



Used Oil Analysis



COASTAL
Blending & Packaging

Used Oil Analysis



Play it safe
before there's a problem.

- Monitor the overall health of your fleet
- Ensure equipment reliability
- Maintain optimum lubrication conditions
- Keep operating costs low
- Detect abnormal equipment condition
- Avoid costly repairs

Whether you're responsible for a fleet of vehicles or the steady operation of heavy-duty equipment, keeping such a large investment running smoothly is crucial to your business and your success. And one of the best ways to monitor the condition of those engines and lubricants is to have the used oil tested and analyzed.

By performing regularly scheduled testing, you have a credible timeline of data that reveals machine performance trends before problems exist. Such insight helps maximize equipment life, reliability, reduces maintenance costs and keeps your equipment worth more at time of trade-in or sale.

For over 30 years COASTAL Blending & Packaging has been providing used oil analysis, quality control, research & development, technical application support and lubrication consulting. It's our business to know and understand everything that goes into the makeup and lifespan of oils and lubricants.

Our Mission

We pledge to help you get the most out of your lubricants and identify early equipment problems. Our in-house technical experts and state-of-the-art laboratory are at your service ensuring quality work and superior products.



What Contributes To Oil Breakdown?

Aside from the extreme heat and punishment engines provide, improper storage and handling can add harmful contaminants to your equipment fluids. During operation, dirt can get into engines through damaged air filter elements, bad seals, faulty hose clamps, cracks in air induction systems or other damaged parts. With a used oil analysis from COASTAL Blending & Packaging, you can identify these problems early and perform maintenance before they turn into downtime and additional expenses.

How you maintain your equipment can contribute to the longevity of your oil. To make sure you're doing your part we recommend:

- Change oil filters regularly and carefully
- Change air filters only as indicated by the service indicator
- Use the proper filters
- Change oil regularly and properly
- Use a transfer filter cart
- Use tight-fitting drum covers

How Do I Get Started ?

Contact your local COASTAL manufactured products (Irving, Cobra) distributor to purchase a COASTAL Used Oil sample kit.

The Basic Test Kit includes the following tests:

- 18 Elements
- Water
- Fuel Dilution
- Glycol
- % Soot

Additional Testing includes:

- BN
- AN
- BS&W
- Viscosity @ 100 C and 40 C
- VI
- Karl Fischer
- Particle Count

(Charges will apply for additional testing.)

Use the kit to sample a small amount of your used oil from an engine, transmission or industrial application. In addition to specifying the level of analysis you want, please also specify the oil brand and grade. Our lab will run a series of tests on the oil and send you a complete report within a few days of receipt.

(Within 24 hours if requested)

What do you get ?

You receive a detailed report that clearly outlines your oil's condition and any potential problems. With this information you can:

Schedule more cost-effective drain intervals

Using ONLY mileage or run time to determine when your oil needs to be replaced does not take into account specific conditions or use of your vehicles or equipment. Changing your oil too early wastes money and resources while changing too late leaves your equipment under-protected. COASTAL Blending & Packaging gives a precise snapshot of your oil's viscosity and effectiveness. Giving you insight in planning drain intervals that make sense for your engine and for your budget.

Detect engine or equipment problems early

Within your oil the amount of parts-per-million of various elements can reveal problems at a very early stage. For example, the presence of glycol indicates antifreeze leaks, or the presence of copper can suggest abnormal bearing wear. Having that information, your service technician can mitigate or correct problems long before they turn into costly breakdowns.

Receive Lubrication Audits

COASTAL Blending & Packaging can provide you with a complete onsite analysis. Based on a thorough assessment of your equipment's operating conditions (including working temperatures, humidity levels, presence of contaminants, etc...) plus lubricant sampling and analysis, our world-class experts can provide you with detailed lubrication management plans (recommended ranges of products or grades and drain intervals) to keep your equipment operating efficiently and economically.

Be Aware of Any Changes

As busy as you are, it's good equipment management to always be on the lookout for potential repair indicators. Noting performance in engines or machine systems greatly increases the accuracy of data analysis. Spotting trends early also helps evaluate the severity of equipment problems and prioritize what needs to be fixed.



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Additional Testing

BN (Base Number)

BN is a measure of the oil's acid-fighting ability. The result is shown as a number but the unit behind it is mgKOH/g (potassium hydroxide) and indicates the amount of base in the oil that is available to neutralize the acid. This test is mostly useful for engine oils, since these oils have to be specially boosted with TBN additive to fight the acids caused by burning fuel in the engine. It can be useful for tracking the life of any oil that has a boosted TBN, such as **Irving MTX** or **Premium Plus**.

AN (Acid Number)

AN is the opposite of TBN. This test measures the acid level of an oil. When oil's degrade, chiefly by oxidation, the oxidation by-products are acidic, and so measuring the acidity of an oil (and comparing it to an initial value) is a good indicator of the oil's suitability for further service. The test uses Potassium Hydroxide instead of Perchloric Acid. TAN This test is useful for turbine oils, hydraulic oils and, gear oils.

Viscosity

Viscosity measures the most fundamental characteristic of any lubricating fluid—its ability to flow. At high operating temperatures, a lubricant must be able to maintain appropriate film thickness. If the viscosity becomes too low, wear will occur within the compartment. If viscosity is too high, the oil will not flow to areas needing lubrication. Many diesel engine oils are designed with multi-grade viscosity characteristics. At low ambient temperatures, multi-grade oils have a lower viscosity to provide start up protection. Appropriate oil viscosity is needed at low temperatures, or the oil will not flow quickly enough to parts needing lubrication. At normal operating temperatures, the multi-grade oils have a higher viscosity to protect moving parts. Viscosity is measured at two standard reference temperatures, 40°C and 100°C. Industrial type oils, whose viscosity grade is quoted using the International Standards Organization (ISO) scale, have their viscosity measured at 40°C. Engine oils that have viscosity quoted using the Society of Automotive Engineers (SAE) scale have their viscosity measured at 100°C.

Kinematic viscosity

Kinematic viscosity and the results are quoted in the metric unit called centiStokes (cSt). Some users in the USA may still be more comfortable relating to the measure of kinematic viscosity called Saybolt Seconds Universal (SSU or SUS). It is possible to convert approximately any cSt value to an SSU value by multiplying the cSt value by 5.



Viscosity Index (VI)

VI indicates the rate of change of an oil's viscosity with change in temperature. For this, the lab has to measure the viscosity of the oil at both 40°C and 100°C. Its chief use for used oil is to test the integrity of the multigrade additive in multigrade products. For non-multigrade products, the VI is a nominal 90-100 and will not normally change in service. For multigrade products, the VI is typically 130 or higher. The additives used to make multigrade oils all suffer from shear-down in service. Measuring the VI in used multigrade oil can indicate if the oil is losing its multigrade characteristic.

Karl Fischer

The Karl Fischer Test gives the exact water content in ppm or % Water. This test is important for Turbine and Hydraulic Applications where the exact water content values are important.

Particle Count

Particle Count measures the level of contaminating particles in a fluid. The result can be quoted according to a number of different scales but the most common is an ISO Cleanliness Code, ISO 4406. This gives the number of particles of 4, 6 and 14-micron sizes counted per mL of fluid. If a customer needs some other scale, such as NAS, RN or Mil Std 1264, it can be requested when the sample is sent in.



Non-Routine Testing

Flash Point

Flash Point measures the temperature at which an oil sample produces enough vapors to “flash” when a spark is applied.

Refractive Index

Refractive Index is useful to quantify the mix strength of aqueous products, such as mixed Universal, Global, and Extended Life Antifreeze. Piprotherm, and Piprotec.

Brookfield

Brookfield method measures an oil’s viscosity at low temperatures. The test measures dynamic viscosity (as opposed to kinematic viscosity) and so the result is quoted in centiPoise (cP). The viscosity can be measured at any temperature specified. Our laboratory can do this test down to a temperature of -40°C (-40°F).



Analysis Results

Monitoring the Trend to assess your equipment’s condition:

1. Interpret Your Analysis Results – Gain an understanding of your equipment’s operating conditions and its lubricated components. Limits applied to each sample can vary based on your Sample Point’s registered manufacturer, model, application, and lubricant-in-service.
2. Monitor the Sample Trend – Trend identification is important to understanding oil analysis results. You should include critical sample information (e.g. date sampled, hr/mi/km, make-up oil, etc.) on the sample label. This data allows you to normalize the analysis trends to enhance your assessment.
3. Review the Entire Report – Proper condition assessment requires a complete review of the report. Changes in equipment condition typically coincide with the presence of contamination or changes in lubricant properties.

Metal Content:

Sources:

Oil Analysis Interactions:

Metal Content:	Sources:	Oil Analysis Interactions:
Iron (Fe)	Cylinder liner, iron pistons, piston rings, cam and followers, crankshafts and gears	Look for low oil viscosity or fuel dilution, Long drain interval, Low sump level, Sample method or location, High soot levels, Additive depletion, High oil consumption
Copper (Cu)	Slipper bushings, con rod and crankshaft bearings, cam follower bushing, camshaft thrust washer and bearings, copper sealant	Long drain interval, Low sump level, Sample method or location, High fuel dilution, Oil cooler passivation (First 2 drains), High lead/tin (bearing wear)
Lead (Pb)	Bearing overlay, present in some grease additives and some EP anti-wear additives	Long drain interval, Low sump level, Sample method or location, High fuel dilution, High copper/tin (bearing wear)
Aluminum (Al)	Piston skirts, blower, camshaft bearings, turbo bearings, crankshaft thrust bearing, Dirt or abrasive grit	Long drain interval, Low sump level, Sample method or location High fuel dilution, High copper/tin (bearing wear), Dirt if also find high Silicon
Chromium (Cr)	Piston ring face coating, some pump component surfaces	Long drain interval, Low sump level, Sample method or location High fuel dilution (wash cylinder walls)
Silicon (Si)	Dirt/dust, Silicone anti-foam, Silicone gaskets	Long drain interval, Low sump level, Sample method/location Look for dirty air cleaners, Plugged oil filter, High Fe analysis What environment did engine run in?, New gaskets installed?
Sodium (Na)	Engine coolant/antifreeze	Coolant leak - Cracked cylinder head, Broken head bolt, Head gasket, Plugged oil filter, May see low viscosity, high lead from bearings <i>Note: Some oil formulations contain high levels of Na</i>
Potassium (K)	Engine coolant/antifreeze	Coolant leak - Cracked cylinder head, Broken head bolt, Head gasket, Plugged oil filter, May see low viscosity, High lead from bearings

Used engine oil analysis is a proven and effective tool to determine the health of your engine and your oil.

Used Oil Analysis

Sampling Tips.

- Fill the sample bottle completely. The bottle in the test kit is the smallest amount possible allowing all the tests to be done.
- Sample regularly. The best use of this program is not as a single snapshot, but as a series of snapshots over time. Trends are usually more important than any single result. COASTAL Blending & Packaging is pleased to help establish a sample frequency for any machine.
- Be consistent. Decide on when and how you will take the sample and always do it that way. Advise the laboratory of any changes.

How to take an oil sample.

Three main methods

In all methods be consistent - same manner and frequency Engine oil should be at operating temperature. Sample while running or soon after engine is stopped to keep contaminants in suspension.

(Do not take from oil filter)

Method 1 - Oil Galley (Pressure Valve) method - Preferred
Take while engine running - purge small amount of oil

Method 2 - Siphon or vacuum through dipstick tube
Use new hose each time, do not siphon off pan bottom

Method 3 - Drain plug method
Allow minimum of 1 quart to drain before sample is taken

Fill out sample labels completely

To receive the most value from our services, supply all of the requested information.

- **Model**
- **Serial number**
- **Service meter units on equipment**
- **Service meter units on fluid**

Obtain fluid and maintenance information from shop records, Product Link, or Equipment Manager. Indicating fluid changes and top off fluid is also important. All of this information is critical to turn data into useful component health information and recommendations.



Tip: fill out the sample label information before you begin taking samples to keep the label clean and easy to read.

Improve turnaround time by following these steps:

1. Mail your sample immediately.
2. Use our online label printing feature which helps expedite your sample through the laboratory registration process.
3. Mail samples via Overnight/Courier Service or use First Class/Priority delivery.

Get Results

You can receive your results three ways

COASTAL Blending & Packaging provides clear, concise, easy-to-understand reports prepared by trained personnel. Each sample is profiled and includes recommendations for specific, immediate actions if needed. And if time is crucial, you can choose how you want to receive your results:

1. Mail

Receive your complete Used Oil Analysis via first class mail to any address you request.

2. E-Mail

E-Mail
Click open your email and find your Used Oil Analysis test results attached as a .pdf document

3. Online

1. Click the Home page (www.coastalbp.com).
2. Click the Results icon next to your account. You will be taken to the Sample Points screen, My Results view tab.
3. Review the results. Click the checkbox next to the result you wish to display as a graphic report.
4. Click the Create Report button on the view tab tool bar.
5. Click OK in the Reports dialog box. The sample point result is now displayed as a graphic report in Adobe reader format.
6. Use the Adobe toolbar to print or save the report.

Lubricant Analysis Report			
SAMPLE REPORT			
Equip: CAT.	Model: 425		
Equip ID: 196	Serial: 5645JJ358900	Type: CAT. - ENGINE	Comp: CAT. - ENGINE
Sample # 2010060334		Lubricant PREM. 15W40	
Date Recieved 18/08/2010	HOURS ON OIL 260	METER READING 2258	Legend
Date Sampled 13/08/2010	Check for leaky and or blown head gasket. Resample in 100 hours to monitor wear trends.		Status is Normal
			Status is Caution
			Status is Critical
Test Date	Methods	13/08/2010	30/06/2010
Contamination			
Water	CBP Mod	Neg	Neg
Color	Karl Fischer	NORMAL (Normal)	
Visual	ISO Count 6/14	NORMAL (Normal)	
Potassium abnormal due to glycol contamination	Fuel	Neg	Neg
Sodium high.	Fuel (%)		
	Glycol	Pos	Trace
	BS&W		
	Soot	0.56	0.43
	Silicon	14.00	7.00
	Potassium	98.00	6.00
	Sodium	478.20	125.00
Condition			
	Visc@40C	19.00	15.20
	Visc@100C		
	Visc Index		
	TAN		
	TBN	6.10	6.70
	Flashpoint		
	Boron	210.00	218.00
	Barium	0.00	0.00
	Calcium	1970.00	1980.00
	Magnesium	12.30	10.10
	Phosphorus	905.00	908.00
	Zinc	1005.00	1022.00
Wear			
	Iron	76.00	67.00
	Nickel	5.20	4.00
	Chromium	3.00	2.70
	Tin	18.00	0.30
	Copper	230.00	31.90
	Lead	213.00	29.00
	Silver	0.00	0.00
	Aluminum	6.10	5.00
	Molybdenum	3.00	3.50
Printed August 18, 2010		ISO 9001:2000 Certified	

To order test kits, please call our Lab toll-free at
1.800.563.TEST

Put Quality In... Keep Quality In



IRVING
Lubricants



coastalbp.com

COASTAL Blending & Packaging P.O. Box 1169 Saint John, NB E2L 4E6 Ph:(800)574-5823 Fx:(506)632-7001