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Four Essentials To Know About Agriculture Fuel & Three Solutions

Fuel problems in stored fuel can cost your business precious dollars. There are essential facts you need to know about the fuels you use, along with solutions to costly problems that can put hard-earned money back in your pocket of you and your business.

#1 – Water in farm fuel tanks or stored fuels means microbial problems may not be far behind.

Like all biological organisms, bacteria and fungi (sometimes called algae) need water to survive. Any water phase in a fuel storage tank gives them everything they need to become a problem. These microbes live between the water at the bottom of the tank and the diesel fuel on top of the tank. They draw nutrients from feeding on the complex organic components of the fuel and multiply like crazy until you have a microbe infestation problem in the tank.

Farmers from back in the day didn't seem to worry about this, but times have changed. Today's fuels have the unintended consequence of making this problem worse. They're better for the environment but changing them made them a lot less resistant to microbial growth. Farms that store diesel are more likely to have bacterial problems in their fuel tanks than they were ten or twenty years ago.

Keep in mind that having "microbial growth" means:

- Higher chance of degraded fuel quality
- Tank corrosion damage
- Plugged filters & stalled equipment

It's a costly problem for farms and other businesses, on multiple levels, and at a time where everyone is operating on thinnest of margins.

#2 - Microbes Don't Just Grow In Diesel Fuel – Other Fuels Have Issues Too

For protecting their stored fuels, farms and agricultural operations storing fuels have traditionally focused the majority of their efforts on keeping them free of microbes like bacteria and fungi. These "antimicrobial" efforts have tended to focus on stored diesel health not because other fuels like ethanol (E10 or E15) or biodiesel are resistant to microbes, but because of #2 diesel's more widespread use in the farms that tend to store them for longer periods of time. Storage time is a key influencer on whether microbial problems will occur (longer storage times equal longer exposure to the conditions favorable to microbial growth in a given system). All other things being equal, even fuels like ethanol blends and biodiesel blends are just as likely to wind up with microbial contamination as stored diesel.

Many farms now are using low-percentage biodiesel blends like B5 to enhance the lubricity of their ultra low sulfur diesel blends while helping them meet green fuel standards. Biodiesel blends are not immune to microbial problems; they provide excellent sources of nutrients for bacteria and fungi in stored fuel tanks, even at low concentrations.



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#3 – Controlling Water Is the Key to Preservation of Fuel Quality - Especially With Ethanol

For anyone who stores ethanol fuels for any length of time, restricting the accumulation of stored water is the key to ensuring the stability of the fuel blend and the prevention of microbial problems that would otherwise be inevitable. Water impacts ethanol fuels to a greater extent than it does diesel fuels.

Ethanol blends like E10 or E15 are a blend of two phases – gasoline and ethanol (ethyl alcohol). Normally this mixture stays seamlessly together. But ethanol loves to attract water and causes a certain percentage of the attracted water to mix with the fuel blend, absorbing it. Each ethanol blend has a tolerance threshold for the volume of water it may absorb, and this threshold varies according to temperature and the percent alcohol in the fuel blend. A good baseline threshold to consider is 0.5% by volume – a couple teaspoons per gallon.

Once the amount of absorbed water reaches this threshold, any additional water starts the “phase separation” process. The fuel can’t absorb any more water, so the ethanol starts separating from the blend, coming out of solution and combining with the water it had absorbed up to that point. The user now has a layer of alcohol plus water at the bottom of the tank.

Phase separation is the aspect of ethanol fuel instability that you are most likely to be concerned with. If your ethanol fuel separates, you’re going to lose octane value (because the ethanol phase strips out octane-enhancing components from the fuel) in the fuel you’ve invested in.

#4 – You May Not Always Have Just 10% Ethanol. You should know about this problem you will be facing.

10% ethanol is supposed to be the norm in the marketplace but blending practices have shown that there’s a decent chance you might be ending up with more than that in your farm fuel. And that’s not to mention what may happen if Congress wraps its head around any changes in the Renewable Fuels Standard and decides to up the on-road minimums to 15%. With the direction the current political climate is heading (with green energies at the forefront), you never know.

What effects would E15 have if you had to start implementing it? The short answer is, more of the same problems that E10 users are facing currently.

Lower Mileage from Less Energy - A 15% ethanol fuel has even less energy value than E10 does, so user fuel mileage will continue to drop.

More Phase Separation - Phase separation becomes more common with E15 fuel because the water absorption threshold decreases as the ethanol goes up.

More and Faster Ethanol Solvency Damage - The issue of solvency and corrosion damage also becomes more severe as the concentration of ethanol increases by 50% from E10 to E15, causing softening and dissolving of polymer parts in fuel systems. This damage is less in recent vehicle models, but the older vehicle models manufactured before 2007 and most small equipment older than a year old can be prone to this.



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More Corrosion for Farm Storage Customers - The corrosion of aluminum and other metals from consistent exposure to ethanol blends is a multi-faceted problem that produces costs both in farm equipment replacement and lost opportunity costs from production interruptions.

Preventing or Spreading Microbial Problems Can Depend On Farm Fuel Housekeeping

One of the problematic natures of fuel microbes is that if one part of a system has an issue, other parts will soon have it, too. Microbes transfer easily from tank to tank, especially if the distribution system components have gone years without treatment. From that point, it's a short jump from where microbes are multiplying in farm fuel tanks until the entire place has the same kind of problems. Clogged fuel filters, corroding tanks and performance-robbing buildup of deposits (made worse by the acids the microbes excrete, which cause fuel to break apart and degrade in quality).

Farms and agricultural operations operate on the thinnest of margins anyway. They need to keep the problem of fuel microbes under control for the health of the business.

What Can Farms Do About This?

- **Microbial problems can be eliminated, but only with the right kind of solution**

For microbial problems, use a biocide & water-controlling fuel treatment.

What Can You Do? Having knowledge of the availability of **fuel biocide products** is one of the best measures you can take. Biocides are very tightly controlled from a regulatory standpoint and there aren't that many of them out there. If you can use something that will kill off the microbial presence with stored fuel through the proper application and distribution of the biocide, you've got a savings center on your hands. You want to prevent a "code red emergency," especially when you know that a biocide is the only solution for fixing your need.

To prevent the establishment of microbial presence in tanks, you do have to keep water buildup under control (in states with humid climates year-round, that's certainly a tall order). But once microbes do infest a fuel tank, simply removing the water will not be enough to kill and remove the infestation. They can still hang around in the fuel tank, waiting for water to accumulate again so they can begin their lifecycle anew. Or they can lay dormant behind shields of biomass where they become revived when the biomass is disturbed by the influx or movement of new fuel somewhere in the system.

Any product that claims to destroy and remove an infection simply by controlling water accumulation is not telling the whole truth. To get rid of the fuel infection for good (and the problems that go with it), you need to use a fuel biocide to disinfect the tank and kill the microbes for good. Biocide treatments are not so easy to find because they are very tightly regulated by the EPA.

Of the biocide solutions available, you can expect to have a treat ratio of between 1:2000 and 1:10000. The biggest influence on treat rate in this wide margin is whether you're using it as a shock treatment (to kill an existing infection that has reared its head) or an on-going maintenance dosage (to prevent microbial problems from appearing in the future). Generally, maintenance doses aren't recommended – use the full shock dose when you need it, rather than treating "prophylactically", as they say in the industry.



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- **For diesel fuel storage, antioxidants and water controllers are essential**

For preserving diesel stability and quality, use an antioxidant and a water controller.

What Can You Do? For diesel and biodiesel products outside of biocides, having antioxidant and water control solutions will offer the greatest benefit for farm fuel stability. An antioxidant, simply speaking, interrupts the chemical reactions that happen in fuel when it is exposed to oxygen and heat. Oxygen exposure initiates the reactions while heat (the kind you'd get in a warm climate area) provides the energy to drive the reactions faster. For consumers working with diesel and biodiesel, they should be looking towards an antioxidant fuel treatment that may be added as early on in the storage process as possible. The earlier the antioxidant is in the fuel, the faster it can stop chemical precursors of instability from happening.

- **For the newest developments for farm fuel, consider microbial testing to pinpoint any problems**

We've stressed how serious microbial problems can be for farm fuel. But in the past, there was a lot of "educated guessing" going on when trying to figure out if you really had a problem or not. And let's be honest – nobody wants to spend money they don't need to spend. Is there a way to know for sure if you've have a microbial fuel problem that you need to do something about?

What Can You Do? There certainly is. In-field ATP testing kits have been developed that allow you to take a sample of your ag fuel, box it up, and ship it to a testing facility for analysis. The facility will run an ATP-By-Filtration test on the fuel, which is the most state-of-the-art testing you can do for identifying the levels of microbial contamination. We say 'identifying the levels' because virtually everything you can test has some microbes in it. But they don't all cause problems. You need to know if you really need to do something to prevent bigger problems. Microbial testing is the best way to do this and save time and money by keeping you from doing something you may not need to do. Or alert you to the fact that your farm fuel does have a problem that should be solved before it becomes a bigger one.

Farmers Appreciate Solutions

At Bell Performance, we fix fuel. In this day and age where there's so much information out there, you can be overwhelmed in trying to sort it all out. The bottom line health of your farming enterprise depends upon you keeping on top of fuel needs and fuel problems.

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