

# Trouble Check Plus Fluid Analysis

**Schroeder INDUSTRIES**

UNIT ID: 10000000000000000000  
 RECORD ID: 10000000000000000000  
 UNIT TYPE: 10000000000000000000  
 APPLICATION: 10000000000000000000

ACCOUNT NUMBER: 10000000000000000000  
 DATE SAMPLED: 10/01/10  
 DATE RECEIVED: 10/01/10  
 DATE COMPLETED: 10/01/10

TRACING # 10000000000000000000  
 MANUFACTURER/MODEL: 10000000000000000000  
 LUBE P/N: 10000000000000000000  
 LUBE TYPE - GRADE: 10000000000000000000  
 FILTER TYPE: 10000000000000000000  
 FILTER ELEMENT: 10000000000000000000  
 HYD SYSTEM PRESSURE: 10000000000000000000  
 LUBE ADDRESS: 10000000000000000000

OVERALL SEVERITY OF REPORT  
 based on comments, not individual tests

0 1 2 3 4

LAB # 10000000000000000000 LOCATION 10000000000000000000 ANALYST 10000000000000000000

FLUID ANALYSIS REPORT - 877-235-5832

Comments: Data Request for observation only. Particle Counts in a 10000 LITRE. Please provide a model number to see other compare data to the proper standards for this unit. Please provide FILTRATION TYPE (Full Flow, Duplex, By-Pass, Bypass/Coales, Filter Cart, Screen Mesh etc.)

WEAR METALS	CONTAMINANT METALS - ppm	MULTI-SOURCE METALS - ppm	ADDITIVE METALS
Fe	0	0	0
Al	0	0	0
Si	0	0	0
Ca	0	0	0
Mg	0	0	0
Na	0	0	0
K	0	0	0
Cr	0	0	0
Pb	0	0	0
Cu	0	0	0
Mn	0	0	0
Ni	0	0	0
Zn	0	0	0
Mo	0	0	0
B	0	0	0
S	0	0	0
Se	0	0	0
Co	0	0	0
V	0	0	0
As	0	0	0
Sr	0	0	0
Zr	0	0	0
Y	0	0	0
Hf	0	0	0
Ta	0	0	0
Nb	0	0	0
Bi	0	0	0
Po	0	0	0
At	0	0	0
Rn	0	0	0
Ac	0	0	0
Th	0	0	0
Pa	0	0	0
U	0	0	0
Np	0	0	0
Pu	0	0	0
Am	0	0	0
Cm	0	0	0
Bk	0	0	0
Cf	0	0	0
Es	0	0	0
Fm	0	0	0
Md	0	0	0
No	0	0	0
Lr	0	0	0

DATE SAMPLED: 10/01/10 UNIT TYPE: 10000000000000000000  
 DATE RECEIVED: 10/01/10 LUBE TYPE: 10000000000000000000  
 DATE COMPLETED: 10/01/10 FILTER TYPE: 10000000000000000000  
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THF Sample Report Form

Schroeder's Trouble Check Plus is an easy to use fluid analysis service that can be utilized as part of any predictive maintenance program.

Schroeder offers two types of sample kits: one for hydraulic fluid (Description: THF P/N: 7624310) and one for water glycol (Description: TWG P/N: 7624741). Refer to the next section for tests performed for each of these kits. Upon receipt of order for any of these part numbers, a sample kit containing a clean sample bottle, blank form, and mailing container is shipped to the customer. After the sample has been taken, the customer simply completes the form and encloses it along with the sample in the mailing container provided. Kits are packaged and sold in lots of 10.

## Description

For each sample submitted, a lab report will be generated and forwarded directly to the user via e-mail or postal mail (per the user's request). Schroeder will maintain an electronic copy of all results for a two year period. It is strongly recommended that a MSDS (Material Safety Data Sheet) and a base line (unused) fluid sample be submitted with the initial sample to be analyzed. In addition to serving as a baseline for comparison to subsequent results, the sample of new oil will be used to determine warning limits for viscosity and TAN (total acid number).

Oil sample reports can be tracked online at: <http://www.trackmysample.com/>

Customers can create their own personal login and password to view all of their reports in one easy to use interface at: <http://oilreports.com/>

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?

	Total Conditioning Analysis Kit (Description: THF P/N: 7624310)	Water Glycol Kit (Description: TWG P/N: 7624741)
Particle Count	✓	Patch Test
ISO 4406 Cleanliness Code	✓	Estimated
Water Content	✓	
Viscosity	✓	✓
TAN	✓	✓
Spectrographic Analysis	✓	

## Part Numbers and Tests Performed

### 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 ingress 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.

### 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.

## Explanation of Results

- CS 1000
- CS 1939
- CSI-C-11
- HY-TRAX\*
- RBSA
- CSM
- TFL
- TFH
- FCU
- MCS
- AS
- SMU
- CTU
- EPK
- Trouble
- Check Plus
- HMG2500
- HMG4000
- ET-100-6
- HTB
- RFSA
- HFS-BC
- HFS-15
- MFD-BC
- MFS, MFD
- HY-TRAX\* Retrofit System
- MFD-MV
- MFS-HV
- AMS, AMD
- FS
- AMFS
- KLS, KLD
- MCO
- AKS, AKD
- LSN, LSA, LSW
- X Series
- OLF Compact
- OLF
- OLF-P
- NxTM
- VEU
- IXU
- Triton-A
- Triton-E
- NAV
- SVD01
- SVD
- OXS
- Appendix

# Trouble Check Plus Fluid Analysis

## Explanation of Results

### Total Acid Number (TAN) \*not applicable to Description: THF P/N: 7624310

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 \*not applicable to Description: TWG P/N: 7624741

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.

## Model Number Selection

Model Code	
Description: THF P/N: 7624310	Total Conditioning Analysis Kit
Description: TWG P/N: 7624741	Water Glycol Kit

### NOTES:

Sample kits sold in case lots of 10 pieces. No samples will be processed without completed paperwork supplied with kits.