

BIODIESEL:

A CHALLENGE FOR THE FUEL SYSTEM

THE CHANGEOVER FROM FOSSIL FUEL TO BIODIESEL HAS ITS PITFALLS - FOR INSTANCE CLOGGED FUEL FILTERS DUE TO DISLODGED OLD DEPOSITS. A BRIEF OVERVIEW OF THE POSSIBLE EFFECTS OF THIS ALTERNATIVE FUEL ON THE FUEL SYSTEM - AND THEIR CAUSES.



Despite controversies: More and more fleet and vehicle owners convert to biodiesel - and more and more biodiesel flows into the fuel tanks. Most of the time it is added to fossil diesel fuel - in European countries up to 7 % (B7) of biodiesel is added to fossil diesel by oil companies as standard - but also pure biodiesel (B100) is used more frequently. However, especially in its pure form or alternating with fossil diesel, biodiesel can be more challenging to the vehicle's fuel system and for instance, can clog the fuel filter due to deposits dislodged from tanks and pipes.

DEPOSITS IN THE FUEL SYSTEM: CAUSED BY FOSSIL DIESEL AND DISLODGED BY BIODIESEL

When diesel from fossil origin is used, it leads to deposits in the fuel system. When changing to biodiesel, this acts like a solvent: The old diesel deposits in the tank and in the pipes are released and collect in the fuel filter, which can clog completely due to the sudden, additional load. The possible consequences: the fuel supply is interrupted and the vehicle stops. Experts recommend therefore to replace fuel filters a few hundred kilometres after changeover from conventional diesel to biodiesel, just to be on the safe side.

Also when there are frequent changes between biodiesel and fossil fuel, increased clogging of the fuel filter can be observed. The deposits that are repeatedly caused by fossil diesel are afterwards dislodged by the biodiesel and washed into the fuel filter. This kind of mixed fuelling is therefore not recommended.

BIODIESEL – RATHER AGGRESSIVE

Biodiesel cannot only dissolve old deposits, but occasionally also plastic materials used in the fuel system, elastomers, glues or even metals. In addition, corrosion protections such as zinc plating or resin based internal tank coatings can be affected by biodiesel. When biodiesel reacts with materials used in the fuel system, soap like substances can form and clog the fuel filter. It is therefore strongly recommended to consult the relevant release notes of the vehicle manufacturers before biodiesel is used.

WATER IN DIESEL – A BREEDING GROUND FOR MICROORGANISMS

Diesel fuel – whether fossil or from renewable raw materials – contains always a small amount of water with nutrients that provide the basis for the undisturbed growth of bacteria, yeasts, algae and fungi. For biodiesel, the capability to solve water and therefore its holding capacity for water is even greater and water

separation in the fuel filter is reduced. As water promotes bioactivity, there is an increased risk that microorganisms may develop that cause the fuel to break down into its basic constituents and lead to corrosion or formation of biomass. When the fuel filter is repeatedly clogged by gelatinous material, this type of “diesel oil pest” can be the reason.

The condensation water in the tank of the vehicle can constantly provide nutrients for the small organisms. In order to contain the growth of such microorganisms, diesel fuel should not be stored for longer time periods. If this cannot be avoided, the tank should always be kept as full as possible – a large air volume favours the formation of condensation water. Also storage in warm environments (for instance, in aboveground tanks exposed to solar radiation as used in farming), promotes the formation of microorganisms.

BIODIESEL AND ENGINE OIL – A PROBLEMATIC MIXTURE

Biodiesel can also get into the engine oil, mostly via the piston skirt. This can dilute the engine oil with fuel – with the result of reduced lubrication and increased oil temperatures. For vehicles that operate with biodiesel, it is therefore recommended to observe the oil change intervals exactly, or even better, to shorten them.

Generally it can be said that for vehicles running on biodiesel it is essential to comply with the specified change and service intervals for oil and fuel filters. However, it is advisable to halve the usual intervals: fuel filters should therefore be changed after a maximum of 6 month.



Clogged filter paper – the result: collapsed filter element.

Biodiesel – what, how, and why?

The name biodiesel is given to fuels that are obtained from renewable raw materials. In Europe, biodiesel is predominantly obtained from rapeseed oil that is converted into Rapeseed oil fatty acid methyl ester (RME) with the help of methanol – a fuel that has largely the properties of diesel oil. Also fatty acid methyl ester (FME, FAME), Sunflower oil methyl ester (SME) or used oil methyl ester (AME) are biodiesel fuels.

Biodiesel is regarded as a CO₂ neutral fuel, since only as much CO₂ is released during its combustion as was taken up by the plants from the atmosphere earlier. Environmental experts

point out that the low sulphur level and the significantly lower emissions of soot, hydrocarbon and particles as well as the fast biodegradability compared to fossil diesel count as further ecological plus points.

On the other hand, the emissions that are generated during cultivation, production and utilisation (such as carbon dioxide and nitrous oxide) have also to be taken into account. Furthermore, it is regarded as problematic that farm land, which otherwise could be used for food production, is required for biodiesel cultivation.