



CENTRAL NEWS[®]

Heating Oil Treatment Dilemma

By Blaine Ballentine, Lubrication Engineer

The choices for heating oil have expanded in many areas. They include ultra low sulfur heating oil and bio-heat, which we would call ultra low sulfur diesel and biodiesel if used in an engine.

Choices have diminished in other areas, forcing changes. New York's ultra low sulfur heating oil mandate became effective July 1, and New York City's 2% bio-heat requirement became effective October 1¹. Several other Eastern States have passed ultra low sulfur and bio-heat mandates that have not yet taken effect.

These new fuels create some challenges that fuel additives can alleviate, but be prepared. There is no miracle in a can that will stop all the fuel related problems, but a good additive will certainly reduce the number of problems.

Lower Sulfur

Many of you remember the transition from traditional diesel fuel to low sulfur diesel (<500 PPM sulfur) in 1992. Most of you remember the transition to ultra low sulfur diesel (<15 PPM sulfur) in 2006. The reduction in sulfur in heating oil will cause many of the same problems already experienced with diesel fuel.

Though with heating oil, the change is more abrupt. The change in diesel fuel was done in two steps many years apart, where the change in heating oil is happening in one step. And heating oil is starting from a higher level. The average heating oil two years ago had a sulfur content of 1,500 to 3,000 PPM². As state mandates take effect, or fuel companies market "green" heating oil, it drops to a maximum of 15 PPM.

Lubricity is not likely to be a big factor for heating oil, as it was for diesel fuel. Where modern diesel injection systems run at 20,000 to 30,000 PSI, heating oil fuel systems run at 140 to 290 PSI³.

The primary problems you can anticipate will

be leaks, sludge, and corrosion.

Leaks

The hydrotreating process used to remove sulfur from fuel also lowers its solvency. The theory goes that lower solvency fuel does not penetrate the seals as well, causing old swollen seals to shrink and leak.

Even if seals do not fail right away, expect seal life to be shorter. Typical seal life with conventional fuel was 8 to 10 years. That may fall in half, 4 to 5 years⁴.

If the solvency theory is correct, one would think that it is simply a matter of adding bio-heat to increase the solvency. Unfortunately, it is unlikely that any additive can eliminate seal failures, and bio-heat makes it worse.

Bio-heat blends shorten seal life. Of four pumps that Oil Manufacturers Association tested, two of them experienced seal failure after the equivalent of 1 ½ to 2 ½ years when run on a B5 ULS blend (5% bio-heat, 95% ultra low sulfur fuel).

You are probably thinking that more resistant seals are needed than the nitrile seals used in most home oil burners. Although viton seals work well with higher concentrations of biodiesel, the Oil Manufacturers Association also tested B5 in pumps with viton seals. They failed on the order of one year.

Sludge

Sludge probably causes more service calls than any other heating oil problem. Sludge is the result of fuel degradation, which is accelerated by water^{5,6}. Water also invites microbial growth that is sometimes called sludge.

Although ultra low sulfur fuel is arguably more stable, its lower solvency is much more likely to make solid deposits as the fuel degrades. It is also more likely to let go of dissolved water as temperatures

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drop, putting free water at the bottom of the tank.

Add bio-heat to the mix and water problems become more likely. Bio-heat absorbs water, leading to larger volumes of water dropping out as temperatures fall. It is less stable than heating oil, increasing solid deposits⁷.

One of the advantages of pure bio-heat is that it is biodegradable if spilled. In other words, it is readily eaten by bacteria. Combine bio-heat's water absorption with ability to rapidly grow bacteria, in a tank that sits partially full during the warm summer months, and you have a much greater risk of plugging the fuel system from microbial growth.

Corrosion

Since the introduction of ultra low sulfur diesel in 2006, tank corrosion has increased dramatically (see 7/10 Central News). The reports of corrosion were not just at the consumer level, but service stations, particularly those sites with low volume and low turnover. Now it is likely that we will extend the corrosion problem to heating oil tanks that sit partially full all summer.

Corrosion is associated with moisture and it is inevitable that as a tank breathes in and out with temperature changes, condensation collects and falls to the bottom of the tank. An outdoor 275-gallon storage tank that is one-fourth full can accumulate a quart of water over the summer.

Corrosion is already a problem with high sulfur fuels. Canada's Prince Edward Island has recorded one corrosion failure each year for every 490 outdoor heating oil tanks installed⁸. They define a tank failure as the tank rusting through causing a spill. Tank failure rates are likely to increase as we transition to the more corrosive ultra low sulfur heating oil.

Fuel Additives

Fuel additives reduce the problems related to heating oil^{9,10}. They can stabilize the fuel, stop corrosion, absorb reasonable amounts of moisture, promote more efficient burner operation, and improve cold flow. In the words of HVAC technician trainer and consultant, George Lanthier, "I've preached about additives for a long time and those that use them have fewer problems."¹¹ A fuel distributor in Connecticut used an additive over several years and saw their fuel related service calls fall by over 50%¹². Well formulated additives work.

The Dilemma

Here is the rub. According to an industry expert, "old oil tank bottoms are the dirtiest place on

earth. One burner manufacturer has even stated that there is normally two to six inches of sludge on the bottom of the average tank.¹³"

When fuel distributors upgrade to faster pumps, their fuel related problems jump. Why? Because it stirs more debris up off the bottom of the tank.

When we made the transition to ultra low sulfur diesel, many fuel distributors had problems with filter plugging. Biodiesel's solvency also cleaned tanks and plugged filters. We can expect similar problems as the transition to ultra low sulfur heating oil and bio-heat loosen the solids from the bottom of tanks.

So, you may be asking yourself if you really want to sell additives for heating oil. You know additives help, but you also know problems are coming with the new fuels and your customer is likely to blame the additive for any problems.

Our diesel fuel additives worked during the transition to ultra low sulfur diesel and biodiesel blends. In fact, our fuel additive customers had a lot fewer problems during the transition than their neighbors. If your tank is relatively clean because you have been using our additives, there is less material to plug a filter. We can expect similar results when using our additives through the changes in heating oil.

Cen-Pe-Co Additives

We recommend Cen-Pe-Co Super Diesel Klenz for heating oil. After all, #2 heating oil is #2 diesel fuel in most areas.

To reduce filter plugging, check for water first. If free water is at the bottom of the tank, advise your client to remove it by pumping or draining before adding the additive.

Inform your client that, short of mechanical tank cleaning, he may experience filter plugging. Super Diesel Klenz can reduce filter plugging, but some of the material on the bottom of his tank is likely to be insoluble solids. When these are moved to the filter by the new fuels, the filter is likely to do its job, plugging in the process. By inhibiting the formation of solids (sludge, gum, varnish, rust), Super Diesel Klenz can minimize plugging.

Super Diesel Klenz will keep the fuel fresh during storage, inhibiting the formation of sludge. Its dispersants will absorb normal amounts of condensation with reasonable fuel handling. Super Diesel Klenz's rust inhibitors will stop corrosion in what is becoming an increasingly hostile environment. And its cold flow improvers keep fuel flowing in cold weather. Finally, Super Diesel Klenz promotes more

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Farm Show Highlights

Ohio Farm Science Review



Roger Tooman, OH and Dale Thomas, OH work the Cen-Pe-Co display at the Ohio Farm Science Review.



Rich, Jordan, and Misty Lustik bring the Silver Bullet Tractor and Hauler for the Cen-Pe-Co display at the Ohio Farm Science Review. This is one of the most popular displays at the show! Thank you Lustik Family.



Milt Boerger, OH speaks with a potential customer in the Cen-Pe-Co display at the Ohio Farm Science Review.

Maine Farm Days



Dave Mraz, ME mans the Cen-Pe-Co display at the Maine Farm Days.



Dave Stevenson, ME chats with Maine Governor Paul LePage at the Maine Farm Days event.

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efficient combustion to lower heating costs, which is particularly a big deal this winter. The Energy Information Administration is predicting a 19% jump in the cost of heating with oil this winter, forecasting a higher oil heating cost than any previous winter on record¹⁴.

Super Diesel Klenz will help achieve trouble free boiler operation as we transition to more environmentally friendly heating oils.



Reference Notes

1. "Ultra Low Sulfur Fuel Set to Debut in New York" by Stephen Bennett, Fuel Oil News 3/12 p20.
2. "Marketers Push for ULSD to be Used as Heating Oil in NE, Refiners want to Nix Plan" Oil Express Newsletter, 2/8/2010.
3. "Soot" by Charles Bursey, Fuel Oil News 7/10 p32.
4. "Ultra Low Sulfur Fuel Oil Effects" by Stephen Bennett, Fuel Oil News 3/11 p18.
5. "Time to Pay the Piper" by John Griffin, Fuel Oil News 9/09 p46.
6. "Fuel Oil Issues" by Charles Bursey, Fuel Oil News 1/09 p32.
7. "Using Biofuel in Oil Fired Systems" Fuel Oil News 9/11 p3.
8. "Heating Oil Storage: Regulation vs. Non-Regulation" by Michael Freill, Fuel Oil News 1 /09 p34.
9. "Oil Quality Control" by Charles Bursey, Fuel Oil News 4/11 p40.
10. "Fuel Oil Issues" Ibid.
11. "Lazy Servicemen—Follow Up" Fuel Oil News 1/11 p18.
12. Fuel Oil News 12/08 p15.
13. "It filters Up and Down" Fuel Oil News 8/08 p16.
14. "Colder Winter to Hike Fuel Demand" OilSpot News 10/15/12



Grawmondbeck's Competition Engines in Mason City Iowa used Cen-Pe-Co oil barrels, provided by Cen-Pe-Co's Mark Bosma, to fabricate a muffler for their engine dyno. There is more than one way Cen-Pe-Co helps engines make more power.