

Karel De Grote Hogeschool vzw
Departement IWT opleiding Chemie/Biochemie
Salesianenlaan, 30
B-2660 Hoboken.
Belgie
Tel: +32-(0)3-820-67-64

Characterization of engine oil by using the additive Shieer Olein

S. Tavernier
J. Geuens 2
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1. Introduction

The Dutch company Shieer developed an additiv for engine oil which is called Shieer Olein. The additiv was added into the engine oil of a Volkswagen Touareg 6-cyllinder motor. After 28700 km a sample of the engine oil was taken and analysed with agents of gel permeation size exclusion chromatografie (GPSEC) and fourier transformed infrarot spectroscopie (FTIR) in order to check the purity of the oil.

2. Analysis

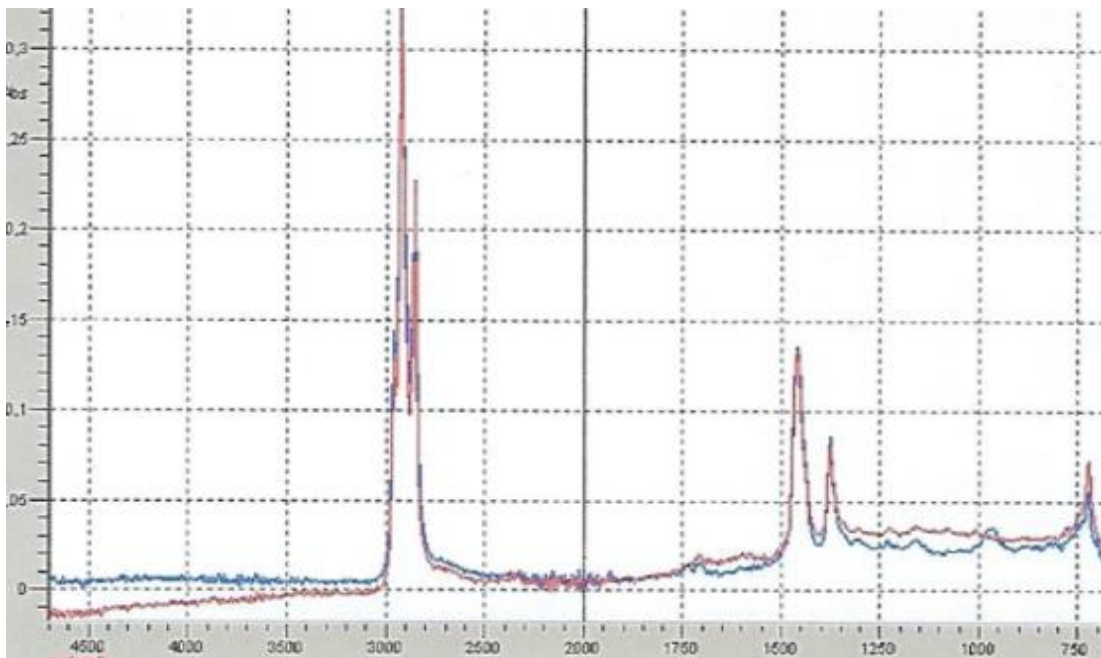
2.1 Template

The new oil was of the 15W40 type. The used oil, which was taken from the motor, (of a Volkswagen Touareg 6-cyllinder) was also of the 15W40 type (both from SHELL). The car drove 28700 km with the oil, without an interim renewal.

2. 2 FTIR - analyse

An infrared spectroscopy gives an idea of the functional groups which are present in certain patters. When we compare a pattern of an unused oil with a pattern of a used oil we can usually see a big difference in the infrared spectrum, when the used oil is contaminated. But when we look at the overlay in the spectra of the fresh engine oil and of the used oil, with the addition of Shieer Olein, (Picture 1 - blue = fresh engine oil, without additive, red = used engine oil with Shieer Olein), we see almost no difference between the two spectra.

This suggests that the used engine oil is still very clean. We can also assume, that no acetification of the motor happened, cause the acid shows on the infrared spectra a peak by 1750 cm⁻¹ and there is nothing to see.



Picture 1 spectra overlay of the FTIR-analyse, of fresh engine oil, without additive and of used engine oil, with the addition of Shieer Olein.

2.3 GPSEC-analyse

“Gel permeation size exclusion chromatography“ is a separation technique in which molecules were separated, based on their size. The pillar on which the molecules were separated, contains a porous gel, whereby the retention of smaller molecules gets bigger. So, the biggest molecules are getting first eluted on the pillar, followed by the smaller molecules.

The chromatogram of the GPSEC-analyse, of the used engine oil (picture 3) looks a bit different then the chromatogram of the fresh engine oil (picture 2). The difference between the two patterns is specially to see at the main point (the fresh oil stands at 5,6 min and the used oil has two main points, the first one after 5,4 min and the second one after 5,6 min). Because there was no pattern of the Additiv Shieer Olein available, it could not be proven if the point after 5,4 min only came because of the additive.

It's also possible that the additive is responsible for some reaction whereby bigger molecules arise, which could be a second explanation for the main point after 5,4 min. In the chromatogram of the used oil appears a point after 7,8min. This point arises through very small molecules and consists of oxygen or carbon dioxide. These components can form on the column when there is an air bubble in the injection needle and the tip will not come off the pattern itself.

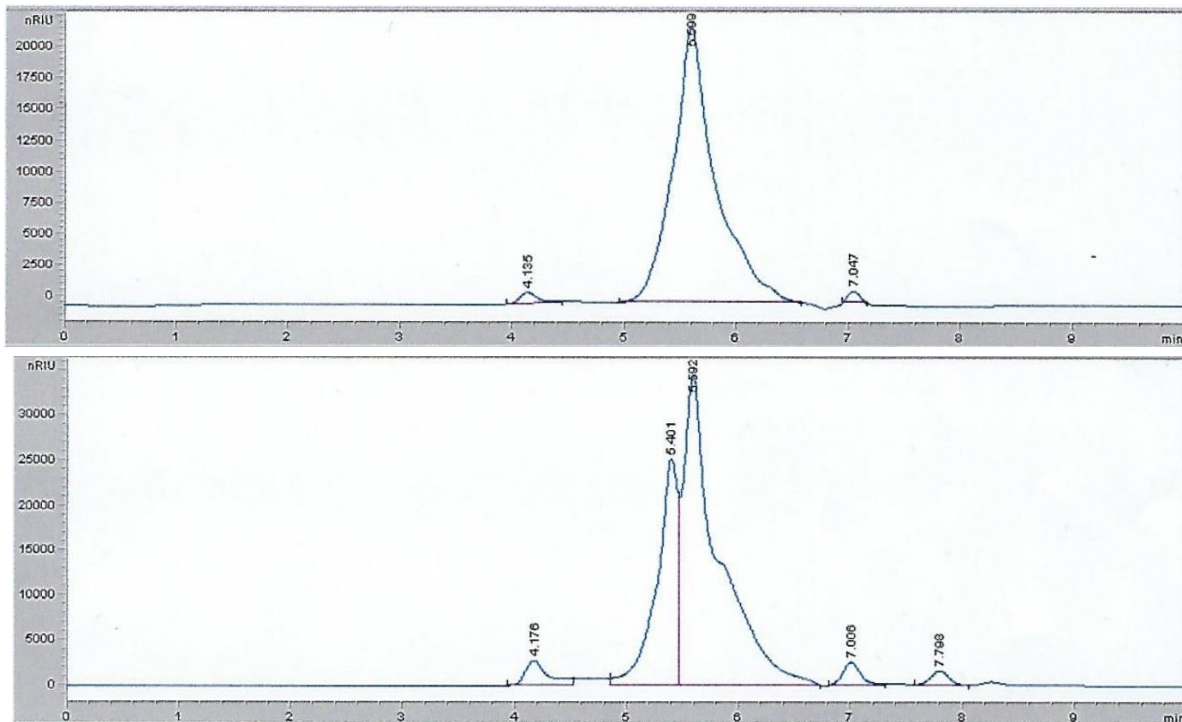


Figure 3 Chromatogram of the GPSEC analysis of used motor oil with the addition of the additive Shieer Olein.

3. Discussion and conclusion

With the addition of the additive Shieer Olein in the engine oil, the engine oil remains cleaner and must be changed less regularly. Most likely, this can be attributed to the fact that the additive provides better sealing of the piston heads, thereby the blow-by amount gets minimized. So there is little or no fuel in the engine oil, possibly creates a chemical reaction of the fuel passes through the blow-by in the engine oil. It may also be that the additive creates a chemical reaction of the engine oil, which can do its job better. Finally, we can say that with the addition of Shieer Olein after 28,700 km, no visible pollution of engine oil has occurred.