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**cen-pe-co**<sup>®</sup>  
**LUBRICANTS**

CENTRAL PETROLEUM COMPANY  
Cleveland, OH      Walcott, IA

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**CENTRAL NEWS**<sup>©</sup>

# Happy Thanksgiving

As we gather together with family and friends for this Thanksgiving Holiday, we have so much to be thankful for:

First and foremost we must be thankful for our health; our physical, mental, and spiritual health, for without solid health we would not be what we are today.

We must be thankful to live in such a wonderful country where we have so many freedoms that are not available to many others around the world. As recently shown, our freedom to vote (no matter how ugly it has become) puts the power to elect our government officials into our hands.

And we must be thankful that we represent a true American Company whose goals have not and will not waver: to produce and market the finest quality lubricants, fuel additives, and paints & coatings available anywhere.

We must be thankful to our customers who trust our products to be used in their millions of dollars worth of equipment.

We want to extend our thanks to all of you for all of your efforts in promoting, selling, and delivering our products.

All the best to you and your families during this holiday season!

*Dave & Paul*



# Diesel Fuel Quality

By Blaine Ballentine, Lubrication Engineer

Infineum recently released the results of its “World Wide Diesel Fuel Quality Survey 2016<sup>1</sup>.” That means last winter for our market, but the Southern hemisphere has winter during our summer. A battery of tests were run on 335 samples collected at random from 50 countries. Thirty-three tests were run on each test producing over 9,000 data points.

Infineum is a multinational petroleum additive manufacturer, and currently the market leader in North American fuel additives. Never heard of them? Understandable, because they sell to oil companies, not consumers.

Since Cen-Pe-Co markets in the Northeast and Midwest, we will evaluate data from the 47 samples gathered from these areas. We will look at cold flow, cetane, and lubricity.

## Cold Flow

The average CFPP (Cold Filter Plugging Point) of the diesel fuel samples from the Northeast and Midwest was -6.5 degrees F. This laboratory procedure is intended to give a general indication of the temperature to become concerned with diesel fuel plugging the fuel filter. Of course, the pore size and overall size of the filter, location of the filter on the vehicle, where the vehicle is stored, the injection system, and a host of other variables determine the actual temperature at which the engine experiences operational problems. The CFPP gives us a repeatable indication of the fuel’s cold flow quality.

The coldest average temperature for

Walcott, Iowa, obtained by averaging the coldest temperature in mid-January, is 14 degrees F. So, and average CFPP of -6.5 sounds pretty good. However, the problem with averages is they do not always give meaningful information.

Let’s dig a little deeper. The worst of the 47 samples for CFPP was 10.4 degrees F. Last winter was mild and the temperature in Walcott, Iowa only got as cold as -5. Winter 2015 got down to -11 and the winter before -16. So, a below average fuel would not have worked in Walcott on the coldest days last winter, and an average fuel would not have worked in either of the two previous years.

We can also tell from the data that most fuel companies are using cold flow improver. In our experience, the Cloud Point and the CFPP are the same for untreated fuel. By subtraction, we can see the contribution of the cold flow improver.

The average Cloud Point among the samples was 2.9. Subtracting the average CFPP of -6.5 we see the average improvement from additives 9.4 degrees. To put this in perspective, Cen-Pe-Co cold flow additives lower CFPP an average of 16 degrees when used at the regular recommended rate.

Again, averages hide the real story. While some companies do an excellent job in driving down the CFPP to where the fuel works on the coldest days, other companies do not add any cold flow improver at all.

Overall, we can say the industry does a fair job of supplying workable diesel fuel for

**the average fuel would cause filter plugging on the coldest days**

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cold weather. On the other hand, if your vehicle quits on one of those very few bitterly cold days in the winter it creates a potentially life threatening situation. Talk with somebody who has changed a fuel filter in a -30 degree wind chill--they never ever want to do that again, ever. Ask a trucker what it costs for a tow if their fuel filter plugs. Additional protection just makes good sense.

Just a reminder, the flow improving additive works by surrounding the wax particles as they fall out of the fuel. If you keep the wax particles submicron in size, they pass through the filter without problem. Let those particles stick together, and you will pack your filter. Therefore, the additive has to be added to the fuel at temperatures above its cloud point.

We receive very few complaints on the performance of Cen-Pe-Co

low the cloud point, some of the wax particles combine and cold flow improvers are not as effective. The above-ground storage tank has to be treated for maximum performance.

If a customer does experience a problem, try to obtain a sample of the fuel that was in the vehicle when the filter plugged. By having a laboratory run a Cloud Point and CFPP, we can see the contribution of the additive to cold weather operability, or perhaps that they forgot to put in the additive.

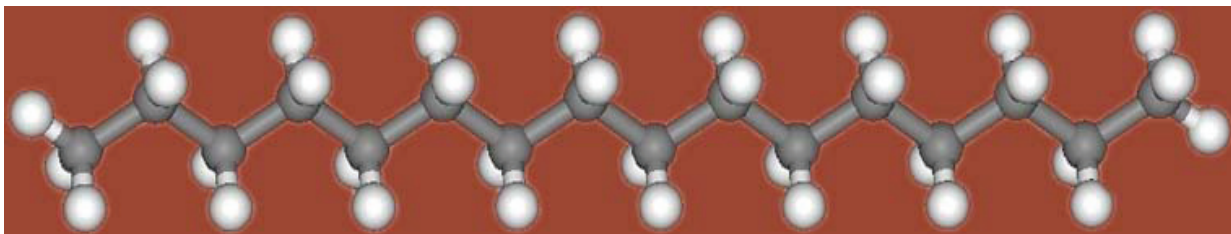
**the average fuel has a cetane rating 5 numbers below manufacturers' recommendations**

### Cetane

Cetane is a measure of combustibility. It indicates how quickly a fuel lights after it is injected.

Here the industry did a pretty good job. The minimum requirement for #2 diesel fuel is 40, which was also the lowest observation among the samples. Average was 45.

On the other hand, the diesel engine



cold flow additives, but if a customer had to suffer the experience of changing a fuel filter in extremely cold windy conditions, he is likely to call and complain. Virtually every complaint over the years has turned out to be that additive was not added, or added to fuel below its cloud point. What seems to catch the majority of them by surprise is that they treat the vehicle tank, but fill from an above-ground storage tank. When the fuel in the storage tank falls be-

manufacturers want cetane to be 51 to 55, depending on the level of emissions requirements<sup>2</sup>. Most of the rest of the world and even the Western USA falls within that range, but we in the Midwest and Northeast have some of the lowest cetane diesel fuel in the world.

We have had feedback from our customers again and again, particularly our trucking customers, that our cetane improving additives improve the performance of their vehicles.

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Some measure performance in miles per gallon, while others measure the improvement in acceleration or by not needing to downshift as much in the hills.

Many of our customers have also noticed higher cetane in a shorter duration of rough running that occurs after startup in cold weather. Engine parts and tolerances are designed for operating temperatures. Essentially, your parts and your motor oil are out of spec at startup, which is not the time you want an imbalance in your engine that can be mitigated with higher cetane fuel.

### Lubricity

Removing sulfur from diesel fuel also removes the “contaminants” that lubricate fuel systems. So, the federally mandated Ultra Low Sulfur Diesel must include lubricity additives to prevent destruction of fuel pumps. The U.S. requirement for lubricity is a wear scar no larger than 520 microns in the HFRR (High Frequency Reciprocating Rig).

The average wear scar among the fuels tested was 406 microns. Again the average is deceiving.

Twelve of the samples, one fourth, contained biodiesel. Biodiesel has its strengths and weaknesses, and lubricity is definitely in the strengths column. Two percent biodiesel will provide excellent lubricity. It is interesting to note that none of those samples contained 2% biodiesel. The lowest level among the samples containing biodiesel was 3%. It is no coincidence that the fuel with the highest biodiesel content also had the lowest HFRR. This sample contained a surprising 12% biodiesel and had only a 182 micron wear scar in the HFRR.

The average HFRR reading is misleading because it was skewed by the fuels containing biodiesel. Five of the samples failed to meet the federal mandate of no more than a 520 micron wear scar in the HFRR.

Where the requirement in the U.S. is less than 520 in the HFRR, the European limit is 460. The engine manufacturers also want a minimum of 460<sup>3</sup>. In fact, injection system manufacturer Bosch considers an HFRR of 450 to be borderline<sup>4</sup>. Thirteen of our samples, over 25%, failed to meet the manufacturers’ recommendation / European requirement of 460.

**over 25% of diesel fuels do not meet manufacturers recommendations for lubricity**

### Additives

A good multi-functional diesel fuel additive can lower CFPP, raise cetane, and improve lubricity. Cen-Pe-Co anti-gel additives lower CFPP an average of 16 degrees, allowing engines to run in the coldest weather.

Cen-Pe-Co cetane improving additives increase cetane 3 to 6 numbers. It is enough that most operators notice better fuel economy, more power, easier cold weather starting, less white smoke, or smoother operation.

All Cen-Pe-Co diesel fuel additives (except Kwik Clean) contain enough lubricity additive to bring the HFRR wear scar for the worst fuels below the 460 microns wanted by the engine manufacturers.

Cold flow, cetane, lubricity—Cen-Pe-Co additives give you premium diesel fuel.

1. Worldwide Winter Diesel Fuel Quality Survey 2016, Infineum, November 2016, <http://www.infineuminsight.com/media/201653/infineum-wdfqs-2016-animated.pdf>  
2. World Wide Fuel Charter (5th Edition), Truck and Engine Manufacturers Association, 9/13, P 10.  
3. Ibid.  
4. “Diesel Fuel Lubricity Requirements for Light Duty Fuel Injection Equipment” CARB Fuels Workshop, Sacramento, CA, 2/20/03, Robert Bosch GmbH, slide 12.