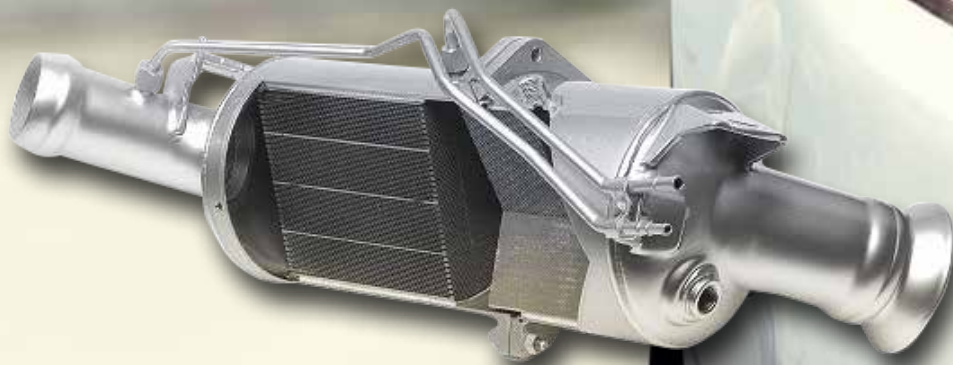




TOTAL

COMMITTED TO BETTER ENERGY



SELECTIVE CATALYTIC REDUCTION AND DIESEL PARTICULATE FILTERS

TOTAL Lubricants range of Low-SAPS oils for passenger cars, vans and 4WD

Keep your engine younger for longer



SELECTIVE CATALYTIC REDUCTION AND DIESEL PARTICULATE FILTERS

Modern diesel powered cars and SUV's are being fitted with filtration systems in the exhaust system to meet the ever tightening exhaust emission standards. As a minimum these vehicles will now likely have a Diesel Particulate Filter (DPF) but many vehicles are also fitted with a Selective Catalytic Reduction (SCR) System. To maximize the reliable operation of these systems it is important that the correct oil is used in the engine.



Diesel Particulate Filters (DPF) work by filtering soot particles from the exhaust to minimize soot emissions into the air we breathe. However, the DPF needs to be regenerated in order to stop it from eventually blocking.

- The DPF cleans or regenerates itself by burning off the captured soot particles as part of the normal driving process when the DPF temperature becomes hot enough.
- Alternatively, the engine management system will trigger a regeneration sequence if the normal driving has not been able to provide sufficient regeneration.
- Diesel Particulate filters are also known as Catalysed Particulate Filters (CPF) or Filtro De Particulas (FAP)

Selective Catalytic Reduction is a type of catalytic convertor that reduces smog producing Nitrous oxide emissions (NOx) to Nitrogen and Water with the use of a Urea Solution known as a Diesel Exhaust Fluid (DEF) or AdBlue to assist the catalytic reaction.

- The DEF usually only needs to be replenished periodically.
- If the DEF runs out the engine may go into limp home mode or may not be able to be restarted until the DEF is replenished.

Why is using the correct engine oil important?

- Engine oils contain Sulphated Ash and Phosphorous in order to do the work required of them. Sulphur is also contained in some base oils and additive systems. These compounds are commonly referred to as SAPS (Sulphated Ash, Phosphorous and Sulphur). To ensure long DPF and SCR life, most systems require Low SAPS oil in the engine:
 - Sulphated Ash can interfere with the regeneration of DPF's and result in blockages.
 - Phosphorous can poison catalysts
 - Sulphur can interfere with the regeneration process and poison catalysts.
- Synthetic base oils need to be used to achieve the restriction on SAPS content and required performance.

What can cause DPF and SCR issues? Whilst using the correct oil is important to ensure long DPF and SCR life it is not the only cause of DPF and SCR issues.

- Combustion or Fuel injection issues, stop start driving and short trips can all have an impact on the success and frequency of regeneration of these systems.
- Poor quality Diesel Exhaust Fluid (DEF) can impact the SCR system. Ensure the DEF is of the quality required by the manufacturer.

LOW SAPS OILS

If it is a late model diesel Car, 4WD or SUV it is likely to have a DPF, SCR or both and require Low SAPS engine oil that meets an ACEA “C” (Catalyst Compatible) specification. Many also require the vehicle manufacturer’s particular specification that will typically be based on an ACEA Low SAPS Specification plus the manufacturer’s specific additional performance requirements.

Whilst the ACEA “C” specification is most commonly specified for diesel engines it is also specified for some petrol engines and this trend will increase in the future with the anticipated introduction of Gasoline Particulate Filters as emission requirements tighten.

There are 5 ACEA Low SAPS specifications and the differences are illustrated in the table below together with a High SAPS specification ACEA A3/B4 to illustrate the differences;

| ACEA | TBN mgKOH/g | Sulphur | Phosphorous | Sulphated Ash | HTHS mPa.s | Fuel Economy |
|-----------------|-------------|----------|----------------------|--------------------|----------------|-----------------------|
| C1-16 | – | ≲ 0.2 % | ≲ 0.05 % | ≲ 0.5 % | ≳ 2.9 | ≳ 3.0 % |
| C2-16 | – | ≲ 0.3 % | ≲ 0.07 % ≲ 0.09 % | ≲ 0.8 % | ≳ 2.9 | ≳ 2.5 % |
| C3-16 | ≳ 6.0 | ≲ 0.3 % | ≲ 0.07 % ≲ 0.09 % | ≲ 0.8 % | ≳ 3.5 | ≳ 1.0 % xW-30 only |
| C4-16 | ≳ 6.0 | ≲ 0.2 % | ≲ 0.09 % | ≲ 0.5 % | ≳ 3.5 | ≳ 1.0 % xW-30 only |
| C5-16 | ≳ 6.0 | ≲ 0.3 % | ≲ 0.07 % ≲ 0.09 % | ≲ 0.8 % | ≳ 2.6 ≳ 2.9 | ≳ 3.0 % |
| A3/B4-16 | ≳ 10.0 | No Limit | No Limit | ≲ 1.0 % ≲ 1.6 % | ≳ 3.5 | No Requirement |

Notes:

- Sulphated Ash Limits do not allow both ACEA A3/B4 and C3 (or other low SAPS spec) to be met with the one oil.
- CX-16 is the latest 2016 ACEA specifications which supersede CX-12, CX-10 etc.
- C5-16 is a new specification introduced with ACEA 2016 for improved fuel economy with low viscosity oils. New products will be released upon demand.
- HTHS - High Temperature High Shear is the Dynamic viscosity which is important for wear protection. Low HTHS oils should only be used in engines designed to use low HTHS oils.





TOTAL LUBRICANTS THE SOLUTION

TOTAL Lubricants has the QUARTZ INEO and CLASSIC ranges of low SAPS oils to cover ACEA "C" specifications and OEM requirements.



ACEA C1

**QUARTZ INEO C1
5W-30**

ACEA C1, Mazda, Ford, Jaguar, Land Rover



ACEA C2

**QUARTZ INEO ECS
5W-30**

ACEA C2, Hyundai, Kia, Subaru, Toyota



ACEA C3

**QUARTZ INEO MC3
5W-30**

ACEA C3, API SN/CF, Mercedes, BMW, Dexos 2, VW, Chrysler, Hyundai-Kia



ACEA C3

**QUARTZ INEO MC3
5W-40**

ACEA C3, API SN/CF, Mercedes, BMW, Porsche, Dexos 2, Ford, Fiat



ACEA C3

**QUARTZ INEO LONG LIFE
5W-30**

ACEA C3, VW 504.00/507.00, Mercedes, BMW, Porsche



ACEA C4

**CLASSIC C4
5W-30**

ACEA C4, Nissan

The above is a guide and the current oil for the engine should be determined by the TOTAL LUB ADVISOR APP or Internet site.

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