



Technical Information

Lubrication Definitions

Friction

When any two surfaces rub against each other, friction will occur. Friction generates heat and thus a loss in power with wear and tear deforming or destroying the two materials. Introducing a lubricant between the two surfaces has the effect of reducing the friction causing the damage. Optimal lubrication is achieved when the exact film of oil is between the two surfaces.

Viscosity

The viscosity is a lubricating oil quality indicator, which is an arbitrary measure for the change in viscosity against temperature. The viscosity of a lubricant decreases as temperature increases and the viscosity of a lubricant is closely related to its ability to reduce friction. Generally, the thinnest lubricant is ideal which still forces the two moving surfaces apart. If the lubricant is too thick, it will require a lot of energy to move the surfaces. If it is too thin, the surfaces will rub and friction will increase.

Viscosity Index

The viscosity index applies to the viscosities of the oil at various temperatures, the higher the index of the lubricant the more stable the viscosity of the oil at temperature and under load.

Multi-Grade Oils

Multi-Grade oils are made possible by adding polymers to the oil. The Polymers allow the oil to have different weights at different temperature. Multi-Grade oils are classified by numbers. The first number indicates the viscosity of the oil at a cold temperature, while the second number indicates the viscosity at an operating temperature.

At cold temperatures, the Polymers are coiled up and allow the oil to flow as their low numbers would indicate. As the oil warms up, the Polymers begin to unwind into long chains that prevent the oil from thinning as much as it normally would. The result is that at 100°C, the oil has thinned only as much as the higher viscosity number indicates. Another way of looking at Multi-Grade oils is to think of a 20W/50 as a 20 weight oil that will not thin more than a 50 weight would when hot.

Mono-Grade versus Multi-Grade

Mono-Grade oils, as by their name, work at their optimal lubrication at a limited outside temperature range. Multi-Grade oils have a stretched range of viscosity which allows a greater difference of outside temperature for optimal lubrication.

Detergency

This is the lubricant's capacity to remove/clean the varnish and carbon residues deposited inside the engine.

Dispersion

This is the oil's capacity to prevent the accumulation and deposit of sludge.

Industry and Products Definitions

The Society of Automotive Engineers (SAE)

International classification of oils on the basis of their viscosities. Grades marked 'W' are at a temperature below 0°C (W = winter). The lower the number next to the 'W', the lower the pouring temperature of the lubricant.

ACEA – European Automobile Manufacturers Association

The ACEA European Oil Sequences define the minimum quality level of Service-fill Oils that ACEA members demand for using these oils in their vehicles. These sequences define the minimum quality level of a product for presentation to ACEA members.

Society of Automotive Engineers

The SAE viscosity classification defines solely viscosity limits at high and low temperature for any grade of lubricant oil. The SAE grade is intended as guide to the choice of the right viscosity for different outside temperatures.

MIL

USA military specification for engine and gearbox oils issued for logistic reasons.

The American Petroleum Institute (API)

The American Petroleum Institute (API) classification system is for engines and gearbox differentials. It is a guide to the choice of the right oil for significantly different operating conditions. Examples of API specifications are as follows:

Petrol Engines: API SF, SG, SH, SJ, SL, SM

Diesel Engines: API CD, CE, CF-4, CG-4, CH-4, CI-4

Gearboxes/Differentials: API GL3, GL4, GL5

- SAPS — Sulphated Ash, Phosphorus and Sulphur
- DPF — Diesel Particulate Filters
- TWC — Three Way Catalyst
- HTHS — High Temperature/High Shear Rate Viscosity
- ATD — After Treatment Device
- EGR — Exhaust Gas Recirculation

Witham Group Expertise

As expert manufacturers of thousands of lubricant products, the Witham Group has its own technical team and laboratory based at the Head Office in Lincoln. On a daily basis, products are tested, researched and developed to ensure that only high quality lubricants are made using the latest manufacturer's requirements. In addition, in house expertise and blending facilities mean that customer bespoke enquiries and ongoing product design and development remain at the heart of our ever changing environment.