Preparing For the COLD with ULSD Fuel
By: Edward Eckert

The winter of 2006 was a very busy one in the fuels laboratory. Although it isn't unusual at this time of year to see an increase in cold flow testing, what was unusual was the number of problems customers were experiencing with the new Ultra-Low Sulfur Diesel (ULSD (S15)) which they had just started using during the past year. The lab received numerous calls regarding fuel filter clogging. One customer, a disposal company with a fleet of garbage trucks, was shut down for days due to fuel filter clogging. This was obviously creating a real "stinky" situation. Everyone was wondering what was going on, and apparently the fuel was to blame, but why?

ULSD has unique characteristics due to the refining process to remove the sulfur. It increases the paraffin wax content, and enables the fuel to retain more dissolved water, unlike its High and Low Sulfur counterparts.

Paraffin wax was the biggest culprit to filter clogging with ULSD during the cold season of 2006. "Wax-gel clogging" in fuel filters was occurring for numerous customers. Unlike the Dr. Scholl's commercials, "Gellin like Magellan" was not cool. When improperly treated ULSD fuel is subjected to very cold temperatures, the wax content in the fuel will bond together creating a wax-gel like substance and drop to the bottom of the fuel tank. The wax-gel will then be drawn into the filter by the fuel pump, blocking any fuel from getting to the engine. When the clogged filters are removed, the wax gel that is on the filters becomes insoluble (solid) at room temperature. It will not become soluble again until approximately 85F, where at this point the wax can be absorbed back into the fuel. With High and Low sulfur fuel, the wax is absorbed back into the fuel at much lower temperatures. Another problem that customers encountered was icing. ULSD can hold more dissolved water than High or Low Sulfur diesel. Even though lab results show there isn't water in the storage or supply tank, the dissolved water when it starts to reach the freezing mark (32F), will get "pushed" out of the ULSD fuel creating ice crystals causing fuel line and filter plugging.

#2 ULSD cannot be winterized with #1 Diesel Fuel, Kerosene, or Jet A fuel types. Even though these fuels are similar in cost, and will reduce the CFPP (Cold Filter Plugging Point) or PP (Pour Point) by 5F for every 10% added to the #2 ULSD, these fuel types contain higher sulfur levels, making the fuel non-approved for on-highway use. #1 ULSD is expensive and production levels are limited, so don't expect to see it that much in 2007. ULSD has to be winterized properly for the cold winter months by using the right winter additives. As was seen by many customers last year using winter additive products that worked well with their High or Low Sulfur fuels, the additives they typically used had little or no affect on ULSD.

It is very important to know for the upcoming cold months ahead, how your fuel will perform when temperatures fall. We suggest asking your fuel supplier how they are winterizing the ULSD they are supplying. Some ULSD is winterized by de-waxing, and there are also numerous anti-gel, anti-ice, and water absorber additive products available to winterize ULSD. Some additive manufacturers offer special additives that will "de-gel" the fuel if gelling has already occurred. If you treat your fuel yourself, be sure to follow the proper treat ratios, and remember that mixing is very important. If you are adding an additive to your tank, you should add it first before filling it up.

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