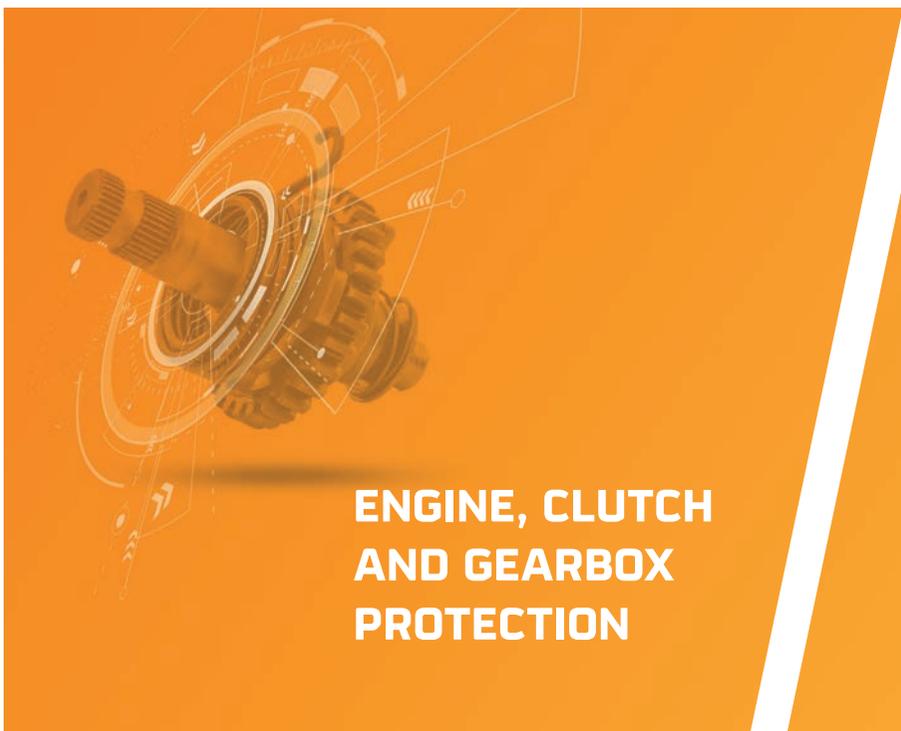
**Engine cleanliness and durability.**

**Oil lifespan.**

**Riding comfort.**

Shown below are the **conclusions of the 14 laboratory tests** performed at the Repsol Technology Centre.

**Discover which lubricants are best and why.**



## ENGINE, CLUTCH AND GEARBOX PROTECTION

### Essential in high- performance engines

The protection and lubrication of **high-performance** engines, such as in four-stroke motorcycles, is the main function that a lubricant must perform.

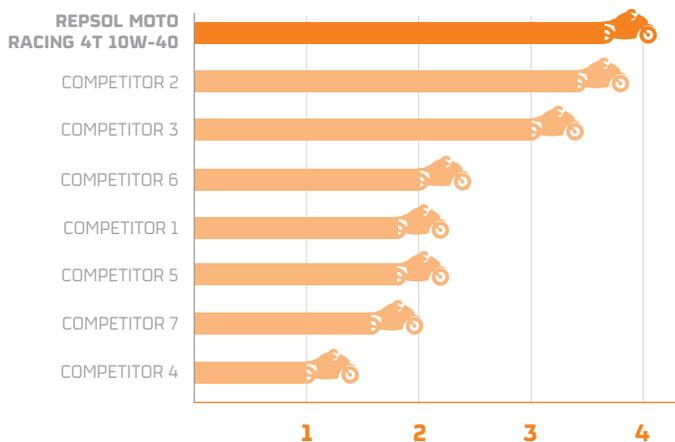
The **friction** generated in these types of engines can lead to a loss of lubricity, causing increased metal **wear** in gearboxes. This situation may sometimes even be noticed by the rider due to the noise and vibration it generates.



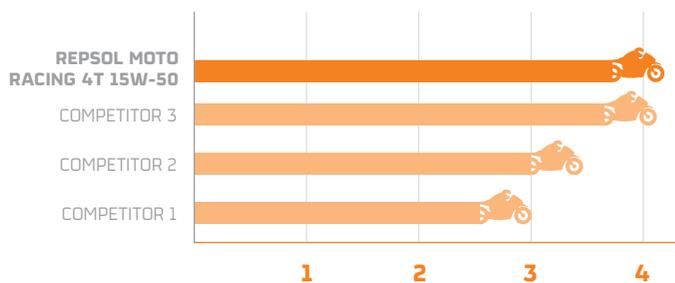
## Protection ranking according to viscosity type

Ranking obtained from an average of 5 tests.

### SAE 10W-40



### SAE 15W-50



Protecting the engine in critical conditions with **high temperatures and high revolutions** is extremely important.

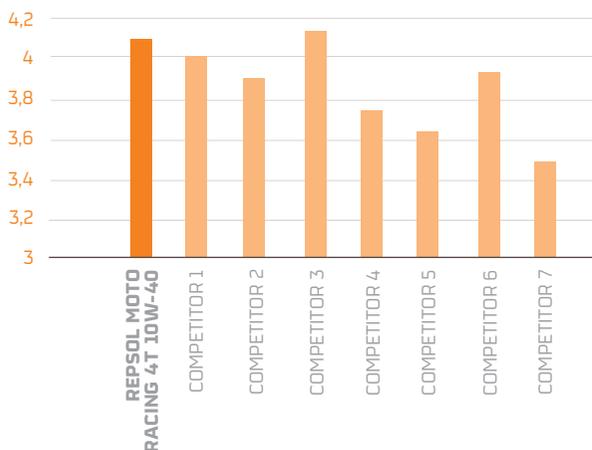
To find out which lubricant performs this function best, the **HTHS (high-temperature, high-shear) VISCOSITY** parameter must be taken into account. This tells us the thickness of the protective film created by the lubricant in these conditions.



The higher the  
HTHS viscosity



The higher the protection  
against wear



HTHS VISCOSITY  
SAE 10W-40

At the Repsol Technology Centre laboratory we also perform a second test to identify the **protective capacity of the oil**.

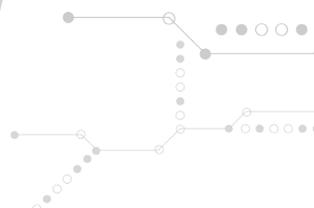
In order to do this, we measure the **WEAR** that occurs on metal parts which are in contact, when a load is applied to them.

At the end of the test, we use the wear scar caused as a reference and measure its diameter:

The lower the wear



The higher the protection



In this photo you can see the wear scar that occurs when the lubricant of a competitor brand is used.

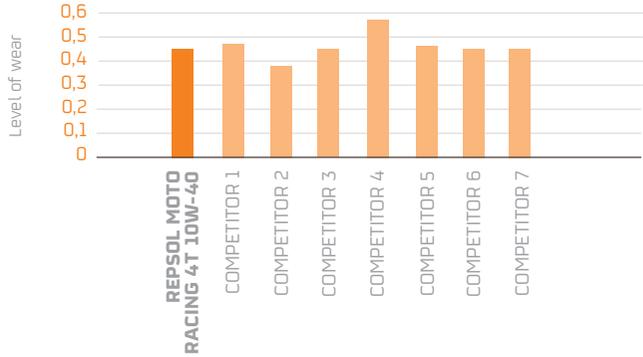


And in this photo you can see the scar left when a Repsol Lubricant is used, which has a smaller area of wear.

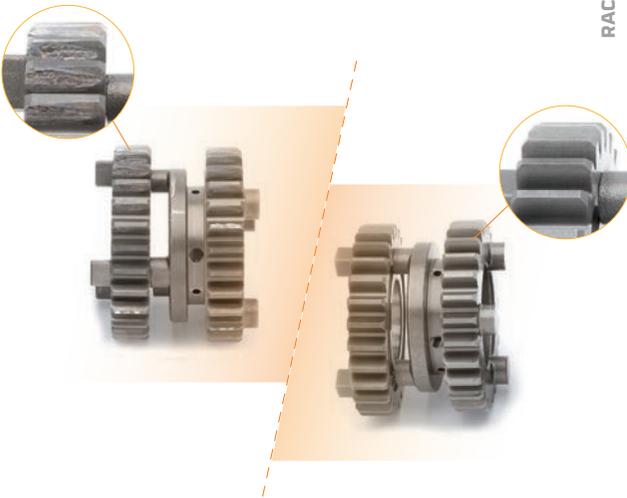
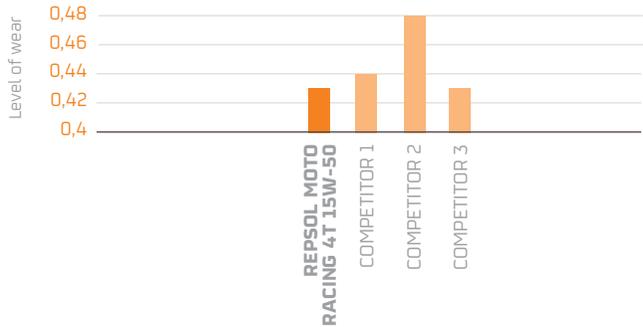
The **diagrams below** show the position of Repsol Lubricants against other brands, **comparing the wear caused**. The best position is that which has the lowest value; in other words, the least wear.

### 4-ball wear test

#### SAE 10W-40 /



#### SAE 15W-50 /



Comparative image of gears which are kept in perfect condition and those in which wear has occurred.



## ENGINE CLEANLINESS AND DURABILITY

Clean engine,  
with increased  
**oxidation  
resistance**

As well as lubricating and protecting the engine, lubricant oil helps to **keep it clean**.

Its detergent and dispersant properties **minimise external contamination** such as water, fuel, dust or the **carbon deposits** generated in engine combustion, preventing accumulation on the piston and piston rings and stopping scuffing from occurring on the liners.

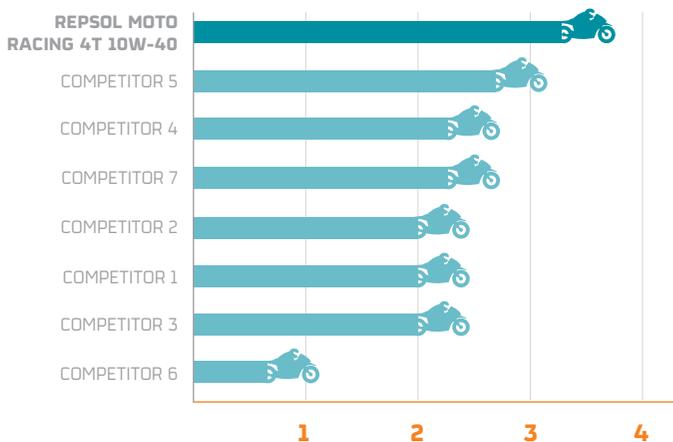
The lubricant must also offer **oxidation resistance** in order to prevent the oxidation products from reacting with the pollutants, causing sludge, varnishes or even corrosive products.



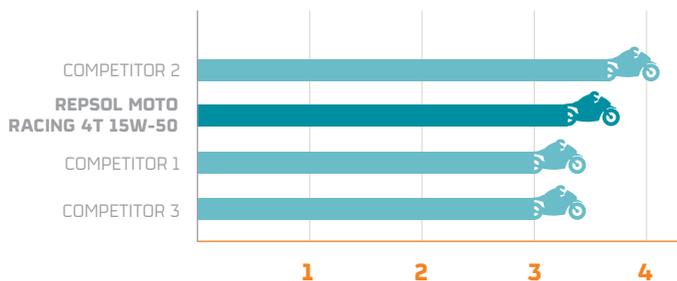
## Cleanliness ranking according to viscosity type

Ranking obtained from an average of 3 tests.

### SAE 10W-40



### SAE 15W-50



**OXIDATION RESISTANCE** is fundamental in high-performance air-cooled motorcycles in order to prevent the generation of deposits and keep the engine cleaner, thereby increasing its durability.

The higher the oxidation resistance

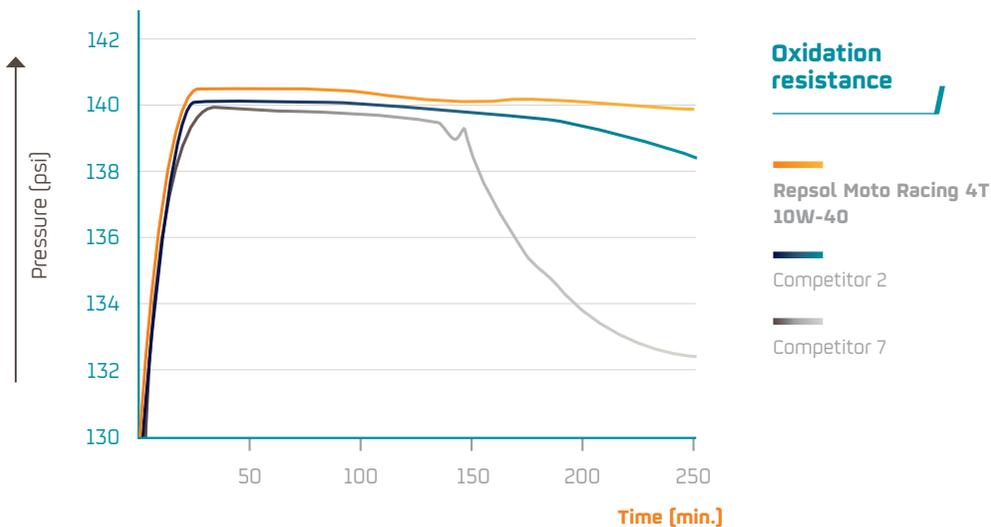


The lower the generation of deposits

At the **Repsol Technology Centre** we performed a test **(TFOUT)** in which we simulated conditions with high temperatures and water and petrol contamination.

In terms of the results obtained, a higher value in minutes means that the oil has higher oxidation resistance and consequently a lower generation of deposits.

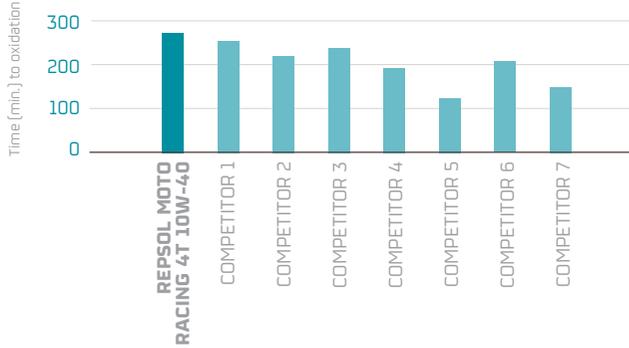
The conclusions can be seen in this diagram, which shows the **oxidation resistance of the lubricant:**



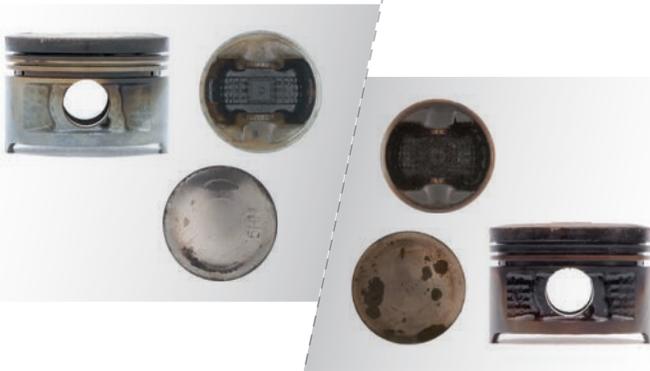
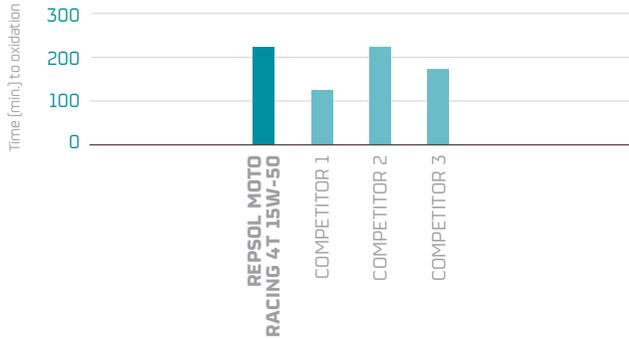
The **diagrams below** show the position of Repsol Lubricants against other brands, **comparing the oxidation resistance**. The best position is that which has the highest oxidation resistance.

## TFOUT

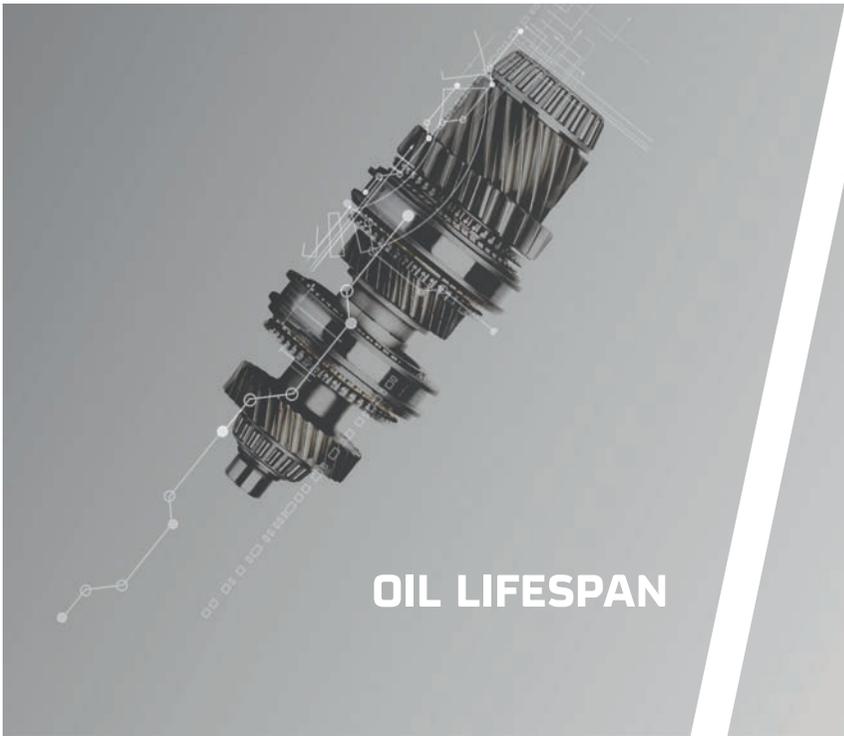
### SAE 10W-40



### SAE 15W-50



These images show the **difference in the accumulation of deposits on the piston caused by combustion**. That's why it is so important for a lubricant to have high detergent and dispersant properties.



## OIL LIFESPAN

### Quality lubricants with lower volatility

It is very important to take into account that lubricants can be degraded by **thermal oxidation and the loss of volatile components**, which leads to a thickening of the oil; in other words, an increase in its viscosity.

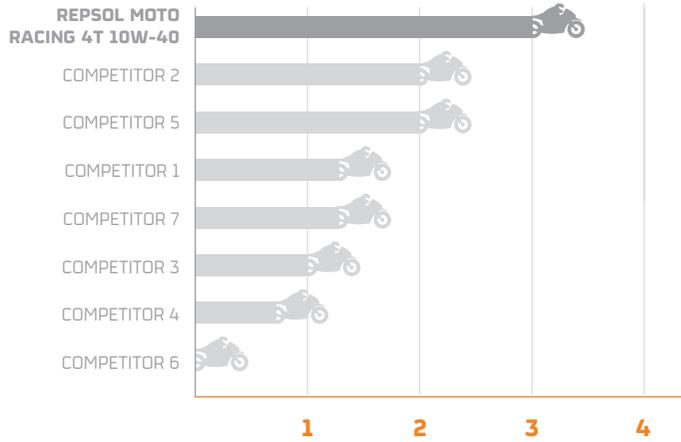
The consequences of this are **excessive oil consumption** and an **increase in temperature due to friction**, which in turn speeds up the degradation of the oil and shortens its lifespan.



## Lifespan ranking according to viscosity type

Ranking obtained from an average of 3 tests.

### SAE 10W-40



### SAE 15W-50



Having a high-tech lubricant which minimises losses due to **VOLATILITY** is fundamental, as this will mean that you will have lower consumption due to evaporation. In other words, the lubricant will have a longer lifespan.

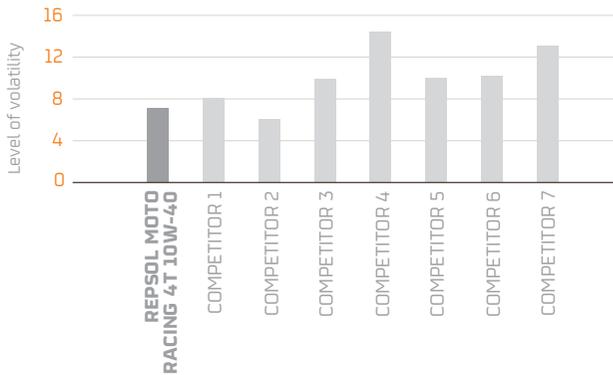


The lower the volatility > The longer the lifespan

The **diagram below** shows the resistance of different lubricant brands to becoming volatilised. As you can see, those that have a lower percentage of losses will have **lower consumption due to evaporation** and are therefore better because **they have a longer lifespan**.

### NOACK volatility [%]

#### SAE 10W-40



#### SAE 15W-50



These photographs show the dirt left in the filters due to the thickening of the oil or an increase in viscosity as a result of its thermal oxidative degradation and the loss of volatile components.

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## RIDING COMFORT

### Controlling friction: the key to comfort

At Repsol we know that riding comfort is an **increasingly important** factor among motorcycle riders, just as much as power or speed.

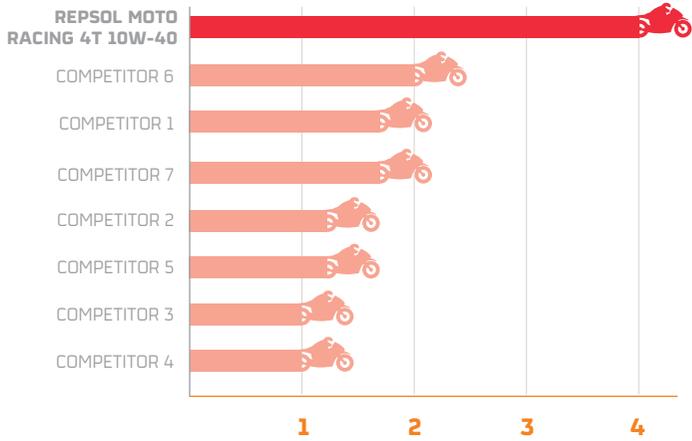
That's why at the Repsol Technology Centre we have evaluated the **influencing factors**: ease of cold starting, smooth and fast gear shifts and the lack of any vibration or noise.



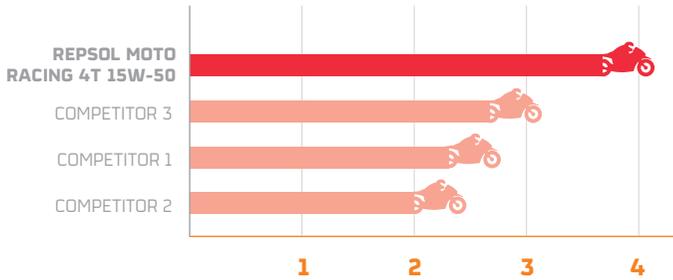
## Comfort ranking according to viscosity type

Ranking obtained from an average of 3 tests.

### SAE 10W-40



### SAE 15W-50



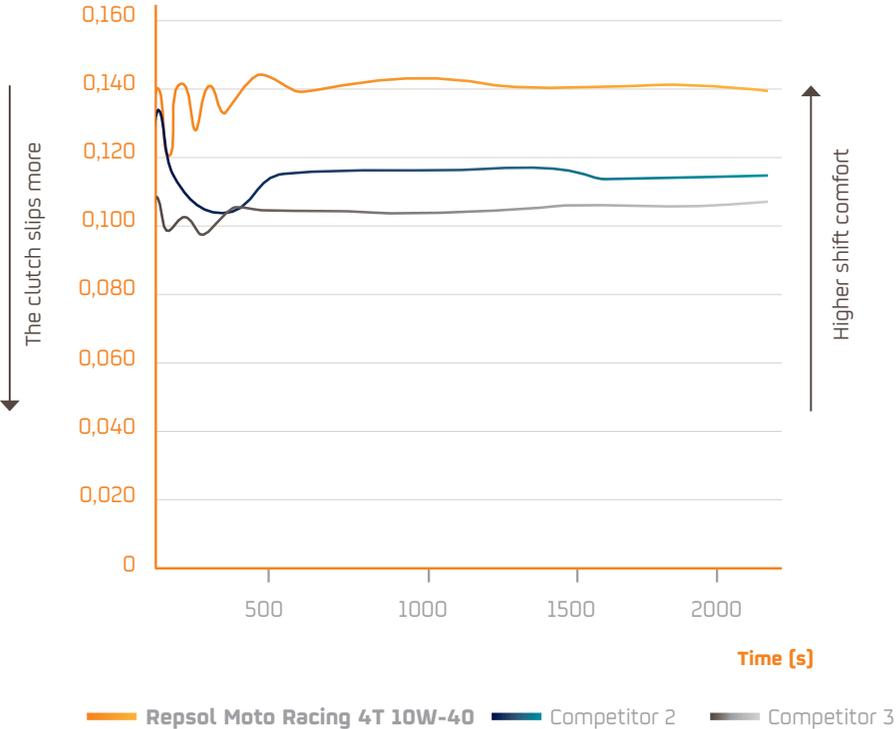
One of the parameters with the biggest influence on **RIDING COMFORT** is clutch friction. In order to evaluate the performance of each of the oils, we use the JASO friction tests.

Repsol Moto Racing 4T Lubricants have the **highest JASO MA2 level**, which means that they offer a better shift speed and response.

**The higher the friction** > **The better the shift response**

In this diagram we have compared the **friction coefficients** obtained using an HFRR instrument. **High values are seen as a good property.**

However, excessively low values can cause the clutch to slip more.





Repsol Lubricantes y Especialidades S.A.  
C/ Méndez Álvaro, 44, 28045 Madrid (Spain)  
[repsol.com](http://repsol.com)