

How to read your Oil Analysis Report

A better understanding



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Let's face it - reading your Oil Analysis results can be a daunting and overwhelming task. Where to start? What to look for? What are all the abbreviations and numbers - when all you really want to know is if anything is wrong and how to fix it. After all, we have a common goal: eliminating and preventing catastrophic failures, right?

The next few pages will show you an example report, what to look for in the reports, why we perform the tests we do and, ultimately, what it means for you and the life of your equipment.

CUSTOMER
 Sample Company
 Equipment Maint.
 P.O. Box 8725 Grand Rapids,
 MI 49512

UNIT
 Unit ID: 592
 Oil Type: Exxon XD3 Extra/15w40
 Manufacturer:
 Type: Engine



Petroleum Technologies
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Grand Rapids, MI 49518
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Sample Information						ASTM D5185 Metals In Used Lubricating Oils By ICP-AES																
Sample	Qrts.	Hours/Miles	Meter	Date Rec.	Date Sampled	Cu	Fe	Cr	Al	Pb	Sn	Si	Ca	Mg	Zn	P	Mo	B	Ag	NI	Na	K
Lab#: 238719	0	20000	214337	03/06/01	03/05/01	6	14	1	1	2	0	6	2790	345	1540	1380	101	103	0	0	0	0
	Job#: 0		Comments: All elements are acceptable. Change oil and filters resample at normal interval.																			
Lab#: 229430	0	20000	168280	12/14/00	12/08/00	6	8	1	2	2	0	8	2692	326	1421	1150	106	102	0	0	0	0
	Job#: 0		Comments: All elements are acceptable. Change oil and filters resample at normal interval.																			
Lab#: 227182	0	20000	153010	11/28/00	11/18/00	6	10	1	1	2	0	7	2437	310	1294	953	95	66	0	0	0	0
	Job#: 0		Comments: All elements are acceptable. Change oil and filters resample at normal interval.																			
Lab#: 224061	0	20000	137585	11/06/00	10/27/00	4	12	1	1	2	0	10	2834	328	1498	1160	101	102	0	0	0	0
	Job#: 0		Comments: All elements are acceptable. Change oil and filters resample at normal interval.																			

FTIR Analysis								ASTM D445 Viscosity		Particle Count (ISO 4402, 4406)							
Sample	Oxidation	Nitration	Sulfation	Water%	Antifreeze	Fuel Dilution	Soot Index(%)	Viscosity @100C	Viscosity @40C	ISO Class Code	2-5 micron	5-10 micron	10-15 micron	15-25 micron	25-50 micron	50-100 micron	>100 micron
Lab#: 238719	24	0	26	0	0	0	0.46	15.2	0			0					
	Job#: 0																
Lab#: 229430	22	0	34	0	0	0	0.54	14.9	0			0					
	Job#: 0																
Lab#: 227182	24	0	36	0	0	0	0.54	14.9	0			0					
	Job#: 0																
Lab#: 224061	26	0	42	0	0	0	0.64	14.9	0			0					
	Job#: 0																

Metal	Metal	Metal	Metal	Metal	Metal
Al	Aluminum	Ag	Silver	B	Boron
Ca	Calcium	Cr	Chromium	Cu	Copper

UNIT

Unit ID: 592
Oil Type: Exxon XD3 Extra/15w40
Manufacturer:
Type: Engine

Unit ID is a way for the customer to uniquely identify the units being tested and their location. It is important to be consistent when identifying the unit, as the history of sampling will be linked to that particular unit name.

Listing the **Oil Type** is a critical piece of information in order to analyze parameters and determine correct limits.

The **Manufacturer** will help to identify the proper drains and limits, as each manufacturer can have different drains intervals and limits.

Type is simply a way to identify where the oil was taken from: engine, transmission, rear final drive, etc.

NOTE: 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. Know your equipment and the lubricants used and share this with us. Two-way communication makes for the best results.

Sample Information					
Sample	Qrts.	Hours/Miles	Meter	Date Rec.	Date Sampled
Lab#: 238719	0	20000	214337	03/06/01	03/05/01

The **Lab #** is assigned to the sample when it is processed in the lab and should be the reference number used when contacting the lab for questions or concerns.

Qrts. is an abbreviation for the quarts of make-up oil added.

The **Hours/Miles** is an indicator of how many hours or miles the oil being sampled has run for.

The **Meter** reading is a total amount of hours or miles on that particular machine/engine.

The **Date Rec.** is when the lab received the sample.

The **Date Sampled** is when the oil was taken for sampling.

ASTM D5185 Metals In Used Lubricating Oils By ICP-AES

Cu	Fe	Cr	Al	Pb	Sn	Si	Ca	Mg	Zn	P	Mo	B	Ag	Ni	Na	K
6	14	1	1	2	0	6	2790	345	1540	1380	101	103	0	0	0	0

Comments: All elements are acceptable. Change oil and filters resample at normal interval.

Wear Metals identify components within the machine/equipment that are wearing down or becoming less effective.

Additive Metals and **Multi-source Metals** determine if the additive package is still intact and usable and can be an indicator of the particular brand of oil that is being used.

Depending on the environmental conditions the oil is being used, **Contaminant Metals** can indicate internal leaks or external contamination.

The **Comment** section is where the analysts provide an overview of the interpretation, any problems or concerns and a recommendation for suggested next steps and when to resample. This provides for a quick overview for the reader to easily determine if there are any problems and what recommendations are suggested based on the results.

FTIR Analysis							
Sample	Oxidation	Nitration	Sulfation	Water%	Antifreeze	Fuel Dilution	Soot Index(%)
Lab#: 238719	24	0	26	0	0	0	0.46

Infra-Red Analysis (FTIR) is the most accepted test method in the industry today to determine the condition of the lubes. IR determines Basic Physical Composition (Base Stock and Additives), Additive Chemistry (and their effectiveness), Contamination (**Oxidation, Sulfation, Nitration, Water, Antifreeze and Soot**) and Lube Degradation.

ASTM D445 Viscosity	
Viscosity @100C	Viscosity @40C
15.2	0
14.9	0
14.9	0
14.9	0

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

Particle Count (ISO 4402, 4406)							
ISO Class Code	2-5 micron	5-10 micron	10-15 micron	15-25 micron	25-50 micron	50-100 micron	>100 micron
		0					
		0					
		0					
		0					

The **Particle Count** determines an **ISO Class Code** which is an index number that represents a range of particles within a specific micron range. Each class designates a range of measured particles per one ml of sample. This test is valuable in determining large particle wear in filtered systems.

Metal		Metal		Metal		Metal		Metal		Metal	
Al	Aluminum	Ag	Silver	B	Boron	Ca	Calcium	Cr	Chromium	Cu	Copper
Fe	Iron	K	Potassium	Mg	Magnesium	Mo	Molybdenum	Na	Sodium	Ni	Nickel
P	Phosphorus	Pb	Lead	Si	Silicon	Sn	Tin	Zn	Zinc		

A **Reference Guide** for the tested elements.

Sample Information						ASTM D5185 Metals In Used Lubricating Oils By ICP-AES																
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	Job#: 0		Comments: All elements are acceptable. Change oil and filters resample at normal interval.																			
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	Job#: 0		Comments: All elements are acceptable. Change oil and filters resample at normal interval.																			
Lab#: 224061	0	20000	137585	11/06/00	10/27/00	4	12	1	1	2	0	10	2834	328	1498	1160	101	102	0	0	0	0
	Job#: 0		Comments: All elements are acceptable. Change oil and filters resample at normal interval.																			

Test results are listed according to the date the sample was run – most recent expressed first. This organization better shows and identifies the **Trend Analysis** – the history of a particular unit over a period of time, typically four sampling intervals.