

Diesel Tank Cleaning

For Emergency Power Systems

Emergency Power Systems (EPS) are installed for one purpose, to provide electricity in case the main power source fails. As a backup system, an EPS is seldom used. These systems should be started weekly and run for a minimum of thirty minutes to make sure that they are operational. Problems rarely occur in these test situations. On the other hand, in an emergency, an EPS may be required to run for an extended period under full load. In this scenario, all the contents within the tank will be suspended in the fuel since the supply and return lines agitate the fuel. If the filters on the diesel engines are overwhelmed by contaminants suspended in the fuel, then the EPS will fail due to fuel starvation (clogged filters). Naturally this is the worse time to have a problem.

Fuel goes through a natural process of degradation when stored, which is why the NFPA recommends that steps be taken to maintain its integrity (NFPA Standard 110). Maintaining a fresh supply of fuel for an EPS is not as difficult as it once was. It is now possible to filter fuel and clean the tank simultaneously rather than

emptying the tank completely and disposing of contaminated fuel. Fuel additives may also be introduced to help stabilize the fuel.

To appreciate the tank cleaning process, one must first understand what is going on inside the tank. All tanks must be vented, therefore, the fuel is subjected to airborne organisms and particles. Moisture from the air causes condensation on the inside walls. Another source of water is rain. Defective gaskets, broken caps and

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uncovered vents will allow water to accumulate in a tank. Because water is heavier than oil, these water droplets will bind together and make their way to the bottom of the tank thanks to gravity. Once at the bottom the water is trapped. Microorganisms from the air and water will begin to grow within the water and feed off of the fuel.

Over time, the interface layer between the fuel and water will become a stringy, black mass. Sediments will form on the tank bottom as the organisms go through life processes. The PH level of the water will rise causing the water to become corrosive.

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Fuel will also repolymerize and microscopic particles will link together to form agglomerates (macroscopic sludge). The fuel may become unpumpable and noncombustible. The layers of sludge and water settle to the bottom of a tank where the pick up line is located. That is why fuel tank maintenance is so critical for an EPS.

To clean a tank, the bottom layers of sludge and water along with the interface layer, must first be removed. To do so, the entire bottom of a tank must be accessed. Once that process is completed, the fuel must be agitated to suspend any remaining contaminants so that they can be filtered out.

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Since there is no way to see inside a tank, it can be difficult to determine the quality of work that is being done. Below are some things to consider before employing a tank cleaning service.

1. It is a common misconception that the company contracted to maintain the diesel engines also maintains fuel tanks. This is not true! Fuel filtration equipment is very specialized and very expensive. Mechanics work on engines and fuel tank work is subbed out.

2. Beware of misleading sampling. Fuel straight off a filtering machine will look great. Have samples drawn from the bottom of the tank far away from where the cleaning is being done.

3. If lab analysis is used, be sure to test for: water, sediment, flash point, particulate contamination, microbiological growth, acid number, corrosion, cetane index and storage ability. These tests are geared specifically for diesel fuel. Unless the sample is drawn from the interface layer, the results may be misleading.

4. Will the entire bottom of the tank be accessed? This can only be accomplished by the use of flexible wands which can be dragged and pushed along the bottom similar to vacuuming the bottom of a pool. Don't expect contaminants to come to a stationary point.

5. What micron size is being used in filtration? Unless you clean down to .5 micron, you will not remove all of the microorganisms.

6. Does the filtration system being used have an oil-water separator in line? Bulk water can be pumped straight off a tank, but emulsified, or suspended water, must be mechanically separated.

7. Does the filtration system being used have water absorption filters in line? Water absorption filters strip out any emulsified water that is missed by oil-water separators. These filters bring the water content to below 100 ppm/ml which is well below the industry standard of 500 ppm/ml.

8. Does your contractor treat the tank chemically? After cleaning a tank, it should be treated with an inhibitor to stabilize the fuel for storage. The use of chemicals can prolong the cleaning cycle. A multipurpose inhibitor that contains a detergent, a dispersant, a biocide, a demulsifier, a corrosion inhibitor, a metal deactivator and polymerization retardant should be used. Fuel does not come with these ingredients, thus they need to be added.

9. How often should a tank be cleaned? This depends on location and how critical the system is deemed. The proposed NFPA Standard 110 recommends that

steps be taken to renew fuel if the entire volume of the tank is not exchanged within one year. Yearly monitoring will indicate when cleaning is required. A good rule of thumb for critical systems is every 2 to 3 years. Non critical systems should be cleaned every 3 to 5 years.

Diesel fuel is considered a middle distillate. It has a shelf life of approximately 1½ to 2 years; it is an organic compound and is affected by the presence of air, water and microbiological growth. Whether you are backing up life support equipment, telecommunications, computers, fire pumps, sewer stations or any other diesel generated electricity, a preventative maintenance and monitoring program will allow for the perpetual storage of fuel for emergency situations.



Phoenix Products Reference List

Diesel Tank Cleaning References:

- National Security Agency
- National Weather Service
- Cape Kennedy Space Center
- CNN/Turner Properties
- Turner Field
- Phillips Arena
- Delta Airlines
- Clear Channel Communications
- Prime Power
- Facilities Engineering
- NDC Health / Global Payment
- Cummins
- Blue Cross/Blue Shield of Florida
- Verizon / Signal Point
- Naval Weapons Station
- First Bank Card Center/Bank of America
- Piedmont Hospital
- Thomasville Medical Center – Consolidated Engineers
- Trident Regional Medical Center
- Women’s Hospital
- Tallahassee Community Hospital
- Northwest GA Medical Center
- Northwest Georgia Regional Hospital
- Southwestern State Hospital
- Hamilton Medical Center
- Care Alliance
- Doctors Hospital
- Medical College of GA
- HCA Hospitals
- HMA Hospitals
- City of Gainesville, GA
- City of Dahlonega, GA

Contact names and phone numbers available upon request.



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