RESEARCH

Biodiesel Blends QUICK GUIDE

FLAME DETECTION

The flame produced by biodiesel emits less light than a petroleum flame. Since cad cell resistance goes up as luminosity (light intensity) goes down, the measured ohms will increase with biodiesel. Exactly how much depends on the appliance and burner. As a rule of thumb, B20 will typically show ohm readings 50% higher than petroleum, B50 approximately 100% higher and B100 generally 250-300% higher.

What to do: No action is needed. This is normal and no cause for concern. Any modern cad cell primary control has a lockout threshold much higher than this. Older three wire type controls may have an issue in some applications and should be replaced when needed. These controls don't offer interrupted ignition, valve on delay, motor off delay or diagnostic capability and are obsolete.

HEAD COKING

This is an issue that occurs in some but not all appliances to varying degrees. Research is underway to determine the exact causes and solutions.

What to do: Increasing pump pressure and reducing nozzle size as well as adding motor off delay(post-purge) has shown good results in many cases. Proper head, draft and combustion air settings are crucial.

COMBUSTION ANALYSIS

Combustion analyzers often do not show a selection for biodiesel or other biofuels causing confusion as to what setting to choose. Analyzers measure O_2 and CO and then calculate the other readings based on the fuel selected.

What to do: Use the light oil or #2 setting when working with any blend of biodiesel. The CO_2 reading will be off approximately 1/3 of 1 percent at B100 and proportionally less at lower blends (less than 1/10 of 1 percent at B20.) The AHR standard for combustion analyzers is plus/minus 3/10 of 1 percent. You can use the O_2 reading to setup if you prefer, 4.5-5.7% O_2 is equivalent to 11.3-12.3% CO_2 and 25-35% excess air.

PUMP BINDING

Fuel unit binding isn't a normal failure mode for pumps. If a pump binds there's an underlying reason, most often it's water. The cause needs to be addressed or the situation will reoccur. While the issue is fuel borne, it's really a tank problem. It can occur multiple times at one site and never at the other sites that received deliveries from the same truck on the same day. A common factor in most of these cases is an outside tank and two pipe system.

What to do: Converting to single pipe or using a deaerator and employing dual filtration has solved the problem in almost every case.

FILTERS

Biodiesel will not clog filters any more than petroleum fuel does. However, biodiesel can keep the sludge already in the tank in solution longer than petroleum allowing the filter to catch more of the existing sludge. This can lead to more frequent filter changes in the short term.

What to do: Maintain a good service schedule and replace the filter as needed. This generally resolves itself quickly as the sludge is removed.

CARBON EMISSIONS

If my combustion analyzer shows that CO_2 is almost the same regardless of the blend, how does biodiesel reduce carbon emissions from home heating?

What to do: The difference is in the carbon cycles. Biodiesel is produced from vegetable oils and animal fats. These are renewable, sometimes in just a few months. The CO_2 that plants absorb during their lifetime is released when the biodiesel is burned—one cancels the other. Petroleum is also formed from plant and animal matter, but over millions of years. When burned, the CO_2 produced by petroleum is reintroduced into the atmosphere after being "locked up" for those millions of years, leading to an increase in CO_2 in circulation.

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