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BIODIESEL FAQ

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Biodiesel and other alternative fuels continue to gain popularity as petroleum fuel prices rise and we become more concerned about our environment. Introduction of these fuels raises many questions about actually using them in current equipment. The purpose of this factsheet is to address some of the common questions asked by those considering the use of biodiesel in existing diesel equipment.

What is biodiesel?

Biodiesel is a renewable fuel for diesel engines. Biodiesel, defined by ASTM International D6751, consists of long-chain fatty acid alkyl esters and is made from renewable vegetable oils, recycled cooking oils, or animal fats. It can be used at full strength, but it is typically blended with petroleum diesel. A blend of 2 percent biodiesel and 98 percent diesel is referred to as B2. Other typical blends include B5, B10, and B20; pure biodiesel is sometimes referred to as B100.

Why should I consider using biodiesel?

Biodiesel is a renewable, biodegradable, cleaner burning alternative to petroleum fuels. It has a slightly higher cetane rating, which can promote easier cold starting and lower idle noise. With tax incentives and rising petroleum prices, biodiesel is becoming more economically competitive.

Is all biodiesel the same?

Because biodiesel can be made from a number of different raw materials and with a number of different processes, there can be some subtle variations in chemical and physical properties. ASTM has established standards for testing diesel fuels to ensure some uniformity in

performance. In most applications, if the biodiesel conforms to ASTM standards it can be used in the same equipment as other diesel fuels. Verify with your supplier that the biodiesel conforms to ASTM standards.

Will I have to modify anything mechanically in my engine to use biodiesel?

Not if you are using blends of B20 or less. The specifications for biodiesel have been established so that it can be used in any diesel engine. Some modifications may be desirable with higher biodiesel concentrations. Consult your equipment manufacturer before using higher biodiesel blends.

Will biodiesel hurt the mechanical parts of my engine?

No. In fact biodiesel can be good for an engine for two reasons. First, biodiesel has more lubricating properties than petroleum diesel. Loss of lubricity is one of the drawbacks of newer low-sulphur diesel fuels. Adding just 1 percent biodiesel increases the lubricity to an acceptable level, so any biodiesel blend will have the required lubricity without sulfur or other additives. The second advantage is that biodiesel will actually help clean the fuel system. Because it is a good solvent, it can

remove deposits and buildup from tanks, lines, pumps, and other fuel system components. Be aware, though, that because it is such a good solvent, it has the potential to damage certain paints and finishes, so always clean up spills immediately.

Will biodiesel hurt seals and other components?

Biodiesel blends higher than B20 can cause problems with natural rubber engine components, such as seals and hoses. Biodiesel will degrade rubber, so any seals or hoses in the fuel system that are made of rubber will be susceptible to damage. Biodiesel blends of B20 or below should not cause problems with rubber components, but users should periodically check rubber components when using any biodiesel blend to make sure they are not degrading or getting hard. As the use of biodiesel increases, most equipment manufacturers are increasing the use of Viton-based materials in seals and hoses. Viton is a synthetic rubber substitute that will not be damaged by biodiesel.

Some manufacturers do caution users about potential problems with the lubricating oil in an engine. If biodiesel gets mixed with the lubricating oil, it can react with the oils to create "sludge" that might accumulate in the sump or in oil passages.

Check manufacturer recommendations about oil change frequency, as some suggest changing oil more often when using biodiesel.

Will biodiesel cause fuel filter problems?

The most common fuel filter problems occur when switching older machinery from petroleum diesel to biodiesel. Petroleum diesel has a tendency to leave paraffin-based buildup on the insides of tanks and other fuel system components. Biodiesel will loosen this buildup, which will be trapped in the fuel filter. Users can expect to replace fuel filters several times after switching older equipment to biodiesel. After the fuel system gets cleaned out, filter usage should return to normal.

Another less common cause of filter problems comes from the use of higher biodiesel blends that have been stored for extended periods of time. Biodiesel will degrade with age (see storage question that follows), producing some gums and sediments that can cause filter plugging.

Will I get as much power from my engine with biodiesel?

Pure biodiesel contains 5 to 8 percent less energy per gallon than petroleum diesel. Blended fuels obviously will have less of an energy loss. Some literature does indicate that other factors such as more efficient burning and better injection efficiency due to higher viscosities may counteract this energy loss. In any event, users might notice a slight power loss with biodiesel fuels.

Will I void the manufacturer's warranty if I use biodiesel?

Warranties vary significantly from manufacturer to manufacturer, but most will not categorically void a warranty if you use biodiesel. However, most warranties will not cover damage that was caused by the fuel (be it biodiesel or any other fuel) because those damages were not caused by a defect in the machine. For instance, if you damage a diesel engine by accidentally putting gasoline in the tank, the manufacturer probably will not repair the engine under warranty. Therefore, it may be more difficult to get warranty coverage for problems that may have been

caused by biodiesel. Furthermore, many manufacturers are reluctant to recommend use of blends higher than B5 in engines. Check carefully with the individual manufacturer to verify what is covered and/or recommended.

Can I use biodiesel in cold weather?

Pure biodiesel is more susceptible to cold temperature problems than petroleum diesel, but when blended, this effect is moderated. A B2 biodiesel blend, for example, has the same cold flow properties as petroleum-based diesel. However, B20 will have a higher gel point, from 3 to 5° F higher. The bottom line is that as with petroleum diesel, you will need to use a kerosene blend or other anti-gelling additive in colder temperatures. Consult your fuel supplier to make sure you will be protected in your climate.

Is biodiesel more susceptible to water contamination?

Biodiesel is more susceptible to water contamination than petroleum diesel. The presence of water in biodiesel or any fuel can promote corrosion of fuel system components and growth of microorganisms. The following are some common-sense techniques useful for preventing water contamination in any fuel system:

- Make sure all tank caps are in place and in good condition.
- Store machinery with tanks full to minimize condensation inside the tank. Get in the habit of filling the tanks at the end of the day so there is no room for condensation to form when the temperatures cool overnight.
- Large temperature swings can promote moisture condensation on the inside of storage tanks. Underground storage tanks are best at preventing condensation because fuel is kept at a relatively constant temperature, but underground storage introduces many other potential problems such as leakage and liability. Aboveground storage tanks should be insulated (double wall) and shaded if possible to moderate temperature swings, thereby reducing the possibility of condensation formation.

- Drain a small amount of fuel from the bottom of storage tanks every six months to remove any water that might have accumulated in the tank.
- Avoid prolonged exposure of fuel to light, which can induce algae growth. Fiberglass tanks should be painted and/or placed in shaded areas.
- If biological growth is a problem, the same products that are used with petroleum diesel can be used in biodiesel to “dry” the fuel and clean up biological contaminants.

How long can I store biodiesel?

Fuel aging and oxidation can lead to heightened acid content, high viscosity, and the formation of gums and sediments that clog filters. It is recommended that biodiesel be stored for no more than six months without an antioxidant additive.

Will biodiesel totally replace diesel some day?

There are no specific efforts at this point to make biodiesel a requirement. Because it is a cleaner burning, renewable fuel source, though, availability and usage will continue to increase.

Where can I get even more information about what biodiesel is and the benefits of using biodiesel?

A companion publication to this one (AEN-89) gives more detail about what biodiesel is, how it is made, and some of the advantages and disadvantages of the fuel. There is also a tremendous amount of information available online through organizations such as the National Biodiesel Board at <www.nbb.org>, the United States Department of Energy at <www.energy.gov>, or the National Renewable Energy Lab at <www.nrel.gov>.

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