

DIESEL FUELS and your engine

Introduction

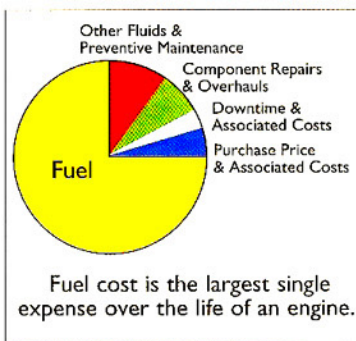
Fuel has more of an effect on your engine operation than just creating power. It is also your largest operating expense.

Unfortunately, often as fuel costs increase, the quality of available fuel decreases. It is important to understand the effects an inferior fuel quality can have on your engine.

Unless the specific measures as per the manufacturers recommendation are taken, using the incorrect fuel can result in excessive engine wear and perhaps even premature engine failure.

Fuel Costs Versus Operating Costs

Before 1970, most manufacturers of medium to high speed diesel engines designed them to operate on fuels that were highly refined ("distillate" fuels). Efficient, economical operation of these engines depended on the quality of fuel they burned and there was a readily available supply of inexpensive, fair quality fuel. Fuel costs were not considered a significant factor before the early 1970s. Before the 1973 oil crisis, fuel typically represented less than 30% of the operating expense of an engine. Today this percentage is often 60 to 90%. Many owners of large engines are seriously considering alternative fuels to help reduce escalating fuel costs.



Understanding Fuel

Fuel produces power in a diesel engine when it is atomized and mixed with air in the combustion chamber. Pressure caused by the piston rising in the cylinder causes a rapid temperature increase. When fuel is injected, the fuel/air mixture ignites and the energy of the fuel is released to force the pistons downward and turn the crankshaft. A perfect fuel would burn completely, leaving no residue or smoke products. However, there is no perfect fuel.

Get the Facts on Fuel

Price is not the only factor when considering the fuel for your engine. Before you make a decision on what type of fuel to burn, read this. It has basic, easy-to-understand explanations of the functions and properties of fuel and how they affect your engine. Once you understand the differences between fuels, it will be easier for you to see the consequences of using an incorrect or poor fuel. This information is an overview of basic fuel.

Fuel Selection

Experience has proven that distillate fuels meeting basic specifications will result in optimum engine performance and durability. Depending on fuel costs and availability, proper application of alternative fuels such as crude oil, blended fuel or residual fuel can also provide a cost competitive engine operation. Before discussing these fuels we need to define fuel properties and their effect on engine operation and fuel handling systems.

Fuel Properties Listed by Their Functional Effects

Fuel quality can significantly affect the performance and maintenance of any diesel engine. It is important to understand basic fuel properties to be able to judge fuel quality. The following properties have an impact on the operation of a diesel engine and its fuel handling and fuel treatment systems.

Specific Gravity

The specific gravity of diesel fuel is the weight of a fixed volume of fuel compared to the weight of the same volume of water (at the same temperature). The higher the specific gravity, the heavier the fuel. Heavier fuels have more energy or power (per volume) for the engine to use. The higher the API number, the lighter the fuel. For most diesel engines an API reading of 35 would be optimum. Lighter fuels like kerosene might have a measurement of 40-44 API

Viscosity

Viscosity is a measure of a liquid's resistance to flow. High viscosity means the fuel is thick and does not flow as easily. Fuel with the wrong viscosity (either too high or too low) can cause engine damage.

Cloud Point

The cloud point of a fuel is that temperature at which a cloud or haze appears in the fuel. This appearance is caused by the temperature falling below the melting point of waxes or paraffins that occur naturally in petroleum products.

Pour Point

The pour point of a fuel is that temperature which is 3°C (5°F) above the temperature at which the fuel just fails to flow or turns solid. Usually the pour point is also determined by the wax or paraffin content of the fuel.

Common Fuel Contaminants

We have just reviewed basic fuel properties and their effect on an engine. It is important to understand contaminants as well. Contaminants are outside elements which can get into your fuel system or are present from the base fuels.

Water

Water can become a contaminant if it is introduced into the fuel during shipment or is the result of condensation during storage. Excessive water in fuel can also cause fuel pump damage in those fuel systems which use fuel oil to lubricate the pump.

Sludge and Fibres

Both sludge and fibres can contaminate fuel during handling and storage. Storage tanks, fuel pipe lines and barge transportation all contribute to these contaminants.

Microorganisms in fuel

All water and fuel offer a medium for bacterial growth. These simple life forms live in the water and feed on fuel.

Fuel Sulphur

Sulphur is an element which occurs naturally in all crude oils. Heavy fuels usually have a high sulphur content. Distillate fuels are usually lower in sulphur content because the sulphur can be reduced or eliminated during the refining process. You should be aware of your fuel sulphur content. Sulphur over 0.5% can severely reduce engine life unless proper steps are taken.

Based on this information we hope that this will provide a better understanding toward the importance of looking after your fuel. □