Trouble Check Plus Fluid Analysis

Description

Clean oil is the key to long equipment life, precision operation, lower maintenance costs and decreased downtime. SCHROEDER's Fluid Analysis Services can unlock the door to increased savings by detecting potential problems early, so that service/downtime can be scheduled and catastrophic failures/costs can be avoided.

SCHROEDER's Fluid Analysis Services provide users of industrial and mobile hydraulic equipment with a complete analytical report available on our Fluid Care Portal including:

- System status (rated as Normal, Caution or Critical)
- Graphs of sample and limit data for easy detection of abnormal results
- Photo of the contamination contained in the current oil sample
- An oil analysis report will be readily available on-line
- Early warning limits based on industry standards, provided targets or a provided baseline
- Sample Data saved in the Fluid Care Portal for trending

Information gained by using this service can help identify potential problems in a hydraulic system at minimal cost to the user. Fluid Analysis can provide answers to important questions such as these:

- Do I have the right filtration system in place for efficient contamination control?
- Is the fluid in my system experiencing changes that could negatively impact component life or system performance?

Oil Test Packages

Schroeder offers several types of sample kits for analysis of Hydraulic Fluids:

BASIC OIL ANALYSIS KIT, BOX 10 – p/n 7651336

ADVANCED OIL ANALYSIS KIT, BOX 10 – p/n 7651338

PREMIUM OIL ANALYSIS KIT, BOX 10 - p/n 7651337

■	■	■	**Appearance**	Bottle Photo
■	■	■	**ISO Particle Count**	Performed by ISO 11500, reported ISO 4406
■	■	■	**Filter Patch**	Photo of filter patch
■	■	■	**Karl Fischer Water %**	ASTM D6304C
	■	■	**Viscosity at 40C**	ASTM D445
	■	■	**Viscosity at 100C**	ASTM D445
	■	■	**Viscosity at Index**	ASTM D2270
	■	■	**ICP Spectrometry**	ASTM D5185
	■	■	**Total Acid Number (TAN)**	ASTM D664
		■	**Varnish Potential (MPC)**	ASTM D7843

Upon receipt of order for any of these part numbers, a sample kit containing a clean sample bottle, blank form, and mailing envelope is shipped to the customer. After the sample has been taken, the customer simply completes the form, encloses it along with the sample in the mailing envelope provided and sends it off to the lab. Kits are packaged and sold in lots of 10.

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Type Test Kit

Schroeder offers kits to test Coolants:

The Basic and Advanced Oil Analysis Kits can also be used for testing coolants. Simply indicate on the **Component Registration Form** that the hydraulic fluid is a coolant and include coolant manufacturer and brand name.

BASIC OIL ANALYSIS KIT, BOX 10 – p/n 7651336

PREMIUM OIL ANALYSIS KIT, BOX 10 – p/n 7651338

		Appearance	Color, Clarity, Odor, Precipitates
		pH	ASTM D1293
		Conductivity - Coolants	In-House
		Refractive Index	Freeze Point, Boiling Point, % Glycol
		Nitrates by Titration	ASTM E2412
		Sediment Patch	Photo of Filter Patch

Grease Test Packages

Schroeder offers several types of sample kits for analysis of Greases:

BASIC GREASE TEST PACKAGE, SI - Each – p/n 7651491

ADVANCED GREASE TEST PACKAGE, SI - Each - p/n 7651492

		Color	Visual Color
		Total Magnetic Iron (TMI)	Ferrous Screening
		FTIR Oxidation	Direct Trend Method
		ICP Spectrometry	25 Element ASTM D5185-05
		Karl Fischer	% Water ASTM D6304
		RULER	Remaining Useful Life
		Penetration Test	Quarter Cup
		Ferrography	Photographic Report

Monitoring the machine fluid condition is one importance aspect of an effective condition monitoring program, however an often overlooked machine component is the Grease. Staying on top of the condition of the grease used within the machine allows you to monitor your equipment condition and identify issues before catastrophic failure occurs. By monitoring grease conditions you can minimize unplanned repairs by tracking degradation trends and wear rates leading to a decrease in downtime, extension of machine life and increase equipment reliability.

Explanation of Results

Particle Count and ISO Codes

Particle contamination is responsible for most of the wear in hydraulic systems. The level of contamination is determined automatically by a laser particle counter. The results are shown as the cumulative counts per milliliter of fluid according to ISO 4406:1999. (For water glycol fluids the patch test photo is used to estimate the ISO code). The current sample ISO code is displayed with the target ISO code. The target is based on the cleanliness level required for the most sensitive component in the system. An increase of 1 ISO digit is considered a caution limit and an increase of two ISO digits is critical. When the target ISO code is exceeded, improvement of the system filtration, elimination of the source of ingression or installation of auxiliary off-line filtration is required.

Water Content

High water content in oil encourages oxidation, corrosion and cavitation. The Karl Fischer Method in accordance with ASTM D 6304-04a determines the water content, which is displayed in percent (% or ppm). (Water glycol fluids normally have upper and lower limits that are set to manufacturer's specifications). Graphing results are available on-line. In general, water contents of up to 500 ppm are typically not critical for the operation of hydraulic and lubrication systems. When the water content exceeds approximately 500 ppm, the system should be protected against water penetration and measures should be introduced to extract water from the oil.

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Explanation of Results

Viscosity

Maintaining the correct viscosity is important for achieving long component service life. Viscosity is reported in centistokes (cSt) @ 40° and 100°C as per ASTM D 445-04. Typically the limits are based on new oil data. Caution limits are calculated at ±10% new oil viscosity and critical limits at ±15% new oil viscosity. (Water glycol fluids can have limits set similarly but the water content should also be monitored as changes in it also affect the viscosity. The manufacturer should be consulted). Trending graphs are available on-line for all reported results. When large changes in viscosity are detected a partial drain of the affected oil and adding fresh fluid may correct the problem. However in some instances a complete oil change may be required.

Total Acid Number (TAN)

Oxidation is the primary mechanism of oil degradation. The TAN measures the corrosive acidic by-products of oxidation. TAN results are reported in mg/g KOH (Potassium Hydroxide). Since all hydraulic fluids have some inherent acidic properties any increases in TAN must be compared to the new oil value as a baseline. Typically caution limits are set at +0.6 new oil value and critical limits are set at +1.0 new oil value. Certain application specific fluids may require limits set to manufacturer specifications. The results are graphed along with the limits to clearly show when oil oxidation has increased above acceptable levels. When the TAN has increased above the critical level, the oil should be changed immediately to prevent damage from occurring to your equipment.

Spectrographic Analysis

Additive, wear metal and contaminant levels are displayed in parts-per-million (ppm). The oil sample is analyzed for eighteen different elements. The results are also graphically displayed for easy detection of increasing or decreasing levels. The manufacturer blends additives into the oil in different forms and quantities. The additive package varies with the oil type. Wear metals indicate wear on particular components of an individual unit. These metals will indicate a wear problem on the microscopic level (< 8 microns) before the problem can be detected by conventional means. The existence of a wear problem is determined by absolute values of metals, and more importantly, by a relative increase or trend in one or more metals. Contaminants can be an indicator of internal or external contamination. The source and amount can be determined by a comparison with new oil data. Below is a list of additive types, wear metal and contaminant sources.

Additives	Function
Magnesium (Mg)	Dispersant / Detergent
Calcium (Ca)	Dispersant / Detergent
Barium (Ba)	Dispersant / Detergent
Zinc (Zn)	Anti-Wear
Molybdenum (Mo)	Anti-Wear
Phosphorous (P)	Anti-Wear
Wear Metals	**Typical Source**
Titanium (Ti)	Turbine Components, Bearings, Platings
Chromium (Cr)	Rings, Roller/Taper, Bearings, Rods, Platings
Iron (Fe)	Cylinders, Gears, Rings, Crankshafts, Liners, Bearings, Housings, Rust
Nickel (Ni)	Valves, Shafts, Gears, Rings, Turbine Components
Copper (Cu)	Bearings, Bushings, Bronze, Thrust-Washers, Friction Plates, Oil Cooler
Silver (Ag)	Bearings, Bushings, Platings
Aluminum (Al)	Pistons, Bearings, Pumps, Blowers, Rotors, Thrust-Washers, Dirt
Lead (Pb)	Bearing Overlays, Grease, Paint, Possible Additive in Gear Oils
Tin (Sn)	Bearings, Bushings, Piston Platings, Solder, Coolers
Vanadium	
Cadmium	
Contaminants	**Typical Source**
Sodium (Na)	Coolant, Sea Water, Dirt, Possible Additive
Boron (B)	Coolant, Sea Water, Possible Additive
Silicon (Si)	Dirt, Possible Additive (Anti-Foam)
Potassium (K)	

Status and Recommendations

Corrective actions are recommended when applicable. The status of the sample is rated in three categories:

- Normal - System is operating within the parameters established by baseline data & prior samples.
  - System requires no immediate action.
- Abnormal - System is operating outside of caution limits in one or more areas.
  - System requires scheduled maintenance.
- Critical - System is operating outside of critical limits in one or more areas.
  - System requires immediate attention.