Description

"SUPER-LUBE" BIODIESEL & POLYOLS

The conventional method of manufacturing biodiesel is already very well established.

This invention is an improvement to the biodiesel, by adding hydroxyl groups to it thus improving it's lubricity in the high temperatures than fuel is exposed to. It also significantly, and in most cases prevents carbon build-up in the engine.

Once the biodiesel has been produced (meeting of course BS EN or ASTM standards) it is warmed up to around 75 degrees Centigrade. Stirring all the time at 100 rpm.

(An) amine(s) common to the cosmetics industry is selected – which one varying upon the oil the biodiesel has been made from (*various amines are better suited to different oils*) – and added to the warmed biodiesel at a level of around 5 %. This amime(s) donate the hydroxyl groups making the fuel a 'super-lube' as well as assisting the reaction kinetics.

This is also stage 1 of making the vegetable oil based polyol for the manufacture of polyurethane products.

Now, heat the mixture to 110 degrees Centigrade, thus driving off any excess water that may be present and include a further 15% of the amine(s) added earlier. Keep stirring at 100 rpm for 30 minutes.

A condenser must be on at all times to collect the condensate (mostly water) in a closed container, which has a vent to the outside.

After a further 45 minutes at an elevated temperature (*the optimum temperature is decided upon by using the saponification value as a guide. For every unit in the saponification value the temperature at max will go up a degree, for example a saponification value of 140 from the base oil would mean the maximum temperature would be 140 degrees Centigrade. This is a generalised rule*) the reaction is completed, again depending of the source oil used in the biodiesel.

The material is now a 'super-lube' because at this point it has achieved a hydroxyl value of around 200. It should be noted that standard castor oil (a common lubricant) has a hydroxyl value of 160.

To make vegetable oil based polyurethane polyols a computer is utilised along with a program I have developed of which monitors the reaction rate and alters the heating process accordingly, increasing the rate of heating or retarding the heating rate as needed, as well as keeping the material at the required holding points time-wise.

The liquid is then cooled as quickly as possible to 80 degrees Centigrade.

Once the temperature has reached 90 degrees Centigrade nitrogen is used to purge water from the polyol.

The polyol is then cooled to 25 degrees Centigrade.

The reaction is then completed.

In the super lube biodiesel 3% styrene monomer should be put in as soon as the reaction is completed to stop the biodiesel fuel from degrading.

Claims

The polyurethane polyol manufactured by this process has a functionality of 3.

The abundance of such polarisable groups cause intermolecular attraction (hydrogen bonding) of which manifests itself as film strength in the oil bulk rather than a metal lubricant interaction.

Film strength is difficult to assess, but could be loosely described as the ability of a fluid film to carry high loads without being squeezed out.

The fluid film of this processed material being 50 molecules high rather than a simple monolayer.

Due to the functionality of the polyol being 3, the film thickness is maintaine at higher temperatures than 165 degrees Centigrade thus allowing the engine to operate at higher temperatures.

It is apparent from this that a machine can be built to manufature both biodiesel and polyurethane polyol without any modification.

The machine that does this can also be used to manufacture vegetable oil based polyurethanes

To make vegetable oil based polyurethane polyols a programme for the computer is used to control the process, analysing the reaction, and ramping up or down temperature rates of rise and introducing various holding points, depending on the nature of the oil or biodiesel.