

PROBLEM SUMMARY

Sample Rating Trend

WEAR

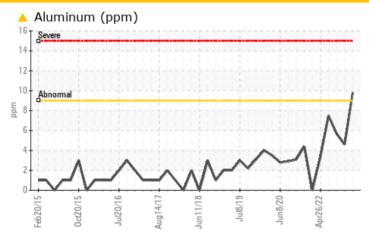
WEAR

Machine Id 3588C Component

Natural Gas Engine

PETRO CANADA DURON GEO LD 15W40 (48 QTS)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

The oil change at the time of sampling has been noted. Resample at the next service interval to monitor.

PROBLEMATIC TEST RESULTS								
Sample Status				ABNORMAL	NORMAL	NORMAL		
Aluminum	ppm	ASTM D5185m	>9	<u> </u>	5	6		

Customer Id: GFL001 Sample No.: GFL0094700 Lab Number: 05972504 Test Package: FLEET



To manage this report scan the QR code

To discuss the diagnosis or test data: Jonathan Hester +1 919-379-4092 x4092 jhester@wearcheckusa.com

To change component or sample information: Customer Service +1 1-800-237-1369 customerservice@wearcheck.com

RECOMMENDED ACTIONS

There are no recommended actions for this sample.

HISTORICAL DIAGNOSIS

31 Jul 2023 Diag: Wes Davis

NORMAL



Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



25 May 2023 Diag: Wes Davis

NORMAL



Resample at the next service interval to monitor. Metal levels are typical for a new component breaking in. Test for glycol is negative. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



22 Dec 2022 Diag: Jonathan Hester

COOL CHEMICALS



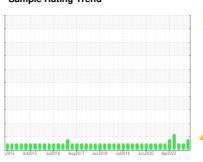
We advise that you check for possible coolant leak. Check for low coolant level. Oil and filter change at the time of sampling has been noted. We recommend an early resample to monitor this condition. All component wear rates are normal. Sodium and/or potassium levels are high. The BN result indicates that there is suitable alkalinity remaining in the oil.





OIL ANALYSIS REPORT

Sample Rating Trend



WEAR



Machine Id 3588C Component

Natural Gas Engine

PETRO CANADA DURON GEO LD 15W40 (48 QTS)

DIAGNOSIS

Recommendation

The oil change at the time of sampling has been noted. Resample at the next service interval to monitor.

Wear

The aluminum level is abnormal. All other component wear rates are normal.

Contamination

There is no indication of any contamination in the

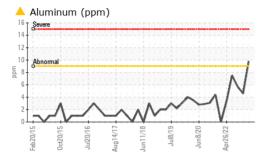
Fluid Condition

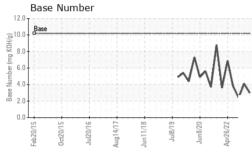
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

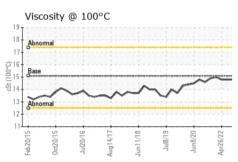
SAMPLE INFORMATION method fimit/base current history1 history2	2015 0x2015 Ju2016 Aug2017 Jun2018 Jun2019 Jun2010 Apr2022						
Sample Date Client Info 06 Oct 2023 31 Jul 2023 25 May 2023 Machine Age hrs Client Info 42949 1814 1304 Oil Age hrs Client Info 0 0 304 Oil Changed Client Info Changed Not Changed Changed Sample Status Limit Changed Not Changed NoRMAL NORMAL CONTAMINATION method limit/base current history1 history2 Glycol WC Method 0.0 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >50 38 28 30 Chromium ppm ASTM D5185m >50 38 28 30 Klokel ppm ASTM D5185m >3 0 0 <1 Titanium ppm ASTM D5185m >3 0 0 <1 Lead <td< th=""><th>SAMPLE INFOR</th><th>MATION</th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></td<>	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
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Oil Age hrs Client Info Changed ABNORMAL Not Changed Chang	Sample Date		Client Info		06 Oct 2023	31 Jul 2023	25 May 2023
Oil Changed Sample Status Client Info Changed ABNORMAL ABNORMAL NORMAL NORMAL Changed NORMAL NORMAL NORMAL NORMAL Changed ABNORMAL NORMAL NORMAL NORMAL Changed NORMAL NORMAL NORMAL NORMAL Contraction of the property of the p	Machine Age	hrs	Client Info		42949	1814	1304
Sample Status Method limit/base current history1 history2 Glycol WC Method 0.0 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >50 38 28 30 Chromium ppm ASTM D5185m >4 4 3 4 Nickel ppm ASTM D5185m >2 1 <1 1 Silver ppm ASTM D5185m >2 1 <1 1 Silver ppm ASTM D5185m >9 4 10 5 6 Silver ppm ASTM D5185m >9 4 10 5 6 Silver ppm ASTM D5185m >30 8 2 5 6 Copper ppm ASTM D5185m >30 8 2 5 6 Copper ppm ASTM D5185m >30	Oil Age	hrs	Client Info		0	0	304
CONTAMINATION	Oil Changed		Client Info		Changed	Not Changd	Changed
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >50 38 28 30 Chromium ppm ASTM D5185m >4 4 3 4 Nickel ppm ASTM D5185m >2 1 <1	Sample Status				ABNORMAL	NORMAL	NORMAL
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >50 38 28 30 Chromium ppm ASTM D5185m >4 4 3 4 Nickel ppm ASTM D5185m >2 1 <1	CONTAMINAT	ION	method	limit/base	current	history1	history2
Iron	Glycol		WC Method				0.0
Chromium ppm ASTM D5185m >4 4 3 4 Nickel ppm ASTM D5185m >2 1 <1	WEAR METAL	.S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>50	38	28	30
Titanium ppm ASTM D5185m 0 0 <1 Silver ppm ASTM D5185m >3 0 0 <1	Chromium	ppm	ASTM D5185m	>4	4	3	4
Silver ppm ASTM D5185m >3 0 0 <1 Aluminum ppm ASTM D5185m >9 ▲ 10 5 6 Lead ppm ASTM D5185m >9 ▲ 10 5 6 Copper ppm ASTM D5185m >30 8 2 5 Copper ppm ASTM D5185m >4 1 <1 1 Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 50 3 4 3 Boron ppm ASTM D5185m 50 3 4 3 Barium ppm ASTM D5185m 50 62 59 65 Manganesium ppm ASTM D5185m 50 62 59 65 Calcium ppm ASTM D5185m 560 628 578 594	Nickel	ppm	ASTM D5185m	>2	1	<1	1
Silver ppm ASTM D5185m >3 0 0 <1 Aluminum ppm ASTM D5185m >9 ▲ 10 5 6 Lead ppm ASTM D5185m >30 8 2 5 Copper ppm ASTM D5185m >35 12 11 12 Tin ppm ASTM D5185m >4 1 <1 1 Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 50 3 4 3 Barium ppm ASTM D5185m 50 62 59 65 Molybdenum ppm ASTM D5185m 50 62 59 65 Manganesium ppm ASTM D5185m 50 628 578 594 Calcium ppm ASTM D5185m 1510 1701 1686 1678 <td>Titanium</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <td>0</td> <td>0</td> <td><1</td>	Titanium	ppm	ASTM D5185m		0	0	<1
Lead	Silver	ppm	ASTM D5185m	>3	0	0	<1
Lead	Aluminum		ASTM D5185m	>9	<u> </u>	5	6
Tin	Lead	ppm	ASTM D5185m	>30	8	2	5
Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 3 4 3 Barium ppm ASTM D5185m 50 0 0 0 Molybdenum ppm ASTM D5185m 50 62 59 65 Manganese ppm ASTM D5185m 0 <1 <1 2 Magnesium ppm ASTM D5185m 560 628 578 594 Calcium ppm ASTM D5185m 1510 1701 1686 1678 Phosphorus ppm ASTM D5185m 870 1081 977 1017 Sulfur ppm ASTM D5185m 2040 2676 2814 2835 CONTAMINANTS method limit/base current history1<	Copper		ASTM D5185m	>35	12	11	12
Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 3 4 3 Barium ppm ASTM D5185m 50 0 0 0 Molybdenum ppm ASTM D5185m 50 62 59 65 Manganese ppm ASTM D5185m 0 <1 <1 2 Magnesium ppm ASTM D5185m 560 628 578 594 Calcium ppm ASTM D5185m 780 750 671 686 1678 Phosphorus ppm ASTM D5185m 870 1081 977 1017 Sulfur ppm ASTM D5185m 2040 2676 2814 2835 CONTAMINANTS method limit/base current his	Tin	ppm	ASTM D5185m	>4	1	<1	1
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Boron	Cadmium		ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 5 0 0 0 Molybdenum ppm ASTM D5185m 50 62 59 65 Manganese ppm ASTM D5185m 50 62 59 65 Magnesium ppm ASTM D5185m 560 628 578 594 Calcium ppm ASTM D5185m 1510 1701 1686 1678 Phosphorus ppm ASTM D5185m 780 750 671 686 Zinc ppm ASTM D5185m 870 1081 977 1017 Sulfur ppm ASTM D5185m 2040 2676 2814 2835 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 19 17 7 Sodium ppm ASTM D5185m 57 50 137 Potassium ppm ASTM D5185m >20	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 50 62 59 65 Manganese ppm ASTM D5185m 0 <1 <1 2 Magnesium ppm ASTM D5185m 560 628 578 594 Calcium ppm ASTM D5185m 560 628 578 594 Calcium ppm ASTM D5185m 780 750 671 686 Phosphorus ppm ASTM D5185m 780 750 671 686 Zinc ppm ASTM D5185m 870 1081 977 1017 Sulfur ppm ASTM D5185m 2040 2676 2814 2835 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 19 17 7 Sodium ppm ASTM D5185m 57 50 137 Potassium ppm ASTM D5185m >20	Boron	ppm	ASTM D5185m	50	3	4	3
Manganese ppm ASTM D5185m 0 <1 <1 2 Magnesium ppm ASTM D5185m 560 628 578 594 Calcium ppm ASTM D5185m 1510 1701 1686 1678 Phosphorus ppm ASTM D5185m 780 750 671 686 Zinc ppm ASTM D5185m 870 1081 977 1017 Sulfur ppm ASTM D5185m 2040 2676 2814 2835 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 19 17 7 Sodium ppm ASTM D5185m >20 13 9 20 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cmm *ASTM D7415 >30	Barium	ppm	ASTM D5185m	5	0	0	0
Magnesium ppm ASTM D5185m 560 628 578 594 Calcium ppm ASTM D5185m 1510 1701 1686 1678 Phosphorus ppm ASTM D5185m 780 750 671 686 Zinc ppm ASTM D5185m 870 1081 977 1017 Sulfur ppm ASTM D5185m 2040 2676 2814 2835 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 19 17 7 Sodium ppm ASTM D5185m 57 50 137 Potassium ppm ASTM D5185m >20 13 9 20 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7415 >30 25.8 22.8 <td>Molybdenum</td> <td>ppm</td> <td>ASTM D5185m</td> <td>50</td> <td>62</td> <td>59</td> <td>65</td>	Molybdenum	ppm	ASTM D5185m	50	62	59	65
Calcium ppm ASTM D5185m 1510 1701 1686 1678 Phosphorus ppm ASTM D5185m 780 750 671 686 Zinc ppm ASTM D5185m 870 1081 977 1017 Sulfur ppm ASTM D5185m 2040 2676 2814 2835 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 19 17 7 Sodium ppm ASTM D5185m 57 50 137 Potassium ppm ASTM D5185m >20 13 9 20 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 12.2 10.7 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method	Manganese	ppm	ASTM D5185m	0	<1	<1	2
Phosphorus ppm ASTM D5185m 780 750 671 686 Zinc ppm ASTM D5185m 870 1081 977 1017 Sulfur ppm ASTM D5185m 2040 2676 2814 2835 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 19 17 7 Sodium ppm ASTM D5185m >20 13 9 20 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 12.2 10.7 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D741	Magnesium	ppm	ASTM D5185m	560	628	578	594
Zinc ppm ASTM D5185m 870 1081 977 1017 Sulfur ppm ASTM D5185m 2040 2676 2814 2835 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 19 17 7 Sodium ppm ASTM D5185m 57 50 137 Potassium ppm ASTM D5185m >20 13 9 20 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 12.2 10.7 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 </td <td>Calcium</td> <td>ppm</td> <td>ASTM D5185m</td> <td>1510</td> <td>1701</td> <td>1686</td> <td>1678</td>	Calcium	ppm	ASTM D5185m	1510	1701	1686	1678
Sulfur ppm ASTM D5185m 2040 2676 2814 2835 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 19 17 7 Sodium ppm ASTM D5185m 57 50 137 Potassium ppm ASTM D5185m >20 13 9 20 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 12.2 10.7 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.9 19.4 20.6	Phosphorus	ppm	ASTM D5185m	780	750	671	686
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 19 17 7 Sodium ppm ASTM D5185m 57 50 137 Potassium ppm ASTM D5185m >20 13 9 20 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 12.2 10.7 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.9 19.4 20.6	Zinc	ppm	ASTM D5185m	870	1081	977	1017
Silicon ppm ASTM D5185m >+100 19 17 7 Sodium ppm ASTM D5185m 57 50 137 Potassium ppm ASTM D5185m >20 13 9 20 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 12.2 10.7 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.9 19.4 20.6	Sulfur	ppm	ASTM D5185m	2040	2676	2814	2835
Sodium ppm ASTM D5185m 57 50 137 Potassium ppm ASTM D5185m >20 13 9 20 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 12.2 10.7 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.9 19.4 20.6	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 13 9 20 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 12.2 10.7 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.9 19.4 20.6	Silicon	ppm	ASTM D5185m	>+100	19	17	7
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 12.2 10.7 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.9 19.4 20.6	Sodium	ppm	ASTM D5185m		57	50	137
Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 12.2 10.7 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.9 19.4 20.6	Potassium	ppm	ASTM D5185m	>20	13	9	20
Nitration Abs/cm *ASTM D7624 >20 12.2 10.7 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.9 19.4 20.6	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 25.8 22.8 25.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.9 19.4 20.6	Soot %	%	*ASTM D7844		0	0	0.1
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.9 19.4 20.6	Nitration	Abs/cm	*ASTM D7624	>20	12.2	10.7	11.7
Oxidation Abs/.1mm *ASTM D7414 >25 21.9 19.4 20.6	Sulfation	Abs/.1mm	*ASTM D7415	>30		22.8	25.9
	FLUID DEGRAI	NOITAC	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 10.2 3.0 4.1 2.4	Oxidation	Abs/.1mm	*ASTM D7414	>25	21.9	19.4	20.6
	Base Number (BN)	mg KOH/q	ASTM D2896	10.2	3.0	4.1	2.4



OIL ANALYSIS REPORT



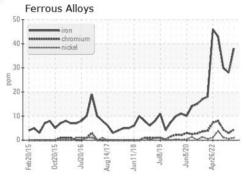


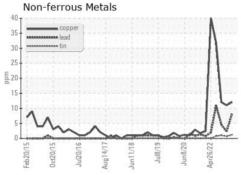


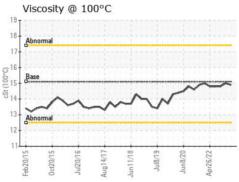
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

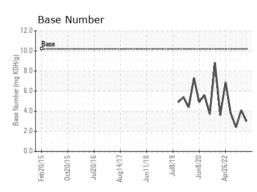
FLUID PROPE	ERTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.1	14.9	15.0	14.8

GRAPHS













Certificate L2367

Laboratory Sample No. Lab Number **Unique Number** Test Package : FLEET

: GFL0094700 : 05972504 : 10684454

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

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 09 Oct 2023 : 11 Oct 2023 Diagnosed Diagnostician : Jonathan Hester

GFL Environmental - 001 - Raleigh(CNG) 3741 Conquest Drive

Garner, NC US 27529 Contact: Craig Johnson

craig.johnson@gflenv.com T: (919)662-7100

* - 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)

F: (919)662-7130