FLUID ANALYSIS GUIDE

JLG GROUND SUPPORT™

JLG GROUND SUPPORT™

JLG FLUID ANALYSIS
INDIANAPOLIS
7898 Zionsville Road
Indianapolis, IN 46268

JLG FLUID ANALYSIS
SALT LAKE CITY
3060 W. California Avenue
Suite B
Salt Lake City, UT 84104

JLG FLUID ANALYSIS
HOUSTON
10910 W. Sam Houston Pkwy. N. Suite 700
Houston, TX 77064-6314

JLG FLUID ANALYSIS
EDMONTON
5140 75th Street
Edmonton, AB T6E 6W2 Canada

Send your samples to the laboratory location nearest you.

JLG Contact Information
Telephone Number: 877-JLG-LIFT (877-554-5438)
Fax Number: 800-733-8939
Website: www.jlg.com

JLG Industries, Inc.
1 JLG Drive
McConnellsburg, PA 17233

JLG Fluid Analysis Program

What Can JLG Fluid Analysis Do For You?

Imagine how powerful it would be to see what's happening inside your equipment and be able to schedule the maintenance needed before the equipment fails on a job. JLG's fluid analysis program does that for you. It can tell you the condition of the fluid and identifies component wear and contamination in engines, transmissions, gear boxes, transfer cases, wheel ends, and hydraulic systems so that you can:

- **Extend Oil Drain Intervals**
  Monitoring the condition of the fluid optimizes drain intervals so that you get the most out of the fluid you're paying for. Fewer oil changes minimize maintenance costs and maximize equipment uptime.
- **Extend Equipment Life**
  System cleanliness and filtration efficiency allow you to keep your equipment longer and significantly reduce replacement costs.
- **Identify Minor Problems Before They Become Major Failures**
  State-of-the-art fluid analysis identifies dirt, wear particles, fuel dilution and coolant – contaminants that can cause catastrophic failure or significantly shorten equipment life.
- **Increase Resale Value**
  Analysis results provide valuable sampling histories that easily justify higher equipment resale values.
- **Maximize Asset Reliability**
  JLG Fluid Analysis ensures that units are up, running and making money.

For all JLG manufactured equipment, only filters and fluids that have been approved by JLG are to be used.

All JLG recommended service and maintenance schedules are to be strictly followed.

Why JLG Fluid Analysis?

High Quality Testing

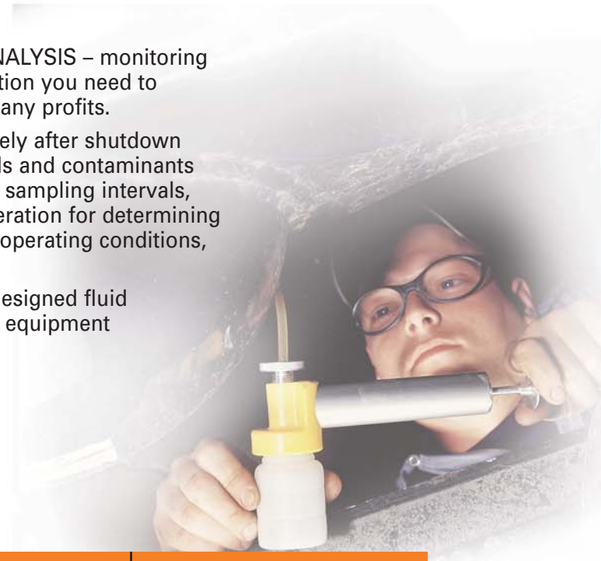
With the JLG fluid analysis program, you can be confident you're testing with a laboratory that knows your equipment better than anyone. And all of JLG's independent laboratories are ISO 17025 A2LA. This is the highest level of quality attainable by a testing laboratory backed by the most stringent accrediting body in the industry. You can be confident that the results you receive are accurate, repeatable and traceable to a standard and that your fluid analysis program is supported by a documented quality system you can depend on to deliver superior testing and customer service.

Taking Samples

JLG Fluid Analysis shows you how regular sampling and TREND ANALYSIS – monitoring test data over an extended period of time – will provide the information you need to continually maximize asset reliability and, ultimately, increase company profits.

Samples should be taken while equipment is operating or immediately after shutdown while the system is still at operating temperature so that wear metals and contaminants don't have an opportunity to settle. Along with JLG's recommended sampling intervals, how critical a piece of equipment is to production is a major consideration for determining sampling frequency, as are environmental factors such as hot, dirty operating conditions, short trips with heavy loads and excessive idle times.

Whether you are a seasoned veteran or a first-time sampler a well-designed fluid analysis program puts you on track for well-managed, cost effective equipment maintenance programming.



Suggested Sampling Intervals & Methods

	Initial Component Sampling Interval	Subsequent Component Sampling Interval	Suggested Sampling Method & Location
OILS			
Engine	1st 50 hours	Every 250 hours	By vacuum pump through dipstick retaining tube or sampling valve installed in filter return
Transmission	1st 50 hours	Every 1000 hours	By vacuum pump through oil fill port of system reservoir at mid-level
Transfer Case	1st 50 hours	Every 1000 hours	By vacuum pump through oil fill port of system reservoir at mid-level or by drain
Differential	1st 50 hours	Every 1000 hours	By vacuum pump through oil level plug or dipstick retaining tube
Wheel End	1st 50 hours	Every 1000 hours	By vacuum pump through oil fill port of system reservoir at mid-level or by drain
Hydraulic System	No Recommendation	Every 1500 hours	By vacuum pump through oil fill port of system reservoir at mid-level
COOLANTS			
Engine	No Recommendation	Every 1500 hours	By vacuum pump through the top tank on the radiator

JLG Fluid Analysis Test Packages

JLG Fluid Analysis kits provide advanced diagnostic, preventive maintenance testing designed to evaluate fluid condition, component wear and contamination in engines, hydraulic systems, transmissions, differentials, gear boxes, transfer cases and wheel ends.

To order JLG Fluid Analysis kits, sampling equipment or supplies, contact your local JLG dealer.

JLG Oil Analysis Test Packages – Part #1001112446

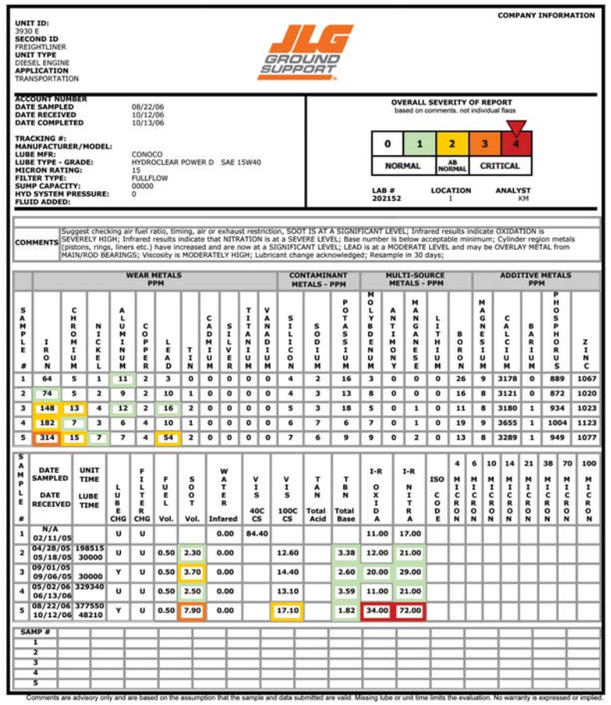
	Engine Test Package	Non-Engine Test Package	Hydraulic System Test Package
Components	Diesel and Gasoline Engines	Transmissions, Differentials, Gear Boxes, Final Drives, Natural Gas Engines, Turbines and Compressors	Hydraulic Systems
Elemental Metals by ICP	•	•	•
Water % by Crackle	•	•	•
Viscosity @ 40°C or 100°C	•	•	•
Fuel Dilution %	•		
Soot %	•		
Total Acid Number			•
Oxidation	•	•	•
Nitration	•	•	•
ISO Particle Count			•

JLG Coolant Analysis Test Package Part # 1001112445

- Elemental Metals by ICP
- pH
- Glycol % (Ethylene or Propylene)
- Freeze Point
- Boil Point
- Nitrites
- SCA Number
- Total Dissolved Solids
- Specific Conductance
- Total Hardness
- Visuals (color, oil, fuel, magnetic Precipitate, non-magnetic precipitate, odor & foam

Sampling Equipment and Supplies

Description	Part #
Oil Vacuum Pump	70010523
Coolant Vacuum Pump	70010524



COMPANY INFORMATION

UNIT ID: 3930 E
SECOND ID: FREIGHTLINER
UNIT TYPE: DIESEL ENGINE
APPLICATION: TRANSPORTATION

ACCOUNT NUMBER
DATE SAMPLED 08/22/06
DATE RECEIVED 10/12/06
DATE COMPLETED 10/13/06

TRACKING #:
MANUFACTURER/MODEL:
LUBE MFR: CONOCO
LUBE TYPE - GRADE: HYDROCLEAR POWER D SAE 15W40
MICRON RATING: 15
FILTER TYPE: FULLFLOW
SUMP CAPACITY: 00000
HYD SYSTEM PRESSURE: 0
FLUID ADDED:

OVERALL SEVERITY OF REPORT
based on comments, not individual flags

0	1	2	3	4
NORMAL		AB NORMAL	CRITICAL	

LAB # 202152 LOCATION I ANALYST KM

COMMENTS: Suggest checking air fuel ratio, timing, air or exhaust restriction, SOOT IS AT A SIGNIFICANT LEVEL; Infrared results indicate OXIDATION is SEVERELY HIGH; Infrared results indicate that NITRATION is at a SEVERE LEVEL; Base number is below acceptable minimum; Cylinder region metals (pistons, rings, liners etc.) have increased and are now at a SIGNIFICANT LEVEL; LEAD is at a MODERATE LEVEL and may be OVERLAY METAL from MAIN/ROD BEARINGS; Viscosity is MODERATELY HIGH; Lubricant change acknowledged; Resample in 30 days;

	WEAR METALS PPM											CONTAMINANT METALS - PPM			MULTI-SOURCE METALS - PPM					ADDITIVE METALS PPM				
SAMPLE #	IRON	CHROMIUM	NICKEL	ALUMINUM	COPPER	LEAD	TIN	CADMIUM	SILVER	TITANIUM	VANADIUM	SILICON	SODIUM	POTASSIUM	HOLYBDENUM	ANTIMONY	MANGANESE	LITHIUM	BORON	MAGNESIUM	CALCIUM	BARIUM	PHOSPHORUS	ZINC
1	64	5	1	11	2	3	0	0	0	0	0	4	2	16	3	0	0	0	26	9	3178	0	889	1067
2	74	5	2	9	2	10	1	0	0	0	0	4	3	13	8	0	0	0	16	8	3121	0	872	1020
3	148	13	4	12	2	16	2	0	0	0	0	5	3	18	5	0	1	0	11	8	3180	1	934	1023
4	182	7	3	6	4	10	1	0	0	0	0	6	7	6	7	0	1	0	19	9	3655	1	1004	1123
5	314	15	7	7	4	54	2	0	0	0	0	7	6	9	9	0	2	0	13	8	3289	1	949	1077

SAMPLE #	DATE SAMPLED / DATE RECEIVED	UNIT TIME / LUBE TIME	LUBE CHG	FILTER CHG	FUEL Vol.	SOOT Vol.	WATER Infared	VIS 40C CS	VIS 100C CS	TAN Total Acid	TBN Total Base	I-R OXIDA	I-R NITRA	ISO CODE	4 MICRON	6 MICRON	10 MICRON	14 MICRON	21 MICRON	38 MICRON	70 MICRON	100 MICRON
1	N/A 02/11/05		U	U			0.00	84.40				11.00	17.00									
2	04/28/05 05/18/05	198515 30000	U	U	0.50	2.30	0.00		12.60		3.38	12.00	21.00									
3	09/01/05 09/06/05	30000	Y	U	0.50	3.70	0.00		14.40		2.60	20.00	29.00									
4	05/02/06 06/13/06	329340	U	U	0.50	2.50	0.00		13.10		3.59	11.00	21.00									
5	08/22/06 10/12/06	377550 48210	Y	U	0.50	7.90	0.00		17.10		1.82	34.00	72.00									
SAMP #																						
1																						
2																						
3																						
4																						
5																						

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

Accurate, thorough, and complete fluid and equipment information allows for more in-depth analysis and can eliminate confusion when interpreting results.

How to Read the JLG Fluid Analysis Report

The information submitted with a sample is as important to who is reading the report as it is to the analyst interpreting the test results and making recommendations. **Properly document your equipment and share this knowledge with your laboratory.** Implement a sampling process for every piece of equipment in your Fluid Analysis program that can be followed consistently each time the unit is sampled. Accurate, thorough and complete fluid and equipment information allows for more in-depth analysis and can eliminate confusion when interpreting results.

Application identifies in what type of environment the equipment operates and is useful in determining exposure to possible contaminants.

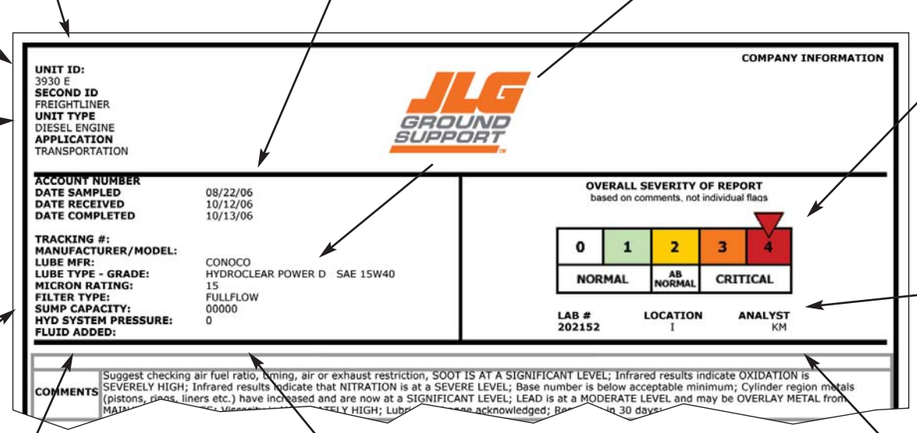
Make note of the difference between the **Date Sampled** and the **Date Received** by the lab. Turnaround issues may point to storing samples too long before shipping or shipping service problems. Also noted is testing **Date Completed.**

Manufacturer and Model can also identify metallurgies involved as well as the OEM's standard maintenance guidelines and possible wear patterns to expect.

Severity Status Levels:
- **0**- Normal.
- **1**- At least one or more items have violated initial flagging points yet are still considered minor.
- **2**- A trend is developing.
- **3**- Simple maintenance and/or diagnostics are recommended.
- **4**- Failure is eminent if maintenance is not performed.

Equipment ID is each **customer's** opportunity to uniquely identify units being tested and their location.

Unit Type should give as much detail as possible. **What kind** of compressor, gearbox, engine, etc., influences flagging parameters and depth of analysis. Different metallurgies require different lubrication and have great impact on how results are interpreted.



COMPANY INFORMATION

UNIT ID: 3930 E
SECOND ID: FREIGHTLINER
UNIT TYPE: DIESEL ENGINE
APPLICATION: TRANSPORTATION

ACCOUNT NUMBER
DATE SAMPLED 08/22/06
DATE RECEIVED 10/12/06
DATE COMPLETED 10/13/06

TRACKING #:
MANUFACTURER/MODEL:
LUBE MFR: CONOCO
LUBE TYPE - GRADE: HYDROCLEAR POWER D SAE 15W40
MICRON RATING: 15
FILTER TYPE: FULLFLOW
SUMP CAPACITY: 00000
HYD SYSTEM PRESSURE: 0
FLUID ADDED:

OVERALL SEVERITY OF REPORT
based on comments, not individual flags

0	1	2	3	4
NORMAL		AB NORMAL	CRITICAL	

LAB # 202152 LOCATION I ANALYST KM

COMMENTS: Suggest checking air fuel ratio, timing, air or exhaust restriction, SOOT IS AT A SIGNIFICANT LEVEL; Infrared results indicate OXIDATION is SEVERELY HIGH; Infrared results indicate that NITRATION is at a SEVERE LEVEL; Base number is below acceptable minimum; Cylinder region metals (pistons, rings, liners etc.) have increased and are now at a SIGNIFICANT LEVEL; LEAD is at a MODERATE LEVEL and may be OVERLAY METAL from

The laboratory at which testing was completed is denoted by an **I** for **Indianapolis**, an **H** for **Houston**, an **S** for **Salt Lake City** and an **E** for **Edmonton**. The following **Lab #** is assigned to the sample upon entry for processing and should be the reference number used when contacting the lab with questions, concerns or feedback.

Lube Manufacturer, Type and Grade identify a lube's properties and its viscosity.

Filter Types and their **Micron Ratings** are important in analyzing particle count-the higher the micron rating, the higher the particle count results.

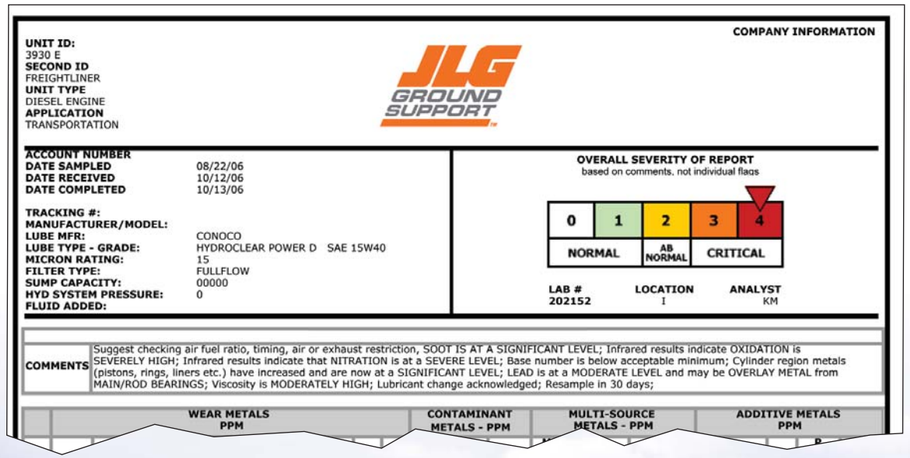
Sump Capacity identifies the total volume of oil (in gallons) in which wear metals are suspended and is critical to trending wear metal concentrations.

Lube Time is how long the oil has been used. **Unit Time** is the age of the equipment and **Lube Added** is how much oil has been added since the last sample was taken.

Data Analysts Initials

Recommendations

A data analyst's job is to explain and, if necessary, recommend actions for rectifying significant changes in the lubricant or the unit's condition. Reviewing comments before looking at the actual test results will provide a road map to the report's most important information. Any actions that need to be taken are listed first in order of severity. Justifications for recommending those actions immediately follow.



UNIT ID: 3930 E
SECOND ID FREIGHTLINER
UNIT TYPE DIESEL ENGINE
APPLICATION TRANSPORTATION

COMPANY INFORMATION

JLG GROUND SUPPORT

ACCOUNT NUMBER	
DATE SAMPLED	08/22/06
DATE RECEIVED	10/12/06
DATE COMPLETED	10/13/06
TRACKING #:	
MANUFACTURER/MODEL:	
LUBE MFR:	CONOCO
LUBE TYPE - GRADE:	HYDROCLEAR POWER D SAE 15W40
MICRON RATING:	15
FILTER TYPE:	FULLFLOW
SUMP CAPACITY:	00000
HYD SYSTEM PRESSURE:	0
FLUID ADDED:	

OVERALL SEVERITY OF REPORT
based on comments, not individual flags

0	1	2	3	4
NORMAL		AB NORMAL	CRITICAL	

LAB #	LOCATION	ANALYST
202152	I	KM

COMMENTS Suggest checking air fuel ratio, timing, air or exhaust restriction, SOOT IS AT A SIGNIFICANT LEVEL; Infrared results indicate OXIDATION is SEVERELY HIGH; Infrared results indicate that NITRATION is at a SEVERE LEVEL; Base number is below acceptable minimum; Cylinder region metals (pistons, rings, liners etc.) have increased and are now at a SIGNIFICANT LEVEL; LEAD is at a MODERATE LEVEL and may be OVERLAY METAL from MAIN/ROD BEARINGS; Viscosity is MODERATELY HIGH; Lubricant change acknowledged; Resample in 30 days;

WEAR METALS PPM	CONTAMINANT METALS - PPM	MULTI-SOURCE METALS - PPM	ADDITIVE METALS PPM

The laboratory will request additional unit and lube information if sample label is incomplete.

Elemental Analysis

Elemental Analysis, or Spectroscopy, identifies the type and amount of wear particles, contamination and oil additives. Determining metal content can alert you to the type and severity of wear occurring in the unit. Measurements are expressed in parts per million (ppm).

Combinations of these **Wear Metals** can identify components within the machine that are wearing. Knowing what metal a unit is made of can greatly influence an analyst's recommendations and determine the value of elemental analysis.

Knowledge of the environmental conditions under which a unit operates can explain varying levels of **Contaminant Metals**. Excessive levels of dust and dirt can be abrasive and accelerate wear.

Additive and **Multi-Source Metals** may turn up in test results for a variety of reasons. Molybdenum, antimony and boron are additives in some oils. Magnesium, calcium and barium are often used in detergent/dispersant additives. Phosphorous is used as an extreme pressure additive in gear oils. Phosphorous, along with zinc, are used in anti-wear additives (ZDDP).

	WEAR METALS PPM											CONTAMINANT METALS - PPM			MULTI-SOURCE METALS - PPM					ADDITIVE METALS PPM				
SAMPLE #	IRON	CHROMIUM	NICKEL	ALUMINUM	COPPER	LEAD	TIN	CADMIUM	SILVER	TITANIUM	VANADIUM	SILICON	SODIUM	POTASSIUM	MOLYBDENUM	ANTIMONY	MANGANESE	LITHIUM	BORON	MAGNESIUM	CALCIUM	BARIUM	PHOSPHORUS	ZINC
1	64	5	1	11	2	3	0	0	0	0	0	4	2	16	3	0	0	0	26	9	3178	0	889	1067
2	74	5	2	9	2	10	1	0	0	0	0	4	3	13	8	0	0	0	16	8	3121	0	872	1020
3	148	13	4	12	2	16	2	0	0	0	0	5	3	18	5	0	1	0	11	8	3180	1	934	1023
4	182	7	3	6	4	10	1	0	0	0	0	6	7	6	7	0	1	0	19	9	3655	1	1004	1123

Test Data

Test results are listed according to age of the sample–oldest to most recent, top to bottom–so that trends are apparent. Significant changes are flagged and printed in the gray areas of the report.

Samples are listed by **Date Received** in the lab - oldest first. They are also assigned a **Lab Number** for easy internal tracking. Important to also note is whether or not the **Lube** has been **Changed** since the last sample was taken.

Viscosity measures a lubricant's resistance to flow at temperature and is considered it's most important physical property. Depending on lube grade, it is tested at 40 and/or 100 degrees Centigrade and reported in Centistokes.

SAMPLE #	DATE SAMPLED / DATE RECEIVED	UNIT TIME / LUBE TIME	LUBE CHG	FILTER CHG	FUEL Vol.	SOOT Vol.	WATER Infared	VIS 40C CS	VIS 100C CS	TAN Total Acid	TBN Total Base	I-R OXIDA	I-R NITRA	ISO CODE	4 MICRON	6 MICRON	10 MICRON	14 MICRON	21 MICRON	38 MICRON	70 MICRON	100 MICRON
1	N/A 02/11/05		U	U			0.00	84.40				11.00	17.00									
2	04/28/05 05/18/05	198515 30000	U	U	0.50	2.30	0.00		12.60		3.38	12.00	21.00									
3	09/01/05 09/06/05	30000	Y	U	0.50	3.70	0.00		14.40		2.60	20.00	29.00									
4	05/02/06 06/13/06	329340	U	U	0.50	2.50	0.00		13.10		3.59	11.00	21.00									
5	08/22/06 10/12/06	377550 48210	Y	U	0.50	7.90	0.00		17.10		1.82	34.00	72.00									

SAMP #
1
2
3

Fuel and **Soot** are reported in % of volume. High fuel dilution decreases unit load capacity. Excessive soot is a sign of reduced combustion efficiency.

(only on engine oil samples)

Water in oil decreases lubricity, prevents additives from working and furthers oxidation. Its presence can be determined by crackle or FTIR and is reported in % of volume. Water by Karl Fischer ASTM D1744 determines the **amount** of water present. These results appear in the Special Testing section of your report.

The **ISO Code** is an index number that represents a range of particles within a specific micron range, i.e., 4, 6, 14. Each class designates a range of measured particles per one ml of sample. The particle count is a cumulative range between 4 and 6 microns. This test is valuable in determining large particle wear in filtered systems.

JLG Fluid Analysis Program

Component Registration Forms

A **Component Registration Form** is included with every sample kit. Fill it out **only** when sampling a component for the first time **or** to notify the laboratory of a change in component and/or oil information already registered with the laboratory. **Complete, up-to-date information ensures that you receive the proper testing and an accurate analysis of the results.**

STEP 1

- Fill out the **Component Registration Form** completely and accurately.
- Use this form **only** for first-time samples or changes in unit **or** oil information previously submitted.
- Include it in the black mailer with the sample jar.

Sample Labels

Complete a **sample jar label** for **every** sample submitted to the laboratory. **Be sure to fill out all label information completely and accurately to ensure proper testing and accurate, in-depth analysis.** Once complete, attach the label to the sample bottle. Fill in the unit's ID on the removable tracking number sticker located to the right of the sample label and retain for your records.

STEP 2

- Fill out the **sample jar label** completely and accurately.
- Include **all** unit and fluid information requested including unit ID, type of component and position, time on both the fluid and the unit and whether or not fluid has been added or changed.
- Track sample processing at www.trackmysample.com.

Shipping Information

Complete the mailer return address label for the laboratory nearest you and attach it to the shipping container, affix the appropriate postage and mail. Use a trackable mail service for shipping samples to the laboratory.

STEP 3

- Complete and attach the return mailer address label to the black shipping container.
- Ship by trackable mail service such as FedEx or UPS.

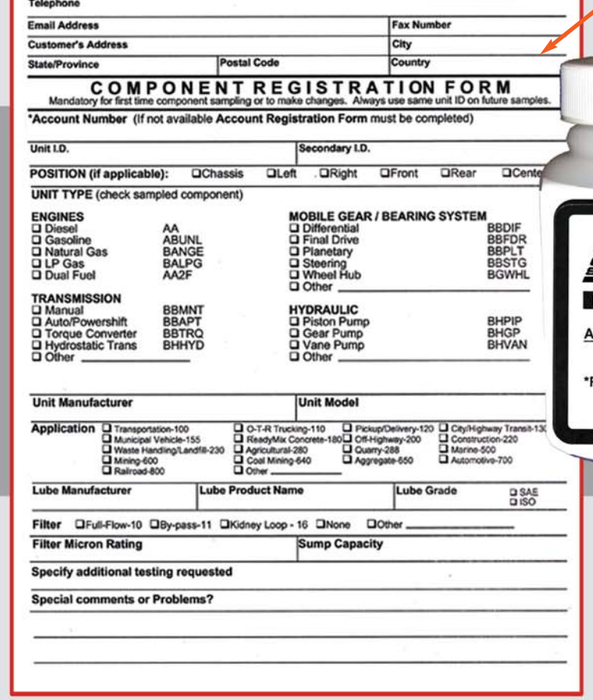
Test Reports and Data Management

Managing your fluid analysis reports allow you to affect positive changes in your daily maintenance practices by keeping sampling schedules on track, identifying bottlenecks in turnaround time that are costing you money and summarizing unit problems that could influence future purchasing decisions.

STEP 4

- Get test results almost immediately – ***FREE***.
- Keep sampling schedules on track.
- Identify bottlenecks in sample turnaround time.
- Influence future purchasing decisions.
- Affect positive change in your daily maintenance practices.

NOTE: When you provide the most accurate and complete unit and oil information, your laboratory can deliver the most accurate and complete results and recommendations.



ACCOUNT REGISTRATION FORM

I would like to receive my reports via: ☐ E-mail ☐ Fax — 00000A00000 — www.trackmysample.com

Customer (sample source)
Distributor/ Sales Rep
Attention
Telephone
Email Address | Fax Number
Customer's Address | City
State/Province | Postal Code | Country

COMPONENT REGISTRATION FORM

Mandatory for first time component sampling or to make changes. Always use same unit ID on future samples.

*Account Number (If not available Account Registration Form must be completed)

Unit I.D. | Secondary I.D.

POSITION (if applicable): ☐Chassis ☐Left ☐Right ☐Front ☐Rear ☐Center

UNIT TYPE (check sampled component)

ENGINES		MOBILE GEAR / BEARING SYSTEM	
☐ Diesel	AA	☐ Differential	BBDIF
☐ Gasoline	ABUNL	☐ Final Drive	BBFDR
☐ Natural Gas	BANGE	☐ Planetary	BBPLT
☐ LP Gas	BALPG	☐ Steering	BBSTG
☐ Dual Fuel	AA2F	☐ Wheel Hub	BGWHL
		☐ Other	
TRANSMISSION		**HYDRAULIC**	
☐ Manual	BBMNT	☐ Piston Pump	BHPIP
☐ Auto/Powershift	BBAPT	☐ Gear Pump	BHGP
☐ Torque Converter	BBTRQ	☐ Vane Pump	BHVAN
☐ Hydrostatic Trans	BHHYD	☐ Other	
☐ Other			

Unit Manufacturer | Unit Model

Application ☐ Transportation-100 ☐ Municipal Vehicle-155 ☐ Waste Handling/Landfill-230 ☐ Mining-600 ☐ Railroad-800 ☐ O-T-R Trucking-110 ☐ ReadyMix Concrete-180 ☐ Agricultural-280 ☐ Coal Mining-640 ☐ Other ☐ Pickup/Delivery-120 ☐ Off-Highway-200 ☐ Quarry-288 ☐ Aggregate-550 ☐ City/Highway Transit-13 ☐ Construction-220 ☐ Marine-500 ☐ Automotive-700

Lube Manufacturer | Lube Product Name | Lube Grade ☐ SAE ☐ ISO

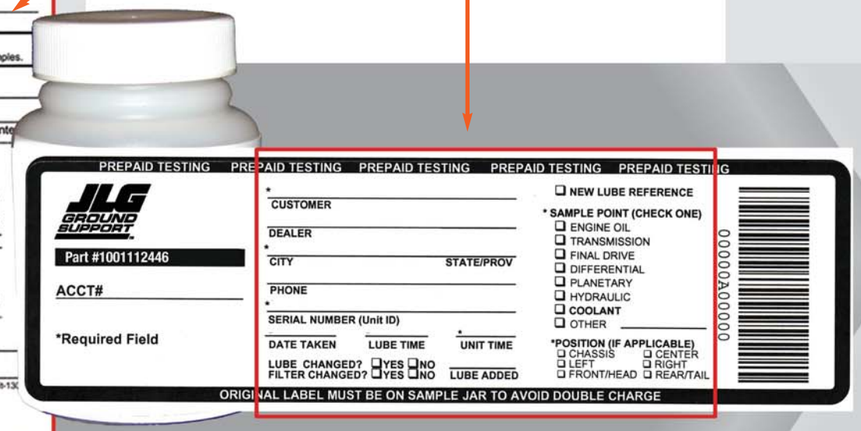
Filter ☐Full-Flow-10 ☐By-pass-11 ☐Kidney Loop - 16 ☐None ☐Other

Filter Micron Rating | Sump Capacity

Specify additional testing requested

Special comments or Problems?

NOTE: When you provide the most accurate and complete unit and oil information, your laboratory can deliver the most accurate and complete results and recommendations.



PREPAID TESTING PREPAID TESTING PREPAID TESTING PREPAID TESTING PREPAID TESTING

Part #1001112446

ACCT#

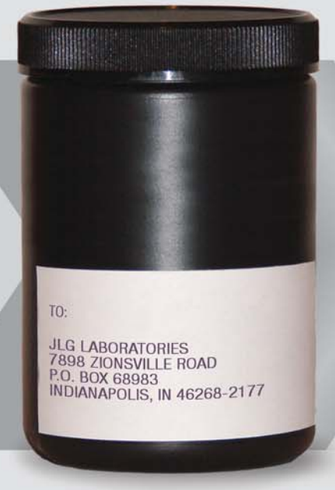
*Required Field

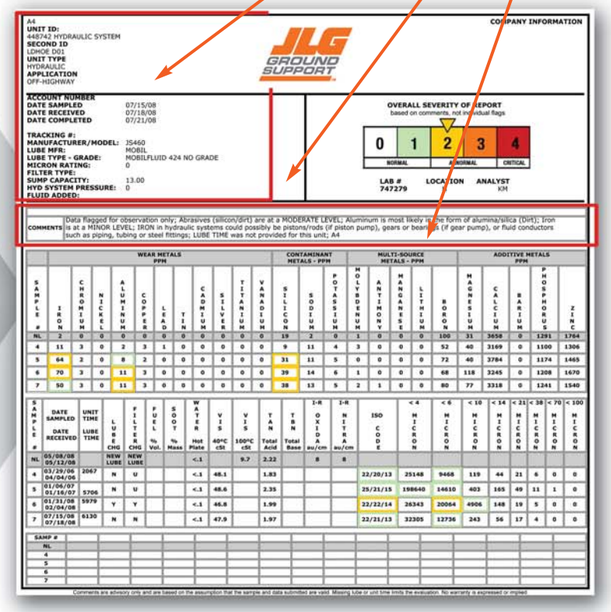
*CUSTOMER
DEALER
*CITY STATE/PROV
PHONE
*SERIAL NUMBER (Unit ID)
DATE TAKEN LUBE TIME UNIT TIME
LUBE CHANGED? ☐YES ☐NO
FILTER CHANGED? ☐YES ☐NO
LUBE ADDED

☐ NEW LUBE REFERENCE
* SAMPLE POINT (CHECK ONE)
☐ ENGINE OIL
☐ TRANSMISSION
☐ FINAL DRIVE
☐ DIFFERENTIAL
☐ PLANETARY
☐ HYDRAULIC
☐ COOLANT
☐ OTHER
*POSITION (IF APPLICABLE)
☐ CHASSIS ☐ CENTER
☐ LEFT ☐ RIGHT
☐ FRONT/HEAD ☐ REAR/TAIL

00000A00000

ORIGINAL LABEL MUST BE ON SAMPLE JAR TO AVOID DOUBLE CHARGE





A4
UNIT ID:
446742 HYDRAULIC SYSTEM
SECOND ID
LDHOE D01
UNIT TYPE
HYDRAULIC
APPLICATION
OFF-HIGHWAY

COMPANY INFORMATION

ACCOUNT NUMBER
DATE SAMPLED 07/15/08
DATE RECEIVED 07/18/08
DATE COMPLETED 07/21/08

TRACKING #:
MANUFACTURER/MODEL: JS460
LUBE MFR: MOBIL
LUBE TYPE - GRADE: MOBILFLUID 424 NO GRADE
MICRON RATING: 0
FILTER TYPE:
SUMP CAPACITY: 13.00
HYD SYSTEM PRESSURE: 0
FLUID ADDED:

OVERALL SEVERITY OF REPORT
based on comments, not individual flags
0 1 2 3 4
NORMAL ABNORMAL CRITICAL

LAB # 747279 LOCATION ANALYST KH

COMMENTS: Data flagged for observation only; Abrasives (silicon/dirt) are at a MODERATE LEVEL; Aluminum is most likely in the form of alumina/silica (Dirt); Iron is at a MINOR LEVEL; IRON in hydraulic systems could possibly be pistons/rods (if piston pump), gears or bearings (if gear pump), or fluid conductors such as piping, tubing or steel fittings; LUBE TIME was not provided for this unit; A4

SAMPLE #	ID	CONDITION	WEAR METALS PPM: IRON	NICKEL	ALUMINUM	COPPER	LEAD	TIN	CONTAMINANT METALS - PPM: CHROMIUM	SILVER	TITANIUM	VANADIUM	SILICON	SODIUM	POTASSIUM	MULTI-SOURCE METALS - PPM: MOLYBDENUM	ANTIMONY	MANGANESE	LITHIUM	BORON	ADDITIVE METALS PPM: MAGNESIUM	CALCIUM	BARIUM	PHOSPHORUS	ZINC
NL	1	0	0	0	0	0	0	0	0	0	0	0	10	2	0	1	0	0	0	100	31	3658	0	1291	1764
4	11	3	0	2	3	1	0	0	0	0	0	0	9	11	4	3	0	0	0	52	40	3169	0	1100	1306
5	64	2	0	8	2	0	0	0	0	0	0	0	31	11	5	0	0	0	0	72	40	3784	0	1174	1465
6	70	3	0	11	3	0	0	0	0	0	0	0	39	14	6	1	0	0	0	68	118	3245	0	1208	1670
7	50	3	0	11	3	0	0	0	0	0	0	0	38	13	5	2	1	0	0	80	77	3318	0	1241	1540

SAMPLE #	DATE SAMPLED / DATE RECEIVED	UNIT TIME / LUBE TIME	LUBE CHG / NEW LUBE	FILTER CHG / NEW LUBE	FUEL % Vol.	SOOT % Mass	WATER Hot Plate	VISC 40°C cSt	VISC 100°C cSt	VISC VI	TAN Total Acid	TBN Total Base	I.R OXIDATION abs/cm	I.R NITRATION abs/cm	ISO CODE	< 4 MICRON	< 6 MICRON	< 10 MICRON	< 14 MICRON	< 21 MICRON	< 38 MICRON	< 70 MICRON	< 100 MICRON
NL	05/08/08 05/12/08		NEW LUBE	NEW LUBE			<.1		9.7	2.22		6	8										
4	03/29/06 04/04/06	2067	N	U			<.1	48.1		1.83					22/20/13	25148	9468	119	44	21	6	0	0
5	01/06/07 01/16/07	5706	N	U			<.1	48.6		2.35					23/21/15	198640	14610	403	165	49	11	1	0
6	01/31/08 02/04/08	5979	Y	Y			<.1	46.8		1.99					22/22/14	26343	20064	4906	148	19	5	0	0
7	07/15/08 07/18/08	6130	N	N			<.1	47.9		1.97					22/21/13	32305	12736	243	56	17	4	0	0

SAMP #
NL
4
5
6
7

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