The Oil Report
April 2020

Oil the News that's Fit to Print!

Everyone's favorite part of the newsletter is the Report of the Month, so we thought this month we'd give you what you really want to see -- interesting reports and problems that you don't have to deal with! We'll start with this sample from a 1997 Foretravel RV. After the first sample, the owner found a hole in the air filter (see silicon, causing a lot of steel wear) and fixed it. Then he found a rear main seal leak. He sent the second sample as he was debating whether to spend the cash to fix the rear main seal (pricey!), or just replace the engine altogether. We followed up with him this month. After the second sample he decided the engine looked okay enough to replace the seal. Since then he's done some routine maintenance but it's been smooth sailing ever since. No plans to sell the RV!

Report of the Month

To learn more about where the elements are coming from, click here.

COMMENTS

BOB: This sample looks much better than the last. The 3 gallons of make-up oil is diluting things, but metals and silicon are so much lower that even with that in mind, this report still shows nice improvements. Only iron and silicon are still high and they may be residual from the previous fill - if all is well, we should see these elements decrease next time. A trace of fuel was detected, but that's harmless and from normal use. If you decide to proceed with the seal replacement, check back afterwards for another look.

ELEMENTS IN PARTS PER MILLION

	MI/HR on Oil	4,000	UNIT / LOCATION AVERAGES	4,000					UNIVERSAL AVERAGES
	MI/HR on Unit	108,500		104,900					
	Sample Date	12/11/2019		11/20/2018					
	Make Up Oil Added	3 gal		3 qts					
	ALUMINUM	7	7	**13**					2
	CHROMIUM	1	1	**5**					1
	IRON	**97**	97	**308**					17
	COPPER	5	5	**8**					2
	LEAD	3	3	1					1
	TIN	2	2	1					1
	MOLYBDENUM	126	126	131					28
	NICKEL	1	1	2					0
	MANGANESE	2	2	4					0
	SILVER	0	0	0					0
	TITANIUM	0	0	1					0
	POTASSIUM	1	1	2					3
	BORON	314	314	332					54
	SILICON	**15**	15	**48**					4
	SODIUM	5	5	6					4
	CALCIUM	1562	1562	1471					2172
	MAGNESIUM	711	711	612					412
	PHOSPHORUS	802	802	776					1113
	ZINC	827	827	853					1283
	BARIUM	0	0	0					0

PROPERTIES

			Values Should Be*					
	SUS Viscosity @ 210°F	67.5		69.4				
	cSt Viscosity @ 100°C	12.29		12.79				
	Flashpoint in °F	**415**	>415	450				
	Fuel %	TR	<2.0	<0.5				
	Antifreeze %	0.0	0.0	0.0				
	Water %	0.0	0.0	0.0				
	Insolubles %	0.3	<0.6	0.3				
	TBN							
	TAN							
	ISO Code							

Report of the Month

This sample came from a 22-year old circular saw that has never had an oil change. What do you think -- problem or not?

To learn more about where the elements are coming from, click here.

BLACKSTONE LABORATORIES

OIL REPORT

LAB NUMBER: H40914 **UNIT ID:** SKIL SAW
REPORT DATE: 3/28/2016 **CLIENT ID:**
CODE: 1/32 **PAYMENT:**

UNIT

MAKE/MODEL: Gear Box Worm Gear
FUEL TYPE:
ADDITIONAL INFO: Circular Saw
OIL TYPE & GRADE: Gear Lube
OIL USE INTERVAL: 20 Years

CLIENT

This 22-year-old circular saw had never had an oil change. When the owner changed it, he decided to pull a sample to see what it looked like. Not great, right? But the thing is, the saw still ran great. Just goes to show that you can have a lot metal in the oil and not necessarily have a problem. See our most recent newsletter for more on what's a problem and what's not! (It was a Skil Saw, in case you're wondering.)

COMMENTS

BRAD: After doing some quick research, I found that some of these circular saws have a worm gear. I can't say I ever thought a circular saw needed an oil change, but apparently it does! This is probably the original oil so some of this material is from the wear-in process, but most of it is from 20 years of sawing the shit out of stuff. The viscosity was in the ISO 468/680 range and insolubles were fine at 0.5%. Let's see how this saw shapes up after a few oil changes. - Samir

ELEMENTS IN PARTS PER MILLION

		UNIT / LOCATION AVERAGES						UNIVERSAL AVERAGES
MI/HR on Oil	20							
MI/HR on Unit								
Sample Date	3/26/2016							
Make Up Oil Added								
ALUMINUM	150							0
CHROMIUM	1							0
IRON	452							46
COPPER	1141							128
LEAD	5							24
TIN	2							10
MOLYBDENUM	0							0
NICKEL	2							1
MANGANESE	9							0
SILVER	0							0
TITANIUM	2							0
POTASSIUM	3							0
BORON	8							16
SILICON	125							7
SODIUM	30							20
CALCIUM	34							11
MAGNESIUM	180							2
PHOSPHORUS	90							193
ZINC	146							83
BARIUM	30							0

PROPERTIES

		Values Should Be*					
SUS Viscosity @ 210°F	171.2						
cSt Viscosity @ 100°C	36.32						
Flashpoint in °F	SHORT						
Fuel %	-						
Antifreeze %	-						
Water %	0.0	0.0					
Insolubles %	0.5	<0.6					
TBN							
TAN							
ISO Code							

Report of the Month

This 1988 F150 doesn't look great, but the problem isn't the age of the engine.
So what is it?
To learn more about where the elements are coming from, click here.

BLACKSTONE LABORATORIES

OIL REPORT

LAB NUMBER: L59895 **UNIT ID:** 88 F150
REPORT DATE: 9/26/2019 **CLIENT ID:**
CODE: 146/32 **PAYMENT:** CC: Visa

UNIT

MAKE/MODEL: Ford 4.9L 300 CID Inline 6 cyl
FUEL TYPE: Gasoline (Unleaded)
ADDITIONAL INFO:
OIL TYPE & GRADE: 5W/30
OIL USE INTERVAL: 3,250 Miles

CLIENT

We talked about the drop in silicon in the comments. When the owner bought this truck, he decided to do some engine work and pulled the oil pan, only to find a wasp's nest! That's probably the source of silicon. Once he cleaned that up and freshened up the cylinder head, followed by another oil change, things started to improve. Next up: installing a turbo.

COMMENTS

CHANDLER: This is a better report than the last one. The shorter oil change helped, though that's not the only thing that helped bring wear down. Most metals dropped by more than 50% but you only cut 750 miles off your oil change (not nearly 50%). This Ford is truly wearing better than it was. It's still making a lot of metal but if you did something to the air filtration system (note the drop in silicon), getting dirt out of the system might be a lot of the reason for the improvement. Suggest running 3,000 mi again & checking back to see if improvements continue.

ELEMENTS IN PARTS PER MILLION

MI/HR on Oil	3,250	UNIT / LOCATION AVERAGES	4,000					UNIVERSAL AVERAGES
MI/HR on Unit	99,985							
Sample Date	9/23/2019		4/15/2018					
Make Up Oil Added	0 qts		0 qts					
ALUMINUM	9	9	19					4
CHROMIUM	11	11	47					2
IRON	58	58	107					20
COPPER	17	17	21					6
LEAD	22	22	23					13
TIN	2	2	3					1
MOLYBDENUM	4	4	12					41
NICKEL	0	0	1					0
MANGANESE	1	1	1					2
SILVER	0	0	0					0
TITANIUM	1	1	1					1
POTASSIUM	1	1	1					1
BORON	6	6	8					36
SILICON	31	31	149					15
SODIUM	56	56	176					39
CALCIUM	976	976	1664					1796
MAGNESIUM	672	672	107					194
PHOSPHORUS	711	711	725					782
ZINC	774	774	797					914
BARIUM	0	0	0					0

PROPERTIES

		Values Should Be*					
SUS Viscosity @ 210°F	58.5	56-63	57.9				
cSt Viscosity @ 100°C	9.80	9.1-11.3	9.62				
Flashpoint in °F	380	>385	390				
Fuel %	TR	<2.0	<0.5				
Antifreeze %	0.0	0.0	0.0				
Water %	0.0	0.0	0.0				
Insolubles %	0.3	<0.6	0.3				
TBN							
TAN							
ISO Code							

Report of the Month

Next up: a Subaru Legacy GT. First it looked fine, then it didn't.
Can you tell what went wrong?

To learn more about where the elements are coming from, click here.

BLACKSTONE LABORATORIES

OIL REPORT

LAB NUMBER: M07015 **UNIT ID:** 08 SPEC B
REPORT DATE: 3/2/2020 **CLIENT ID:**
CODE: 44/68 **PAYMENT:** CC: Visa

UNIT

MAKE/MODEL: Subaru 2.5L (EJ25) 4-cyl Turbo
FUEL TYPE: Gasoline (Unleaded)
ADDITIONAL INFO: Legacy GT
OIL TYPE & GRADE: Castrol Edge High Mileage 5W/30
OIL USE INTERVAL: 4,345 Miles

CLIENT

This Subaru experienced a turbo failure between the 2018 and 2020 samples. The car was driven for 60 miles after the failure. We tend to see a lot of bronze wear after a turbo failure, so that's why copper and lead are high. Iron is probably from a steel shaft though it could also be cylinder wear, since aluminum (piston wear) is out of line.

COMMENTS

JOSHUA: Ah, sorry to hear about the turbo failure. Most of the copper in this sample could be from the turbo bearing itself. Lead could be main/rod bearing wear. Aluminum is a piston metal while iron could be from anything steel (e.g. cylinders, shafts). Once the new turbo is installed, we'll look for improvement across the board. Good news is we didn't find any other issues (such as contamination) to address. The oil held up well during the last 4,345 miles, keeping a viscosity in the 5W/30 range. Check back after repairs - hopefully it'll be smooth sailing from then on.

ELEMENTS IN PARTS PER MILLION

			UNIT / LOCATION AVERAGES						UNIVERSAL AVERAGES
	MI/HR on Oil	4,345		4,752					
	MI/HR on Unit	148,093		143,748					
	Sample Date	2/16/2020		6/10/2018					
	Make Up Oil Added	0 qts		0 qts					
	ALUMINUM	**14**	9	4					4
	CHROMIUM	2	2	1					1
	IRON	**21**	15	8					9
	COPPER	**31**	16	1					8
	LEAD	**8**	5	1					2
	TIN	2	1	0					1
	MOLYBDENUM	73	72	71					75
	NICKEL	0	0	0					0
	MANGANESE	1	1	0					2
	SILVER	0	0	0					1
	TITANIUM	20	25	30					1
	POTASSIUM	11	6	1					2
	BORON	27	52	76					56
	SILICON	14	13	12					10
	SODIUM	14	17	19					25
	CALCIUM	875	1232	1589					1853
	MAGNESIUM	1195	975	755					392
	PHOSPHORUS	641	730	819					845
	ZINC	794	842	889					994
	BARIUM	0	0	0					0

PROPERTIES

		Values Should Be*					
	SUS Viscosity @ 210°F	59.9	56-63	57.3			
	cSt Viscosity @ 100°C	10.18	9.1-11.3	9.45			
	Flashpoint in °F	405	>385	**380**			
	Fuel %	<0.5	<2.0	TR			
	Antifreeze %	0.0	0.0	0.0			
	Water %	0.0	0.0	0.0			
	Insolubles %	0.2	<0.6	0.3			
	TBN						
	TAN						
	ISO Code						