

Diesel Fuel Quality Degradation

Emergency power fuel systems are characterized by diesel storage systems where fuel is stored for up to several years prior to use. The long term storage of diesel fuel will result in degradation of the fuel in two important ways – particulate formation, and water accumulation promoting biological growth.

Particulate Formation: As diesel fuel ages, particulates are generated from components of the liquid solution. If the particulates are allowed to accumulate in excessive quantities, they could be problematic for the generator filters during generator operation. Periodic filtering of the tank contents will prevent these problems.

Water Accumulation and Biological Growth: Water accumulates at the bottom of tanks by two common mechanisms: (a) air inlet through the tank vent as the fuel level changes and subsequent condensation of moisture in the air as it cools, and (b) trace moisture in fuel deliveries. The water – fuel interface at the tank bottom is an environment that enables biological growth. Excessive biological growth can be problematic as the growth can clog filters and prevent fuel flow to the generator engines.

Basic Diesel Tank Maintenance: Gross fuel system problems can be avoided by (3) standard practices:

- a) **Avoid Excessive Water Accumulation:** Monitor the tanks for water accumulation. A water detection feature is built into most tank level – leak monitoring systems, or it can be checked with a gauge stick and water sensitive paste. The accumulation will vary based on the relative humidity in the location of the installation. Water is typically pumped from the tank and treated by a licensed environmental service provider.
- b) **Prevent Biological Growth by adding Biocide:** Tanks should receive an initial dose of biocide with an annual test and biocide addition as needed.
- c) **Avoid Particulate Accumulation by Periodic Filtration:** Filter the tanks at least annually to avoid excessive accumulation. This may be accomplished by a service provider, a portable filter cart, or a fixed filtration system.

Advanced Diesel Tank Maintenance: Filtration / Polishing systems provide convenient and regular filtration / coalescing of diesel fuel tanks. On a timed cycle, fuel is pumped from the tank, circulated through the filter / coalescer, and returned to the tank. This process removes water and particulates from the diesel fuel to prevent its gross accumulation at the bottom of the tank. Filters vessels and elements are sized to allow for a projected annual replacement of elements and draining of water. Filters are monitored for excessive water accumulation and differential pressure.

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Common Questions:

What is the recommended micron level for filter – coalescer?

Filter elements should be sized for 10 micron for both particulate removal and water coalescing. Up to 25 micron would still be in the range of reasonable practice. Removal to 1 or 2 micron levels is sometimes promoted as “polishing”, however it leads to excessive maintenance without significant benefit. The final filter at the generator will provide any additional level of filtration needed to meet the engine manufacturer’s requirements.

What is the recommended timing settings for automatic filtration systems?

The timer settings for automatic operation are typically set for a complete turnover of the full tank contents every month. For example a 10,000 gallon tank with a 20 GPM filter pump will require about 8 hours of filtration.

What is a recommended Biocide?

A standard biocide product is Kathon FP1.5 (Rohm Haas) which is available from a US distributor at www.fqsinc.com. Racor Filtration also has a biocide product which is available from its local distributors. The dosage rate will vary with the product but a first estimate would be 1 gallon per 10,000 gallons of diesel.

When should tanks be tested and re-treated?

Tanks should be tested for biological problems at least annually, and biocide added in accordance with the test results. Sample and test kits are available from www.fqsinc.com or local testing services may be recommended from your local fuel supplier.