



# DIESEL ENGINES

Farm Machinery Fact Sheet FM-07

By *Dr. Von H. Jarrett*, Extension Agricultural Engineer

Diesel engines are rugged, dependable and economical to operate if properly maintained. However, a diesel is different than a common gasoline engine. There are no spark plugs, points or carburetor to adjust. The fuel pump will perform all of these operations if it has a steady flow of clean, water-free No. 2 diesel fuel. The key to success in engine performance is proper fuel, air and lubrication.

In a diesel engine, the fuel serves as a lubricant and coolant during the fuel injection processes, in addition to supplying BTU's for power production. That is why it is so important that all contamination be removed before the fuel reaches the injection pump and injector. These parts have extremely close tolerance and highly-polished internal surfaces that will fail if water, rust, slime, micro-organisms or scale is allowed to pass through the diesel pump.

Water is a serious threat to the diesel system. It does not have the lubricating ability that is vital for the proper operation of pumps and injectors. The clearances are as small as 6-12 microns in size. That's 2-3 times smaller than a human hair. Water is not supplied by the oil distillation processes, but occurs through condensation in storage and handling processes through the tank filler cap and dirty containers that are used in the fuel transfer to the engine.

All diesel engines have fuel filters that need to be changed periodically for removal of solid contamination, but may not remove all the water present. Water will mix with diesel fuel through agitation and handling. The water will settle out of diesel fuel in 24 hours, if allowed to, under normal conditions. This water needs to be drained from fuel storage tanks periodically to prevent the possibility of pumping it into a diesel engine.

Some filtration processes offer a centrifugal action that separates the water, which is heavier than diesel fuel, through a turbine centrifuge. Here the water will bead on the inside of a glass shell and as it accumulates, becoming larger and heavier, will eventually fall to the bottom of the bowl where it can be drained.

Each time the filters are drained or replaced and new filters installed, considerable air is left in the filter body and fuel line. This air must be drained and replaced with diesel fuel or your engine will not start. The procedure for bleeding the system will be mentioned in your operating manual in a step-by-step procedure. The procedure will be different for the various types of diesel engines. The operator must be familiar with this process.

When purchasing diesel fuel, be sure to obtain it from a reliable refinery. Remember that

diesel fuel is blended for the seasons of the year. The refiners balance the fuel and additional additives are not required for proper engine performance.

Ask your supplier for specifications on the fuel being delivered to your farm. All fuel should have been checked by the American Standards of Testing Materials, and should contain the following:

1. Centane number of 40 or more.
2. 0.5% sulfur or less by weight.
3. 0.05% or less of water.

Next, ask what constitutes the blend of “winterized” diesel fuel when the weather turns cold. No. 1 diesel fuel is the most common additive to add to the No. 2 because it has a higher centane rating and a lower cloud point.

Of over 2000 products registered with the EPA as diesel fuel additive, few have been evaluated for their actual effect on diesel fuel quality. I doubt if you can find research data to support “exorbitant claims” promised by the salesman.

Go to your equipment manufacturers and find out what they approve for your equipment. “Don't use fuel additives indiscriminately.”

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert L. Gilliland, Vice President and Director, Cooperative Extension Service, Utah State University, Logan, Utah. (EP/2-95/DF)