

# REAL Torque

March 2019

Contact maintenance for any questions on 0800 80 80 69

## Engine oil and its job



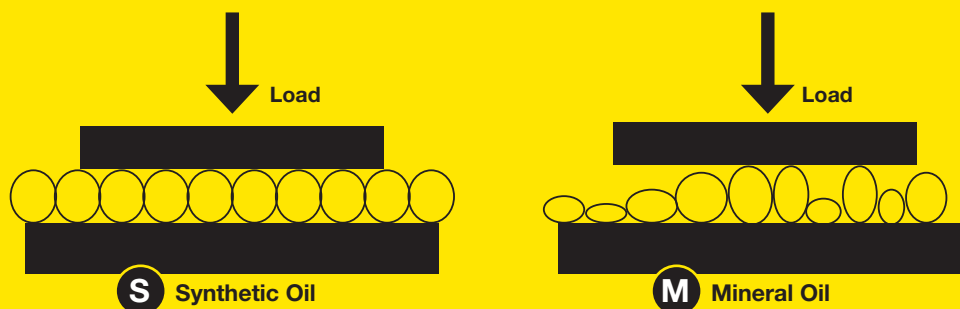
**When the first diesel engines were invented and put into service, engine oil was simply used to lubricate the moving parts.**

**The main role of engine oil is to:**

- ▶ separate and lubricate moving parts within the engine.
- ▶ cool engine parts.
- ▶ prevent deposits from forming on internal engine parts.
- ▶ suspend dirt and contaminants in the oil long enough to be captured by the engine oil filter.
- ▶ provide protection across a wide range of engine temperatures.
- ▶ enhance engine fuel efficiency by reducing friction on internal parts moving past each other.

**Engine oil achieves these properties by having a good base stock but also with the help of some additives such as:**

- ▶ detergents which are used to clean and prevent harmful deposits that can cause sludge build up.
- ▶ viscosity improvers or modifiers that allow the oil to be more stable across a range of temperatures.
- ▶ corrosion inhibiting additives that prevent the oxidation or rusting of internal engine parts.
- ▶ anti-wear additives that produce a film to surround metal parts to keep them separated.



### Synthetic Oil vs Mineral Oil - What is the difference?

**S Synthetic Oil**, being man made, exhibits far more stable properties than mineral oils. Synthetic oils contain more additives and offers better engine protection than mineral oils in terms of heat dissipation, wear and sludge build up.

**M Mineral Oil**, on the other hand, being made solely from a natural resource, makes it difficult to produce oil that contains all the properties required to maintain stability and exceptional lubrication properties.

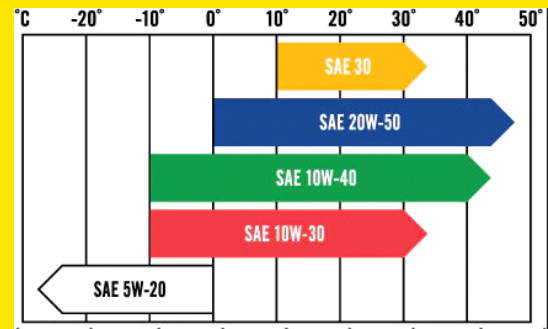
## What is Viscosity?

Viscosity is a measure of the resistance of a fluid's flow. The thicker (high viscosity) the oil, the slower it will flow.

Most oils today are "multigrades", which simply means that the oil falls into two viscosity grades (i.e. 10W-40). In a 10W-40 for example, the 10W (W = winter) simply means that the oil must have a certain maximum viscosity or flow at low temperature. The lower the "W" number,

the better the oil's cold temperature performance.

The 40 in a 10W-40 simply means that the oil must fall within certain viscosity limits at 100°C. This is a fixed limit and all oils that end in 40 must achieve these limits. Once again the lower the number, the thinner the oil. For example, a 30 oil is thinner than a 40 oil at 100°C.



## Engine Oil Viscosity Guide

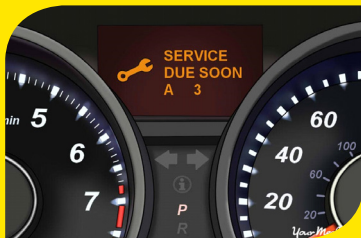
## What is an Engine Oil Sample?

An engine oil sample is usually taken when the oil is drained. The sample is then sent to a laboratory which produces a report identifying anything that is out of the ordinary.

An example is a sample that has detected high sodium. This can indicate an internal engine coolant leak such as from an oil cooler. Identifying this before it becomes an issue saves not just downtime, but also an expensive engine repair if the cooling system fails.

DATE SAMPLED	09-Oct-17	24-Apr-17	13-Nov-16	30-Aug-16	08-May-16	05-Dec-15
DATE REPORTED	11-Oct-17	03-May-17	21-Nov-16	09-Sep-16	17-May-16	12-Dec-15
LAB NO.	43021064481	43020991279	43020917312	43020883156	4302081434	4302078668
SIF NO.	15259287	14972694	005025	15681794	15681790	10598145
TIME ON UNIT	MI	41862	41115	38514	37569	32653
TIME ON OIL	MI	17659	16112	13571	12566	10339
OIL BRAND	Castrol	Castrol	Castrol	Castrol	Castrol	Castrol
OIL TYPE	Edge	Edge	Edge	Edge	Edge	Edge
OIL GRADE	SAE 0W20	SAE 0W20	SAE 0W20	SAE 0W20	SAE 0W20	SAE 0W20
OIL ADDED						
FILTER	Not Changed	Not Changed	Not Changed	Not Changed	Not Changed	Not Changed
OIL CHANGED	Not Changed	Not Changed	Not Changed	Not Changed	Not Changed	Not Changed
W/O NUMBER						
<b>Metals (ppm)</b>						
Iron (Fe)	13	16	11	10	9	6
Chromium (Cr)	<1	<1	<1	<1	<1	<1
Lead (Pb)	<1	<1	<1	<1	<1	<1
Copper (Cu)	3	4	2	3	3	1
Tin (Sn)	<1	2	<1	1	5	1
Aluminum (Al)	6	7	7	7	7	4
Nickel (Ni)	<1	<1	<1	<1	<1	<1
Silver (Ag)	<1	<1	<1	<1	<1	<1
Titanium (Ti)	45	55	48	45	47	44
Vanadium (V)	<1	<1	<1	<1	<1	<1
<b>Contaminants (ppm)</b>						
Silicon (Si)	19	27	17	16	13	11
Sodium (Na)	4	9	14	9	11	8
Potassium (K)	2	<1	2	1	2	<1
<b>Additives (ppm)</b>						
Magnesium (Mg)	1236	1496	1305	1339	1236	1209
Calcium (Ca)	657	777	696	703	696	677
Barium (Ba)	<1	<1	<1	<1	<1	<1
Phosphorus (P)	605	741	652	775	585	576
Zinc (Zn)	772	903	799	867	762	723
Molybdenum (Mo)	73	88	77	71	73	71
Boron (B)	24	23	20	23	19	19
<b>Contaminants</b>						
Water (%)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Coolant	No	No	No	No	No	No
<b>Physical Tests</b>						
Viscosity (cSt @ 100C)	9.4	9.3	9.7	9.5	8.4	8.6
<b>Physical / Chemical</b>						
Base Number (mg/KOH/g)	4.6	5.0	4.4	5.0	4.4	5.5

## Service Intervals



Manufacturers decide what the interval should be based on many factors including the intended use of the vehicle.

Linehaul trucks generally have a longer drain interval as they tend to have a more stable operating temperature and better fuel burn which keeps the oil in better condition for longer.

Metro trucks tend to do a lot of idling with greater variation in engine oil temperature which reduces the service life of the oil.

This is why it is important to maintain regular servicing and have your vehicle serviced when it is due.

## Flexible Servicing Schedules

Some manufacturers now offer flexible based servicing. Essentially, the engine management computer decides when the engine oil requires changing based on several factors such as:

- ▶ Engine load
- ▶ Fuel burn
- ▶ Operating temp
- ▶ Idling time
- ▶ Hours since last oil drop
- ▶ Time

When the engine management computer decides service is due, it will illuminate the service light, generally allowing up to a 2-week time frame.

TR Group have worked with OEM on this function to produce a fixed service interval that gets the most from the oil.

This was created by monitoring fuel burn v service light activation across different applications for a specific vehicle. Eg. with OEM X in application Y = average of 1.85 km/litre service indicator on at 63000kms, TR have fixed the interval at 60000kms.

This allows us to set a schedule in Optimus and report on potential overdue vehicles and create reports for our customers.

The service light in this case becomes a secondary warning to the operator.

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