Diesel Fuel Tank Maintenance

This article is for general informational purposes as individual circumstances vary. Tank maintenance instructions for your specific circumstances are available from local fuel distributors and fuel polishing services.

Diesel fuel tanks are an important tool in fleet, marine, and farming operations. They provide both a chance to save time and money, as well as the opportunity to insure the use of reliably high quality fuel. As with most tools, maintenance is the key to insuring consistently good performance.

It is important to understand why tank maintenance is required in order to create an effective maintenance strategy.

Water vapor condensing in diesel fuel tanks creates conditions for microbial growth and ultimately severe microbial contamination of the fuel system. Microbes are dependent on this water contamination for growth.

Fuel degradation is a direct consequence of microbial contamination. Changes in fuel color are a great indicator that this contamination has occurred. Reduced combustion efficiency, elevated pour point and cloud point, poor detergency and increased corrosion of fuel components, and plugged fuel filters are just a few of the negative effects of microbial growth in storage tanks.

Microbial contamination of fuel is caused by two main groups of microorganisms: bacteria and fungi. Just like all living things, these bacteria and fungi require 2 main things to survive, food and water. In the case of a fuel tank, fuel is their food. Since oil and water don't mix, the best place for these living things to congregate is the fuel-water interface (typically formed at the bottom of the fuel tank). This is the first key to keeping fuel clean and microbe free -- the less water available, the less opportunity for fuel bugs to develop and thrive.

The best way to keep fuel tanks fresh and clean is to avoid contamination in the first place. This prevention requires evaluation and control of:

A. Fuel monitoring program for microorganisms
B. Fuel system maintenance
C. Fuel treatment

A. Fuel Monitoring: Periodic sampling and testing of your fuel is important since problems can be minimized by early detection. Be sure your test lab follows procedures outlined in ASTM D-4057-81 and D-4177-82.

B. Fuel Storage Maintenance: The most effective maintenance practice in storing diesel fuel is to minimize exposure of diesel fuel to water.

Procedures designed to minimize water accumulation include: fuel tank insulation (to stabilize fuel temperature); recycling of fuel through water separators and routine discharge of water bottoms.

In addition, sludge should be removed from diesel fuel storage tanks on a regular basis.

Additional preventative maintenance (PM) procedures include scheduling periodic tank inspections and cleaning. Periodic treatments with preventative doses of EAP approved diesel fuel biocides help prolong the time interval between tank cleanings.

Fuel Treatment: These proactive maintenance steps may be insufficient to stop stored fuel from being heavily contaminated with microbial growth. At this stage, the fuel and water bottoms need treatment to control the infection and removal of biomass from the system is required. As noted under "Maintenance", the use of a diesel fuel biocide is effective in reducing the risk of catastrophic contamination.

Heavily contaminated microbial growth must be treated using a diesel fuel biocide at a shock level after fuel clarification and mechanical processing of the fuel, water bottoms and sludge. This process is known as fuel scrubbing or polishing.

Contaminated diesel fuel will need to be removed from problem tank and:

- Dewatered.
- Clarified using filtration through filters (>20 mm filters).
- Polished using a mixed media filtration system (sand or diatomaceous earth) with fiber filter.

As noted, the shock level of the diesel fuel biocide is injected into the clarified (clean) stream of this mechanically processed fuel.

The original contaminated diesel fuel storage tank must be cleaned and sterilized before re-use. Any residual material (slime, sludge bottoms, etc.) must be removed. A visual inspection of tank interiors and internal pipe fittings should be inspected for corrosion, proper function and clean lines.

Biocide selection is based on several variables including:

- Water/fuel solubility.
- Speed of kill.
- Persistence of effort.
- Compatibility with fuel and other additives.
- Compatibility with other system components.
- Handling/disposal safety considerations.
- Regulatory and industry approvals.

The use of a biocide should be reviewed in your vehicle owner's manual or repair facility/servicing dealer.

Summary:

Catastrophic failure will always result from undetected severe microbial contamination of diesel fuel. Fuel performance, fuel system integrity, filter life and engine life can be significantly affected by direct and indirect microbial activity effects. Proper and thorough fuel storage tank maintenance is crucial for trouble free operation of the diesel engines fueled by these tanks.