

# Composition and Method of Manufacture of Heat Activated Chemical Biodiesel Based Oil Additive.

## Description

This invention relates to the composition and method of manufacture heat activated chemical biodiesel based oil additive which when heated enhances the load carrying capacity of all oils and hydrocarbon mediums. The said additive significantly increases the load carrying capacity of said mediums when it experiences an increase in temperature due to friction.

## BACKGROUND OF THE INVENTION

Proper lubrication is critical to the operation of all mechanical machinery. In fact, the success of our industrial economy is dependent on reliable lubrication.

Most of the lubricants used in automotive and industrial machinery are refined from petroleum crude. However, the increasing demand for higher machine performance has led to the development of said additives.

The term "lubricant" generally refers to lubricating materials that are applied as fluids. To be effective, a lubricant must maintain sufficient film thickness to carry the load while keeping friction and wear at minimum. The lubricant must also cool moving parts by absorbing and carrying away the heat produced by friction.

The thickness of a lubricant is generally the function of viscosity, temperature and load. Viscosity is the measure of the oil's thickness, or resistance to flow. A higher viscosity lubricant will generally result in greater film thickness. However, using lubricant with too high a viscosity will also increase frictional load and energy consumption. Using lubricant with too low viscosity will reduce film thickness and increase machinery wear.

Lubricant viscosity is affected by operating temperature. As the temperature rises, the lubricant tends to become thinner, and loses its lubricant properties resulting in excessive wear to the metals and ultimately seizure of moving parts.



Additives must be added into the lubricant to meet the demanding performance of modern machinery, but the current conventional lubricant additives only enhance the oil properties by increasing its viscosity index, however, when the load and temperature increases further the lubricant treated with conventional additives will fail.

## **SUMMARY OF THE INVENTION**

The said invention is a heat-activated lubricant additive, scientifically blended Vegetable Fatty Acid Ester, Extreme Pressure Agent, Anti-Wear Agent, lubricity agent and Anti-Oxidant with petroleum based product. It uses heat-activated chemical technology to achieve the desired lubrication results.

Energy that goes into friction is converted directly to heat. This heat originates from billions of collisions of microscopic protruding peaks of metal ("asperities") on the surfaces of the moving parts, caused these asperities to penetrate the oil film. With ordinary lubricant, these asperities impact each other and usually immediately break off, creating "wear metals" that are often visible in used lubricant.

The said invention contains proprietary Extreme Pressure (EP) Agent. When activated by heat, the E.P. agent fuses/attaches itself to the metal surface by modifying the molecular structure of the ferrous metal. In this way, it actually seals the pores, thus smoothening out the asperities of the metal surface without changing any tolerances.

Due to its superior film strength and its ability to modify the surfaces of the asperities thermally, it causes most of these impacted asperities to bend or fold over by internal yield-type flow of the metal in the direction of impact, without breaking off. They also tend to flatten out, mostly into their normal plane of shear, which is usually cylindrical or flat. This flattening greatly increases the total area of potential contact between the two surfaces, thus providing a greater surface area over which to distribute the load. This is one of the mechanisms which result in greater load carrying capacity, longer wear, or both.

This effect tends to reduce the coefficient of friction as evidenced by measurement with a motor-monitoring ammeter on a Timken Load machine.

## **DETAILED DESCRIPTION OF THE INVENTION**

In accordance with this invention, it is an object of the invention to provide the composition and method of manufacture of said invention.

## **The Method and Composition are herein described.**

In accordance with this discovery, it is an object of the invention to provide a method and composition for the manufacturing of oil additives using a combination of Extreme Pressure Agent, Anti-Wear Agent, Lubricity Agent, Anti-Oxidation, and biodiesel oil as main proportion of the composition.

In accordance with the invention, the heat activated chemical oil additives is produced by blending a major proportion of biodiesel with a carbon chain of C14 to C18 and a minor proportion of chlorine extreme pressure additives, sulfur or zinc anti-wear additives, ester lubricity agent, sulfonated or amine base corrosion inhibitor, and aminic anti-oxidant in a mixing vessel.

Figure 1 shows biodiesel oil of C-14 to C-18 carbon chain is loaded into the mixing vessel at an amber temperature of 25°C to 30°C,

Figure 2 shows extreme pressure additives either chlorine or phosphorus based is added into the mixing vessel and are mixed and agitated for 10 minutes with the aid of an industrial mixer.

Figure 3 shows sulfur or zinc anti-wear additives is added into the mixture and mixed for another 10 minutes with the aid of an industrial mixer.

Figure 4 shows the ester lubricity agent is added slowly into the mixture and mixed for 10 minutes with the aid of an industrial mixer.

Figure 5 shows aminic anti-oxidant is added into the mixture and mixed for 10 minutes with the aid of an industrial mixer.

It is preferred that the above composition is prepared with 80 % of biodiesel oil by weight with the remainder 20 % by weight of extreme pressure additives, anti-wear additives, anti-oxidant, lubricity agent and corrosion inhibitor.

### **Biodiesel Oil**

Biodiesel Oil can be selected from biodiesel with C-14 to C-18 carbon chain.

### **Extreme Pressure Additives**

Extreme pressure additives can be selected from chlorinated alkanes or ZDDP Zinc dialkyl dithio phosphate. A preferred chlorinated alkane is chlorinated paraffin with a chlorine content of 30 wt% to 52 wt%.

The said preferred Chlorinated paraffin is selected because of its excellent extreme pressure characteristics.

## **Anti-Wear Additives**

Anti-wear additives can be selected from Polysulfide compound or Zinc phosphate. A preferred Zinc phosphate is ZDP, Zinc Dithiophosphate. Zinc Dithiophosphate was selected for the said composition because of its excellent oxidation and anti-wear characteristics.

Zinc Phosphate based anti-oxidant/ Aminic anti-oxidant

Zinc phosphate based anti-oxidant can be selected from Zinc dithiophosphate or Zinc dialkyldithiophosphate.

Aminic anti-oxidant additives can be selected from one of these; PAN (Phenyl-1-Naphthylamine), ODP (Octylated diphenyl amine), NDPA (Nonylated diphenylamine), ADPA (Alkylated diphenyl amine).

A preferred aminic anti-oxidant is Phenyl-1-Naphthylamine due to its excellent anti-oxidation and higher thermal stability properties.

## **Lubricity Agent**

Lubricity Agent can be selected from Vegetable Fatty Acid Ester.

## **EXAMPLES**

By way of example and not limitation, the following are illustrative of various embodiments of the foregoing invention.

### **Example 1**

This example illustrates the composition and the percentage of raw materials used in manufacturing said oil additives.

In a typical process, 65 wt % of biodiesel oil of C-14 to C-18 carbon chain, a 35 wt % mixture of Vegetable Fatty Acid Ester, Phenyl-1-Naphthylamine, Chlorinated paraffin, Zinc Dithiophosphate were mixed in a stainless steel mixing vessel.

## Example 2

This example illustrates the composition and the percentage of raw materials used in manufacturing said oil additives.

In a typical process, 75 wt % of biodiesel of C-14 to C-18 carbon chain, a 25 wt % mixture of Vegetable Fatty Acid Ester, Phenyl-1-Naphthylamine, Chlorinated paraffin, Zinc Dithiophosphate were mixed in a stainless steel mixing vessel and having the help of an industrial mixer.

The foregoing embodiments are susceptible to considerable variation in its practice.

Accordingly, the embodiments are not intended to be limited to the specific exemplifications set forth hereinabove. Rather, the foregoing embodiments are not within the spirit and scope of the appended claims, including the equivalents thereof available as matter of law.

The patentees do not intend to dedicate any disclosed embodiments to the public, and to the extent any disclosed modifications or alterations may not literally fall within the scope of the claims, they are considered to be part hereof under the doctrine of equivalents.

## **Claims:**

### **What is claimed is:**

- 1) A composition and method of manufacturing biodiesel based oil additives comprising of the steps of:
  - a. Blending a major proportion of biodiesel oil and with a minor proportion of extreme pressure additives, anti-wear additives and anti-oxidant additives, and lubricity agent.
  - b. Adding sulfur or zinc salts of dithio organophosphates anti-wear additives to enhance the boundary lubricant properties of the biodiesel based oil additives.
  - c. Adding Chlorine or Phosphorous Extreme Pressure additives to enhance the load carrying capabilities of the biodiesel oil additives.
  - d. Adding anti-oxidant to enhance the biodiesel based oil additives anti-oxidant properties.
  - e. Adding vegetable ester to enhance the lubricity properties of the biodiesel based oil additives.
- 2) A composition and method of manufacture as in claim 1a wherein the biodiesel is derived from methyl or ethyl ester.
  - a. A method as in claim 1a wherein the carbon chain of the biodiesel is C-14 to C-18
  - b. A method as in claim 1a wherein the Cetane Index of the biodiesel is 50-90
- 3) A composition and method as in claim 1b wherein the sulfur anti-wear additives contain a sulfur content of 0.5% to 38%.
- 4) A composition and method as in claim 1b wherein the Zinc anti-wear additives is selected from any one of the combination of ZDDP, ZnDTP or ZDP
- 5) A composition and method as in claim 1c wherein the chlorine extreme pressure additives contains a chlorine content of 15 to 52% w/w.
- 6) A composition and method as in claim 1d wherein the anti-oxidant agent is in the Aminic or Zinc phosphate chemical family.
- 7) A composition and method as in claim 1e wherein the lubricity agent is a vegetable ester.
- 8) A composition and method as in claim 5 wherein the sulfur or zinc anti-wear agent is blended with biodiesel at temperature range of 25° C up to 85° C to increase its anti-wear properties.
- 9) A composition and method as in claim 6 wherein 0.1 to 6 wt % of aminic or zinc phosphate anti-oxidant is added to the biodiesel based oil additives.

- 10) A composition and method of manufacture as in claim 1 wherein in step b sulfur or zinc additives is added into the biodiesel based oil additives at temperature of 25° C to 30° C.
- 11) A composition and method of manufacture as in claim 1 wherein in step c chlorine or phosphorous additives is added into the biodiesel at temperature of 25° C to 30° C to increase the load bearing carrying capabilities.
- 12) A composition and method of manufacture as in claim 1 wherein in step c aminic anti-oxidant is added to the biodiesel at temperature of 25° C to 30° C.
- 13) A composition and method of manufacture prepared in accordance with the method of claim 1, a biodiesel based oil additives composition comprising:
- a) 65-85 wt % biodiesel.
  - b) 1-15wt % sulfur or zinc phosphate additives.
  - c) 1- 25 wt % of chlorine or phosphorous or boron additives.
  - d) 1- 3 wt % anti-oxidant.
  - e) 1 to 5 wt % lubricity agent.
- 14) A biodiesel based oil additives as claim in 13 comprising of
- a) 70 wt % biodiesel.
  - b) 5 wt % sulfur or zinc phosphate additives.
  - c) 18 wt% chlorine or phosphorous or boron.
  - d) 5 wt % aminic anti-oxidant or Zinc dithiophosphate anti-oxidant.
  - e) 2 wt% lubricity agent.