

OIL ANALYSIS REPORT

Sample Rating Trend

WEAR

FREIGHTLINER 11198C

Component

Natural Gas Engine

PETRO CANADA DURON GEO LD 15W40 (9 GAL)

DIAGNOSIS

Recommendation

Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor.

Wear

The chromium level is abnormal. The lead level is abnormal.

Contamination

There is no indication of any contamination in the

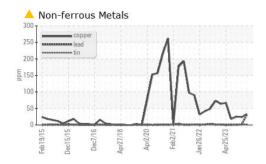
Fluid Condition

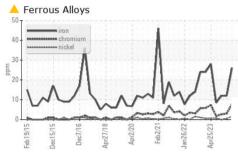
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

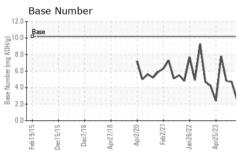
Sample Date Client Info 07 Feb 2024 14 Sep 2023 05 Sep 2023 Machine Age hrs Client Info 3154 2559 2517 573 573 575 573 573 575 573	(9 GAL)								
Client Info	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2		
Machine Age hrs Client Info 3154 2559 2517 Oil Age hrs Client Info 1170 575 533 Oil Changed Client Info Changed Not Changd	Sample Number		Client Info		GFL0109587	GFL0087544	GFL0087476		
Machine Age hrs Client Info 3154 2559 2517 Oil Age hrs Client Info 1170 575 533 Oil Changed Client Info Changed Not Changed Not Changed Sample Status BABNORMAL NORMAL NORMAL CONTAMINATION method Ilmit/base current history1 history2 Water WC Method >0.1 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >50 26 12 12 2 Chromium ppm ASTM D5185m >50 26 12 12 1 0 1 1 1 0 1 1 1 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Sample Date		Client Info		07 Feb 2024	14 Sep 2023	05 Sep 2023		
Contained Client Info Changed Not Changed Normal Norm	Machine Age	hrs	Client Info		3154				
Oil Changed Sample Status Client Info Changed ABNORMAL NORMAL NORMAL NORMAL Not Changd NORMAL NORMAL NORMAL NORMAL NoRMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL	Oil Age	hrs	Client Info		1170	575	533		
CONTAMINATION method limit/base current history1 history2 Water WC Method >0.1 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >4 & 8 3 3 Nickel ppm ASTM D5185m >4 & 8 3 3 Silver ppm ASTM D5185m >2 1 <1	-		Client Info		Changed	Not Changd	Not Changd		
Water WC Method >0.1 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >50 26 12 12 Chromium ppm ASTM D5185m >4 8 3 3 Nickel ppm ASTM D5185m >2 1 <1 0 Tittanium ppm ASTM D5185m >3 0 0 0 Alluminum ppm ASTM D5185m >3 0 0 0 Alluminum ppm ASTM D5185m >9 3 2 2 <1 Alluminum ppm ASTM D5185m >30 32 2 2 <1 Lead ppm ASTM D5185m >30 32 2 2 <1 Copper ppm ASTM D5185m >30 0 0 <1 <1 <1 <1 <1 <1 <th< td=""><td>Sample Status</td><td></td><td></td><td></td><td>_</td><td>NORMAL</td><td>_</td></th<>	Sample Status				_	NORMAL	_		
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history1	history2		
Iron	Water		WC Method	>0.1	NEG	NEG	NEG		
Chromium ppm ASTM D5185m >4 AS 3 3 Nickel ppm ASTM D5185m >2 1 <1	WEAR METAL	.S	method	limit/base	current	history1	history2		
Nickel	ron	ppm	ASTM D5185m	>50	26	12	12		
STIME	Chromium	ppm	ASTM D5185m	>4	<u>^</u> 8	3	3		
Silver	Nickel	ppm	ASTM D5185m	>2	1	<1	0		
Silver ppm ASTM D5185m >3 0 0 0 Aluminum ppm ASTM D5185m >9 3 2 2 Lead ppm ASTM D5185m >9 32 2 2 Copper ppm ASTM D5185m >4 1 2 0 Vanadium ppm ASTM D5185m >4 1 2 0 Vanadium ppm ASTM D5185m 0 0 0 <1 0 Cadmium ppm ASTM D5185m 50 2 5 5 Boron ppm ASTM D5185m 50 2 5 5 Barium ppm ASTM D5185m 50 55 50 54 Molybdenum ppm ASTM D5185m 50 55 50 54 Magnessium ppm ASTM D5185m 50 55 50 54 Magnessium ppm ASTM D5185m 1510 1687	Titanium	ppm	ASTM D5185m		<1	<1	<1		
Aluminum	Silver			>3	0	0	0		
Lead ppm ASTM D5185m >30 ▲ 32 2 <1 Copper ppm ASTM D5185m >35 32 24 25 Tin ppm ASTM D5185m >4 1 2 0 Vanadium ppm ASTM D5185m 0 0 0 <1	Aluminum					2	2		
Copper ppm ASTM D5185m >35 32 24 25 Tin ppm ASTM D5185m >4 1 2 0 Vanadium ppm ASTM D5185m 0 0 <1	Lead				<u> </u>	2	<1		
Tin	Copper		ASTM D5185m	>35		24	25		
Vanadium ppm ASTM D5185m 0 0 <1 Cadmium ppm ASTM D5185m <1 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 2 5 5 Barium ppm ASTM D5185m 5 <1 44 0 Molybdenum ppm ASTM D5185m 50 55 50 54 Manganese ppm ASTM D5185m 50 55 50 54 Manganesium ppm ASTM D5185m 560 576 503 572 Calcium ppm ASTM D5185m 780 809 613 692 Zinc ppm ASTM D5185m 780 809 613 692 Sulfur ppm ASTM D5185m 2040 2693 2396 2770 CONTAMINANTS method limit/base current history1									
ADDITIVES	Vanadium				0	0	<1		
Boron ppm ASTM D5185m 50 2 5 5 5					<1				
Barium ppm ASTM D5185m 5 <1	ADDITIVES		method	limit/base	current	history1	history2		
Molybdenum ppm ASTM D5185m 50 54 Manganese ppm ASTM D5185m 0 1 1 <1 Magnesium ppm ASTM D5185m 560 576 503 572 Calcium ppm ASTM D5185m 560 576 503 572 Calcium ppm ASTM D5185m 1510 1687 1434 1698 Phosphorus ppm ASTM D5185m 780 809 613 692 Zinc ppm ASTM D5185m 870 993 884 972 Sulfur ppm ASTM D5185m 2040 2693 2396 2770 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 7 5 Sodium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1<	Boron	ppm	ASTM D5185m	50	2	5	5		
Manganese ppm ASTM D5185m 0 1 1 <1 Magnesium ppm ASTM D5185m 560 576 503 572 Calcium ppm ASTM D5185m 1510 1687 1434 1698 Phosphorus ppm ASTM D5185m 780 809 613 692 Zinc ppm ASTM D5185m 870 993 884 972 Sulfur ppm ASTM D5185m 2040 2693 2396 2770 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 7 5 Sodium ppm ASTM D5185m >+100 8 8 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM	Barium	ppm	ASTM D5185m	5	<1	44	0		
Magnesium ppm ASTM D5185m 560 576 503 572 Calcium ppm ASTM D5185m 1510 1687 1434 1698 Phosphorus ppm ASTM D5185m 780 809 613 692 Zinc ppm ASTM D5185m 870 993 884 972 Sulfur ppm ASTM D5185m 2040 2693 2396 2770 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 7 5 Sodium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 13.9 10.4 10.2 Sulfation Abs/clmm *ASTM D7415 >30	Molybdenum	ppm	ASTM D5185m	50	55	50	54		
Calcium ppm ASTM D5185m 1510 1687 1434 1698 Phosphorus ppm ASTM D5185m 780 809 613 692 Zinc ppm ASTM D5185m 870 993 884 972 Sulfur ppm ASTM D5185m 2040 2693 2396 2770 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 7 5 Sodium ppm ASTM D5185m >+100 8 8 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current	Manganese	ppm	ASTM D5185m	0	1	1	<1		
Phosphorus ppm ASTM D5185m 780 809 613 692 Zinc ppm ASTM D5185m 870 993 884 972 Sulfur ppm ASTM D5185m 2040 2693 2396 2770 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 7 5 Sodium ppm ASTM D5185m >+100 8 8 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 13.9 10.4 10.2 Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base	Magnesium	ppm	ASTM D5185m	560	576	503	572		
Zinc ppm ASTM D5185m 870 993 884 972 Sulfur ppm ASTM D5185m 2040 2693 2396 2770 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 7 5 Sodium ppm ASTM D5185m 10 8 8 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 13.9 10.4 10.2 Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2<	Calcium	ppm	ASTM D5185m	1510	1687	1434	1698		
Sulfur ppm ASTM D5185m 2040 2693 2396 2770 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 7 5 Sodium ppm ASTM D5185m 10 8 8 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 13.9 10.4 10.2 Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 17.0 17.4	Phosphorus	ppm	ASTM D5185m	780	809	613	692		
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 7 5 Sodium ppm ASTM D5185m 10 8 8 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 13.9 10.4 10.2 Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 17.0 17.4	Zinc	ppm	ASTM D5185m	870	993	884	972		
Silicon ppm ASTM D5185m >+100 6 7 5 Sodium ppm ASTM D5185m 10 8 8 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 13.9 10.4 10.2 Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 17.0 17.4	Sulfur	ppm	ASTM D5185m	2040	2693	2396	2770		
Sodium ppm ASTM D5185m 10 8 8 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 13.9 10.4 10.2 Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 17.0 17.4	CONTAMINAN	ITS	method	limit/base	current	history1	history2		
Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 13.9 10.4 10.2 Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 17.0 17.4	Silicon	ppm	ASTM D5185m	>+100	6	7	5		
Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 13.9 10.4 10.2 Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 17.0 17.4	Sodium	ppm	ASTM D5185m		10	8	8		
Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 13.9 10.4 10.2 Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 17.0 17.4	Potassium		ASTM D5185m	>20	6	4	1		
Nitration Abs/cm *ASTM D7624 >20 13.9 10.4 10.2 Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 17.0 17.4	INFRA-RED		method	limit/base	current	history1	history2		
Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 17.0 17.4	Soot %	%	*ASTM D7844		0	0.1	0		
Sulfation Abs/.1mm *ASTM D7415 >30 26.7 19.9 20.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 17.0 17.4	Nitration	Abs/cm	*ASTM D7624	>20	13.9	10.4	10.2		
Oxidation Abs/.1mm *ASTM D7414 >25 23.2 17.0 17.4									
	FLUID DEGRAI	NOITAC	method	limit/base	current	history1	history2		
	Oxidation	Abs/.1mm	*ASTM D7414	>25	23.2	17.0	17.4		
	Base Number (BN)				2.6	4.7	4.8		

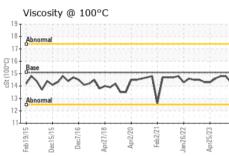


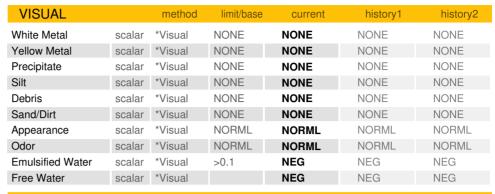
OIL ANALYSIS REPORT





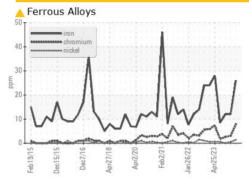


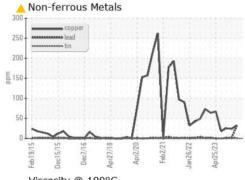


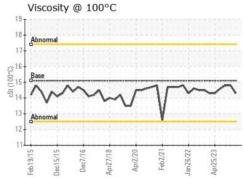


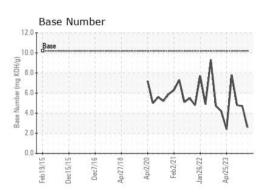
FLUID PROPE	RHES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.1	14.3	14.8	14.8

GRAPHS













Certificate L2367

Laboratory Sample No.

Lab Number : 06083348 Unique Number: 10870793

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0109587

Received **Tested** Diagnosed

: 08 Feb 2024 : 08 Feb 2024

: 09 Feb 2024 - Don Baldridge

GFL Environmental - 331 - Columbus 180 Ada Moore Rd Columbus, NC

US 28722 Contact: Matt Segars

F: (252)617-2494

matt.segars@gflenv.com T: (800)207-6618

Test Package : FLEET To discuss this sample report, contact Customer Service at 1-800-237-1369.

* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)