



## ***Tech Tip: Alternative Fuels; Biodiesel***

As you may be aware, alternative fuels have been garnering a lot of attention lately. There is nothing like record fuel prices to pique the interest of the average citizen in an alternative to traditional fuels. One of the fuels you may have heard some “buzz” about is biodiesel. There is a lot of interest in biodiesel these days, so we are going to take a look at its benefits, challenges, some myths surrounding this fuel. As with any hot topic, there has been a fair amount of both information and misinformation generated on the subject, so we are going to try to cut through some of the confusion surrounding this topic.

First of all, let's examine the chemical make-up of biodiesel. Biodiesel is an alternative fuel that is produced from renewable resources. It is derived from either plant or animal oils which are processed to produce biodiesel. Pure biodiesel contains no petroleum, is biodegradable, nontoxic, and is effectively free of sulfur. It is created through a chemical reaction called transesterification. Methyl esters and glycerin are the two products created from this process. Methyl esters are what we call biodiesel, and glycerin is a commodity which is used by the manufacturers personal care products.

There seems to be some confusion as to what exactly constitutes biodiesel. A common question is if raw vegetable or animal oil the same as biodiesel. The short answer is no. Biodiesel has been extensively tested for health and performance characteristics and is legally registered with the Environmental Protection Agency as a legal motor fuel. Fuel-grade biodiesel must be produced to stringent industry standards (ASTM D6751) to insure proper performance. This cannot be said of raw vegetable oil.

Biodiesel is commonly blended with petroleum diesel. These blends are labeled as BXX. For example, B2 would be representative of a mixture containing 2% Biodiesel and 98% petrodiesel. Biodiesel has attained “mainstream” status in a blended formulations ranging from B2 – B20. In most cases, biodiesel in a B20 or lower blends, can be used in compression ignition (diesel) engines with little or no modifications. For years, Wix as a company has been an industry leader in biodiesel compatibility research, and this exploration has paid dividends. We are pleased to report that all of our diesel fuel filters are approved for use with biodiesel blends of up to B20.

Once seen as the less refined relative of the gasoline engine, the modern diesel boasts technology and complexity that would have been hard to imagine just 10 years ago. These advances, in part due to tightening EPA regulations, have created a shifting landscape to which manufacturers have had to adapt. Now more than ever, our commitment to innovation is necessary to keep pace with changing demands.

Fuel delivery systems in particular have seen sweeping changes in system pressures and mechanical tolerances. Combine this with diesel fuel that has been stripped of its lubricating properties during the removal of sulfur so that it meets tough new regulations, and you have the potential for greatly accelerated injector wear and premature failure. Laboratory studies have shown conclusively that biodiesel in concentrations as low as B2 can replace these lost lubricants and negate the potential for accelerated fuel system wear.

When preparing to convert to a biodiesel blend it is important to be aware of the fact that biodiesel has a “solvent” quality which will result in the cleansing of the fuel delivery system. This typically translates to changing fuel filters more often as the system is rid of accumulated contaminants. The duration of this process is dependant upon the overall cleanliness of the fuel system. The amount of hours/miles the system has been in use, along with the quality of fuel and the level of preventative maintenance system has seen, are all contributing factors. After this initial clean-up, you can expect a return to typical fuel filter service intervals.

Biodiesel also has different handling characteristics than petrodiesel. It has both a higher cloud and pour point than petrodiesel, which impacts its usability in cold climates. Considerable research is being devoted to improving the cold-weather performance of biodiesel. Additionally, biodiesel has 8% less energy in its pure form than petroleum diesel. Both of these factors are by in large negated when it is blended with petrodiesel.

In closing, it is fair to say that biodiesel represents an opportunity to lessen our dependence on petroleum and realize environmental benefits at the same time. At Wix, our research in this evolving technology is ongoing, and we are excited about our continuing role in its development.