How to Read the POLARIS Fuel Analysis Report

POLARIS™ Laboratories

TECHNICAL BULLETIN

Diesel fuel analysis allows you to determine if the diesel fuel you are using is negatively affecting fuel filter life or engine performance. The descriptions below will help you interpret the test results and understand the impact condition monitoring can have on the overall effectiveness of your maintenance reliability program.

Metal concentrations of greater than 10 ppm is an indication that corrosion is occurring somewhere in the system or fuel storage tank, or there has been lube contamination.

Dates Sampled, Received and Completed help monitor proper sampling intervals and lab turnaround time. **Miles on Unit** indicates age of the equipment. **Lab Sample Number** indicates the lab location where testing was completed and will expedite answers to questions concerning your samples.

Data Analyst Initials

A POLARIS analyst's Comments and Recommendations highlight test results of most importance and provide a suggested course of action when needed.

Viscosity is the measurement of a fuel's resistance to flow and is reported in centistokes. When viscosity measures out of spec, the fuel can reduce injector performance.

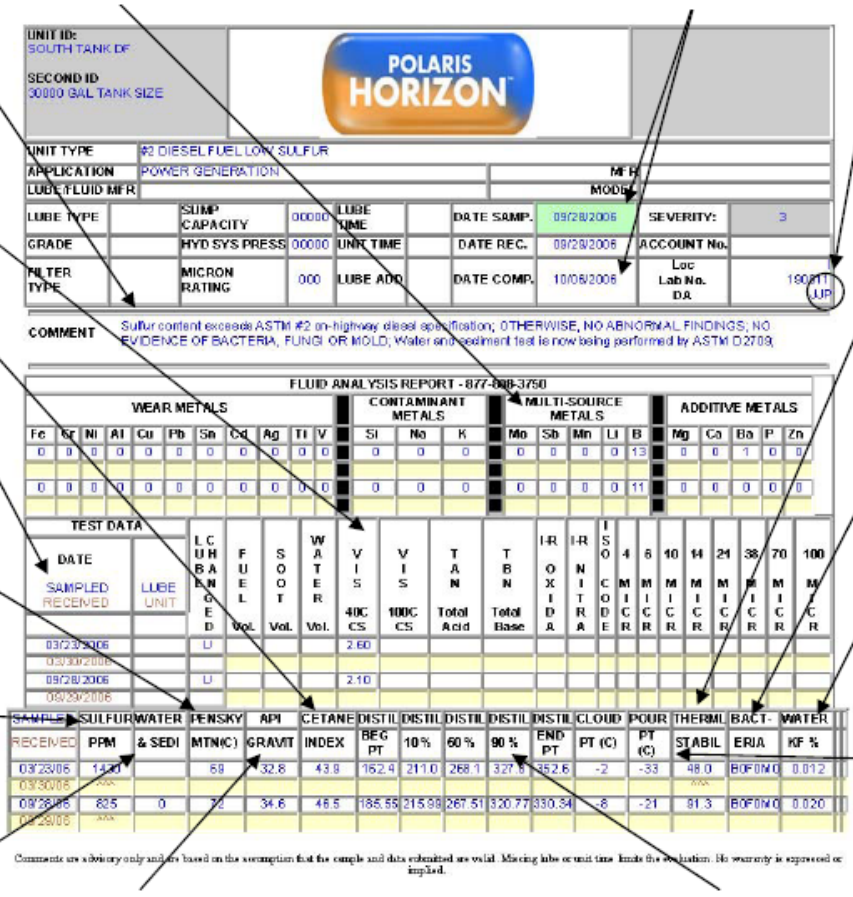
Cetane Index is a measure of a diesel fuel's ignition quality. The limit for a #2 diesel fuel is a Cetane Index of at least 40.

The Current Sample is listed first. As many as three preceding samples may also be included.

Flash Point is the lowest temperature at which the vapors of a combustible liquid will ignite momentarily in air. Low diesel fuel flash points indicate contamination by more volatile fuels such as gasoline. Refer to ASTM guidelines for minimum flash point limits.

Sulfur content will affect SOx emissions and can have adverse effects on many NOx and PM emission reduction devices. It is important to determine if the sulfur level in fuel is appropriate for a specific application.

Water and Sediment in fuel can cause corrosion, wear, bacterial growth and premature fuel filter clogging. The amount of water in fuel should not exceed 500 ppm (0.05%). Sediment should be no greater than 100 ppm (0.01%).



UNIT ID: SOUTH TANK DF
SECOND ID: 30000 GAL TANK SIZE
POLARIS HORIZON

UNIT TYPE	#2 DIESEL FUEL LOW SULFUR							
APPLICATION	POWER GENERATION				MFR			
LUBE/FLUID MFR					MODEL			
LUBE TYPE		SUMP CAPACITY	00000	LUBE TIME		DATE SAMP.	09/28/2006	SEVERITY: 3
GRADE		HYD SYS PRESS	00000	UNIT TIME		DATE REC.	09/28/2006	ACCOUNT No.
FILTER TYPE		MICRON RATING	000	LUBE ADD		DATE COMP.	10/06/2006	Loc Lab No. DA 19081 UP

COMMENT: Sulfur content exceeds ASTM #2 on-highway diesel specification; OTHERWISE, NO ABNORMAL FINDINGS; NO EVIDENCE OF BACTERIA, FUNGI OR MOLD; Water and sediment test is now being performed by ASTM D2709.

FLUID ANALYSIS REPORT - 877-808-3750

WEAR METALS											CONTAMINANT METALS			MULTI-SOURCE METALS					ADDITIVE METALS				
Fe	Cr	Ni	Al	Cu	Pb	Sn	Cd	Ag	Ti	V	Si	Na	K	Mo	Sb	Mn	Li	B	Mg	Ca	Ba	P	Zn
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	1	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0

TEST DATA																							
DATE SAMPLED	DATE RECEIVED	LUBE UNIT	LUBRICATED	FUEL Vol.	SOOT Vol.	WATER Vol.	VIS 40C CS	VIS 100C CS	TAN Total Acid	TBN Total Base	I-R OXIDA	I-R NITRA	ISO CODE	4 MICR	6 MICR	10 MICR	14 MICR	21 MICR	38 MICR	70 MICR	100 MICR
03/23/2006			U				2.60														
03/30/2006																					
09/28/2006			U				2.10														
09/29/2006																					

SAMPLE RECEIVED	SULFUR PPM	WATER & SEDI	PENSKY MTN(C)	API GRAVIT	CETANE INDEX	DISTIL BEG PT	DISTIL 10%	DISTIL 50%	DISTIL 90%	DISTIL END PT	CLOUD PT (C)	POUR PT (C)	THERML STABIL	BACT-ERIA	WATER KF %
03/23/06	1430		68	32.8	43.8	162.4	211.0	268.1	327.6	352.6	-2	-33	48.0	BOF0N0	0.012
03/30/06	***												***		
09/28/06	825	0	72	34.6	46.5	185.55	215.98	267.51	320.77	330.34	-8	-21	81.3	BOF0N0	0.020
09/29/06	***														

Comments are advisory only and are based on the assumption that the sample and data submitted are valid. Missing lube or unit time limits the evaluation. No warranty is expressed or implied.

As diesel fuels rise in temperature, they produce "asphaltenes," tar-like resinous substances most often responsible for clogging fuel filters, therefore reducing filter life. Fuel with Thermal Stability of 80% or greater should not cause filter clogging. Fuels with values between 60%-80% could have a marginal affect and values less than 60% will significantly

The presence of Bacteria, Mold or Fungi is a good indication that fuel storage tanks have not been properly maintained. Water builds ups at the bottom of the tank and provides an excellent breeding ground for biological growth.

Water % by Karl Fischer measures the amount of water present in the fuel.

Cloud Point and Pour Point are measures for a fuel's tendency to form waxes at low temperatures. Cloud Point is the temperature at which wax crystals begin to form. Pour Point is the lowest temperature at which the fuel will still pour. Refer to ASTM guidelines for acceptable limits.

API Gravity is the measure of a diesel fuel's density, or weight per volume. The higher the API gravity, the less dense the fuel. API gravity provides useful information about a fuel's composition and performance characteristics such as power economy, low temperature properties and smoking tendencies.

Distillation temperature is the temperature at which 90% of the fuel volume can be distilled off. This temperature is directly related to the fuel's volatility and therefore its Cetane Index, density, flash point and viscosity as well. A #2 diesel fuel's minimum distillation temperature is 282°C—maximum is 338°C.