

Financial Benefits of Synthetic Lubricating Fluids

Why is there a misperception that synthetic lubricating fluids have to be avoided because they cost more than conventional mineral oil lubricants?

Motorists estimate the distance travelled before their next service in terms of their own personal transport needs and predict that it would take them so many months to reach the next oil change and service. This is totally unrelated to the actual time seated behind the wheel and the number of engine working hours used to complete the distance.

To illustrate: a motor vehicle traveling 30 000 kilometres at 60 kilometres per hour for twenty-four hours a day will take 20.8 days of engine time to complete this distance. This means that by distance travelled and operating time, a synthetic engine oil change is recommended when the oil has only served for less than a month.

Combustion of petrol or diesel in engines produces carbon soot, acid and water. These components rapidly build up to when they must be removed from the engine sump by draining before causing any damage to the metal engine parts. This is why the synthetic oil has to be discarded although it is still well within its useful working life. The benefits for automobile engines are reduced fuel consumption due to lower liquid friction in the sump and reduced wear.

Mineral oil engine oils are hydrocarbons attracting oxygen from the air and polymerising to form varnish and gum and so cannot match the performance of synthetic oils.

Compressors

A prime example of cost-effective savings is using a synthetic oil for compressor lubrication. Compressors typically work for 12 hours a day over a year will run up approximately 3000+ hour's operation time. This will only require one oil change in two years with a synthetic oil compared with mineral oil which would have to be changed once a month. There is no combustion acid soot and very little water required to necessitate an earlier oil change, plus oxygen is unable to attach itself to oxidise stable synthetic oil. The useful life time of synthetic poly alpha olefins is 10 000 hours at 180°C well below the operating temperature of a hard working compressor. Mineral oils useful lifetime is 250 hours at 100°C or one hour at 200°C.

The cost savings are huge when considering the price of labour for the frequent oil changes and the larger volumes of mineral oil required for a once-a-month oil change compared with that of synthetic fluid.

Four Factors

There are four important differences between the physical properties of synthetic oils and mineral oils:

- ♣ The first is that the temperature at which the fluids change from their liquid state to their gaseous state;
- ♣ The second is the rate at which oxygen can join the liquid to reach a point where the fluid is polymerized and is no longer useful as a lubricant.
- ♣ The third property is the pour point, the minimum temperature at which the fluid no longer flows.
- ♣ The fourth is Viscosity Index. Synthetics have natural Ultra High Viscosity Indexes which means they are thinner at lower temperatures and more viscous at higher temperatures than mineral oil so will benefit users with lower energy cost due to less internal liquid friction at operating temperatures and therefore save fuel consumption in automobiles and measurably reduced electricity costs in manufacturing and mining operations.

Tribology involves the entire management stream of a company in our highly competitive world. This includes the managing director, the accountant who reviews and accepts the annual budget for maintenance, the engineer and his maintenance team right down to the machine operator who need to understand the properties of available lubricants and select them to realise economic savings for their companies.

The SAIT runs a five-day course throughout the country to train personnel to realise these savings for their industries.

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