IT'S THE WATER

WHAT'S IT DOING IN YOUR TRUCK?

BY JESSICA CRABTREE KATTNER

We all know that water is a good thing. It's the key ingredient to life. However, the wrong type of water in the wrong place can lead to the death of a diesel engine.

Diesel-powered equipment experiences problems year-round due to water contamination in diesel fuel. Diesel fuel contains two types of water: dissolved and free. Dissolved water is the water already in solution, or dissolved" within the fuel. This fuel looks clear and bright.

The amount of water that can be dissolved in diesel fuel varies based on temperature and the composition of the fuel. Diesel fuel dissolves 60-100 parts per million (ppm) of water before it starts to fall out of solution. As to temperature and its effects, when a diesel's engine distributes fuel from the fuel tank across the injectors to help keep them cooler, the now higher-temperature fuel returned to the tank absorbs water from condensation inside the tank. As the warm fuel cools, the excess water is shed – eventually leading to a water buildup at the fuel tank's base.

Dissolved water typically does not cause any problems and is burned along with the diesel fuel. All diesel fuel will contain some dissolved water; it is impossible to remove completely.

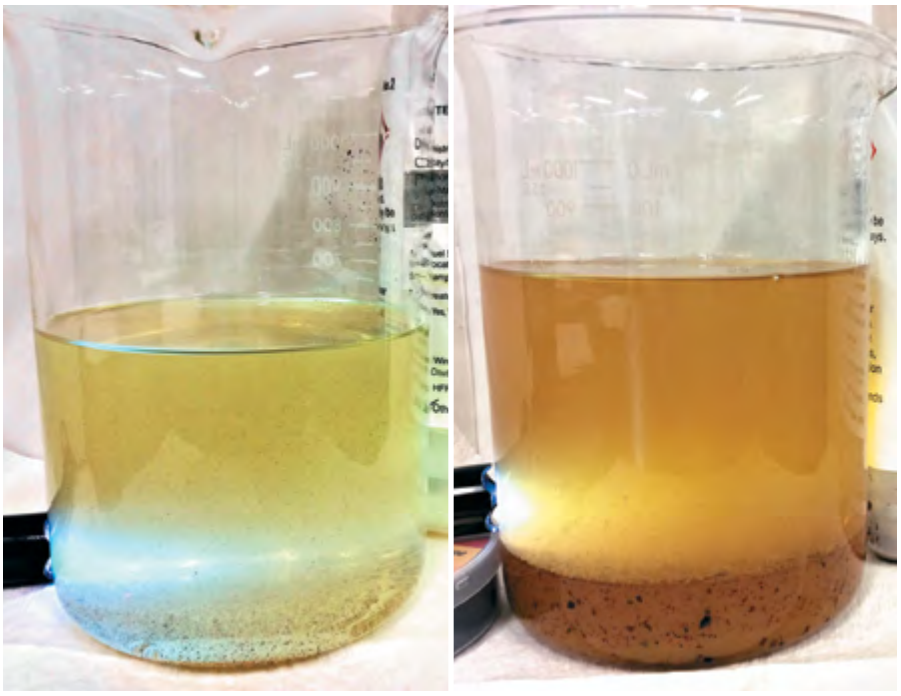
Once the fuel is completely saturated with dissolved water, it begins to accumulate free water. The presence of free water causes a hazy or cloudy appearance and it accumulates on the bottom of the fuel tank.

Free water can enter a fuel tank from a variety of sources, including condensation, poor tank hygiene or an improperly sealed tank. Diesel fuel, unlike gasoline, does not have a vapor layer to displace air.

When air gets in the tank, it also brings in water vapor that condenses on the tank walls and eventually falls to the bottom of the tank. The longer the water sits at the bottom of the tank, the greater the likelihood that serious problems will occur.

WATER AND BIODIESEL

More recently, the widespread use of biofuels has increased the number of water-related problems. Biofuels hold up to 10 times more water than standard petroleum diesel fuel.



Both fuels above have extreme water contamination. The fuel on the left is very hazy and contains a small amount of water at the bottom. The fuel on the right is extremely hazy, and has a large water layer. Both fuels are at risk for developing serious problems.

Biodiesel already has extreme winter operability problems, and the extra water only exacerbates them. In order to avoid water contamination, extra precautions should be taken with any diesel fuel containing more than 5 percent biofuel.

It is important to note that biodiesel blends containing less than 5 percent do not have to be labeled at the pump. This means most drivers have no idea that there is biodiesel in their fuel tanks.

WATER AND WINTER

Many times, drivers believe they have gelled diesel fuel when they actually have fuel filters plugged with ice due to excess water.

Water contamination causes winter operability problems well before the diesel fuel becomes gelled. Because water freezes at 32 degrees F, fuels with excess water form ice—plugging fuel filters and blocking the flow of fuel to the engine.

Addressing water problems before winter arrives is the best way to avoid icing problems. There are diesel fuel additives formulated specifically to address water problems that help prevent fuel filter icing, including Power Service Clear-Diesel Fuel & Tank Cleaner.

Anti-gel or winterizing additives that contain de-icers protect against fuel filter icing as well. Not all anti-gels contain a de-icer, so read labels carefully. Power Service Diesel Fuel Supplement +Cetane Boost is an anti-gel that contains anti-icing chemistry to address fuel gelling and icing. However, a de-icer will not remove water already in the fuel system.

The best way to avoid icing headaches in the winter is to deal with excess water prior to the arrival of cold weather.

MICROBIAL CONTAMINATION

In 2006, Ultra Low Sulfur Diesel (ULSD) fuel was introduced with a maximum sulfur content of 15 ppm sulfur. ULSD is more susceptible to the growth of bacteria and fungus due to several factors.

Sulfur acts as natural poison to microbes. Fuels with lower sulfur content provide a less-hostile environment in which bacteria and fungus can flourish.

Sulfur dissolves and carries water out of fuel systems. More water is shedding to the bottom of fuel tanks, creating a life-support system and breeding ground for microbes. Additionally, moisture is produced within fuel tanks via condensation, thermal changes and humidity.

Diesel fuels blended with biodiesel contain higher levels of water than standard 100 percent petroleum diesel, contributing further to the accumulation of water in diesel fuel. Biodiesel also is a food source for microbes.

Low sulfur content paired with higher water concentrations creates the perfect condition for microbes to grow.

Premature fuel filter plugging usually is the first sign of microbial contamination. Microbes invade the water on tank bottoms