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Advanced Low Power Diesel Fuel Polishing System

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ADVANCED LOW POWER DIESEL FUEL POLISHING SYSTEM

INTRODUCTION

It is commonly known that diesel and other light fuel oils degrade in quality over time, even during short term storage. Fuel degradation can lead to diminished performance, decreased service life, and potential failure of the engine or generator using the fuel. This is particularly noticeable on marine pleasure craft and other applications where the engine or generator sits idle for extended periods between uses. In addition to the degradation of the fuel's energy content over time, the daily accumulation of water in the idle fuel system can lead to growth of microbial contaminants such as bacteria. The accumulated water and bacteria can quickly overwhelm the fuel system's filter/water separator, leading to costly fuel system damage and a cumbersome clean-up process.

Advancements in fuel treatment systems designed to keep diesel fuel "fresh" have greatly reduced the operation and maintenance costs of diesel engines and generators. New low power diesel fuel polishing systems now continuously clean stored fuel during engine downtime, thereby preventing the accumulation of water and organic contaminants. By conducting ongoing fuel system maintenance during downtime, the process of maintaining a clean fuel supply becomes easier and less time consuming than other approaches.

The best way to prevent fuel related problems is to prevent the daily accumulation of water in the system. Treating contamination is inevitably more time consuming and less economical than taking a preventative approach.

HOW YOUR FUEL DEGRADES

The main cause of fuel degradation and subsequent poor system performance is water. Regardless of whether the fuel is being used in land- or marine-based applications, the infiltration of water on a daily basis is virtually impossible to prevent. Simply through the same daily temperature swings, water condenses and builds up in your fuel system. If you can see condensation outside of your fuel tank—whether in the form of dew, fog, or rain—then water is almost certainly accumulating inside your fuel tank.

The water collected inside the tank fosters the growth of bacteria by literally providing a microbial breeding ground. These bacteria feed on the stored diesel fuel which reduces fuel energy content. Further, the amassed bacteria leads to clogged filters once the engine or generator is engaged. The presence of water in the tank also promotes oxidation (rust) inside fuel tanks and damages the associated components of the fuel delivery system, such as pumps, valves, and fuel hoses. The collateral damage inflicted upon the various fuel system components only serves to increase the cost of repairs. Because of the repair costs associated with fuel contamination, fuel maintenance can be just as important as regular engine maintenance.

CURRENT SOLUTIONS

Fixed-Based Filtration Systems

Until recently, there were few options available to address water and other contaminants in fuel. Fixed-base fuel filtration services were one of the original solutions to this problem. Fixed-base filtration offers the use of a large system that pumps your fuel supply out of the tank, filters the contents, and often includes thorough scrubbing of your fuel tank to remove sediment build-up. While these systems do a good job of removing contamination from a fuel system, they are prohibitively expensive to utilize on a regular basis. Normally priced on a per-gallon basis that rivals the per gallon cost of the fuel itself, this approach is the most effective means to address a severe contamination problem. However, it is not intended for addressing the daily build up of water in your fuel system.

Additives

Specialty manufacturers offer a range of chemical treatment solutions such as enzyme-based additives for diesel fuels to solve specific fuel problems. These products can vary widely in their effectiveness. Even if the correct product is used to kill bacteria in the fuel system, the root cause of the issue—water collected in the tank—remains a problem.

Pre-filtration Systems

Pre-filtration, either with or without water separators, has also been a commonly

offered solution. This method reduces the fuel system load and can increase the service life on the Original Equipment Manufacturer's (OEMs) filtration system. Racor™, a division of Parker Hannifin, is one of the best-known names in fuel filtration for marine craft. Racor makes a variety of spin-on filters and cartridge filters with contaminant collection bowls and drain valves for gas and diesel engines. These offer excellent high-capacity water separation and fuel filtration, but they do require frequent change outs on the filter elements. The more contamination there is in a system, the more frequently filter changes are required. In some cases, in order to maximize the service life on the filter element, the manufacturer will increase the effective area of the element, therefore increasing its physical size and impinging on the already limited, valuable space available on the craft.

High Flow Rate Polishing Systems

High flow rate polishing systems typically use a high power gear pump, pre-filters, and associated liquid and electrical switching. These units are normally specified in gallons per hour of filtering capacity. They are typically sized to match the fuel consumption demands. Generally these systems are used for a period of several hours to treat bulk contamination before the fuel can be fed to the engine or generator.

While these systems are effective at the treatment of existing minor contamination their high power draw limits their utility. They require power from a generator or from a shore power source. Due to the high power requirement, it is impractical to use battery power to fully treat a typical fuel supply.

THE RIGHT SOLUTION: PREVENTATIVE FUEL SYSTEM MAINTENANCE

The best solution to maintain a healthy fuel delivery system is to address the root of the problem and continuously remove water and other contaminants before they lead to lower performance, clogged filters, corrosion, or system failure. This is most easily achieved by constantly operating a low power consumption fuel recirculation system that does not allow water to collect in the system. The **Parker FPM-050** performs this function effectively and economically. The approach employed by the low cost Parker FPM-050 promotes a bacteria free environment in your tank while consuming minimal power and working with your installed pre-filter to maximize water removal efficiency.

The FPM-050 can circulate up to 350 gallons of fuel each week, ensuring that water is constantly removed from the fuel system. Water that builds up on a daily basis forms an emulsion, or micro-droplets, within the fuel. By operating at a lower flow rate than other polishing systems, the FPM-050 removes particulate matter and the emulsified water which can only be removed at these low flow rates. The FPM-050 also features a solid state pump based on patented technology with inherently long working life. This long working life allows the FPM-050 to be operated on a regular basis without damage to the unit.

Low Power Preventative Maintenance

The FPM-050's solid state pump consumes only 150 mA at 12 VDC, less than 2 W of power. The FPM-050 can even be powered by a small, optional solar panel, leaving no net drain on your batteries. Using an optional programmable timer, you can schedule preventative fuel maintenance to take place automatically. Simply program the FPM-050 to perform regular maintenance while you are away to keep fuel dry and to prevent contaminants from accumulating in the fuel system. Then you can arrive at the marina after weeks away, confident that your fuel is freshly filter and your boat is ready to get underway.

Retrofit into Virtually Any System

This versatile fuel maintenance solution can be installed in multiple configurations to maximize fuel system reliability. The module is designed for easy retrofitting into existing diesel fuel systems, whether inline with the main fuel filter/water separator, or as part of a dedicated fuel maintenance loop. In either configuration, regular use of Parker's FPM-050 while the engine is idle helps prevent contaminants from building in the fuel system by continuously removing moisture from the fuel.

In addition to being easy to install, the FPM-050 is also easy to operate. The internal automatic bypass valve means that no manual switching is required to alternate between polishing your fuel and supplying fuel to the engine or generator. Simply use the optional programmable timer or other approved electrical switch to activate and deactivate the FPM-050.

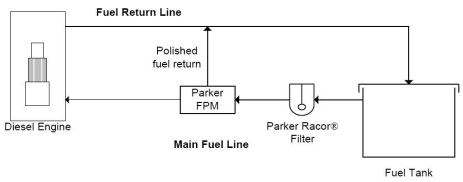

Figure 1
Inline with existing fuel system

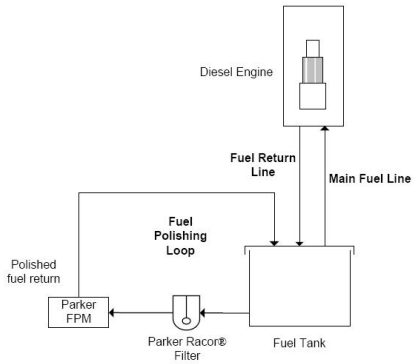

Figure 2
Installed as a dedicated fuel polishing loop

SUMMARY

The Parker FPM-050 cleans and polishes diesel fuel while the generator or engine is idle, maximizing the effectiveness of existing filters while minimizing power consumption. By operating the FPM-050 on a daily basis, it maximizes fuel system reliability and minimizes maintenance expenses.

More information can be found by contacting Scott Leahy at sleahy@parker.com or by visiting *www.parkerfuelpolishing.com*.

NOTE: Racor is a registered trademark of Parker Hannifin Corporation