



DIESEL FUEL SYSTEM ANTIFOULANT



THE CHALLENGE

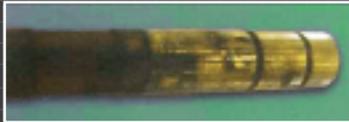
The two known issues that affect high performance diesel engines operating on ULSD are:

1. Premature fuel filter plugging
2. Formation of deposits in the high pressure fuel injection (HPFI) system.

INJECTOR FOULING

Legislation to reduce diesel emissions has encouraged the development of engines with advanced fuel injection equipment. These injection systems produce temperatures and pressures that are considerably higher than those found in older diesel engines.

This can lead to particularly stubborn deposits forming at and around the injector valve seat and nozzle. This results in injector drift, power loss and an increase in smoke emissions.



Fuel injector valve plunger
No Additive



Fuel injector valve plunger
with Black-Out™

FUEL FILTER PLUGGING

The formation of black soot-like deposits in the fuel filter is caused by these extreme high temperatures and pressures. Under these conditions, the ULSD is then thermally decomposed in the injection system. Field tests show that filters are often blocked with the resulting black deposits and need replacing after just 16,000 to 20,000 km of operation.

Fleet Trial - Same make and model trucks, same fuel, same work load. The only difference is **BlackOut™** Diesel Fuel System Antifoulant



24,000 km, no additive



48,000 km with **Black-Out™**

THE SOLUTION

Black-Out™ Diesel Fuel System Antifoulant is a new fuel Additive created specifically to improve the performance of ULSD in newer model vehicles equipped with high pressure fuel injectors. This is the latest addition to the impressive line of Power Up fuel additives. It complies with the federal low sulfur content requirements and does not exceed 15ppm. While traditional detergents may have historically been effective in combating injector deposits, these products are proving less feasible in modern heavy duty diesel engines and the treat rates required to have any impact are simply not effective. At the same time, the need to remove deposits in and around the injector valve seat and nozzle has become even more critical to overall performance.

Black-Out™ Diesel Fuel System Antifoulant is a highly innovative multifunctional middle distillate fuel additive that offers a number of important benefits to fleet operators. It prevents the formation of fuel soot by conditioning ULSD to withstand the extreme temperatures and high pressures of today's fuel injection systems. It also cleans up existing deposits, returning injectors to "like new" condition within a short time period.

This new Power Up fuel additive not only maintains the thermal and oxidative stability of ULSD, it also prevents the formation of black sludge. This is a common problem which can escalate in high pressure engine units operating at high temperatures. Over time, contaminants from unburnt fuel and combustion soot build up to form a thick black sludge. This sludge ultimately affects performance.

As a result of using **Black-Out™**, fuel filter plugging is reduced dramatically. Field tests suggest the filter lifecycle is extended from between 8,000 and 20,000 km to approximately 48,000 km. It is estimated that savings on fuel filters alone could cover the cost of using **Black-Out™**.

With injectors cleaned and maintained, operators can expect fewer injector failures and optimum combustion at all times. This makes for a more efficient engine which benefits from restored power, reduced emissions and better fuel economy.

APPLICATION

For effective clean-up of problematic fuel system sludging, apply **Black-Out™** Diesel Fuel System Antifoulant at a 1:1500 ratio (1L treats 1,500 litres of diesel fuel). To ensure optimum fuel system performance and protection, use **Black-Out™** in combination with **Gen49D** diesel fuel system conditioner. **Black-Out™** performs the clean-up and **Gen49D** provides the fuel system maintenance and performance enhancement.



DIESEL FUEL SYSTEM ANTIFOULANT



GIVE YOUR BOTTOM LINE A CASH INJECTION!

Whether your business is trucking, agriculture, mining, marine or if you simply own a diesel truck, you all have something in common:

Ultra Low Sulfur Diesel & Modern Diesel Engine Technology

Since the introduction of ULSD in 2006, a number of issues have been plaguing diesel users such as injector failures, filter plugging, loss of horse power and diminished fuel economy.

Today's ULSD fuels pass all of the current laboratory tests for thermal and oxidative stability, however the tests are not equivalent to the extreme conditions of the high pressure common rail (HPCR) injection systems. It has been discovered that some of today's ULSD fuels are not as stable as predicted early on by many industry experts.

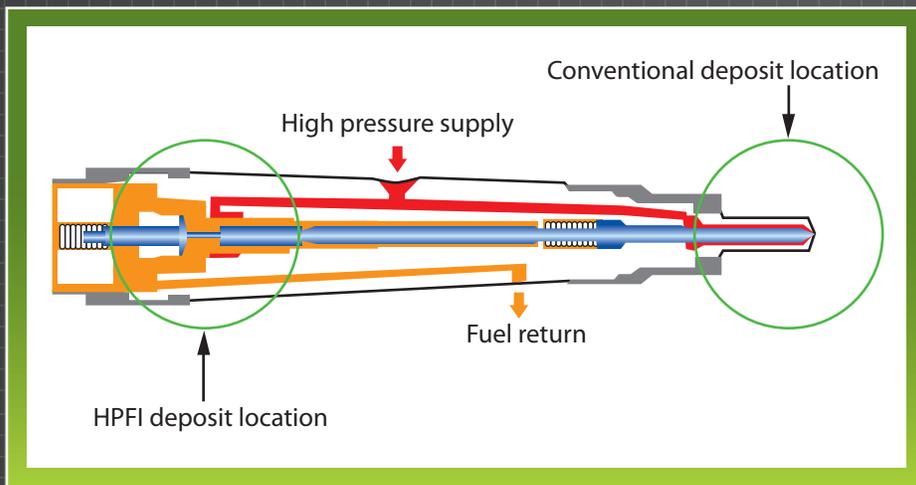
With new emission standards forcing OEMs to build more efficient engines with much tighter tolerances, the typical HPCR injection system has constant pressures and temperatures that exceed 30,000psi and 400°F respectively. This environment thermally stresses the fuel and cause it to break down or coke in the upper cylinder of the injector, thus creating a black soot like material often referred to as an asphaltine like substance. This material not only fouls injectors, but gets returned back to the saddle tank via the return fuel line. This circulates dirty fuel throughout the fuel system, causing premature fuel filter plugging, loss of power and significant loss of fuel economy.

Power Up has developed a new product that not only conditions the fuel to prevent this in-engine thermal stressing, but also cleans up existing injector deposits and keeps them in "like new" condition. **Black-Out™** Diesel Fuel System Antifoulant products prevent injector failure, extend filter life, improve horsepower and restore lost fuel economy.

Power Up **Black-Out™** Diesel Fuel System Antifoulant has been formulated to:

- Clean and prevent deposits in high pressure fuel filters & injection systems
- Inhibit fouling of Ultra Low Sulfur Diesel
- Prevent fuel filter black sludge deposits
- Maintain efficient filter performance
- Restore lost horsepower
- Reduce harmful exhaust emissions
- Provide thermal and oxidative stability
- Maximize optimum fuel economy

INJECTOR DIAGRAM SHOWING PROBLEM



Black-Out™ Diesel Fuel System Antifoulant is available in the following convenient sizes:



355ml bottles



1 Litre bottles



DIESEL FUEL SYSTEM ANTIFOULANT



TECHNICAL INFORMATION

Black-Out™ Diesel Fuel System Antifoulant provides the following performance benefits:

- Prevents formation of black sludge
- Prevents filter plugging caused by thermal stressing within the engine
- Restores lost horsepower
- Reduces exhaust emissions
- Provides thermal and oxidative stability
- Cleans and prevents deposits formed in high pressure fuel injection systems
- Cleans and prevents injector deposits resulting from ULSD
- Improves and maintains power
- Improves and maintains fuel economy

Typical Properties

Properties	Results
Appearance	clear amber liquid
Specific Gravity, 15.6/15.6°C (60/60°F)	0.918
Density, lb/gal, 15.6°C, (60°F)	7.64
Flash Point, PMCC, °C (°F)	160 (71.1)
Pour Point, °C (°F)	<-40(<-40)
Viscosity, cSt @ 37.8°C (100°F)	9
20°C (68°F)	15
0° (32°F)	29
-17.8° (0°F)	61
-28.9° (-20°F)	109

Recommended Treat Rates

Black-Out™	Diesel Fuel	Black-Out™	Diesel Fuel
70ml	100 litres	2 oz.	26 gallons
355ml	500 litres	12 oz.	132 gallons
1 litre	1500 litres	1 quart	396 gallons
101 cc's	180 litres	101 cc's	40 gallons

Personal Safety, First Aid, Storage and Handling

See the Material Safety Data Sheet for product specific information