

Technical Bulletin Q&A

Subject: BioDiesel Fuel and Fuel Filtration Systems

Date: December, 2005

BIODIESEL – QUESTIONS & ANSWERS

What is BioDiesel?

A renewable fuel for diesel engines that contains modified animal fats and/or vegetable oils such as soybean and rape seed (primarily in Europe).

Chemical description: fuel containing mono-alkyl esters of long chain fatty acid.

How is it manufactured?

In the presence of a catalyst, Bio-Oils are reacted with alcohol such as methanol to form the neat product known as B100. Glycerin is a sugar type by-product of this process that must only exist in a very small percentage in the resulting B100.

How biodiesel blend ratios are noted

BioDiesel Blends are mixtures of neat (straight) BioDiesel (B100) and petroleum (Dino) diesel fuels.

Ratios of biodiesel and petroleum fuels are indicated by the capital letter “B” followed by the percentage of biodiesel in the mix. Therefore, B20 is 20% BioDiesel and 80% petroleum Diesel.

Are PetroClear filters compatible with BioDiesel?

Yes, the elastomers, adhesives, metals, filtration media and media resin systems in our products are suitable for BioDiesel. Extensive laboratory and field testing has shown our PetroClear and Luberfiner filters to be compatible in BioDiesel Blends ranging from B2 to B20, and neat B100 from methyl soyate.

Is the solvency issue only a problem at or above B35?

No. You will read on pro BioDiesel websites that B20 is a drop-in to existing systems and the problems begin around B30-35. We have fleets running B11 and are suffering through gross contamination being released and plugging dispensing and vehicle filters. Some fleets are doing fine with B20 after a short run of plugging. We have analyzed competitive filters from the same units. **When the fuel system is in this kind of unbalanced condition there is next to no difference in filter life regardless of the brand or media.**

It is important to remember the filters are doing their job by stopping the contaminant before it clogs the fuel injection system, or causes wear.

What other options or recommendations for rapid plugging?

If you have open access to your dispensing pumps, such as an above ground tank, we recommend you add another filter in series to the system. Use a PetroClear 30 micron particulate filter as the primary followed by a 10 micron filter for the secondary. The 30 micron filter will keep some of the contaminant off of the 10 micron filter and may allow you to extend the service life of the secondary. The 10 micron filter is a good idea on the dispenser to take some of the load off of the vehicle fuel filters. Plugged dispensing filters are easier to deal with than plugged vehicle filters since they usually occur out on the job.

It is possible that you simply won't be able to clean up certain tank loads in an efficient cost effective manner. In those cases it is best to have the fuel supplier become involved in the solution.

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Is Water Separation an Issue?

Biodiesel blends are a different system when it comes to water separation. The fuel behaves something like a strong detergent and emulsifying agent making water separation nearly impossible.

Can you get a bad or out of spec load of BioDiesel?

Certainly, as with most products there are fuels being sold as BioDiesel or BioDiesel Blends that do not meet the ASTM D 6751 specification. We have seen B100 fuel that had an out of spec glycerin content which plugged off dispensing filters in a couple hundred gallons, and truck filters every two days. Petroleum fuel quality in general usually suffers when stocks are low & demand is high.

Here are some points to remember when using biodiesel

- Varnishes, gums, sediments, and fuel degradation products are cut free by the high solvency of the biodiesel. This can increase the load on the fuel filtration systems the degree of which is determined by how much build up is present during the transition.
- Higher water saturation limits causes fuel system corrosion and icing issues, supports microbiological growth, carries more water that condenses out in storage tanks when fuel temperature drops. More water, more potential problems.
- Bio-fuels are more susceptible to Micro-biological growth- "bugs" that feed off the hydrocarbons and biological components. These bugs live off the oxygen in the fuel water mixture that can exist in these fuels. This can result in the entire fuel load chemically becoming highly acidic. That in turn can very quickly cause corrosion on all metal surfaces resulting in an increased amount of sediment. Remember, PetroClear filters are epoxy coated so they will not corrode internally under these situations.
- Cold weather operations lower cloud and pour points. B20 blends have a 7°F (typical) higher cloud point than # 2 Diesel. B100 can have very high cloud points, making even moderate climates an issue.
- Storage will create some new things to consider. For example, B100 should be purchased in quantities that will be used up in 30 days.
- Ethanol blends should be used up in 90-120 days, shorter if in above ground tanks due to heat fluctuations. This can cause the fuel to deteriorate.

Inadequate blending of B100 and petroleum fuels leaves layers fuel with the B100, at the bottom of the vehicle tank/fuel pick-up.

What precautions should be taken regarding filters?

- Change fuel dispensing filters upon loading BioDiesel into the tanks.
- Have extra filters available for dispensers and be prepared to change them.
- Change filters on the dispensers as soon as any reductions in flow are noted.
- Use high quality filters such as PetroClear.

If you are running a BioDiesel blend higher than B5, you should be prepared to changeout filters at any length of service. This depends on degradation products resulting from previously used petroleum diesel in the dispensing and vehicle tanks. This is somewhat dependent on the age and maintenance history of the systems.

What is the safest way to utilize biodiesel?

- As a diesel fuel for compression ignition engines.
- In a Blend range from B2 – B20.
- As a injection system lubricity enhancement.
- By changing out dispensing and engine fuel filters at first fill.
- By having extra filters on hand for the transition.

Working with your PetroClear representative.