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FUEL ADDITIVES: PART II

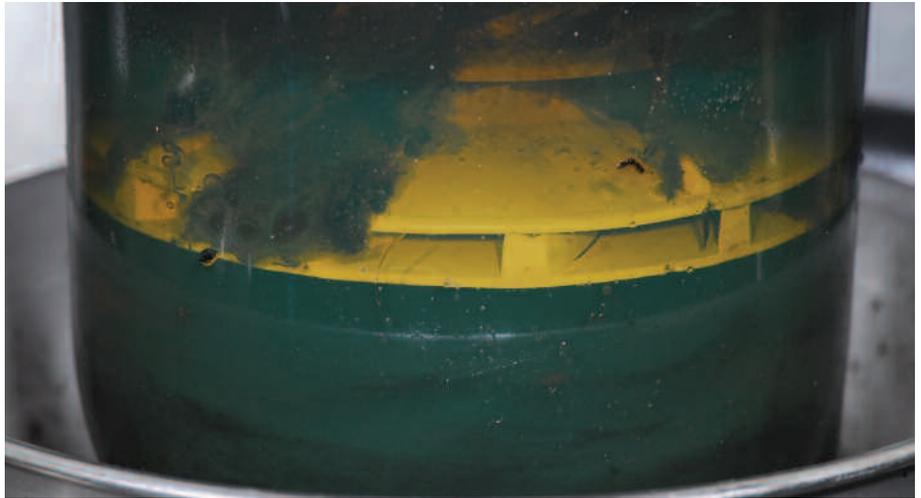
Before you consider using any fuel additive, you should first consult the guidelines, recommendations, and requirements of your engine and generator manufacturer. Different engine manufacturers necessarily have different takes on what they recommend regarding the use of additives.

For instance, Caterpillar's diesel fuel guidelines generally discourage the use of additives. However, the guidelines go on to say that cetane improvers and biocides may be used where necessary—for example, if the cetane number of the fuel you're purchasing is lower than 40 or if biological growth is an issue.

Some engine manufacturers clearly point out that the owner/operator is responsible for verifying that the fuel he or she uses meets their requirements for lubricity, sulfur content, cetane, and cleanliness. (How do you do that other than having the fuel analyzed?) Engine manufacturers also might say that if the boat owner is using fuel of low or unknown lubricity, then a fuel conditioner should be used, usually their own brand.

John Deere's take on additives is a bit different: "The need to use a diesel fuel conditioner is now more important than ever. Diesel fuel quality can vary dramatically from source to source and even day to day. Inconsistent fuel quality can result in customer dissatisfaction over equipment life and performance..."

As you can see, the path is anything but clear. However, most engine manufacturers are in the business of ensuring that their engines work well and last a long time, so it's in their best interest to guide you appropriately on the subject of additives.



Steve D'Antonio

Water in fuel and fuel tanks can only lead to trouble, including prodigious growth of biological colonies whose fibrous structures can clog fuel filters.

Types Of Additives

Perhaps the most discussed issue regarding diesel fuel is its most common contaminant: water. The presence of water in fuel can lead to a host of problems, from corrosion and reduced lubricity to formation of biological colonies and their fibrous and acidic by-products. Clearly, water contamination is worthy of a boat owner's closest attention.

Additives that "deal with" water fall clearly into two categories—those that encourage its mixture with or suspension in fuel, whereby the water is captured by a water separator or passed on to the engine and vaporized during the combustion process, and those that encourage its separation from fuel so it can later be drained from a tank or filter. These additives are referred to as emulsifiers and demulsifiers, respectively. There are variations on this theme regarding how and if emulsifiers (also called dispersant or suspension additives) will actually pick up free water from the tank bottom or simply suspend existing water in the fuel column. Some say these types of additives are "water neutral," meaning they will not *cause* water to drop from suspension (or will prevent it from

doing so) and will not encourage emulsification of water on the tank bottom. Also consider that water in suspension, when trapped in fuel injection plumbing at rest, may fall out of suspension, where it can accumulate and cause corrosion and lubrication problems.

Some additive suppliers are careful to point out that their products will not—and, in many cases, are specifically designed not to—remove free water from the tank bottom. This is an important distinction to be recognized by the user, who may believe he or she is remediating a water problem when, in fact, the additive is only *preventing* water from falling out of suspension.

Is Water Present?

One of the dangers in using additives to remediate water problems is not knowing how much water, if any, is in the tank. If your deck fill is vertical, you can use a water-finding paste to help determine this. Smear the paste on the end of a dowel, and dip it to the tank bottom. If water is present *at that location in the tank*, the paste will turn a different color. The depth of the color change—i.e., how high up the dowel the paste changes

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color—indicates the depth of the accumulated water. With this information, one is afforded some indication of the presence of water and the need to treat or remove it.

As previously mentioned, emulsifiers, dispersants, and other similar additives are designed to allow water to either be caught by a water separator (tough to do when the water is thoroughly emulsified) and then drained off, or sent on to the injection system and combustion chamber. Water is a poor lubricant and it doesn't burn, so the latter option is less than ideal for the injection system. Some would argue that having water enter the combustion chamber is better than having it remain in the tank, where it often leads to much more serious biological fouling and corrosion. One additive manufacturer, Power Service

(www.powerservice.com), utilizes a "solubilizer," a dispersant that resists precipitation (water falling out of suspension) and also prevents the formation of water droplets.

Thus, provided the product is approved by your engine manufacturer, use of an emulsifier, dispersant, or solubilizer may prove to be the best option. Be aware, though, that most engine manufacturers prohibit the use of emulsifiers, dispersants, or other products that rely on alcohol to encourage water to remain in suspension.

If your fuel tank is equipped with a stripper tube or polishing system, you may opt for an additive that relies on a demulsifier, which encourages water to separate from the fuel rather than remain in suspension. Once separated, the water can be removed by draining

or pumping. In considering this option, it's critical that the stripper or polishing system be installed in such a way as to ensure it will draw fuel/water from the absolute lowest portion of the tank (ideally, from a well). If this is not the case, accumulated water may remain in the tank, leading to biological growth and, in metallic tanks, corrosion. Depending on the location of a tank's primary fuel pickup tube in relation to the bottom of the tank (is it at the very lowest point?), high-quality conventional water-separating fuel filters may be able to remove water that accumulates in the tank bottom—but only if the engine is used regularly.

In the next issue, we'll look at additives that enhance running characteristics, lubricity, and stability.—Steve D'Antonio 

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