



FORD FLEET



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Biodiesel Technology

Biodiesel is defined as the mono alkyl esters of long chain fatty acids derived from renewable liquid feedstocks, such as vegetable oils and animal fats for use in diesel engines. The most common biodiesel fuel is made by the transesterification of soy or rapeseed triacylglycerides with methanol in the presence of a strong base catalyst such as sodium hydroxide, potassium hydroxide, or sodium methoxide.

Biodiesel has some favorable properties when used, as a fuel component. The US EPA has analyzed B-20 blends (20% biodiesel blended with 80% conventional diesel) and has concluded that these blends can reduce VOC emissions by 20%, CO and PM emissions by 10%, NOx emissions were increased by 2% in the EPA study.

The World-Wide Fuel Charter, a compilation of fuel quality requirements endorsed by the Alliance of Automobile Manufacturers, the European Automobile Manufacturers Association (ACEA), the Engine Manufacturers Association, the Japanese Automobile Manufacturers Association and a number of other automobile manufacturer trade associations around the world, does not endorse fuels that contain more than 5% biodiesel for fuels sold in WWFC defined category 1-3 areas (most of the world). International Truck and Engine Company has stated that the use of biodiesel in their engines - some of which are in Ford products - at greater than 5% concentration, is solely at the discretion and risk of the customer.

In the US, the ASTM (American Society for Testing and Materials) recently adopted D6751, which specifies properties for neat biodiesel intended for blending with diesel fuel containing up to 500-ppm sulfur. ASTM also plans to develop a standard for biodiesel that can be blended with ultra- low sulfur diesel fuel (15 ppm max). This standard has no requirement for feedstock quality.

European standards organization, CEN (Comité Européen de Normalisation) has released specifications for biodiesel, EN 14214, which specifies properties and the test methods needed to determine compliance. This standard allows any feedstock to be used, but its specifications are most easily met by rapeseed methyl esters.

Ford Motor Company Position

Fuels containing no more than 5% biodiesel may be used in Ford diesel powered vehicles. Consistent with WWFC (World-Wide Fuel Charter) category 1-3, "Fatty Acid Methyl Esters (FAME) used in commercial fuel must meet both the EN 14214 and ASTM D 6751 specifications".

There are still some unresolved technical concerns with the use of biodiesel at concentration greater than 5%. Some of the concerns are:

- Requires special care at low temperatures to avoid excessive rise in viscosity and loss of fluidity
- Storage is a problem due to higher than normal risk of microbial contamination due to water absorption as well as a higher rate of oxidation stability which creates insoluble gums and sediment deposits
- Being hygroscopic, the fuel tends to have increased water content, which increases the risk of corrosion
- Biodiesel tends to cause higher engine deposit formations
- The methyl esters in biodiesel fuel may attack the seals and composite materials used in vehicle fuel systems
- It may attack certain metals such as zinc, copper based alloys, cast iron, tin, lead, cobalt, and manganese
- It is an effective solvent, and can act as a paint stripper, whilst it will tend to loosen deposits in the bottom of fuel tanks of vehicles previously run on mineral diesel

Ford believes that it is unlikely that the emission benefits of biodiesel will be sufficient to achieve Tier 2 emission standards with out catalysts and particulate filters. Ford is working aggressively on technologies, including engine improvements, new catalysts and particulate filters that will remove HC, CO, NOx and soot from diesel exhaust. Renewable fuels or blends containing renewable components can help reduce the total lifecycle CO2 impact and may be used when available, but they are not the key step to achieving Tier 2 emission standards.

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