

Life Expectancy of Stored Diesel Fuel

From The Desk of
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Life expectancy of stored diesel fuel is limited. Depending on the amount of contaminants, sooner or later stored diesel fuel will deteriorate. Of the many contributing causes there are three main factors responsible for the deterioration of stored diesel oil/fuel. These factors include: oxidation, microorganism growth and corrosion.

In the case of oxidation, oxygen reacts with the hydrocarbon molecules in the fuel. Oxidation causes discoloration, formation of particulate, water and gum. Oxygen is introduced to stored diesel fuel through tank ventilation, refueling and can even be entrapped during the refining process.

In the case of microorganism growth, bacteria and fungi will gather at the fuel water interface in the storage tank. They consume the diesel fuel and produce acid and water as a bi-product. Again, air is a contributing source for these contaminants. Emulsified water in the diesel fuel will accelerate this process.

Corrosion is caused by microbial growth, water and voltage potential through storage tank walls. Corrosion destroys storage tank walls and releases metals back into the stored fuel. This action will accelerate the oxidation reaction.

Conducted studies have confirmed the effects of some of the factors discussed above. University of Idaho scientists have conducted tests to determine the timeline and percentage of degradation of stored diesel fuel #2. The results of this testing was that the petroleum diesel fuel #2 degraded 26% after 28 days of storage.

Nitrogen compounds will affect the storage stability of hydrocarbon fuels in a variety of ways depending on the type and concentration of the nitrogen compound, the chemical make up of the fuel, presence of other trace materials and storage conditions. Studies conducted by Frankenfeld et.al. under accelerated storage conditions have proved that sediments are formed. The formation of these sediments are even more in the presence of water and dissolved oxygen.

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 2. Frankenfeld, J.W. "Storage Stability of Synfuels from Oil Shale. 1. General Features of Sediment. Formation in Model Fuel System", *Ind. Eng. Chem. Prod. Res. Dev.* 1983, 22, 608-614.
 3. Bretz, E.A. "Ensure Reliable Standby Service With Proper Fuel Treatment" *Power*, Vol. 134, April 1990, 47-50.
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