TRIBOLOGIK®
NEWSLETTER

ISO 17025:2005 **www.tribologik.com**

NOVEMBER 2013

In this Issue :

Fuel testing – Continued from October

In our last issue (October 2013), we have described six of the most frequently performed tests on diesel fuel, i.e.: **Karl Fischer, Viscosity, Sulfur Content, Flash Point, Density, Ash Content and Wear Metals**. For detailed descriptions, see http://www.pmaint.com/?section=PAST_ISSUES

Contaminated or poor quality fuel causes numerous adverse effects on engine performance, parts, components and supporting systems such as pumps and injection systems. The first and most obvious adverse effect of water on metal is corrosion, water being the ideal growth environment for bateria, a prominent cause of filter plugging and poor engine performance.

The performance of diesel engines is usually affected by a combination of several factors. The causes of poor performance as well as the causes of corrosion and filter plugging can only be detected by a combination of analyses.

Performance Tests

Four tests allow detecting combustion, ignition and fuel startup performances:

- **Carbon Residue :** Fuel combustion produces carbon monoxide. In addition, sulfur can leave **deposits in the combustion chamber**, **corrode** exhaust systems and cause piston, ring and cylinder wear.

- **Pour Point :** The Pour Point is the lowest temperature at which a fuel sample continues to flow when cooled down under specific conditions. It is an indication of the fluidity of the fuel at low temperature. The pour point is an important factor in easing engine **startup and fuel pumping** during **frigid temperatures**.

- **Distillation** is a separation technique for mixtures of petroleum products, each with a different boiling point. This boiling point determination method allows estimating the

cetane index of the diesel fuel and its self-ignition properties (**ignition quality**). ASTM D 86 determines the temperature at which 95 % of the diesel fuel is distillated. Reducing the boiling point slightly lowers the NOx emissions but increases Hydrocarbons and CO emissions.

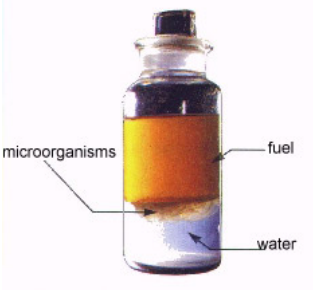
- **Cetane Index** is a measurement of the **ignition quality** of a diesel fuel. It is somewhat the diesel equivalent of **octane numbers** for gasoline. The cetane index varies with the types, brands and sizes of engines. Speed, weight loads and engine start conditions must also be considered. The cetane index is an important measure of an engine's **cold-starting** ability.

Preventing Corrosion

- **TAN :** Total Acid Number measures the total amount of **acidic material** present in a lubricant. An increase in the TAN above that of the new product indicates degradation of fuel by **oxidation or contamination**. The results are expressed as a numeric value corresponding to the amount of the alkaline chemical potassium hydroxide (KOH) required to neutralize the acid.

- **Copper Corrosion** uses a strip tarnish test to detect corrosion from petroleum products on yellow metals. Copper Corrosion assesses the relative **degree of corrosiveness** of a petroleum product due to active sulfur compounds. Results are rated by comparing the stains on a copper strip to a color-match scale from 1a to 4c.

- **Bacteria** depend on water for growth. Diesel being an organic fluid, it also provides all they need for growth : oxygen for respiration and carbon for food. A droplet of water is a lake for them. They hide in pits and cracks where they exert their **corrosive action**, reproduce and **plug filters.**



Preventing Filter Plugging

- **Sediments** consist of insoluble residues and impurities such as dust, scales of rust and free water, present in petroleum products. The most effective method to determine the water and sediment content in % volume (V/V) is the centrifuge method. The ASTM D 1796 method describes the determination of water and sediment in fuels.

- **Asphaltenes** are becoming a more important problem since the introduction of ultra low sulfur diesel (ULSD) fuels. They agglomerate to form an oily sludge and it is even worse when water is added to the mixture. ULSDs contain twice as much asphaltenes as low or high sulfur diesel. Also, warmer temperatures in storage tanks or due to the recirculation of fuel by the engine fuel system speeds the process and thickens the sludge.

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The aforementioned tests and combination testing are dependent on the application. For more information, contact your technical representative.

WEBINAR – Manage your Oil Analysis Program using the Tribologik® web site

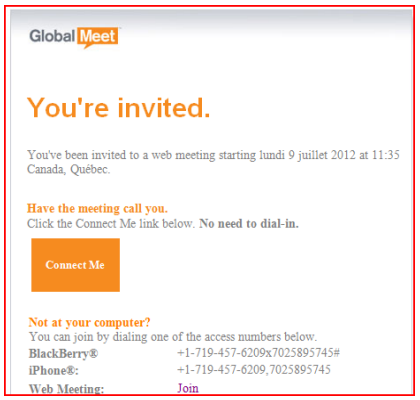
By **Nicholas Reich**

Date : Friday November 29, 2013
Time :

- **Ontario, Manitoba : 12:00 PM, Toronto time**
- **Saskatchewan, Alberta : 10:00 AM, Calgary time**

Duration : 30 minutes

Reserve now with Nicholas : nreich@tribologik.com



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