

An example of the change in diesel injector patterns caused by wear from abrasive particles in dirty fuel.

Dirty farm diesel

Dirty farm diesel fuel can cause serious trouble

BY SCOTT GARVEY

Many farmers regularly update their equipment fleets to get their job done. But the farm fuel storage tanks where those new machines stop to refuel tend to stick around the farm for years. And old, outdated fuel storage systems can allow contaminants into the fuel that gets pumped into all that new equipment.

With the level of sophistication built into today's diesel engines, dirty fuel is now a far bigger problem than it used to be, and it can sabotage the reliability of new equipment. "It's important for them (farmers) to understand the new equipment they're running is a lot less tolerant to dirty diesel

than before," says Scott Grossbauer, director of clean fuel solutions at Donaldson, a filter manufacturer. "New engines have to meet new emissions requirements. To do that, they've done two main things. One is exhaust aftertreatment. The other is an in-cylinder solution related to the fuel system, which means having higher injection pressures, more precise injections and more injections per cylinder stroke. As a result, the tolerance for (dirty) fuel goes way down."

To protect modern injection systems, engines now depend on very efficient filters that trap particles at much smaller micron levels.

"For example," continues Grossbauer. "If you are running a tractor from the late '90s, you could probably get away with

putting a little dirtier diesel in there. It would probably run and not damage anything. If you do that now on today's equipment, you'll either plug the filter up or if some of that contamination gets by the filter it can damage the injection system."

That means relying solely on the filters installed on farm machines isn't a sound strategy for preventing trouble. If a machine goes down in the field due to a plugged fuel filter, that means lost production, usually at the time you need it most. So Grossbauer recommends taking a more systematic approach to fuel handling and storage, as well as taking steps to make fuel cleanliness a top priority. At the very least, fuel taken out of on-farm storage tanks should have to go through a dispensing filter before it gets into a machine.

"We're trying to advocate for the cleanliness of fuel going into the equipment itself," he says. "As a farmer, the way you obtain that is by focusing on dispenser filtration, first and foremost."

FURTHER STEPS

There are also other steps that can further guarantee fuel stays squeaky clean. Farmers should ensure they prevent contamination from getting into their storage tanks in the first place. Placing a filter on the tank's breather is an often overlooked but very valuable step in that direction. The risk of dirt being drawn into a tank through an unfiltered ventilation cap is actually pretty high.

"Every diesel storage tank is open to the atmosphere," Grossbauer explains. "The reason is that when the fuel gets pumped out, air gets sucked in. Even atmospheric changes during the day can make the tank breath in and out a little bit as the air (inside) expands and contracts. If you're in a dusty environment, that (dirty air) gets into the fuel as well. So we advocate putting a breather filter on the storage tank."

Most fuel suppliers across the Prairie do a pretty good job of delivering clean fuel, but there is always the risk of inadvertent contamination before it gets to the farm. Producers who want the highest level of protection can take an additional step to eliminate the risk of letting dirty fuel contaminate their tanks by installing another filtration system on the inlet side.

"Another option, and a lot of people do it in a lot of different industries, is you put a filter on the fuel coming into the tank," he adds. "Then if you get a delivery of fuel that plugs up the filters, you know there's a problem, and you can deal with the fuel supplier then and there. That's a problem that's not going to get into your storage tank." But don't think you can skip the filter system on the outlet side if you've opted for filtering delivered fuel. Because fuel sometimes sits in farm tanks for long periods, there are a number of contamination risks from things like bacteria forming inside if there is any kind of water accumulation.

"The reason you put a filter on the outlet as well as the inlet is fuel can change over time," says Grossbauer. When retrofitting a storage tank



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Your ISOBUS compatibility

BY SCOTT GARVEY

In 2008 engineers at the major manufacturers and a few other brands decided to work together to create a standard for tractor-implement digital compatibility. That led to the creation of the Agricultural Industry Electronics Foundation (AEF), which now has over 170 member companies and groups. The ultimate goal of that organization was to create a global standard for electronic communication between all tractor monitors and implement control systems.

Having a standard communications protocol eliminates the need for each implement to have its own, dedicated in-cab monitor. Instead, a single monitor is

able to control all implements the tractor may drag behind it.

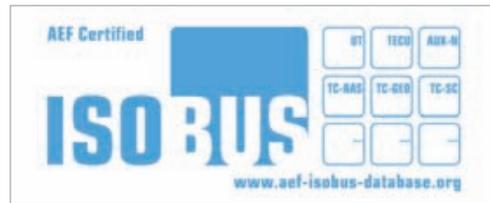
That AEF communications standard has become known as ISOBUS 11783. Machines that use it should all play nicely with each other — at least, that's the theory.

Monitors and implement systems that use this electronic communications format are considered ISOBUS compatible. But so far not all so-called ISOBUS compatible systems seem to be working as advertised. Now, however, farmers can get some help when trying to determine whether or not they can count on ISOBUS compatibility before buying new equipment.

In April AEF announced the launch of a special website, www.aef-isobus-database.org, designed to allow anyone to log in and

determine the digital compatibility of tractor-implement combinations before they make buying decisions. Just find your tractor and the implement you want to put behind it in the website database and see if they'll talk to each other. And if they will, find out what level of compatibility they will accommodate. The data there is based on actual testing done by the AEF, so it should be accurate.

All systems tested by AEF are in the database. So far not every manufacturer has been willing to fully open their systems to ISOBUS communication, choosing instead to keep some functions proprietary. That means some implements only offer full functionality when paired with their own brand's monitor.

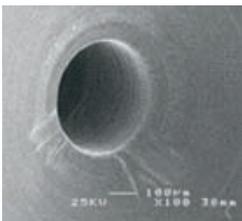
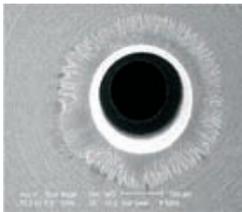


The AEF Certified label signifies a system has been tested in an AEF lab and is ISOBUS compatible. Systems permitted to wear this label will also be listed in AEF's online data base.

For farmers intending to buy a new implement that requires an in-cab terminal — say a round baler — knowing ahead of time how compatible their existing tractor's monitor is with that machine could be a real bonus. That information will help them decide whether or not they should pony up the extra cash for a dedicated monitor for the implement before they make a purchase decision.

Coinciding with this year's Agritechnica show in Germany, AEF will begin allowing manufacturers who've proven their systems in an AEF test lab to display a certification label, signifying that the product has been tested by AEF and meets the ISOBUS compatibility standard.

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Microscopic views showing the excessive wear around the needle seat in an injector on the left compared to a normal injector on the right. Dirt in fuel acts like a sand blaster changing the very fine tolerances in a fuel injection system.

with a dispensing filtration system, picking the right filter system depends primarily on two factors: how much fuel passes through the system in a season and how fast the pump transfers fuel. Filters should be capable of matching the pump's flow rate without causing a restriction, and they should have the capacity to handle an adequate level of material to avoid frequent changing. Each bulk storage and transfer system should be evaluated on its own before deciding on the number of filters needed.

"There's no rule of thumb," Grossbauer says.

The best way to assess the condition of a dispensing filter already in use on a storage tank — without removing it — is to check for pressure drop when filling equipment. Clogged filters will noticeably reduce the flow rate.

If you have relatively clean fuel in your tank and it doesn't get contaminated during storage, a single dispenser filter could clean 50,000 to 100,000 gallons before needing replacement, according to Grossbauer.

For a detailed discussion on diesel fuel cleanliness, visit Donaldson's website at mycleandiesel.com.

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