

# EasyTest™ Series

## EPK EasyTest™ Patch Test Kit



### Description

The new Patch Test Kit from Schroeder provides the necessary tools to determine levels of both water and solid particulate contamination present in a particular fluid sample. The kit is named for the patch method used to visually assess the amount of solid contaminants. Using the vacuum pump contained in the kit, the fluid sample is drawn through a membrane patch. The residual dirt left on the patch is viewed under a microscope and compared to photos of known contamination levels in the Schroeder Contamination Handbook (included) for a visual assessment. The handbook also provides photos of various contaminants for use in identifying the type of particulate and its possible source(s).

The water sensing device included in this kit is an aluminum mixing vessel with a small LCD display and microprocessor built into the lid – the same one featured in our EWC (EasyTest™ Water Contamination Sampler) kit. When the two reagents supplied in the kit (one liquid and one powder) are mixed with the sample fluid in the cell, the resulting chemical reaction causes an increase in pressure within the vessel. This change in pressure is converted into water content and displayed on the screen in terms of parts per million (ppm) or % by volume.

### Features

- Compatible with hydraulic and lube oils
- Provides results on site in a matter of minutes
- Determines both solid and water contamination levels
- Includes all necessary equipment in a single lightweight case

### Applications

- Perform quick on-site determination of contamination levels of solid particulate, water, or both
- Supplement on-site laboratories
- Use as a tool to demonstrate need for improved filtration

### Model Number Selection

#### How to Build a Valid Model Number for a Schroeder EasyTest™ Patch Test Kit:

BOX 1

**Example:** NOTE: One option per box

BOX 1

Model	OR	Model
EPK-K No Options		EPK-S Patch Test Kit without water measurement capability

**Preferred order codes designate shorter lead times and faster delivery.**

# EasyTest™ Series

Kit as supplied includes:

Quantity	Description
1	Mixing chamber
2	Reagent A (solvent), 500 ml bottle
1	Reagent B, 50 packets
3	Syringe, 5 ml
1	Syringe, 10 ml
1	Syringe, 30 ml
1	Disposable rubber gloves, bag containing 50 pairs
1	Scissors
1	Tweezers
50	Membrane patches, 0.8 µm, 25 mm diameter
50	Plastic covered slides
1	Microscope, 100x, with flashlight
1	Vacuum pump with folding stand
1	Receptacle bottle, threads onto vacuum pump
1	Plastic funnel
3	Plastic sample bottle, 4 oz
1	Case with foam insert
1	Contamination handbook
1	Instruction manual

Please note: Kit contents subject to change at the discretion of the manufacturer.

Part Number	Description
EPK-115	Plastic sample bottle
EPK-116	Membrane patches, 0.8 µm, 25 mm diameter, qty. 50
EPK-120	Plastic covered slides, slides, qty. 50
EPK-112	Replacement parts pack, includes: <ul style="list-style-type: none"> <li>2 Reagent A (solvent), 500 ml bottle</li> <li>1 Reagent B, 50 packets</li> <li>3 Syringe, 5 ml</li> <li>1 Disposable rubber gloves, bag containing 50 pairs</li> <li>1 Scissors</li> <li>1 Tweezers</li> </ul>

## Consumables

TCM  
 TCM-FC  
 TSU  
 TMU  
 TPM  
 TIM  
 TMS  
 CTU  
 TWS-C  
 ET-100-6  
 HMG 3000  
**EPK**  
 HTB  
 GS  
 Trouble  
 Check Plus  
 Test Points  
 Adapters  
 Hose  
 Joiners  
 Microflex  
 Hose  
 Pressure  
 Limiters  
 Pressure  
 Gauges  
 Test Kits  
 Probalizer  
 Filtration  
 Station  
 MFS, MFD  
 AMS, AMD  
 KLS, KLD  
 AKS, AKD  
 KLC  
 X Series  
 MTS  
 HFS  
 SVD  
 TDS-A  
 TDS-E  
 IXU  
 Appendix

# Hydraulic Test Bench

## HTB Hydraulic Test Bench



### Description



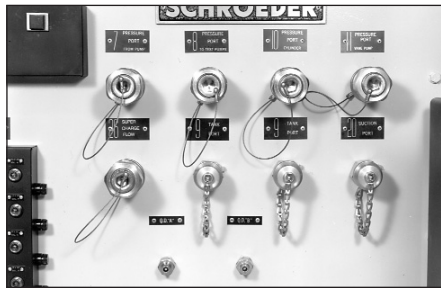
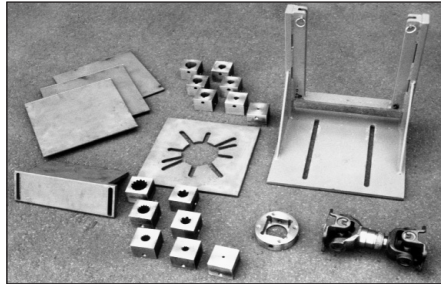
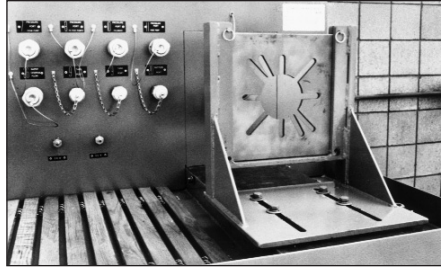
The Schroeder Model HTB hydraulic test bench is the ultimate diagnostic tool, capable of thoroughly testing a vast array of new or rebuilt components and subassemblies prior to their installation in a working system. Test bench instrumentation has been designed to make diagnosis fast and accurate, with virtually no requirement for connecting external instruments. The bench panel includes a digital flow gauge, a tachometer to measure the speed of tested pumps or motors, and a reservoir temperature gauge. Individual gauges measure pressure on the test bench main pump, the pump or motor being tested, the test bench load pump, the cylinder and valve pressure port, and the test bench super charge pump.

Every HTB includes efficient Schroeder hydraulic filters to keep the bench oil at optimum cleanliness, providing assurance that newly rebuilt components will not be subjected to harmful levels of dirt. To keep filters operating at peak efficiency, the instrument panel includes a red pilot light that signals the operator when any bench filter needs a new element.

These benches have been refined for over 30 years by Schroeder engineers, based on the comments and requests of over 700 test bench owners. The versatile hydraulic circuitry present in each of the three models can shorten troubleshooting time and take the guesswork out of diagnoses. Current models are powerful, compact units that pay for themselves quickly in saved maintenance time and expenses.

# Hydraulic Test Bench

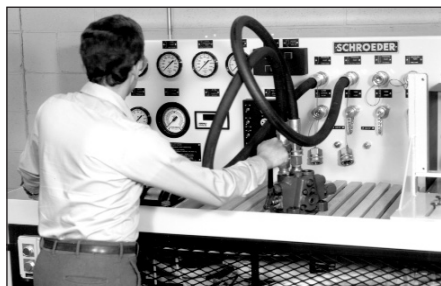
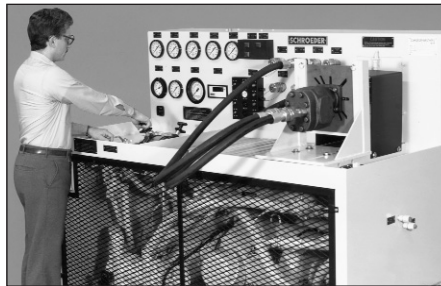
- An ingenious universal mounting bracket makes mounting pumps and motors on the bench a simple, quick operation
- Mounting plates are furnished to accommodate flange-mounted and foot-mounted pumps or motors
- Drive adapter equipment includes inserts for keyed shafts, an insert chuck and a universal drive shaft
- Quick disconnect porting on the bench provides convenient hook-up for test components
- Includes a factory-trained technician for a two-day, on-site training session
- Two complete operating manuals are supplied with each bench
- Kits and spare parts available for upgrades and maintenance



**Pumps and motors** can be tested dynamically. Pump and motor testing is aided by the wide speed and torque ranges built into the bench and by the universal mounting bracket and mounting accessories that come with the bench. An open loop hydrostatic variable volume hydraulic system provides the power and speed control for the drive shaft. Motors can be dynamically tested, under load, for operating efficiency. Pumps can be tested for external leakage and volumetric efficiency in either direction, at speeds from 100 to 2400 rpm. The test bench can also be used to break-in pumps and motors to manufacturer's specifications before they are installed in a system.

**Cylinder leaks** are easy to find. Double-acting cylinders may be cycled, and tested for both internal and external leakage at any point of piston travel. Scored cylinder walls and defective packing are easily detected. Single-acting cylinders are tested at maximum stroke.

**Valve testing** time is minimized. Pressures can be set, external and internal leakage spotted, flow and pressure data can be generated and checked against operating requirements and overall valve efficiency determined. Optional electrical and pilot pressure supplies are available on the bench for testing solenoid-actuated and pilot-operated valves.



## Features

- TCM
- TCM-FC
- TSU
- TMU
- TPM
- TIM
- TMS
- CTU
- TWS-C
- ET-100-6
- HMG 3000
- EPK
- HTB**
- GS

Trouble  
Check Plus

Test Points

Adapters

Hose  
Joiners

Microflex  
Hose

## Applications

Pressure  
Limiters

Pressure  
Gauges

Test Kits

Probalizer

Filtration  
Station

MFS, MFD

AMS, AMD

KLS, KLD

AKS, AKD

KLC

X Series

MTS

HFS

SVD

TDS-A

TDS-E

IXU

Appendix

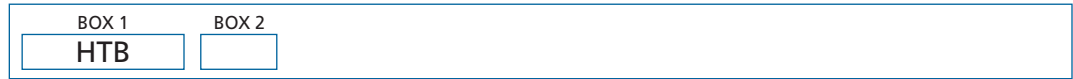
# Hydraulic Test Bench

## HTB

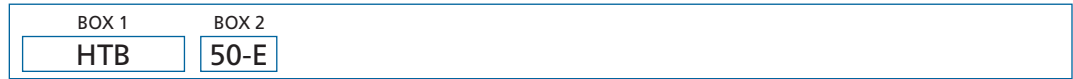
continued

### Specifications and Model Numbers

#### How to Build a Valid Model Number for a Schroeder HTB:



**Example:** NOTE: One option per box



BOX 1	BOX 2
Model Number HTB	Options 50-E 100-E 150-E

Notes: Box 2: See chart for explanation of options.

	Model HTB-50-E	Model HTB-100-E	Model HTB-150-E
Speed Range in either direction	100 to 2400 rpm	100 to 2400 rpm	100 to 2400 rpm
Power Available For testing pumps Expressed torque	275 ft-lbs to 1200 rpm	458 ft-lbs to 1200 rpm <i>(decreasing proportionately to 2400 rpm)</i>	670 ft-lbs to 1200 rpm
Expressed in horsepower	60 hp at 1200 rpm	115 hp at 1200 rpm <i>(with constant hp to 2400 rpm)</i>	150 hp at 1200 rpm
Test Pressure	0 to 5000 psi (345 bar)	0 to 5000 psi (345 bar)	0 to 5000 psi (345 bar)
Test Motor Load Maximum in either direction	275 ft-lbs	458 ft-lbs	670 ft-lbs
Electrical Drive Motor-230/460V, 1800 rpm; 3 phase, 60 hertz. A start-stop push button is mounted on the bench. Starter(s) is/are not included. Customer must advise type of starter(s) and service voltage he will use.	50 hp	100 hp	100 hp and 50 hp
Hydraulics			
Main Bench Pump (variable piston)	23 gpm/5000 psi (87 L/min/345 bar)	38 gpm/5000 psi (144 L/min/345 bar)	38 gpm/5000 psi (144 L/min/345 bar)
Auxiliary Main Pump (variable piston)	N/A	N/A	23 gpm/5000 psi (87 L/min/345 bar)
Supplemental Pump	20 gpm/2000 psi (76 L/min/138 bar)	20 gpm/2000 psi (76 L/min/138 bar)	20 gpm/2000 psi (76 L/min/138 bar)
Pressure and Return Ports	1" quick disconnects	1" quick disconnects	1" quick disconnects
Suction Porting	1" & 2" quick disconnects	1" & 2" quick disconnects	1" & 2" quick disconnects
Flow Gauge Scales	Three Scales: 2 to 14; 8 to 36; 24 to 100 gpm (all models)		
Reservoir Capacity	100 gallons (378 L)	100 gallons (378 L)	200 gallons (757 L)
General	Full flow 3 micron filtration maintains excellent system cleanliness level; bench includes a 30" x 30" work pan, oil level gauge, fill cap mesh strainer, digital tachometer.		
Bench Dimensions and Weight	62" H x 76" L x 43" W 4100 lbs (1860 kg)	62" H x 76" L x 43" W 4500 lbs (2041 kg)	62" H x 76" L x 55" W 6000 lbs (2722 kg)  Auxiliary Power Unit 30" H x 50" L x 30" W 900 lbs (408 kg)

### Accessories



- Suction and pressure hose and fittings group (contains hose connection with female quick disconnects on both ends, plus a series of separate national pipe thread, straight thread, and SAE four-bolt flange adapters, ranging in size from 3/8" through 2", equipped with male quick disconnects) (A-TB-2170)
- Oil cooler (A-TB-1661)
- Solenoid and pilot-operated valve test group (A-TB-1738)
- Spline shaft adapter kit (A-TB-2172)
- Jib crane (A-TB-1739)
- Fully digital instrumentation package (contact factory)

# Multi-Gauge



P/N GS-5



P/N GS-6U

The Schroeder Multi-Gauge provides multiple pressure readings for hydraulic, transmission, and converter systems all in one handy, compact enclosure. While one hook-up connects all three gauges, the built-in gauge protector automatically protects the low and medium pressure gauges from high pressures. Each gauge is equipped with a high quality poppet valve. The Multi-Gauge is available with two types of connections: (1) the standard braided copper, flexible high pressure hose with male 1/8" pipe universal swivel fitting and (2) microbore flexhose and test point adapter (specified by U in the part number).

- **Protects against overpressurization.** The 150 psi gauge can not be damaged when a 2500 psi system is being checked. This design feature eliminates the need to know the pressure before testing.
- **Simple yet rugged construction.** The dust and moisture proof steel case is provided with a rubber bumper for shock protection. A hanger is also provided on the case back for the user's convenience.
- **Compact and portable.** The GS-5 and GS-6 models are 6-1/2" and 8-1/2" in diameter. The GS-5 fits easily into the average tool box for instant availability.
- **Saves time.** The three pressure ranges and one vacuum range provided in one case meet most routine hydraulic maintenance requirements.

	GS-5 & GS-5U	GS-6 & GS-6U
Case Diameter:	6.31 in (160 mm) O.D.	8.50 in (216 mm) O.D.
Gauge Diameter:	1.50 in (38 mm) O.D.	1.50 in (38 mm) O.D.
Approximate Weight:	3.25 lbs (1.47 kg)	4.5 lbs (2.0 kg)
Range:	Vacuum (30" Hg) to 5000 psi (345 bar)	Vacuum (30" Hg) to 6000 psi (3413 bar)
Case:	Steel with rubber bumper strip	Steel with rubber bumper strip
Vacuum Gauge:	30 in Hg	30 in Hg
Pressure Gauges:	0 to 150 psi (10 bar) 0 to 600 psi (41 bar) 0 to 5000 psi (345 bar)	0 to 300 psi (21 bar) 0 to 1000 psi (69 bar) 0 to 6000 psi (414 bar)

## How to Build a Valid Model Number for a Schroeder GS:

BOX 1	BOX 2
GS	

**Example:** NOTE: One option per box

BOX 1	BOX 2
GS	5U

BOX 1	BOX 2
Model Number	Options
GS	5 Standard Multi-Gauge 5U Multi-Gauge with Microbore Flexhose and Test Point Adapter 6 Multi-Gauge with 2-1/2" Liquid Filled Gauges 6U Multi-Gauge with 2-1/2" Liquid Filled Gauges, Microbore Flexhose and Test Point Adapter

## GS Multi-Gauge

- TCM
- TCM-FC
- TSU
- TMU
- TPM
- TIM
- TMS
- CTU
- TWS-C
- ET-100-6
- HMG 3000
- EPK

## Description

HTB

GS

Trouble Check Plus

Test Points

## Features

Adapters

Hose Joiners

Microflex Hose

Pressure Limiters

Pressure Gauges

Test Kits

Probalizer

Filtration Station

MFS, MFD

AMS, AMD

KLS, KLD

AKS, AKD

## Model Number Selection

KLC

X Series

MTS

HFS

SVD

TDS-A


TDS-E

IXU

Appendix

# Trouble Check Plus™ Fluid Analysis

## Description

<b>UNIT ID</b> 12345678 <b>SECOND ID</b> 87654321 <b>UNIT TYPE</b> HYDRAULIC <b>APPLICATION</b> HYDRAULIC PLANT/INDUSTRIAL				<b>COMPANY INFORMATION</b> XYZ COMPANY JOHN DOE 123-456-7890 123 MAIN STREET ANYTOWN, USA 12345																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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PPM		UNIT	PPM	UNIT	PPM	UNIT	PPM	UNIT	PPM	Fe	170	Al	0	Ca	0	Mo	0	Cu	0	Si	0	Mg	0	Ni	0	Pb	0	B	0	Na	0	Co	0	Ni	0	P	0	K	0	Mn	0	Mn	0	S	0	Cr	0	Zn	0	Zn	0	Cl	0	Fe	0	Se	0	Mo	0	Br	0	Al	0	As	0	Co	0	I	0	V	0	Sb	0	Ni	0	O	0	Cr	0	Bi	0	Cr	0	N	0	Pb	0	P	0	Se	0	H	0	Cu	0	Ag	0	As	0	Ca	0	Zn	0	Cd	0	Sb	0	Fe	0	Mo	0	Hg	0	P	0	Mn	0	Ni	0	Sn	0	Ag	0	Al	0	Co	0	Cu	0	Cd	0	Si	0	Mn	0	Zn	0	Hg	0	B	0	Fe	0	Mo	0	Sn	0	P	0	Al	0	Ni	0	Cu	0	S	0	Cr	0	Co	0	Zn	0	Cl	0	V	0	Mn	0	Mo	0	I	0	Pb	0	Zn	0	Ni	0	O	0	Cu	0	Mo	0	Cr	0	N	0	Zn	0	Ni	0	Se	0	H	0	Mo	0	Cr	0	As	0	Ca	0	Ni	0	Se	0	Sb	0	Fe	0	Co	0	As	0	P	0	Mn	0	Mn	0	Sb	0	Ag	0	Al	0	Fe	0	P	0	Cd	0	Si	0	Al	0	Ag	0	Hg	0	B	0	Cr	0	Cd	0	Sn	0	P	0	V	0	Hg	0	Cu	0	S	0	Pb	0	Sn	0	Zn	0	Cl	0	Cu	0	Cu	0	Mo	0	I	0	Zn	0	Zn	0	Ni	0	O	0	Mo	0	Mo	0	Cr	0	N	0	Ni	0	Ni	0	Se	0	H	0	Co	0	Co	0	As	0	Ca	0	Mn	0	Mn	0	Sb	0	Fe	0	Al	0	Al	0	P	0	Mn	0	Cr	0	Cr	0	Ag	0	Al	0	V	0	V	0	Cd	0	Si	0	Pb	0	Pb	0	Hg	0	B	0	Cu	0	Cu	0	Sn	0	P	0	Zn	0	Zn	0	Cu	0	S	0	Mo	0	Mo	0	Zn	0	Cl	0	Ni	0	Ni	0	Mo	0	I	0	Co	0	Co	0	Ni	0	O	0	Mn	0	Mn	0	Cr	0	N	0	Pb	0	Pb	0	Se	0	H	0	Cu	0	Cu	0	As	0	Ca	0	Zn	0	Zn	0	Sb	0	Fe	0	Mo	0	Mo	0	P	0	Mn	0	Ni	0	Ni	0	Ag	0	Al	0	Co	0	Co	0	Cd	0	Si	0	Mn	0	Mn	0	Hg	0	B	0	Fe	0	Fe	0	Sn	0	P	0	Al	0	Al	0	Cu	0	S	0	Cr	0	Cr	0	Zn	0	Cl	0	V	0	V	0	Mo	0	I	0	Pb	0	Pb	0	Ni	0	O	0	Cu	0	Cu	0	Cr	0	N	0	Zn	0	Zn	0	Se	0	H	0	Mo	0	Mo	0	As	0	Ca	0	Ni	0	Ni	0	Sb	0	Fe	0	Co	0	Co	0	P	0	Mn	0	Mn	0	Mn	0	Ag	0	Al	0	Fe	0	Fe	0	Cd	0	Si	0	Al	0	Al	0	Hg	0	B	0	Cr	0	Cr	0	Sn	0	P	0	V	0	V	0	Cu	0	S	0	Pb	0	Pb	0	Zn	0	Cl	0	Cu	0	Cu	0	Mo	0	I	0	Zn	0	Zn	0	Ni	0	O	0	Mo	0	Mo	0	Cr	0	N	0	Ni	0	Ni	0	Se	0	H	0	Co	0	Co	0	As	0	Ca	0	Mn	0	Mn	0	Sb	0	Fe	0	Al	0	Al	0	P	0	Mn	0	Cr	0	Cr	0	Ag	0	Al	0	V	0	V	0	Cd	0	Si	0	Pb	0	Pb	0	Hg	0	B	0	Cu	0	Cu	0	Sn	0	P	0	Zn	0	Zn	0	Cu	0	S	0	Mo	0	Mo	0	Zn	0	Cl	0	Ni	0	Ni	0	Mo	0	I	0	Co	0	Co	0	Ni	0	O	0	Mn	0	Mn	0	Cr	0	N	0	Pb	0	Pb	0	Se	0	H	0	Cu	0	Cu	0	As	0	Ca	0	Zn	0	Zn	0	Sb	0	Fe	0	Mo	0	Mo	0	P	0	Mn	0	Ni	0	Ni	0	Ag	0	Al	0	Co	0	Co	0	Cd	0	Si	0	Mn	0	Mn	0	Hg	0	B	0	Fe	0	Fe	0	Sn	0	P	0	Al	0	Al	0	Cu	0	S	0	Cr	0	Cr	0	Zn	0	Cl	0	V	0	V	0	Mo	0	I	0	Pb	0	Pb	0	Ni	0	O	0	Cu	0	Cu	0	Cr	0	N	0	Zn	0	Zn	0	Se	0	H	0	Mo	0	Mo	0	As	0	Ca	0	Ni	0	Ni	0	Sb	0	Fe	0	Co	0	Co	0	P	0	Mn	0	Mn	0	Mn	0	Ag	0	Al	0	Fe	0	Fe	0	Cd	0	Si	0	Al	0	Al	0	Hg	0	B	0	Cr	0	Cr	0	Sn	0	P	0	V	0	V	0	Cu	0	S	0	Pb	0	Pb	0	Zn	0	Cl	0	Cu	0	Cu	0	Mo	0	I	0	Zn	0	Zn	0	Ni	0	O	0	Mo	0	Mo	0	Cr	0	N	0	Ni	0	Ni	0	Se	0	H	0	Co	0	Co	0	As	0	Ca	0	Mn	0	Mn	0	Sb	0	Fe	0	Al	0	Al	0	P	0	Mn	0	Cr	0	Cr	0	Ag	0	Al	0	V	0	V	0	Cd	0	Si	0	Pb	0	Pb	0	Hg	0	B	0	Cu	0	Cu	0	Sn	0	P	0	Zn	0	Zn	0	Cu	0	S	0	Mo	0	Mo	0	Zn	0	Cl	0	Ni	0	Ni	0	Mo	0	I	0	Co	0	Co	0	Ni	0	O	0	Mn	0	Mn	0	Cr	0	N	0	Pb	0	Pb	0	Se	0	H	0	Cu	0	Cu	0	As	0	Ca	0	Zn	0	Zn	0	Sb	0	Fe	0	Mo	0	Mo	0	P	0	Mn	0	Ni	0	Ni	0	Ag	0	Al	0	Co	0	Co	0	Cd	0	Si	0	Mn	0	Mn	0	Hg	0	B	0	Fe	0	Fe	0	Sn	0	P	0	Al	0	Al	0	Cu	0	S	0	Cr	0	Cr	0	Zn	0	Cl	0	V	0	V	0	Mo	0	I	0	Pb	0	Pb	0	Ni	0	O	0	Cu	0	Cu	0	Cr	0	N	0	Zn	0	Zn	0	Se	0	H	0	Mo	0	Mo	0	As	0	Ca	0	Ni	0	Ni	0	Sb	0	Fe	0	Co	0	Co	0	P	0	Mn	0	Mn	0	Mn	0	Ag	0	Al	0	Fe	0	Fe	0	Cd	0	Si	0	Al	0	Al	0	Hg	0	B	0	Cr	0	Cr	0	Sn	0	P	0	V	0	V	0	Cu	0	S	0	Pb	0	Pb	0	Zn	0	Cl	0	Cu	0	Cu	0	Mo	0	I	0	Zn	0	Zn	0	Ni	0	O	0	Mo	0	Mo	0	Cr	0	N	0	Ni	0	Ni	0	Se	0	H	0	Co	0	Co	0	As	0	Ca	0	Mn	0	Mn	0	Sb	0	Fe	0	Al	0	Al	0	P	0	Mn	0	Cr	0	Cr	0	Ag	0	Al	0	V	0	V	0	Cd	0	Si	0	Pb	0	Pb	0	Hg	0	B	0	Cu	0	Cu	0	Sn	0	P	0	Zn	0	Zn	0	Cu	0	S	0	Mo	0	Mo	0	Zn	0	Cl	0	Ni	0	Ni	0	Mo	0	I	0	Co	0	Co	0	Ni	0	O	0	Mn	0	Mn	0	Cr	0	N	0	Pb	0	Pb	0	Se	0	H	0	Cu	0	Cu	0	As	0	Ca	0	Zn	0	Zn	0	Sb	0	Fe	0	Mo	0	Mo	0	P	0	Mn	0	Ni	0	Ni	0	Ag	0	Al	0	Co	0	Co	0	Cd	0	Si	0	Mn	0	Mn	0	Hg	0	B	0	Fe	0	Fe	0	Sn	0	P	0	Al	0	Al	0	Cu	0	S	0	Cr	0	Cr	0	Zn	0	Cl	0	V	0	V	0	Mo	0	I	0	Pb	0	Pb	0	Ni	0	O	0	Cu	0	Cu	0	Cr	0	N	0	Zn	0	Zn	0	Se	0	H	0	Mo	0	Mo	0	As	0	Ca	0	Ni	0	Ni	0	Sb	0	Fe	0	Co	0	Co	0	P	0	Mn	0	Mn	0	Mn	0	Ag	0	Al	0	Fe	0	Fe	0	Cd	0	Si	0	Al	0	Al	0	Hg	0
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# Trouble Check Plus™ Fluid Analysis

## 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) \*not applicable to P/N TWG

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 P/N TWG

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)	Dispersent / Detergent
Calcium (Ca)	Dispersent / Detergent
Barium (Ba)	Dispersent / Detergent
Zinc (Zn)	Anti-Wear
Molybdenum (Mo)	Anti-Wear
Phosphorous (P)	Anti-Wear
<b>Wear Metals</b>	<b>Typical Source</b>
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	
<b>Contaminants</b>	<b>Typical Source</b>
Sodium (Na)	Coolant, Sea Water, Dirt, Possible Additive
Boron (B)	Coolant, Sea Water, Possible Additive
Silicon (Si)	Dirt, Possible Additive (Anti-Foam)
Potassium (R)	

## 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.

## Explanation of Results

TCM  
TCM-FC  
TSU  
TMU  
TPM  
TIM  
TMS  
CTU  
TWS-C  
ET-100-6  
HMG 3000  
EPK  
HTB  
GS

## Trouble Check Plus

Test Points  
Adapters  
Hose Joiners  
Microflex Hose  
Pressure Limiters  
Pressure Gauges  
Test Kits  
Probalizer  
Filtration Station  
MFS, MFD  
AMS, AMD  
KLS, KLD  
AKS, AKD  
KLC  
X Series  
MTS  
HFS  
SVD  
TDS-A  
TDS-E  
IXU  
Appendix