



TRIBOLOGIK®

NEWSLETTER

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Engine Malfunctions May Indicate Fuel Contamination

Have you noticed any increases fuel consumption, higher emissions of soot, unburned fuel, engine noise and/or rough operation? Do you have problems starting your engine? Is it knocking? Or, hard start, engine stalling or refusing to start, odd behaviour, eventually making it to stop abruptly as though you're running out of gas when climbing through steep slopes, acceleration problems, fume odor, motor sputtering, drowning when running idle, etc.?

These aforementioned symptoms may result from fuel or fuel system related problems.

Injector/Filter Clogging

The clogging of injector nozzles and fuel filters figure among the most common of these problems. They have multiple causes for which a variety of tests are available:

- **Carbon residue:** Residual carbon accumulation affects the injectors, hinders the fuel-air mixing process, which increases fuel consumption, emissions of soot and unburned fuel, engine noise and rough operation.
- **Cetane number:**
 - **Too high of a** cetane number causes high proportion of soot emissions and the formation of carbon deposits clogging the injection nozzle.
 - **Too Low of a** cetane number causes a long delay ignition, leading to engine knocking.
- **Octane number:** spark-ignition engine **knocking** correlates to wrong octane number.
 - Typical commercial fuels produced for spark-ignition engines operating under **mild condition** rate in the 88 to 101 Research Octane Number range.
 - The Motor Octane Number correlates with commercial automotive spark-ignition engine antiknock performance **under severe conditions** of operation. Typical commercial fuels produced these spark-ignition engines rate in the 80 to 90 Motor Octane Number range.
 - Typical commercial fuels produced for **aviation spark-ignition engines** rate in the 98 to 102 Motor octane number range.
- **Lubricity** of diesel fuel: Diesel fuel functions as a lubricant in most components of fuel injection equipment such as pumps and injectors. Shortened life of engine components, such as diesel fuel injection pumps and injectors can be ascribed

to lack of lubricity in a diesel fuel. This test may be used to evaluate the relative effectiveness of diesel fuels for preventing wear.

- **Oxidation Stability:** Products of oxidation can take the form of various acids or polymers, which, if in high enough concentration, can cause fuel system deposits and lead to filter clogging and fuel system malfunctions. These contaminants can increase deposits and lacquer build-up in fuel pumps and injectors.
- **Water and sediment** contamination can contribute to filter plugging and fuel injection system wear.
 - An accumulation of sediment in storage tanks and on filter screens can obstruct the flow of oil from the tank to the combustor.
 - Free water in middle distillate fuels can cause corrosion of tanks and equipment, and if detergent is present, the water can cause emulsions or a hazy appearance. Free water can also support microbiological growth at fuel-water interfaces in fuel systems.

Environmental Regulations

- **Sulfur emissions** are detrimental to the environmental and regulatory issues. Fuel sulfur can affect emission control systems performance and various limits on sulfur have been imposed for environmental reasons. This test method covers the determination of total sulfur in liquid hydrocarbons and can be used for purposes of regulatory control.
- **Vapor Pressure:** EPA and Environment Canada regulate the vapor pressure of fuels and fuel additives if such fuel, additive or any evaporative emission product causes or contributes to air or water pollution that may endanger the public health or welfare. The Vapor Pressure test is a common measure for the measurement of the vapour pressure of gasoline, solvents, light crude oils, and other similar products. The Vapor Pressure test monitors the Vapor Pressure of the fuel and its compliance with EPA and EC regulations.

These are some of the fuel tests offered at your Tribologik laboratory.

Please contact your Account Manager for additional information.