

CHAPTER I

INTRODUCTION

The purpose of investigation ^[1]

The used of gasoline and diesel oil as passenger car engine oil have had dramatic volume growth and improved technology leading to progressively better performance properties. Dispersant additive began to play a major role in these fuel oils to provide fuel injector, carburetor and valve cleanliness. Engine life is prolonged and undesirable engine exhaust emissions are reduced.

Dispersants have long chain hydrocarbons with polar ends containing oxygen and/or nitrogen. In engine oils, the harmful products of combustion and other contaminants are rendered harmless by the polar ends and the long chain hydrocarbon of this additive helps to solubilize or suspend the debris in the oil.

In this study, a method for quantitative determination of high molecular weight dispersant in gasoline and diesel oil is developed. In the past, the methods for determination of dispersant in fuel oil such as UV-visible and IR spectroscopy have had problems such as the effect from base oil, use long time to determine, the indirect method had low precision and had long time to determine, the indirect method had low precision and repeatability or too complicate. Some method used HPLC and GPC but they had problem about aging of indicator which used in the method and the effect of base oil which came from different source.

The commercial gasoline and diesel oil have had two main components; one has been low molecular weight molecules such as base oil or solvent in dispersant additive package and another one has been high molecular weight molecules such as dispersant polymer additive.

The present invention method is directed to determine the concentration of high molecular weight dispersant in gasoline and diesel oil. The HPLC/GPC can distinguish the high molecular weight from low molecular weight and EMD technique was used for this study. The concentration of dispersant additive in gasoline and diesel oil was determined.

Objectives

To develop suitable technique for determination of dispersant in gasoline and diesel oil.

Scope of the investigation

For determination of dispersant additive in gasoline and diesel oil by HPLC/GPC method, the appropriate condition such as column, temperature of the EMD, flow rate of Nitrogen gas and flow rate of THF as mobile phase were studied. And in diesel case, the appropriate conditions such as absorbent, solvents to separate the dispersant additive away from base diesel were studied, as well. After the condition was found, the known samples and unknown samples were injected to HPLC/GPC system. To determine the concentration of dispersant in sample oils by comparing the peak area of first peak of unknown samples with standard calibration curve of known samples. The necessary procedure may be as follows:

1. Literature survey and in-depth study of this research work.
2. To look for optimum conditions to operate HPLC/GPC system.
3. To look for optimum conditions to separate dispersant molecules away from the base fluid materials such as the base oil.
4. Inject sample to HPLC/GPC system.

5. Determination of the concentration of dispersant in sample oil by compared the peak area of unknown samples with standard calibration curve of known sample.
6. Determination the concentration of dispersant in commercial oil by used the method like in 5.
7. Summarizing the results.